Supply Chain Collaboration:

Impacts and Mediation on Firm Performance

by

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❧ *To my beloved family* ❧

Abstract

Purpose: The aim of this thesis is to explore the dimensions of supply chain collaboration and examine its impact on firm performance and its mediating variables.

Methodology: A theoretical model was developed from a systematic review of relevant literature and theories. This was then revised by academics and practitioners. The model was empirically tested with survey data of 853 responses of tourism firms in Thailand using Structural Equation Modeling.

Findings: Results indicate that supply chain collaboration improves firm performance. This impact is mediated by trust, commitment, transaction costs and sustained competitive advantage. A multiple group analysis supports the research model across four groups, however there are differences in the coefficients in some of the paths. In goods-based transactions suppliers emphasises on collaboration to build relationships and to reduce transaction costs through developing commitment, while buyers focus on trust building. In the service-based transactions, service providers also tend to focus on trust as a key factor than service intermediaries who emphasises on developing commitment.

Theoretical contribution: This thesis synthesised six theories to explain how supply chain collaboration affects firm performance. The constructs of supply chain collaboration and transaction costs are also improved.

Managerial insight: The results inform managers about how different types of supply chain collaboration can improve the performance of their organisations. It also emphases the different mechanisms (i.e., trust and commitment) in supply chain relationships between goods-based and service-based transactions.

Keywords: Supply Chain Management, Tourism supply chains, Sustained Competitive Advantage, Structural Equation Models, Thailand.

JEL Classification [1] : C42, D2, L22, L25.

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[1] Classification system by the Journal of Economic Literature, available at: http://www.aeaweb.org/jel/guide/

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> Encouragement after censure
> is as the sun after a shower.
>
> *Johann Wolfgang von Goethe*
> *(1749 - 1832)*
> *A German writer, artist, and politician*

Although PhD is an individual work, my thesis may not be completed smoothly and effectively without the helps and supports of many individuals and organisations. Therefore, I would like to express my grateful appreciations and thanks to the followings:

❧

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List of Abbreviation

Abb.	Full Terms	Type
ADF	Asymptotically Distribution Free	SEM
AIC	Akaike Information Criterion	SEM
AGFI	Adjusted Goodness-of-fit Index	SEM
CFA	Confirmatory Factor Analysis	SEM
CFI	Comparative Fit Index	SEM
CMV	Common Method Variance	SEM
ENEF	European Network on the Economics of the Firm	Organisation
IFI	Bollen's Incremental Fit Index	SEM
MLE	Maximum Likelihood Estimation	SEM
OLS	Ordinary Least Squares	SEM
RBV	Resource Based View	Theory
RMSEA	Standardised Square Error of Approximation	SEM
RDT	Resource Dependency Theory	Theory
SCM	Supply Chain Management	SCM
SEM	Structural Equation Models or Structural Equation Modelling	SEM
SET	Social Exchange Theory	SET
TAT	Tourism Authority of Thailand	Organisation
TCE	Transaction Cost Economics	Theory
TCT	Trust-Commitment Theory	Theory
TLI	Tucker-Lewis Index	SEM
TSC	Tourism Supply Chains	SCM

An applicable knowledge has to be
correct, accurate, specialised
and ready-to-use.

H.M. speech in the 23rd Graduation Ceremony of
Chiang Mai University
on 24th January 1989

King Bhumibol Adulyadej of Thailand
(1927 - Present)

The World's Longest-Serving Head of State
&
Awarded
The UNDP's Human Development Lifetime Achievement Award in 2006.

Chapter 1

Introduction

Coming together is a beginning.
Keeping together is progress.
Working together is success.

Henry Ford (1863 - 1947)
The founder of the Ford Motor Company

1.1 Introduction

As *Henry Ford* mentioned, getting people and/or organisations working together is the critical success factor (Lumsden et al., 2003). This chapter presents the overview of the thesis. First the rationales of the thesis including both academic and practical interest of the topic were discussed. Then, the research questions and their relationships were explained. Research methods used in this thesis was justified. Moreover, the delimitation and contribution of the thesis were presented. Furthermore, the structure of the chapters in this thesis was also explained.

In this highly competitive business climate (Kotzab et al., 2009), creating sustained competitive advantage of the firm is the key to success (Laseter and Gillis, 2012; Cao

and Zhang, 2011; Walker et al., 2000). Rather than maximising profit of a firm, supply chain management (SCM) suggests that firms should aim to maximise profit of the whole supply chain (Gadde et al., 2010). Hence competition should be between supply chains not at the firm level (Christopher, 2011). However, the search for mutual understanding of benefits and sustainability for all the supply chain partners is still a challenge for both academics (Fawcett et al., 2012; Halldórsson et al., 2009) and practitioners (Grocery Manufacturers Association, 2008). Furthermore, although supply chain relationships are recognised as one of the dominant research domains (Grant, 2005), there are a few studies investigating the topic across the supply chain echelon. (Soni and Kodali, 2012).

The question of whether supply chain collaboration has a specific positive impact on the firm performance is also a subject of debate (Gunasekaran and Ngai, 2012*b*). Studies examining the effects of supply chain collaboration on a firm's performance have shown inconsistent results (Ha et al., 2011). This ambiguity highlights that the impact of supply chain collaboration on firm performance is uncertain. However, the literature on factors that affect the success of supply chain collaboration is still limited (Kotzab et al., 2011). Therefore supply chain managers may struggle to implement supply chain collaboration strategies. Such ambiguity means that insights into how supply chain collaboration works are currently needed (Quinn, 2012).

Despite many successes (Hofman and Aronow, 2012), supply chain collaboration failures have also been reported (Bragg et al., 2011). Reasons for failures include the lack of effective communication, lack of capital and investment and planning gaps between supply chain partners (Fyall and Garrod, 2005). Hence, one of the current questions in modern management is *"does supply chain collaboration work in practice?"*. This thesis aims to help clarify this issue.

1.2 Rationale of the thesis

> "*The research agenda in supply chain management must not be driven by industrial interests alone.*" (New, 1997, p. 21)

In this thesis, the research agenda is derived from both academic interest and calls from professionals. While most research primarily aim to make an academic contribution, there is also a need to make an impact in the real world. Specifically in SCM research, the gaps between research and practice are significant. As SCM is considered a new discipline, many SCM researchers feel the need to prove that they are ***scholarly*** (Carter, 2008). However, SCM is a very practical discipline and the outcomes of the research should not only make an academic contribution but also excel in making an impact on SCM practitioners (Dess and Markoczy, 2008). Hence, SCM scholars need to aim for both rigour and relevance in their research (Mentzer, 2008). Therefore, the academic and practical interests that grounded this study were discussed in the following sections.

1.2.1 Academic interest

Recently there has been a call for influential research in logistics and supply chain management by conducting research that not only articulate what happens at the day-to-day operations level but also at the strategy and design level (Fawcett et al., 2011). In current SCM literature, the ongoing debates centre around supply chain collaboration (Siew et al., 2012; Cao and Zhang, 2011; Christopher, 2011; de Leeuw and Fransoo, 2009) and its impact on performance (Stank, Keller and Daugherty, 2001). As one of the major trends in SCM research (Fawcett et al., 2011), supply chain collaboration has often been advocated by both academics (Nyaga et al., 2010; Ireland and Webb, 2007; Spekman et al., 1998) and practitioners (Engel, 2011; Bragg et al., 2011). An importance of supply chain collaboration also presents in the tourism sector (Song, Dwyer, Li and Cao, 2012).

1.2.2 Practical interest

In reality, whilst many companies have successfully benefited from collaboration (Cooke, 2011), many others have struggled or even failed to do so (Benavides and de Eskinazis, 2012; Kotzab et al., 2006). This is similar to evidence that has been found in other operations management practices such as Just-in-Time (JIT) technique (Towill et al., 1992) or Six Sigma (Kumar et al., 2011). According to a survey of 220 consumer-packaged-goods executives (Grocery Manufacturers Association, 2010), it was found that only 20% of companies' collaborative efforts have achieved significant outcomes. This problem could be a result of the lack of understanding of the mechanism in which supply chain collaboration makes an impact (Sheu et al., 2006). This failure can lead to the breach of the collaborative agreement and damage inter-firm relationships in the long term (Serapio Jr. and Cascio, 1996).

To understand the behaviour of firms in the supply chain, there is a call for an integration and combination of relevant theories in SCM (Chicksand et al., 2012; Soni and Kodali, 2012; Boyer and Swink, 2008). Such theories include i.e., transaction cost economics (Wong and Karia, 2010; Williamson, 2008; Grover and Malhotra, 2003), resource based view (Barney, 1991), social exchange theory (Griffith et al., 2006; Uzzi, 1997), resource dependency theory (Crook and Combs, 2007; Ketchen Jr and Hult, 2007) and collaborative network theory (Skjoett-Larsen et al., 2003).

1.3 Research questions

The aim of this thesis is:

> *To examine the impacts of supply chain collaboration on firm performance and the mechanism that mediate such impacts*.

In order to achieve this aim, each research question (RQ) was developed. The research questions are categorised into four groups: (1) dimensions of supply chain col-

laboration, (2) outcomes of supply chain collaboration, (3) mediating variable of supply chain collaboration and its outcomes, and (4) the equivalence of such structural relationships between collaboration, its outcomes and the mediating variables across different supply chain partners.

1.3.1 Dimensions of supply chain collaboration

The first set of research questions are associated with dimensions (or aspects e.g., information sharing) of supply chain collaboration. They are:

RQ 1.1 *What are the dimensions of supply chain collaboration found in the existing literature?*

RQ 1.2 *How important are these dimensions?*

1.3.2 Dimensions of outcomes of supply chain collaboration

The second set of research questions are associated to outcomes of supply chain collaboration. They are:

RQ 2.1 *What are the dimensions of collaboration outcomes found in the existing literature?*

RQ 2.2 *Are there other dimensions of collaboration outcomes?*

RQ 2.3 *How important are these collaboration outcomes?*

1.3.3 Mediating variables

The third set of research questions are associated to mediating variables of the impacts of supply chain collaboration on its outcomes as follows:

> **RQ 3.1** *What are the factors mediating the impact of collaboration on its outcomes in the existing literature?*
>
> **RQ 3.2** *Are there other such factors?*
>
> **RQ 3.3** *How important are these mediating factor?*

1.3.4 Equivalence of the structural relationships

The fourth set of research questions are associated to the equivalence of the structural relationships across different supply chain members. They are:

> **RQ 4.1** *Are the causal relationships mentioned in the previous research questions applicable for the perspectives of both suppliers and buyer firms?*
>
> **RQ 4.2** *Are the causal relationships mentioned in the previous research questions applicable for the perspectives of both service providers and intermediaries?*

1.4 Research Methodology

This research is considered to be a descriptive and exploratory study concerning the constructs in the research model. These constructs are called *supply chain collaboration*, *inter-firm trust*, *commitment*, *transaction cost*, *sustained competitive advantage and firm performance*. The research also includes the examination of the causal relationships of such constructs using a sample from one sector in a particular country. This study was designed and conducted under the positivist's paradigm. Even though qualitative methods were also employed, the objective was to facilitate the hypothesis and construct development, not to explore an in-depth knowledge of particular phenomenons (Spens and Kovacs, 2012; Bryman and Bell, 2011; Mangan et al., 2004; Mentzer and Kahn, 1995; Hunt, 1991, 1983). Hence the positivism paradigm is applicable to the study.

1.4.1   Research approach

This research employs the abductive reasoning approach, which combines qualitative with quantitative methods to develop and empirically test the research model. First, the research model was conceptualised by a thorough literature review via a systematic review (Wilding and Wagner, 2012) and meta analysis method (Hunter and Schmidt, 2004). A set of qualitative methods including an exploratory case study and follow-up multiple case study method was also used. Then a survey of firms in the tourism supply chain (i.e., hotels, suppliers and travel agents) was conducted to obtain data to test the research hypotheses.

1.4.2   Analysis methods

First a causal relationship model was developed via a systematic quantitative review of the previous literature (Meta analysis) to identify the ambiguity in the literature. The research model was then empirically tested with data from the tourism sector, which has been rarely studied in a supply chain context (Zhang et al., 2009). An empirical examination was conducted using a multivariate method, called Structural Equation Modelling (SEM) (Jöreskog, 1973).

A SEM analysis was then conducted to test hypotheses of relationships between the variables (Flynn et al., 1990). Software used for SEM in this study were *Mplus* version 6 (Muthen and Muthen, 1998-2010) and *R* version 15.0 (R Development Core Team, 2012) with the **lavaan** package (Rosseel, 2011). Two-step approach was adopted to analyse the data (Anderson and Gerbing, 1988). Three multiple-group models were developed to compare the perceptions of the three main supply chain members (supplier/hotel/travel agency). Finally, post-survey (in-depth) interviews were also conducted to inform the quantitative results. An overview of the research methods employed in this thesis is presented in Table 1.1.

Table 1.1: Overview of research methods used in this thesis

Stage	Method	Brief description	Number	Time
I. Literature review				
1	**Systematic literature review**	Content analysis of two themes of literature in tourism supply chain and SCM research in Thailand.	2 reviews	October 2008 - September 2012
2	**Meta analysis**	Quantitative approach to summarise the empirical results of the causal relationships between constructs i.e., supply chain collaboration and its outcomes.	1 analysis	June 2008 - September 2012
II. Hypothesis development				
3	**Exploratory case study**	Process mappings, reviewing of documents and interview with managers and executives as well as operating staff.	1 case study	April 2009
4	**Focus group interviews**	Groups of academics and practitioners	2 focus groups	April 2009
5	**Multiple case studies**	To conceptualise the initial research model and hypotheses, also providing information to contextualise the findings from the main survey.	6 cases	October - November 2010
III. Scale development				
6	**Q sorting**	Sorting items for each construct with 2 independent judges	2 rounds	January - February 2011
7	**Pre-test**	Check for face validity of the measurements.	4 Academicians in SCM and tourism	March - April 2011
8	**Pilot study**	Paper questionnaires to hotel, travel agent and supplier managers in Chiang Mai Thailand	36 responses	May 2011
IV. Hypothesis testing				
9	**Main survey**	On-line survey to managers of hotels, food and beverage suppliers and travel agents in Thailand.	853 usable responses	September - October 2011
10	**Follow-up interviews**	Phone and personal interviews with academics and practitioners to contextualise and explain the results from SEM.	5 interviewees	January 2012

1.5 Thesis delimitation

The boundaries of this thesis are illustrated in the Figure 1.1. Such delimitations include unit, sector and geographical area of analysis.

Figure 1.1: The scope of the tourism supply chain in this thesis

1.5.1 Unit of analysis

In this thesis, the unit of analysis is a dyadic transaction between organisations in the tourism supply chain. Such organisations include suppliers, hotels and travel agents. Activities between these organisations cover various aspects such as passenger transports, distribution of goods, marketing activities and information sharing such operations and logistics data (orders, inventory & transportation) and marketing information (sales & promotions).

1.5.2 Sector of analysis

The context of this thesis is supply chain collaboration in tourism. Tourism has a significant role not only in a domestic economy but also internationally (Nowak et al., 2010). According to Zhang et al. (2009, p. 347), tourism supply chains are defined as:

> *"Tourism supply chain is a network of tourism organizations engaged in different activities ranging from the supply of different components of tourism products/services such as flights and accommodation to the distribution and marketing of the final tourism product at a specific tourism destination, and involves a wide range of participants in both the private and public sectors".*

Supply chain collaboration has a critical role in tourism management (Zhang et al., 2009). It helps reduce cost and improve profitability (Qin et al., 2012). For example, in destination management, various types of tourism organisations and firms use collaborative marketing campaigns to promote their destination (Wang, 2008).

Tourism supply chains were investigated in this paper due to their distinctive characteristic of including both product and service based transactions between supply chain partners (March and Wilkinson, 2009). For example, while hotels are seeking to purchase the right foods in terms of quality and quantity from suppliers, they are also working with travel agencies on room reservations (Zhang et al., 2009). There has been evidence of supply chain collaboration success in the tourism sector (Wang, 2008; Sigala, 2008; Mitchell and Faal, 2008).

In the UK, it was found that hotels collaborated with the local suppliers. Such collaborative activities include building long-term commitment, providing training and technical support. Collaborating with supply chain partners was found to enable the delivery of the required quality and quantity of products (Font et al., 2008). In Australia, March and Wilkinson (2009) found that a hotel had successfully collaborated with both travel agencies and tour operators by sharing their marketing information. More discussion about the tourism supply chain management and its related literature is presented in Section **??**.

1.5.3 Geographical scope of the analysis

The geographical scope of this study is Thailand. In Thailand, supply chain management has been recognised as a key to the development of the country. In Thailand, the first logistics development strategy was drafted and proposed by the Office of National Economic and Social Development Board in May 2005 (Office of National Economic and Social Development Board, 2005; Office of National Economic and Social Deelop-

ment Board, 2006). It was approved by the Council of Ministers of Thailand on 27th February 2007 (Office of National Economic and Social Deelopment Board, 2007). This strategy includes the plan to improve logistics performance of Thai firms. To support this strategy, two Logistics and Supply Chain Research Strategies were issued. The strategy outlines the research themes in logistics and supply chain management that would potentially benefit the development of Thailand (Singkarin, 2011; Singkarin et al., 2011).

Recently the National Research Council of Thailand (2012) (in cooperation with other five national research funding bodies) announced the call for research proposals to the value of THB 1,000 Millions (or approximately GBP 20 Millions). This call will support important research programmes that support national development covering 11 subjects. Two of them are logistics & supply chain system and tourism management. In the logistics & supply chain research framework, the tourism industry was mentioned as an important industry. In the tourism management research framework, supply chain management approach was also specified.

As an illustration of the importance of supply chain management in the tourism sector of Thailand, Atthirawong et al. (2011) used a *distance matrix* that consists of eight dimensions to prioritise the importance of the logistics and supply chain research agenda in 13 industries in Thailand, tourism was ranked the first followed by hospital, textile and clothes and logistics providers. A detailed review of SCM research in Thailand is presented in Section 2.9.

1.6 Contributions of this thesis

This thesis aims to advance the knowledge in supply chain collaboration specifically in terms of its impacts and mediation on firm performance. The theoretical and practical contributions of this thesis can be summarised in as follows.

1.6.1 Theoretical contributions

First this thesis presents a novel theoretical contribution of a systematic review of the existing literature. A concept of tourism supply chains have been developed based on the previous studies of Tapper and Font (2004) and Zhang et al. (2009) by extending the understanding of tourism supply chains in a boarder perspective including the flow of people and the scope beyond a single destination. Furthermore, considering a meta analysis, the results (correlations) of existing empirical studies that examined the outcomes of the supply chain collaboration were quantitatively summarised. As a Meta analysis on this topic has never been done before, the results offer insights into the current state of the outcomes of supply chain collaboration. Considering the results of structural equation models, three main areas of contributions have been made in this thesis including (1) the development of supply chain collaboration and transaction costs, (2) an empirical examination the impacts of supply chain collaboration on two key outcomes and mediating variables, and (3) a comparison of the causal relationships between perspectives of different types of supply chain partners i.e., suppliers vs. buyers and service providers vs. intermediaries.

1.6.2 Practical contribution

Considering the perceived difficulties in implementing supply chain collaboration and the doubt on the benefit of supply chain collaboration, this thesis offer a better view of the wider aspects of supply chain collaboration. Moreover, this thesis offer a novel insights for the practitioners on how different supply chain partners utilise supply chain collaboration to develop the relationship with the supply chain partners. The results suggest that differences in term of the trust building mechanism perceived by different firm types i.e., suppliers and travel agents. This novel contribution provides managerial insights to the practitioners on how they can develop the collaborative activities successfully.

1.7 Organisation of the thesis

1.7.1 Structure and outline

This thesis is organised into six sections (i.e., introduction, backgrounds, methodology, hypothesis development, findings and conclusions) consisting of 10 chapters.

1.7.1.1 Introduction

Chapter 1 (Introduction) introduces the background, rationale, contribution and organisation of this thesis.

1.7.1.2 Background

This section consists of three chapters including chapter 2, 3 and 4. It presents the literature review on supply chain collaboration (2), relevant theories (3) and an exploration of the concept of tourism supply chains (4). These three chapters were developed individually to explore three key themes of thesis, however they may share some interrelationships of the literature

Chapter 2 (Literature Review) discusses the relevant literature associated to supply chain collaboration as well as its key outcomes (i.e., firm performance) and their key mediating variables (i.e., trust, commitment, and competitive advantage).

Chapter 3 (Theoretical Background) discusses relevant theories describing the impact of supply chain collaboration on firm performance discussed in the previous chapter. Such theories are the foundation of the thesis to conceptualise the research model.

Chapter 4 (Tourism Supply Chains) explores and defines a concepts of the tourism supply chain. It also systematically reviews the extant literature specifically in tourism supply chain.

1.7.1.3 Methodology

Chapter 5 (Methodology) describes the methodology used in this thesis including the research design, philosophy, and the research methods including both the qualitative methods in the early stage and the Structural Equation Modelling (SEM) in the main study.

1.7.1.4 Hypothesis development

Chapter 6 (Hypothesis and Scale Development) illustrates the development of research hypotheses based on relevant theories and previous related literature. Findings from the qualitative fieldwork were also used to conceptualise the research model and hypotheses as well as to develop the scales used in the measurements.

1.7.1.5 Main findings

The main findings consist of three chapters including chapter 7, 8 and 9 presenting the results of measurement models, structural models and the multiple group analysis respectively.

Chapter 7 (Measurement Models) presents the descriptive results of the research findings, contains the results of measurement models using Confirmatory Factor Analysis (CFA) and the model evaluation to ensure reliability and validity.

Chapter 8 (The Structural Model) shows the results from the structural model (latent variable model or path model) and model diagnostics results to ensure validity and generalisability of the findings.

Chapter 9 (Multiple-Group Analysis) illustrates a multiple-group analysis procedure and the results of comparing the perspectives of suppliers & buying firms (hotels) and service providers (hotel) & and intermediaries (travel agents).

1.7.1.6 Conclusion

Chapter 10 (Conclusions and Implications) summarises answers to the research questions and concludes the findings of this thesis. It discusses limitations of the research and suggests future avenues of research.

The structure of the chapters in this thesis can be illustrated in the Figure 1.2.
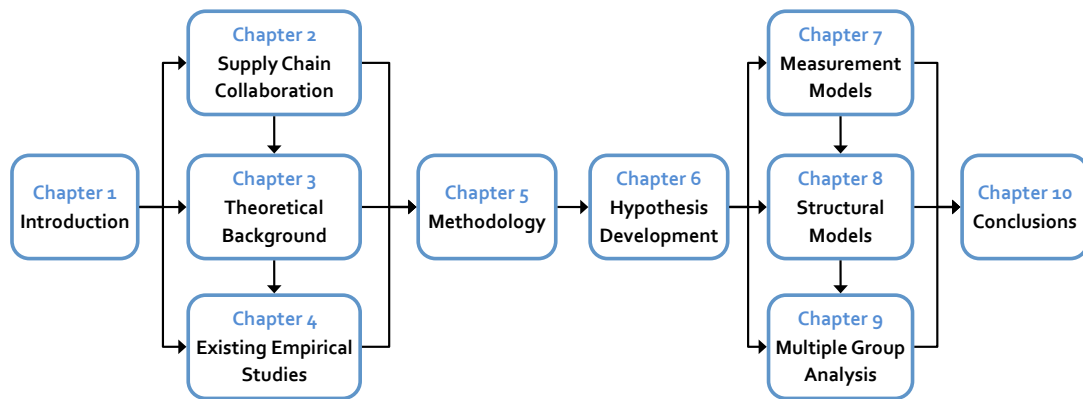
Figure 1.2: Chapter structure of this thesis

1.7.2 Presentation of the Thesis

1.7.2.1 Typesetting software

Using LaTeX typesetting technology, this thesis contains hyper-links for citations, internal cross-referencing, and external links (URL). When reading in a PDF format, readers may click on in-text citations to go to the references section. Hyper-links in this thesis use blue, red and magenta colours for citations, links and URL respectively.

1.7.2.2 Page layout

The page layout of the thesis remained as the default in LaTeX. To enable the reader to recognise the page they are reading, **fancyhdr** package in the LaTeXwas used to display the section number and name on the top-left of the page (header) and chapter number and name in the bottom-right (footer).

1.7.2.3 Bookmarks

Bookmarks also allow readers to go direct to a specific part of the thesis such as chapters, sections or subsections. Bookmarks are normally available in the scrollbar on the side of the PDF viewer window.

1.7.2.4 Index

To browse for a specific topic in the thesis (e.g., hypothesis development, methodology or findings), readers can search in the Index section at the end of the thesis and click on the page number to see the contents consisting of the topic in the Index.

1.8 Conclusion

This chapter provides the foundation for this thesis. Its objective is to provide the reader with the rational and logical justification of the development of the research design from the rationales of the research to the development of research questions, how research methods were selected and the novel contributions of the thesis. This chapter introduced context of the research and briefly described the need for this research. The methodology adopted in this thesis was briefly explained and justified. Based on this foundation provided in this chapter, the next chapter (Chapter 2) will discuss the concept of supply chain collaboration and its related topics. A link of this chapter to the next chapter in the thesis is shown in Figure 1.3.
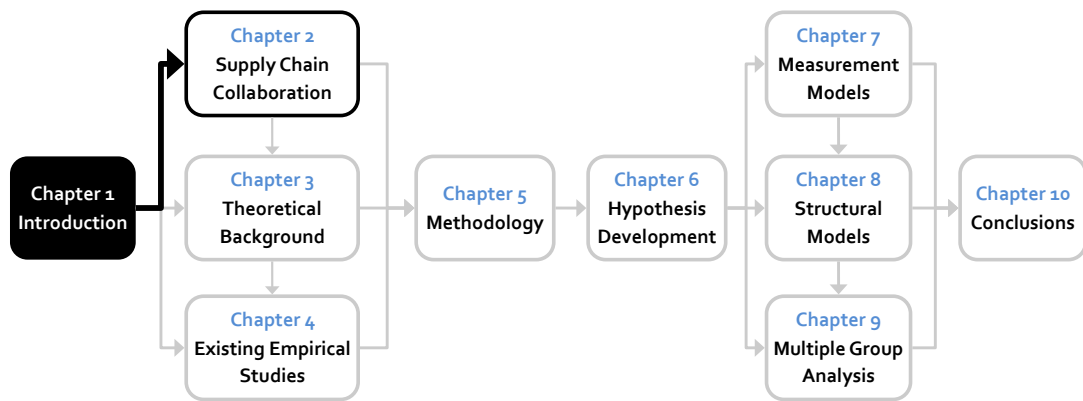
Figure 1.3: A direction of chapter 1 to the next chapter

Chapter 2

Literature Review

As the economy changes,
as competition becomes more global,
it's no longer *company vs. company*
but **supply chain vs. supply chain**.

<div style="text-align: right">

Harold Sirkin (born 1959)
VP Boston Consulting Group

</div>

2.1 Background

Since the 1990s, it has been observed and recognised that firms no longer compete with other firms, the level of competition has shifted to the supply chain level (Christopher, 2011; Henkoff, 1994; Ellram, 1991; Londe and Masters, 1994). Currently customer expectation is rising under increasing uncertainty (Schoenherr, 2009). Therefore collaboration between organisations plays a critical role for improving performance and establishing sustained competitive advantage (Grant, 2012; Gunasekaran and Ngai, 2012*a*; Hassini et al., 2012; Cao and Zhang, 2011), which can then help economic development (Mefford, 2011).

According to the variety of the concepts of supply chain, supply chain management as well as supply chain collaboration. The key objective of this chapter is to present the different views of such terms used in the thesis. This review chapter on the literature related to the three key terms will provide the fundamental understanding of the development in the literature and foundation of the thesis. Moreover, the chapter will also review the literature related to the key constructs used in the research hypotheses including trust, commitment, sustained competitive advantage and firm performance.

This chapter defines the concepts of supply chain, supply chain management and supply chain collaboration. Moreover, it reviews mechanisms governing supply chains and supply chain collaboration specifically inter-firm trust. This chapter also presents key outcomes of supply chain collaboration (i.e., competitive advantage and firm performance) as well as important mechanism (i.e., trust and commitment) are also presented in this chapter. Furthermore, this chapter reviews the current stage of SCM research in Thailand. The role of this chapter in the thesis is illustrated in Figure 2.1.
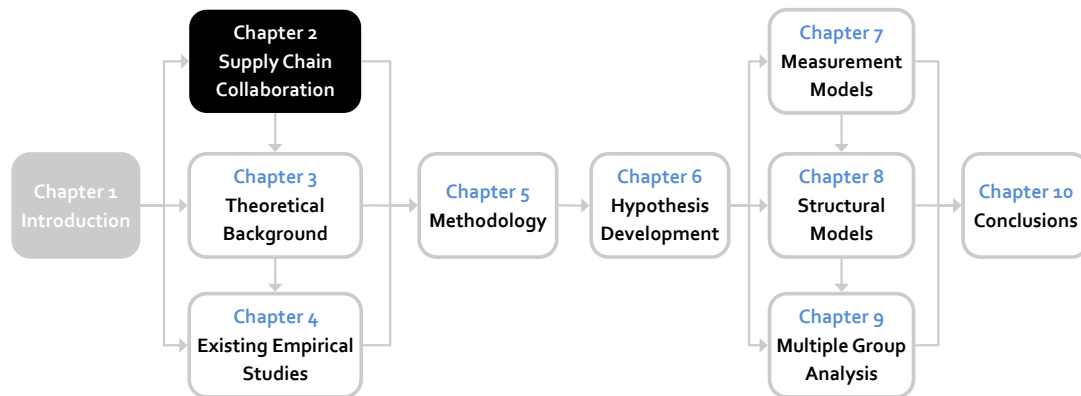
Figure 2.1: Position of the chapter in this thesis

2.2 Supply Chain Management

Since the 1980s, Supply Chain Management (SCM) has gained much interest from both academic and practitioners in business management and economics (Stock et al., 2010; Wisner, 2003). As SCM is a relatively new discipline, one of the issues is the lack of consensus on the definition of the term (Fayezi et al., 2012; Burgess et al., 2006; Storey et al., 2006; Chicksand et al., 2012; Pilbeam et al., 2012; Wilding and Wagner, 2012). Hence the definition of SCM was reviewed in this chapter.

According to Tan (2001), SCM research has two evolution paths; (1) purchasing and supply management and (2) logistics and transport management. Therefore, the definition of SCM used by researchers mainly depends on their research path (i.e., purchasing or logistics path). The next section will discuss the various definitions of SCM and related issues.

2.2.1 Definitions of SCM

SCM is a new discipline compared to other fields of business and management studies (Larson and Halldórsson, 2004). The term logistics originates from military operations, and then its concept, tools, and techniques were applied to business management. Logistics management has played a critical role in business management (Gudehus and Kotzab, 2012). Since the emergence of *supply chain management*, there has been some discussion on its associations to logistics management (Gudehus and Kotzab, 2009; Larson and Halldórsson, 2004; Mentzer et al., 2001; Cooper et al., 1997), strategy and organisation (Seuring and Müller, 2003) or an expanded marketing concept (Alvarado and Kotzab, 2001).

Furthermore, SCM has been also expanded to the concept of value chains (Evans and Berman, 2001). Thus, definitions of SCM are not unique, different definitions of

supply chain and SCM are summarised in the Table 2.1 and Table 2.2 respectively.

As the most widely used, this thesis adopts the definition of **supply chain** from **Council of Supply Chain Management Professionals** (CSCMP, 2010, p. 179), which was based on the works of Mentzer et al. (2001) as follows:

> *"Supply Chain: 1) starting with unprocessed raw materials and ending with the final customer using the finished goods, the supply chain links many companies together. 2) the material and informational interchanges in the logistical process stretching from acquisition of raw materials to delivery of finished products to the end user. All vendors, service providers and customers are links in the supply chain."*

The SCM definition adopted for this research is also from CSCMP (2010, p. 180):

> *"SCM encompasses the planning and management of all activities involved in sourcing and procurement, conversion, and all logistics management activities. Importantly, it also includes coordination and collaboration with channel partners, which can be suppliers, intermediaries, third party service providers, and customers. In essence, supply chain management integrates supply and demand management within and across companies."* (CSCMP, 2010, p. 180)

2.2.2 Benefits of SCM

The role of SCM is highly significant in most parts of business (Ramanathan and Gunasekaran, 2012; Slack, 2006) including logistics, distribution (Sigala, 2008; Attwood and Attwood, 1992), marketing and finance (Chen and Paulraj, 2004*b*; Ellinger et al., 2000). However, operations and supply chain strategies should be consistent with each other. Hence other parts of the business process are properly supported (Ireland and Webb, 2007; Holweg et al., 2005). Moreover, SCM creates a competitive advantage using techniques in SCM (Hunt and Davis, 2012; Cao and Zhang, 2011) to be able to compete with their business rivals (Fawcett et al., 2011).

Table 2.1: Supply Chain Definitions

Sources	Definition
Christopher (2011, p. 4)	The network of connected and interdependent organisations mutually and co-operative by working together to control, manage and improve the flow of materials and information from supplier to end users.
Ellram et al. (2004, p. 17)	Supply chain management is the management of information, processes, goods and funds from the earliest supplier to the ultimate customer, including disposal.
Bask and Juga (2001, p. 138)	Consists of vertically linked organisations from raw material sources to end-users.
Mabert and Venkatara-manan (1998, p. 538)	The network of facilities and activities that performs the functions of product development, procurement of material from vendors, the movement of materials between facilities, the manufacturing of products, the distribution of finished goods to customers, and after-market support for sustainment.
Alber and Walker (1998, p. 2)	The global network used to deliver products and services from raw materials to end customers through engineered flows of information, physical distribution, and cash.
Lee and Ng (1997, p. 191)	A network of entities that starts with the suppliers' supplier and ends with the customers' custom, the production and delivery of goods and services.
Kopczak (1997, p. 226)	The set of entities, including suppliers, logistics services providers, manufacturers, distributors and resellers, through which materials, products and information flow.
Cooper et al. (1997, p. 2)	The integration of business processes from end-user through original suppliers (that provides products, services and information), which adds value to customers.
Harland (1996, p. S64)	Supply chain could be categorised into four definitions: (1) Internal supply chain: focuses on the internal flow of materials and information within one specific company; (2) A network of firms interacting to deliver a product or service to the end customer, linking flows from materials supply to final delivery; (3) Entire supply chain including the supplier's suppliers and customer's customers and so on; (4) Network of connected and interdependent organisations mutually and co-operative working together to control, manage and improve the flow of materials and information front suppliers to end customers.
Lee and Billington (1992, p. 65)	Networks of manufacturing and distribution sites that procure raw materials, transform them into intermediate and finished products, and distribute the finished products to customers.
Towill et al. (1992, p. 3)	A system whose constituent parts include suppliers of materials, production facilities, distribution services and customers, all linked together via the feed forward flow of materials and the feedback flow of information.
Stevens (1989, p. 39)	A connected series of activities which is concerned with planning, coordinating and controlling materials, parts and finished goods from suppliers to customer. It is concerned with two distinct flows (material and information) thought the organisation.

Table 2.2: Supply Chain Management Definitions

Sources	Definition
Christopher (2011, p. 3)	"The management of upstream and downstream relationships with suppliers and customers in order to deliver superior customer value at less cost to the supply chain as a whole."
CSCMP (2010, p. 180)	SCM encompasses the planning and management of all activities involved in sourcing and procurement, conversion, and all logistics management activities. Importantly, it also includes coordination and collaboration with channel partners, which can be suppliers, intermediaries, third party service providers, and customers. In essence, supply chain management integrates supply and demand management within and across companies.
Robert M. Monczka (2009, p. 10)	SCM endorses a supply chain orientation and involve proactively managing the two-way movement and coordination of goods, services, information and funds (i.e., the various flow) from raw material through end user.
Jespersen and Skjøtt-Larsen (2005, p. 12)	SCM is the management of relations and integrated business process across the supply chain that produces products, services and information that add value for the end customer.
Van der Vorst and Beulens (2002, p. 410)	SCM is the integrated planning, co-ordination and control of all business processes and activities in the supply chain to deliver superior consumer value at minimum cost to the end-consumer while satisfying requirements of other stakeholders.
Simchi-Levi and Simchi-Levi (2000, p. 1)	SCM is a set of approaches to efficiently integrate suppliers, manufacturers, warehouses, and stores, so that merchandise is produced and distributed at the right quantities, to the right locations, and at the right time, in order to minimize system-wide costs while satisfying service level requirements.
Ballou et al. (2000, p. 9)	SCM involves all activities associated with the transformation and flow of goods and services, including their information flows, from sources of raw materials to end users.
Lambert et al. (1998, p. 1)	SCM is the integration of key business processes from end user through original suppliers that provides products, services, and information that add value for customers and other stakeholders.
Van Hoek (1998, p. 187)	SCM is characterized by control based on networking and integration of processes across functional, geographical, and organizational interfaces.
Tan et al. (1998, p. 3)	SCM encompasses materials/supply management from the supply of basic raw materials to final product (and possible recycling and re-use). SCM focuses on how firms utilise their suppliers' processes, technology and capability to enhance competitive advantage. It is a management philosophy that extends traditional intra-enterprise activities by bringing trading partners together with the common goal of optimisation and efficiency.
Cooper et al. (1997, p. 2)	The integration of business processes from end-user through original suppliers (that provides products, services and information), which adds value to customers.
Berry et al. (1994, p. 20)	Supply chain management aims at building trust, exchanging information on market needs, developing new products, and reducing the supplier base to a particular OEM (Original Equipment Manufacturer) so as to release management resources for developing meaningful, long term relationship.
Londe and Masters (1994, p. 38)	SCM refers to "the strategy of applying integrated logistics management to all the elements of a supply chain."

2.2.2.1   Enabling seamless supply chains

Since it was introduced by Childerhouse and Towill (2006) and Childerhouse et al. (2004), a seamless supply chain has not been achieved (Chen et al., 2012; Lida, 2012). The seamless supply chain is a theoretical goal where there is no boundary between firms and the supply chain members think and act as one (Childerhouse and Towill, 2006). Supply chain management can masquerade itself in terms of information sharing, incentive alignment and decision synchronisation (Holweg and Pil, 2008; Spekman et al., 1998).

2.2.2.2   Increasing profitability

An insight of supply chain knowledge and practices can help firms improve their profitability (Gunasekaran et al., 2001; Maloni and Benton, 2000). Profitability can be improved by economies of scale that decrease production costs with higher volume (Bragg et al., 2011; Dierickx and Cool, 1989), market value, and improved the value of products (Ramanathan, 2012; Fawcett et al., 2011). Moreover firms could mitigate risk using SCM techniques (Bragg et al., 2011). An improved understanding of the current supply chain situation would enable supply chain practitioners to be able to seek more profit and turn uncertainty into a manageable risk (Christopher, 2011).

2.2.2.3   Establishing competitive advantage

SCM has been widely recognised as essential to achieve competitive advantage in the current globalised marketplaces (Benavides and de Eskinazis, 2012; Christopher, 2011). Yet, it is inevitable that firms still primarily run their businesses in the traditional way of maximising local profit rather than maximising the profit of the entire supply chain as a whole (Benavides and de Eskinazis, 2012). Hence, SCM has gained an interest from both academics and practitioners for more than two decades (Cousins, Lawson and Squire, 2006). One of the current focuses of SCM is considerably **collaboration** (Benavides and de Eskinazis, 2012; Chan et al., 2012; Verdecho et al., 2012; Ramanathan and

Gunasekaran, 2012; Verdecho et al., 2012), which will be discussed in the next section.

2.3 Supply chain collaboration

2.3.1 Definition of supply chain collaboration

Similar to SCM, supply chain collaboration has several definitions (Wilding and Wagner, 2012; Lumsden et al., 2003; Mentzer et al., 2001; Sriram et al., 1992). However one of the most widely adopted defines supply chain collaboration as "*two or more independent companies work jointly to plan and execute supply chain operations with greater success than when acting in isolation*" (Simatupang and Sridharan, 2002, p. 19). Hence this definition was adopted in this study.

2.3.1.1 Attributes of supply chain collaboration

Considered as a regime for governing organisations (Stein, 1982), it is believed that collaboration in supply chains could yield tremendous benefits (Mena et al., 2009). There are several form of collaboration in supply chains e.g., information sharing, incentive alignment and decision synchronisation (Arshinder et al., 2011; Cao and Zhang, 2011; Holweg and Pil, 2008; Skjoett-Larsen et al., 2003; Cachon and Lariviere, 2005; Akintoye et al., 2000; Spekman et al., 1998). Collaboration practices, such as supply chain integration or joint planning, are evolved from coordination (e.g., Information linkages) (Stein, 1982), which developed from cooperation (e.g., Longer-term contracts) and open market negotiation (adversarial relationships). Such an evolution from open market to collaboration is illustrated in the Figure 2.2.

Supply chain collaboration can be implemented by various types of programmes such as *Vendor Managed Inventory* (VMI), and continuous replenishment programmes (Disney et al., 2003). Moreover, it can be in more advanced forms of collaboration such
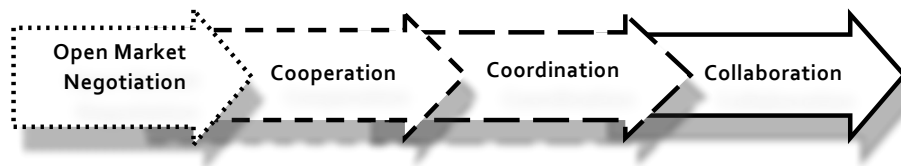
Figure 2.2: Transition of collaboration
Source: Adopted from Spekman et al. (1998)

as *Collaborative Planning Forecasting and Replenishment* (CPFR) (Barratt, 2004; Ireland and Bruce, 2000). Furthermore, firms could achieve better performance, such as reducing cost and improving efficiency, by working collaboratively with their key partners (Prajogo and Olhager, 2012; Handfield et al., 2009; Aksin and Masini, 2008; Cousins and Spekman, 2003).

2.3.2 Benefits of supply chain collaboration

2.3.2.1 Improving operational performance

Supply chain collaboration has been argued to enhance firm performance (Simatupang and Sridharan, 2004; Squire, Cousins, Lawson and Brown, 2009; McLaren et al., 2002). By working with supply chain partners, firms are expected to multiply the outcomes of the effort from working alone (Wilding, 2006). Such outcomes include a better level of responsiveness and service level improvements from their supply-chain collaborative programmes (Holweg et al., 2005). (Squire, Cousins, Lawson and Brown, 2009; McLaren et al., 2002).

2.3.2.2 Increasing service quality

The performance of firms is heavily reliant upon accurate and timely information in the supply chain (Holweg et al., 2005; Chen and Paulraj, 2004*a*; Mentzer et al., 2001). Firms expect a better level of responsiveness and service level improvements to result from their supply chain collaborative programmes (Cooke, 2011; Morash and Clinton,

1998). Another often expected benefit is the reduction of supply chain costs such as those associated with inter-firm transactions, inventory and production (McLaren et al., 2002).

2.3.2.3 Improving logistics performance

Many studies have found that a higher level of supply chain collaboration can improve the performance of firms (Nyaga et al., 2010; Robson et al., 2008) especially on their logistics activities (Ha et al., 2011). Moreover success of the current collaboration could lead to more collaborative actions in the future (Ramanathan and Gunasekaran, 2012).

2.3.2.4 Mitigating risks

Furthermore, it was found that collaboration could also reduce gaming and rationing in the supply chains. This is one of the main causes of the *Bullwhip effect*[1] (demand amplification (Lee et al., 2000; Lee and Padmanabhan, 1997). Moreover, there are also benefits that could only be obtained via a higher level of collaboration. They are the elimination of Bullwhip effect, inventory reduction, better transport capacity utilisation, and risk mitigation (Holweg et al., 2005).

2.3.3 Cost of collaboration in supply chains

2.3.3.1 Direct costs

To achieve a high level of supply chain collaboration, there are costs of making collaborative actions including both direct and indirect costs (McLaren et al., 2002). Information and communication technology such as Internet and software for integrating operating systems and sharing information along the supply chains has been considered as a direct cost (Burgess et al., 2006).

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[1]*"The bullwhip effect is essentially the phenomenon of demand variability amplification along a supply chain, from the retailers, distributors, manufacturer, and the manufacturers' suppliers, and so on"* (Lee et al., 2000, p. 626)

2.3.3.2 Indirect cost

However, there are indirect costs such as labour costs and opportunity costs that firms may not obviously perceive as expenses (McLaren et al., 2002).

2.3.4 Factors affecting cost and benefit of supply chain collaboration

The costs and benefits of supply chain collaboration may vary in different circumstances. First, geographical dispersion and the location of the firm and its supply chain partners may affect the needs for collaboration and the benefits from implementing the collaborative activities (Bragg et al., 2011). Second, the management system and cooperate culture also have an impact on the implementation of supply chain collaboration (Akintoye et al., 2000; Min et al., 2005).

2.3.5 Types of collaborations

There are several ways to categorise supply chain collaborations (Simatupang and Sridharan, 2005). Holweg et al. (2005) classified supply chain collaboration into four types based on inventory and planning coordination (Mena et al., 2009). However, supply chain collaborations can also be classified into two taxa, vertical and horizontal collaboration (Barratt, 2004; Lafferty and van Fossen, 2001). Each collaboration taxon can also be further categorised (Yang, Huang, Song and Liang, 2009). This study adopted Barratt (2004)'s and Lafferty and van Fossen (2001)'s approach to classify supply chain collaboration as it covers different dyadic relationships between supply chain partners, which fits the good purposes of this research. This study focuses on the vertical collaboration between hotels and their supply chain partners i.e., suppliers and travel agents. Collaboration in the tourism supply chain will be discussed in details in Chapter 4.

2.4   Criticisms of supply chain collaboration

Most researchers have praised the benefits of implementing supply chain collaboration through the economic and social capital mechanisms. However some researchers have argued that supply chain collaboration is not always the answer. Villena et al. (2011) show that too much or too little social capital. They found an inverted curvilinear relationships between social capital and performance. Furthermore, collaboration, between private-private or private and public sector, has been arguably a key driver for supply chain sustainability (Laseter and Gillis, 2012). However, supply chain collaboration can also costs the organisation in terms of ownership cost and transaction costs (McLaren et al., 2002). Moreover, Holweg et al. (2005) argued that collaboration can be viewed as a continuum and should be designed according to various factors including " *the geographical dispersion, the demand pattern, and the product characteristics*". In developing collaboration and enabling the its impacts, many researchers suggest that trust is the key factors as it is the critical social capital of the sustainable relationship in between supply chain partners (Fawcett et al., 2012).

In the tourism industry, Akkaranggoon (2010) found that there is a low level of collaboration between firms such as between hotels and suppliers stated that:

> "... low exploitation of information technology and manual-based supply chain activities with a high level of dependency on head chefs regarding supply chain performance ..."

Moreover, it was found that in the tourism industry, collaboration can be formed within the same destination (Wang, 2008). Such a form of collaboration usually designed for marketing purposes (Atthirawong et al., 2011). However, there was an evidence in the United Kingdom that collaboration between supply chain partners in the tourism industry can lead to the better performance Phillips and Louvieris (2005). Such collaboration can be initiated by a form of collaborative alliance (Selin, 1994). In

Thailand, it was found that supply chain collaboration can mitigate the impact of cultural differences Koblun (2011).

Even though there are different views on the role of supply chain collaboration (McLaren et al., 2002; Skjoett-Larsen et al., 2003; Wilding and Humphries, 2006), the scope of this thesis is to focus on the positive impacts of supply chain collaboration on firm performance and the mechanism. Moreover, the results form this thesis could be a platform to further investigate an opposite view in the supply chain collaboration practices.

2.5 Dimensions of supply chain collaboration

There are different types of collaborative approaches in SCM such as information sharing, incentive alignment and decision synchronisation (Holweg and Pil, 2008; Akintoye et al., 2000; Spekman et al., 1998). Dimensions of supply chain collaboration can be categorised using different criteria such as mutual objectives, information sharing and incentive alignment (Simatupang and Sridharan, 2005). Moreover firms collaboratively control inventory and ordering policies (Holweg et al., 2005). Furthermore, collaboration can be implemented through pricing strategies in order to achieve a win-win situation (Chen et al., 2012). Firms may also collaborate with their suppliers to reduce supply chain costs via a decentralised supply chain strategy (Lida, 2012). A summary of different dimensions of supply chain collaboration is presented in the Table 2.3.

Table 2.3: Summary of dimensions of supply chain collaboration

Authors	Dimensions of supply chain collaboration									
	Information sharing	Joint activities	Dedicated investment	Goal congruence	Collaborative communication	Incentive alignment	Risk sharing	Joint knowledge creation	Synchronised decision	Resource sharing
Simatupang and Sridharan (2005)	Information sharing	Integrated supply chain processes.	NA	a collaborative performance system (CPS)	NA	Incentive alignment	NA	NA	Synchronised decision	Resource sharing
Simatupang and Sridharan (2004)	Information sharing	NA	NA	NA	NA	Incentive alignment	NA	NA	Decision synchronisation	NA
Simatupang and Sridharan (2002)	Information sharing	Integrated policies	NA	Mutual objectives	NA	Incentive alignment	Risk sharing	NA	Decision domain	NA
Nyaga et al. (2010)	Information sharing	Joint effort	Dedicated investment	NA	NA	NA	NA	NA	NA	NA
Cao and Zhang (2011)	Information sharing	NA	NA	Goal congruence	Collaborative communication	Incentive alignment	NA	Joint knowledge creation	Synchronised decision	NA
Ramanathan and Gunasekaran (2012)	Information sharing	Joint teamwork	Investment	Joint planning	NA	NA	NA	NA	Decision sharing	Resource sharing
Wilding and Humphries (2006)	Information sharing	NA	NA	Synchronisation of objective	Frequent, open dialogue	NA	Lowering joint costs	risks	Innovation	NA
Sheu et al. (2006)	Information sharing	coordinative project	Resource investment	NA	Communication	NA	NA	NA	Supply chain decision making	NA

2.6 Trust and supply chain collaboration

Trust has been recognised for its importance in supply chain collaboration (Ha et al., 2011; Sheu et al., 2006; Humphries and Wilding, 2004; Barratt, 2004; Berry et al., 1994). However, one of the main debates in the SCM literature is the causal relationship between SCM and inter-firm trust among supply chain partners. Some authors (Ha et al., 2011; Fynes et al., 2005; Sriram et al., 1992) argue that inter-firm trust should affect the optimal level of supply chain collaboration. Whereas others (Nyaga et al., 2010) have proposed the opposite (Lui and Ngo, 2012; Wagner et al., 2012; Ireland et al., 2002; Welty and Becerra-Fernandez, 2001; Akintoye et al., 2000), suggesting supply chain collaboration affects inter-firm trust. Both sides have found statistical evidence for some of their proposed hypotheses and there is still little consensus on this issue. However there seems to be a consensus that a high level of inter-firm trust could improve supply chain performance (Fawcett et al., 2012). Moreover, in tourism, trust between firms in the supply chain has a critical role to ensure the smooth flow of tourists visiting a destination (Presenza and Cipollina, 2010).

2.6.1 Definition of trust

Trust is recognised as a critical factor in supply chain relationships (Nyaga et al., 2010). Trust has been defined in various ways (McEvily et al., 2012). However, a widely used categorisation classify trust into two main dimensions; cognitive and affective trust (Zur et al., 2012). Definitions of cognitive and affective trust are summarised in the Table 2.4.

Trust has been argued to be a critical factor in developing relationships in the supply chain (Christopher, 2011; Simatupang and Sridharan, 2005). A survey by Akintoye et al. (2000) in the UK found that firms believe that trust is the top key factor in effective supply chain relationships. Building inter-firm trust could eliminate unnecessary ac-

Table 2.4: Definitions of cognitive and affective trust in SCM literature.

Author(s)	Cognitive dimension	Affective dimension
McAllister (1995, pp.25-26)	Cognitive-based trust arises from available knowledge and good reasons (Luhmann, 1979; Simmel, 1964).	Affective-based trust consists of the emotional bonds between individuals (Lewis and Weigert, 1985).
Chen et al. (1998, p. 294)	Cognitive-based trust "pertains to the fulfilment of one's prescribed responsibilities"	Affect-based trust arises from "a social emotional bond that goes beyond a regular business and professional relationship"
Costigan et al. (1998, p. 306)	Cognitive trust "pertains to the rational decision to trust or to withhold trust of another party. The decision to trust is based on good reasons, such as responsibility, dependability, and competence (Lewis and Weigert, 1985)"	Affect-based trust "involves a deep emotional investment in relationship. A trustor's deep care and concern of the trustee characterize such a relationship"
Scott (2000, p. 84)	Cognitive trust is "a rational view of trust and encompasses competence, ability, responsibility, integrity, credibility, reliability, and dependability"	Affective trust is "the social view of trust and has a more emotional connotation. It encompasses care, concern, benevolence, altruism, a sense of personal obligation, commitment, mutual respect, openness, a capacity for listening and understanding, and a belief that sentiments are reciprocated"
Hansen et al. (2002, p. 43)	"Cognitive trust is more objective in nature and is based on a rational and methodical process that results in a judgement that an individual, group, or organization is trustworthy"	"Affective trust is subjective in nature because it is based on the moods, feelings, or emotions that one has concerning the perceived trustworthiness of an individual, group, or organization"
Webber and Klimoski (2004, p. 1000)	Cognition-based is "grounded in individual beliefs about peer reliability and dependability, as well as competence"	"Affective trust is grounded in reciprocal interpersonal care and concern or emotional bonds"
Ladebo (2006, p. 411)	Cognitive trust "is an objective, rational, and methodical evaluation by a trustor concerning a target as being trustworthy"	Affective trust "is believed to be subjective in nature because it relates to the feelings, mood or emotions that a trustor has concerning the target as being trustworthy"
Ng and Chua (2006, p. 45)	"Cognition-based trust hinges on an appraisal of the other's track record - the competence and reliability this person has demonstrated in the past"	"Affect-based trust, on the other hand, arises from social interactions with others, and reflects confidence in others that develops along with concern for their welfare"
Ergeneli et al. (2007, p. 43)	"The cognition-based component treats trust or distrust in the other party as a rational decision, based on experience and premises such as responsibility and competence"	"Affect-based trust requires deep emotional investment in a relationship"
Chua et al. (2008, p. 436)	"Cognition-based trust involves a calculative and instrumental assessment"	"Affect-based trust involves empathy, rapport, and self-disclosure"
Robson et al. (2008, p. 649)	NA	"Affective trust takes the form of loyalty to a partner resulting from norms, ethics, and bonds of kinship (Nooteboom et al., 1997)."
Hon and Lu (2010, p. 670))	"Cognitive trust relates to individual beliefs about supervisor reliability, dependability and competency"	"Affective trust derives from the feeling of having trust in another person and is associated with reciprocal interpersonal relations of care" (Mayer et al., 1995; McAllister, 1995)
Wang et al. (2010, p. 359)	"Cognition-based trust occurs due to perceptions of competence, reliability, and dependability"	"Affect-based trust occurs as a product of social exchange. That is, the positive emotions generated via perceptions of care and concern motivate one to continue reciprocating socio-emotional benefits"
Atkinson and Butcher (2003)	Cognitive trust is based on rational, calculative perspectives.	Affective trust is developed based on social context, emotional and social interaction.

Source: Developed from (Zur et al., 2012, p.74).

tivities that firms need to do to prevent opportunistic behaviour (Lui and Ngo, 2012). When firms believe that their partner is trustworthy, transaction costs such as those associated with monitoring and quality control (Williamson, 2005*b*) can be reduced. Moreover, firms with high level of trust tend to produce better collaborative performance (Robson et al., 2008) and also tend to maintain their commitment (Nyaga et al., 2010).

2.6.2 Antecedents of trust

Lack of trust arguably has its price. If the opportunistic behaviours of the firm's partner cannot be detected, the partners will take advantage of the firm (Williamson, 2005*b*). Thus, monitoring and quality checking processes need to be implemented because the firms do not trust their partners (Grover and Malhotra, 2003). Moreover, uncertainty may also cause the need for transaction costs (Gaur et al., 2011; Demil and Lecocq, 2006; Langlois, 1992). Nevertheless, opportunism and uncertainty could be reduced by information sharing in terms of both quality and quantity (Ryu et al., 2007; Kwon and Suh, 2005).

2.6.3 Outcomes of trust

Key outcomes of trust between firms in the supply chain include performance improvement (Fawcett et al., 2012), long-term relationships (Nyaga et al., 2010; Humphries and Wilding, 2004), risk mitigation (Chiles and McMackin, 1996). Moreover, it is believed that trust could mitigate the transaction costs, which may incur when firms collaborate (Wilding and Humphries, 2006). It is claimed to be a main reason when the higher level of trust, the better performance (Krishnan et al., 2006; Hansen et al., 2002). Trust can eliminate unnecessary activities that firms need to do to prevent opportunistic behaviour from their collaborating partners (Lado et al., 2008). Moreover, the better collaboration performance, the higher level of commitment between collaborating firms

(Kwon and Suh, 2005; Welty and Becerra-Fernandez, 2001; Hansen et al., 2002).

Hence, long-term relationships in the supply chain could be established by an increased collaboration performance driven by higher levels of trust (Humphries and Wilding, 2004). However, there is not only an (indirect) impact of trust on collaboration performance, some researchers also believe that success in the past collaboration can also give rise to inter-firm trust and lead to the intention for future collaboration (Ramanathan and Gunasekaran, 2012). This feedback loop could be considered as the dynamic interplay between trust and performance in supply chain collaboration (Gaur et al., 2011). Recently Delbufalo (2012) conducted a Meta analysis of the outcomes of trust, 33 outcomes were found in 96 independent samples but the key impacts of trust were commitment, inter-firm relationship and firm performance.

2.6.4 Mediating and moderating roles of trust

Trust has not been only examined as an antecedents or as an outcomes, some have argued the mediating (Nyaga et al., 2010) and moderating role of supply chain collaboration in supply chain relationship (Squire, Cousins and Brown, 2009). Ryu et al. (2007) proposed that trust moderates the impacts of *environmental uncertainty* on *vertical control* and *satisfaction with supplier performance*. Trust is also linked to the intention of future collaboration (Wagner et al., 2011).

Furthermore, it was found that informal socialisation mechanisms have a greater impact on relational capital than formal ones (Cousins, Handfield, Lawson and Petersend, 2006). Trust was also argued to have other roles such as a mediating role on cooperation via knowledge transfer (Squire, Cousins and Brown, 2009). Moreover, it was found that such relational capital developed from integration and collaboration with suppliers is the key to improve firm performance (Lawson et al., 2008).

Hence trust has a significant role in the supply chains, explained in various the-

ories such as transaction cost economics or social exchange theory. Such theories are presented in Chapter 3. To conclude the role of trust in SCM research, the literature focussing on inter-firm trust in the supply chain are summarised in Table 2.5.

In the tourism sector, there is research on inter-firm trust and supply chain collaboration. Recently Leeman and Reynolds (2012) studied the impact of trust on the intention to outsource in the hospitality industry. Crotts and Turner (1999) proposed a conceptual framework of ten determinants (or antecedents such as cooperation, performance satisfaction or reputation) that can build trust between supply chain partners. Even though various empirical studies have proved that inter-firm trust could give rise to enhance firm performance, the mechanism of how trust influence firm performance has been rarely studied.

2.7 Sustained Competitive Advantage

Within a fierce business environment, firms need to excel at their core competency to achieve a competitive advantage over their business rival (Cao and Zhang, 2011; Reuter et al., 2010; Porter, 1985). Moreover, firms also need to sustain such advantage (Barney, 2012; Fawcett et al., 2012; Hart, 1995). To do so, firms need to work closely with their supply chain partners (Christopher, 2011). The concept of Sustained Competitive Advantage (SCA) has been developed significantly by the **Resource Based View** (RBV) theory, which explain SCA as an outcome of the capabilities created from the management of the strategic resources of the firm (Barney, 1991). RBV also argues that SCA is the key driver of firm performance (Collis and Montgomery, 1995,?). A detailed discussions of SCA and RBV is presented in Section 3.3. In the tourism management literature, key success factors of SCA include cost reduction (Eligh et al., 2002).

Table 2.5: Summary of key studies on inter-firm trust in supply chains

Author(s)	Setting	Key findings & contributions
Dyer and Chu (2000)	453 supplier-automaker relationships in the US, Japan & Korea	Prior history as measured by duration and intensity of past relationship and track record of repeated exchange promotes trust.
Faems et al. (2008)	Case study of two successive alliances between the same firms	Broad contracts promote while narrow contracts hinder trust development, while rigid contract application triggers negative trust dynamic.
Gulati and Nickerson (2008)	222 component-sourcing arrangements of two assemblers in the automobile industry	Pre-existing inter-organizational trust enhances exchange performance; increases the probability that a less formal mode of governance was chosen over a more formal one.
Katsikeas et al. (2009)	215 importing distributors in the USA	Trust positively affect relational performance, moderated by interdependence. Internal uncertainty negatively affects trust development.
Krishnan et al. (2006)	126 international alliances of Indian firms	There is a positive relationship between trust and alliance performance; this relationship is stronger under high behavioural uncertainty and weaker under high environmental uncertainty.
Lado et al. (2008)	409 agents from Fortune 500 firms	The positive relationship between trust and performance is mediated by relationalism.
Maguire and Phillips (2008)	Case study of Citigroup after the merger of Citicorp and Travellers	Institutional trust, like personal trust, can be identity based; the ambiguity in an organization's identity undermines institutional trust.
Molina-Morales and Martínez-Fernández (2009)	154 firms in Spain	Inter-firm trust has a positive linear effect on firm value creation as measured by innovation, but negatively for curvilinear effect.
Nielsen and Nielsen (2009)	119 international alliances of Danish firms	Trust has a positive effect on learning, but not on innovation. Trust and knowledge tacitness together affect innovation performance.
Perrone et al. (2003)	119 buyer-supplier relationships	Autonomy of purchasing managers enhances their trust from supplier representative. Tenure of the relationship positively affect trust.
Poppo et al. (2007)	137 surveys of heads of purchasing departments	The positive relationship between prior history and trust is mediated by the expectation of continuity.
Robson et al. (2008)	177 international strategic alliances of EU firms	Inter-partner trust positively affect alliance performance, negatively moderated by complexity (firm size).
Zaheer et al. (1998)	107 buyer-supplier relationships in the electrical equipment manufacturers	Interpersonal and inter-organizational trusts are related but distinct constructs. Inter-organizational trust has a direct effect on performance.
Wagner et al. (2011)	183 firms in various sectors of the US	Trust during the current project positive affect future collaboration.

Source: Developed from (Gaur et al., 2011).

2.8 Firm performance

2.8.1 Definition of firm performance

Performance of the firm can be measured in several ways. According to Chen and Paulraj (2004*b*), a firm's performance can be measured in terms of financial performance and operational performance. Firm performance can be also viewed as service effectiveness and cost effectiveness (Richey et al., 2010). Performance can be also measured by cost, quality, delivery and flexibility (Krause et al., 2007). Otto and Kotzab (2003) catagorise performance measurement in SCM into six categorises based on the disciplines: (1) system dynamics; (2) operations research; (3) logistics; (4) marketing; (5) organization and (6) strategy.

In tourism, the performance of a firm such as hotel can also be measured by customer satisfaction and service quality in terms of delivery time and order accuracy (Sainaghi, 2010; Phillips and Louvieris, 2005).

2.8.2 Firm performance and SCM

Firms tend to judge their relationship with supply chain partners by their performance (Ahmed et al., 1996). For the firms that have collaborative programmes, logistics performance is a key determinant for maintaining the relationship (Glenn Richey et al., 2010; Ellinger et al., 2006, 2000; Beamon, 1999). Therefore, supply chain partners tend to be more satisfied when their logistics performance is improved (Gunasekaran et al., 2001).

2.9 SCM research in Thailand

As discussed previously in Section 1.5.3 (Chapter 1), SCM research has emerged in the last decade, the Thai government has played a key role in raising awareness of the bene-

fits of SCM (Office of National Economic and Social Deelopment Board, 2007, 2006; Office of National Economic and Social Development Board, 2005). Moreover, Thai firms have increasingly recognised the need to implement SCM due to the tough domestic and global competition (National Research Council of Thailand, 2012; Singkarin, 2011). Since this thesis collected data in Thailand, there is a need to understand the current situation of SCM research in Thailand. Therefore this section will present a systematic review of the SCM publications that have been conducted in Thailand or are based on the context of Thailand. Having such a review, this thesis can make a clear contribution to the SCM research of Thailand.

2.9.1   Review procedures

To obtain the current state and evolution of SCM research in Thailand, a systematic literature search was conducted in leading the academic databases; **Scopus**, **ABI/IN-FORM Global (Proquest)**, **ScienceDirect** and **EBSCO** as well as **Google Scholar** using the keywords of "*supply chain*" combining with either "*Thai*" or "*Thailand*".

2.9.2   Findings of a systematic review

SCM research in Thailand can be summarised in Table 2.6. Thirteen SCM research publications in the context of Thailand were found in the databases. In parts, this small number could be due to most of the research in Thailand is not often published in academic journals, very little is written in the English. Furthermore SCM has just emerged as a new theme instead of transport or logistics management in Thailand. Based on the focuses of this thesis, only SCM and collaborative logistics research were included in the review. The table 2.6 shows that most of the SCM research in Thailand was conducted in the agriculture and manufacturing sectors.

Table 2.6: Recent SCM research in Thailand

Authors	Topic	Method	Sector
Banomyong (2012)	Supply chain integration	Quick Scan Audit Methodology	Textile and Garment
Banomyong and Sodapang (2012)	Relief supply chain	Simulation	-
Sopadang et al. (2012)	Value chain analysis	Case study	Agriculture (Longan)
Banomyong and Supatn (2011*a*)	Supply chain performance tool	44 cases	SMEs
Banomyong and Supatn (2011*b*)	Supply chain assessment tool	25 cases	SMEs
Wong et al. (2011)	The contingency effects of environmental uncertainty in supply chain	Survey & Statistics (SEM)	Automotive industry
Ongkunaruk and Piyakarn (2011)	Logistics costs for farmers	Survey & statistics	Agriculture (Mangosteen)
Payongyam et al. (2010)	Supply chain system improvement	Case study	Poultry (cooked chicken product)
Pathumnakul et al. (2009)	Integration of function in supply chains	Analytical model (senario analysis)	Agriculture (Shrimp)
Piewthongngam et al. (2009)	Crop growth and supply chain management practices	Mathematical and simulation model	Agriculture (sugar)
Wong and Boon-itt (2008)	Impact of Institutional norms and environmental uncertainty in supply chain integration.	Case study	Automotive industry
Banomyong et al. (2008)	Leagility in reverse logistics	Case study	Electronics (electrical appliance)
Edward Rubesch (2005)	Logistics cost & supplier selection	Case study	Automotive

2.10 Conclusion

This chapter presented different concepts of supply chain, supply chain management and supply chain collaboration. Even though there are various definitions of those terms, there are commonalities in such definitions. The selection of particular definition were justified based on the relevance of the thesis and the acceptance in practices. The chapter also highlights the need to develop a holistic model that explains how supply chain collaboration improves performance of the firms. The chapter reveals a lack of empirical results on collaboration and inter-firm relationships in the tourism supply chains. Furthermore, the differences of the perspective of different types of supply chain partners are also highlighted in this chapter.

This chapter has laid out the understanding of the main subjects of this thesis i.e., supply chain collaboration and its related topics. Moreover, it also presents the development of the subjects as well as the reviews of the current state. Hence to address such gaps in the literature and to advance the knowledge in supply chain collaboration, the next chapter (Chapter 3) will discuss the theories that explain the understanding of mechanisms and outcomes of supply chain collaboration, resulted in the development of research hypotheses for this thesis (see Figure 2.3).

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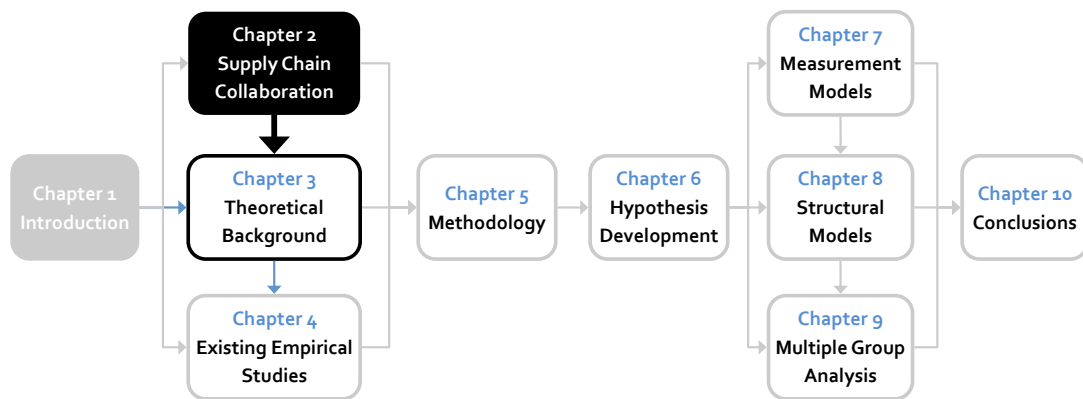
Figure 2.3: A direction of chapter 2 to the next chapter

Chapter 3

Theoretical Background

It is theory that decides
what can be observed.

Albert Einstein (1879 - 1955)
Nobel prize winning physicist

3.1 Introduction

The aim of this chapter is to review the relevant theories related to the supply chain collaboration, its outcomes and its mechanism. The role of this chapter is to provide the review of the theoretical implication in order to develop the conceptual framework and research model in the Chapter 6.

In Chapter 2 (Literature Review), the importance and significance of supply chain collaboration and related topics were discussed. It showed that there is no consensus on any theory or conceptual framework that can completely explain this phenomenon (Halldórsson et al., 2007). In SCM research, there are various relevant theories adopted from other disciplines e.g., marketing, organisation behaviour and psychology. The theories that explain how supply chain collaboration improve performance of the firm

include Transaction Cost Economics (TCE), Resource Based View (RBV), Social Exchange Theory (SET), Resource Dependency Theory (RDT), Principal Agent theory (PAT), Collaborative Network Theory (CNT) (Chicksand et al., 2012). Whilst other theories have been applied in SCM research (e.g., theory of constraints or contingency theory), these were excluded in this study due to their irrelevance to explaining the outcomes of supply chain collaboration (Chicksand et al., 2012; Soni and Kodali, 2012; Halldórsson et al., 2007).

As a foundation of the research, this chapter presents the background of each theories. The applications of the theory to SCM research and relevance to this study are also presented. The position of this chapter in the thesis is presented in the Figure 3.1
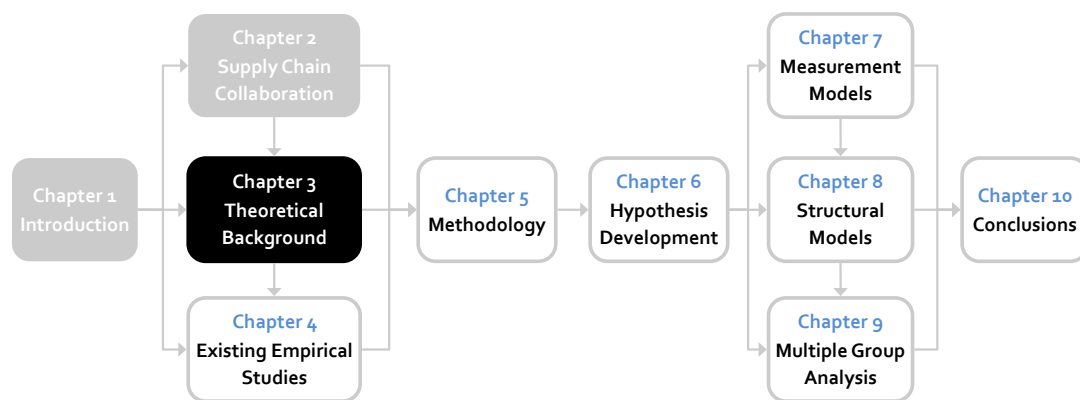
Figure 3.1: Position of the chapter in this thesis

3.2 Transaction Cost Economics

3.2.1 Foundation of Transaction Cost Economics

Transaction Cost Economics (TCE) aims to explain the existence and boundaries of the firm (Williamson, 2008). TCE was originated by Coase (1937) who developed the

theory from the works of Chester Barnard, and Herbert Simon (Williamson, 2005*b*). TCE has been further developed by a series of seminal works by Williamson (1971, 1973, 1981, 1985, 1996, 2005*a*,*b*, 2008, 2009, 2010). Coase and Williamson then were awarded a Nobel Prize based on their contribution of so called "**Transaction Cost Economics (TCE)**" in 1991 and 2009 (Williamson, 2010) respectively[1].

Transaction Cost Economics is a theory that offers an alternative approach to the traditional mainstream economics through a lens of "*choice*" (Williamson, 2002). This alternative approach is to view the nature of the firm and its boundaries via the lens of "*contract*" (Williamson, 2008). Main drivers for transaction costs include asset specificity, uncertainty and transaction frequency (Williamson, 2005*b*). In a collaborative relationship, it has been found that asset specificity and environmental uncertainty positively affect an intention for a long term orientation between supply chain partners (Lui and Ngo, 2012).

3.2.2 Underlying Assumptions

Drawing from the theory of TCE, there always be transaction cost in any supply chain interaction (Grover and Malhotra, 2003). This is because of the assumptions of bounded rationality (Simon, 1957) and opportunistic behaviour (Williamson, 2008). These two assumptions are the essential foundation of TCE, which are discussed as follows.

3.2.2.1 Bounded Rationality

Based on the classical economics theory, it is assumed that humans have perfect rationality of their behaviours (Coase, 1937). However, according to neurophysiological and language limits of individuals (Simon, 1957), there are the constraints of human abilities to receive, process and analyse information without any error (Grover and Malhotra, 2003). Therefore, bounded rationality is viewed as a source of transaction

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[1]Ronald H. Coase was awarded *"for his discovery and clarification of the significance of transaction costs . . . "* and Oliver E. Williamson *"for his analysis of economic governance, especially the boundaries of the firm"* which is the extension of Ronald Coase's works on transaction cost

costs because all factors cannot be considered in the decision making process (Barros, 2010).

3.2.2.2 Opportunistic Behaviour

It is expected that suppliers may deliver inferior goods if they know that their clients cannot detect the difference (Wuyts and Geyskens, 2005; Morgan et al., 2007). This opportunistic behaviour leads to the cost of monitoring the outsourced production processes and the quality of delivered products (Vieira et al., 2011). Although the firm have may not discover any opportunistic behaviour of its suppliers, quality checking may still be necessary as long as the expectation of opportunistic behaviour still exists (Lui and Ngo, 2012).

3.2.3 Critiques of TCE

Although being widely applied in SCM research, there are also critiques on the implication of the TCE approach (Gibbons, 2005; Cousins, 2002). Such critiques include the implication for "*Appropriable Rent*" (Quasi-rent) and post-contractual opportunistic behaviour (Klein et al., 1978). This critique was deliberated with the case of the *General Motors* (GM)'s acquisition of *Fisher Body* (Williamson, 2002). Later Coase (2006) has responses to this critique by arguing that the event used in the case of GM was not true. Coase (2006, p. 255) stated that "*The problem with this widely used example is that the events, so minutely described, never happened.*" Moreover, TCE was challenged by Ghoshal and Moran (1996, p. 13) on its assumption which ignores that;

> "*Organizations are not mere substitutes for structuring efficient transactions when markets fail; they possess unique advantages for governing certain kinds of economic activities through a logic that is very different from that of a market.*"

Furthermore, Martinez and Dacin (1999, p. 91) has pointed out the weaknesses of TCE which is;

> *"... analyzing transactions at the individual level, which neglects social behavioral constraints; and an assumption of the relative universality of TCE's explanatory power, which leaves little room for integration with other organization theories."*

To improve the application of TCE, Martinez and Dacin (1999) proposed a model that joins TCE with institutional theory. Therefore, even though TCE may be criticised but TCE is flexible enough to be able to combine with other theories, which is one of the reasons why TCE has been extensively applied in management research (Williamson, 2005*b*).

3.2.4   Applications of TCE to SCM research

TCE has been applied to SCM scenarios to explain the decision process of whether to implement in-house operations or outsource the operations instead (Shelanski and Klein, 1995). Moreover, TCE was also applied to understand the behaviour in supply chain collaboration (Wilding and Humphries, 2006) and its impacts on supply chain relationships and performance (Cao and Zhang, 2011; Nyaga et al., 2010). Hence TCE is considered to fit with the nature of SCM research (Ketchen Jr and Hult, 2007). It has been shown that lower transaction costs favour outsourcing and higher transaction costs favour in-house operations (Williamson, 2008).

As an alternative for either *firm* or *market governance*, collaboration arises as one of the hybrid governance forms (Koh and Venkatraman, 1991), which can reduce transaction costs of factors such as opportunism and monitoring activities or external uncertainty (Kinra and Kotzab, 2008). This can be achieved through the development of relational capital such as inter-firm trust (Croom, 2001).

The concept of TCE has been widely used to explain the existence and boundary of the firm (Coase, 1937) as well as other forms of economic governance (Williamson,

2005*b*). Recently, TCE has been applied to supply chain management such as inter-firm relationships (Hobbs, 1996) and outsourcing (Williamson, 2008). Albeit a study by Grover and Malhotra (2003) measured transaction costs in the context of supply chain management, the aspects of governance and opportunity costs are still missing. Moreover, seldom has the antecedents of such transaction costs in supply chain collaborations been studied (Williamson, 2010).

In a supply chain collaboration context, firms also have the option to closely collaborate with their partners or just to deal with them at "*arms length*". Therefore, in order to have a high level of collaboration, there are associated costs e.g., information and communication technology, effort, and risk from opportunistic behaviour of collaborative partners (Hobbs, 1996). Nevertheless, firms may prefer to collaborate since they anticipate greater benefits such as inventory and transport cost reduction as well as customer service level or customer satisfaction improvement (Demil and Lecocq, 2006). Not only are there internal factors that affect the collaboration but external drivers such as the number of available suppliers and the distance between the firm and suppliers also drive the need for collaboration (Tate et al., 2011). Transaction costs caused by partners' opportunism behaviour was found to reduce firm performance (Morgan et al., 2007). Furthermore, it was found that high transaction costs drive a firm's propensity to collaborate with their partners to reduce such costs in the future (Sriram et al., 1992).

3.2.5 Application of TCE to this thesis

Even though having been frequently discussed in relation to supply chain collaboration (see Table 3.1), transaction costs are generally considered as a mediator of supply chain collaboration, but they are rarely included in empirical studies explicitly. Most of such studies have not directly included transaction costs as a construct in their model (hypotheses). Some included transaction costs in their model indirectly by examining antecedents of the transaction costs i.e., asset specificity (Lui et al., 2009; Joshi and

Stump, 1999) or uncertainty (Kwon and Suh, 2005). By doing so, there might be a bias as the transaction costs were not measured properly. Apart from TCE there are other alternative theories which have been used to conceptualise supply chain relationship such as principal agency theory, or resource based view. The latter is discussed in the next section.

Table 3.1: Summary of key SCM research using TCE approach

Reference	Sample	Key independent variable(s)	Key dependent variable(s)	Key findings
Levy (1985)	69 manufacturing firms	Asset specificity, environmental uncertainty	The degree of vertical integration	Higher assets specificity and uncertainty is related to greater vertical integration.
Anderson (1985)	159 sales managers in the electronics industry	Asset specificity, uncertainty, transaction frequency	The use of direct sales force vs. manufacturing reps.	Behavioral uncertainty, asset specificity, and interactions are related to the use of direct (in-house) sales force.
Balakrishnan and Wernerfelt (1986)	93 manufacturing industries	Technological obsolescence	Vertical integration	Technological obsolescence has a negative impact on vertical integration.
Walker and Weber (1987)	60 outsourcing decisions in US auto manufacturer	Market competition, environmental uncertainty	Outsourcing	Interaction of uncertainty and competition affects outsourcing.
Heide and John (1992)	199 manufacturers agents in electrical equipment industries	Asset specificity of agency	Replacement of principal	Specific investments by agents are negatively related to replicability of the principal.
John and Weitz (1988)	88 industrial manufacturers	Asset specificity, environmental and behavioral uncertainty	Percentage of manufacturer sales through direct distribution channels	All variables are positively related to manufacturer's forward integration.
Noordewier et al. (1990)	140 manufacturers	Environmental uncertainty	Level of possession and acquisition cost	High relational governance lowers acquisition costs under conditions of high uncertainty.

Continued on next page

Table 3.1 – Continued from previous page

Reference	Sample	Key independent variable(s)	Key dependent variable(s)	Key findings
Heide and John (1990)	155 manufacturing firms	Asset specificity, environmental and behavioural uncertainty	Joint action and relationship continuity	Both party asset specificity are related to joint action. Supplier-specific investments are related to expectations of continuity.
Walker and Poppo (1991)	99 supplier dyads of a large manufacturer	Asset specificity, competition	Transaction costs	Asset specificity is related to lower in-firm transaction costs.
Lieberman (1991)	203 manufacturers of chemical products	Supplier concentration, asset specificity, cost inputs	As related to integration vs. contractual arrangement	Higher cost inputs are related to higher backward integration
Sriram et al. (1992)	65 purchasing managers in large manufacturing firms	Asset specificity, perceived transaction costs	Buyer dependence, collaboration	Supplier-specific investments are negatively related to perceived buyer dependence. Transaction costs are positively related to collaboration propensity.
Heide and John (1992)	155 manufacturing and 60 supplier firms	Asset specificity, relational norms	Buyer's control over supplier's decisions	Buyer specific investments are positively related to control over supplier decisions only when both parties share relational norms.
Anderson and Weitz (1992)	378 large manufacturer-distributor relationships	Relationship-specific investments (actual and perceived)	Commitment to the relationship	Idiosyncratic investments are positively associated with both manufacturer and distributor commitment.

Continued on next page

Table 3.1 – Continued from previous page

Reference	Sample	Key independent variable(s)	Key dependent variable(s)	Key findings
Parkhe (1993)	111 manufacturers	Perceptions of opportunistic behaviour, history of cooperation	Performance of alliance, specific investments, contractual safeguards, perceptions of opportunistic behaviour	Perceptions of opportunistic behaviour are negatively related to alliance performance, specific investments and contractual safeguards. History of cooperation negatively related to perceptions of opportunism.
MaltzArnold (1994)	147 manufacturing firms	Assets specificity, transactional frequency	Probability of outsourcing warehousing	Asset specificity has a negative and frequency has a positive relationship with outsourcing.
Stump and Heide (1996)	165 chemical manufacturers	Asset specificity	Incentive design and monitoring	Specific investments by buyers protected through specific investments by suppliers.
Bensaou (1997)	447 relationships in US and Japanese auto industry	Switching costs, ownership ration, contract length, goal compatibility, fairness, technological unpredictability, use of it	Cooperation	Most relationships significant for Japanese but not for US relationships. Behavioural conditions important for cooperation.
Azoulay (2000)	Over 5000 clinical trials in six major drug manufacturers	Complex knowledge production activities vs. generic data production activities	Outsourcing probability	Costly to monitor knowledge intensive trials tend to be managed in-house rather than outsourced.

Chapter 3. Theoretical Background

		Table 3.1 – *Continued from previous page*	
Reference	**Sample**	**Key independent variable(s)**	**Key dependent variable(s)**	**Key findings**
Novak and Eppinger (2001)	7 key automotive systems from eight luxury car manufacturers	Product complexity	Sourcing decision	Significant positive relationship between product complexity and vertical integration.

3.3 Resource Based View

Resource Based View (RBV) is a theory that has been widely applied in management research. RBV is generally used to explain the factors affecting resource utilisation of firms in order to improve their competitive advantage and firm performance (Barney, 2001). RBV is also a popular theory in SCM research (Cao and Zhang, 2011). Although, TCE focuses on cost reduction, there is little attention to the matter of sustainability of firms' competitive advantage (Miles and Snow, 2007). Therefore, RBV has been combined with TCE to gain both views of cost reduction and competitiveness of the firm (Carter and Rogers, 2008; Barney et al., 2001).

3.3.1 Foundation of RBV

The main concepts of RBV include the firms' resources, capabilities, and strategic assets (Barney, 1991). The foundation of RBV argues that the performance of the firms are dependent on these strategic resources. Such resources include core competencies (Javidan, 1998; Prahalad and Hamel, 1990), dynamic capabilities (Teece et al., 1997) and absorptive capacity (Cohen and Levinthal, 1990).

According to Prahalad and Hamel (1990), core competencies are the key characteristics of the core or main products of the firm. Core competencies also considered a collective learning across functions within an organisation (Prahalad and Hamel, 1990). In RBV, the core competencies of the firm are the critical factor of competitive advantage (Kroes and Ghosh, 2010).

The framework of *dynamic capability* focuses on how and where firms create and capture capabilities from thier resources (Teece et al., 1997). In RBV, it is also believed that competitiveness of the firm can be derived from their capability to utilise their resources in the changing environment (Eisenhardt and Martin, 2000).

Absorptive capacity is ability of the firm to utilise resources to achieve efficiency and knowledge creation (Malhotra et al., 2005; Cohen and Levinthal, 1990). Such ability include assimilation, transformation, acquisition, and exploitation. Absorptive capacity is another key to enhance competitive advantage of the firms (Malhotra et al., 2005).

3.3.2 RBV and sustained competitive advantage

In RBV, firms combine their resources in a unique manner to establish a competitive advantage over their competitors (Barney, 1991). To sustain their advantage, such an approach has to be difficult to replicate (Barney et al., 2001; Dyer and Singh, 1998). To gain a sustained competitive advantage, firms may own scarce resources and assets and utilise them together with their core capability and competencies (Knudsen, 2003; Barney, 1991). RBV argues that an investment on relational specific assets can build competitive advantage of the supply chain partners because such assets are scarce and difficult to imitate (Jap, 2001; Barney, 1991). Moreover, supply chain collaboration enable the firms to focus on their core competencies. This results in increased specialisation and improved economy of scale, enhancing their competitive advantage (Barney, 2012; Park et al., 2004; Barney, 2001).

RBV has a primary focus on explaining the impact of firms' strategic resources, core competencies and capabilities on the performance, economic rents and sustained competitive advantage of the firm (Barney, 1991; Grant, 1991). The terms *resources* and *capabilites* can be used interchangeably as both tangible and intangible assets employed according to the strategy of the firm (Ray et al., 2004).

Moreover, RBV argues that firms possessing strategic resources will have more potential to benefit from opportunities and mitigate the impacts of threats in the business

circumstances rather than those who possess only marginal resources (Cousins and Menguc, 2006; Barney, 1991). Such resources have to be non-substitutable and non-imitable as well as scarce among the competitors of the firms (Barney, 2012; Cousins and Menguc, 2006).

According to the possibility of an incomplete market for such resources, it is argued that the strategic resource should be utilised within the boundary of the firm (Dierickx and Cool, 1989). However, some resources, that cannot be bought or exchanged such as reputation, have to be developed within the firm over a significant time period. Hence, such resources are considered as the non-tradable and non-transferable resources which are the key to building competitive advantage of the firm (Cousins and Menguc, 2006). The resource attributes in RBV are summarised in the Table 3.2.

3.3.3 Extended RBV

It has been argued that such strategic resources are also available beyond the boundary of the firm (Das and Teng, 2000). Hence the collaboration between supply chain partners may also be viewed as another source of exploitation of the resources to improve competitive advantage of the firm (Afuah, 2001). This perspective of the boundaries of strategic resources firms may exploit has shifted the view of the *firm as an island* to the boarder view of the resources, capabilities and competitive advantage of the firm. In a network and supply chain perspective, RBV can be applied with other theories such as Resource Dependency Theory (Hillman et al., 2009) or Collaborative Network Theory (Ireland et al., 2002). This development of RBV also changes the unit of analysis from a firm to dyadic relationship between supply chain partners or the whole supply chain or network. Such a developed framework of RBV is also termed as the *extended resource-based view of the firm* (Cao and Zhang, 2011; Mathews, 2003).

The realisation that resources can be acquired externally (Mathews, 2003) has at-

Table 3.2: Summary of Resource Attributes in RBV

Resource Attribute	Terminology
Ex ante limits to competition	
Value	Value (Barney, 1991; Dierickx and Cool, 1989)
Rarity	Rare (Barney, 1991)
	Scarcity (Amit and Schoemaker, 1993)
	Idiosyncratic assets (Williamson, 1979)
Appropriability	Appropriability (Pierper, 1996; Hamel and Prahalad, 1994; Amit and Schoemaker, 1993; Grant, 1991)
Ex post limits to competition	
Imitability	Imperfect imitability: history dependent, causal ambiguity, social complexity (Barney, 1991)
	Replicability (Grant, 1991)
	Inimitability (Amit and Schoemaker, 1993; Andrews, 1987)
	Uncertain imitability (Lippman and Rumelt, 1982)
	Social Complexity (Fiol, 1991)
	Causal ambiguity (Dierickx and Cool, 1989)
Substitutability	Non-substitutability (Barney, 1991)
	Transparency (Grant, 1991)
	Substitutability (Das and Teng, 2000; Barney, 1991)
	Limited substitutability (Amit and Schoemaker, 1993; Dierickx and Cool, 1989)
	Substitutes (Black and Boal, 1994)
Mobility	Imperfect mobility (Barney, 1991)
	Transferability (Grant, 1991)
	Low tradability (Amit and Schoemaker, 1993; Dierickx and Cool, 1989)
	Tradability (Black and Boal, 1994)

Source: Adopted from (Wade and Hulland, 2004, p.118)

tracted more studies to investigate the role of the RBV in inter-firm relationships (Cousins and Menguc, 2006; Ireland et al., 2002). The inter-firm relationships are viewed as the mechanism for acquiring the resources outside the boundary of the firm (Grant, 1991) that could fill the gaps between strategic goals and the current resources possessed the firm (Mathews, 2003). However, only some inter-firm relationships are relevant to this application, one of them is supply chain collaboration (Araujo et al., 1999).

In a classical theory on competitive advantage, the variation of the firm's competitive advantage has been explained by resources, capabilities and strategies of the firm (Porter, 1985; Prahalad and Hamel, 1990; Barney, 1991; Persson, 2001; Cao and Zhang, 2011). According to Penrose (1959), resources are the key to increase competitive advantage of firms when they are properly used. Such argument has contributed significantly to the development of RBV (Kor and Mahoney, 2004). Then an influential paper in the Journal of Management titled "*Firm resources and sustained competitive advantage*" by Barney (1991) has made a significant step to formalising RBV as a theory. In Barney (1991)'s article, there were two fundamental assumptions of the RBV. First, resources and capabilities are heterogeneously distributed among firms. Second, resources are imperfectly mobile.

According to such assumptions, there are the differences in firm resource endowments to both exist and persist over time. Hence firms can achieve a resource-based competitive advantage (Barney, 1991). Barney (1991) also argued that valuable resources (i.e., the resources that are useful in order to exploit business opportunities and/or minimise impacts from threats) and rare resources (i.e., unique, uncommon with other competitors) could yield a competitive advantage and increase performance of the firm in the short term (Wong and Karia, 2010). Furthermore, to sustain such a competitive advantage, the resources have to be difficult and costly to imitate and be substituted (Barney, 1991). When the sources of competitive advantage of the firm is perceived as *causal ambiguity*, it is costly and difficult for other competing firms to imi-

tate (Barney, 1991, 2012). The degree of ambiguity depends on the degree of tacitness, complexity, and specificity (Reed and Defillippi, 1990).

In RBV resources are important, possession alone does not create much benefit (Barney, 1991). To achieve the higher level of competitive advantage, firms must not only possess but also utilise such resources (Rubin, 1973). Mahoney and Pandian (1992) also argued that resources are not the reason firms possess competitive advantage, but rather the capabilities to maximise the utilisation of the resource in a unique way are more important. There is evidence of the gaps between *resource possession* and *resource exploitation* (Priem and Butler, 2001; Barney and Arikan, 2001). RBV literature was criticised that the knowledge of where, when and how resources may be useful to the firm still remains a *"black box"* (Priem and Butler, 2001). To open this black box, the concept of *dynamic capability* was introduced by Teece et al. (1997, p. 516) as *"the firm's ability to integrate, build and reconfigure internal and external competences to address rapidly changing environments"*. These argument then offered the avenue of the research on the process of resource configuration in dynamics markets (Eisenhardt and Martin, 2000).

Furthermore, a theory of resource management was suggested to explain the *black box* (Sirmon et al., 2007). This theory provides *"comprehensive processes in structuring a firm's resource portfolio, bundling the resources to build capabilities, and leveraging those capabilities to realise a competitive advantage"* (Wong and Karia, 2010, p. 53). The structuring of the resource portfolio includes the processes (acquiring, accumulating, and divesting) to gather the resources that the firm needs for bundling and leveraging. The resource bundling includes the processes that the firms employed to integrate such resources to develop their capability (Sirmon et al., 2007). Bundling is recognised as the key tool to create and increase value of the resources (Barney, 1991; Wernerfelt, 1984). Moreover, leveraging processes (i.e., mobilising, coordinating, and deploying) can be conducted to enable capabilities of the resource to achieve competitive advantage in specific markets (Sirmon et al., 2007). The whole picture of RBV can be illustrated in

the Figure 3.2
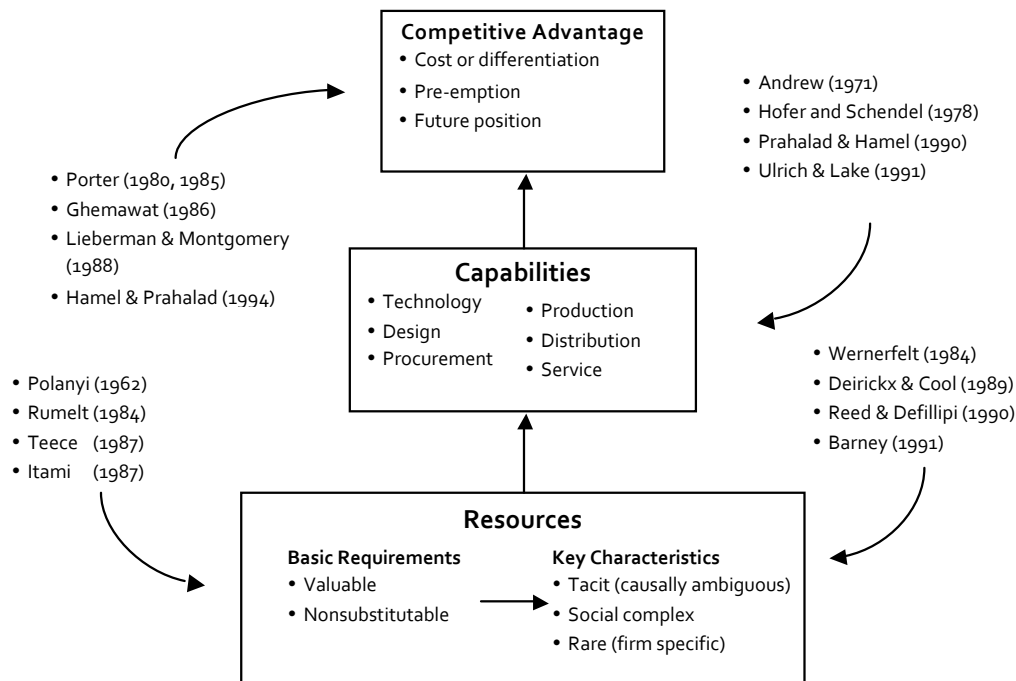
Figure 3.2: Framework of the Resource Based View

Source: Adapted from (Hart, 1995, p.988)
Competitive advantage: Porter (1980, 1985); Ghemawat (1986); Lieberman and Montgomery (1988); Hamel and Prahalad (1994); **Capabilities:** Andrews (1987); Hofer and Schendel (1978); Prahalad and Hamel (1990); Ulrich and Lake (1991); **Resources-Basic requirement:** Polanyi (1962); Rumelt (1984); Teece (1987); Itami and Roehl (1987).

3.3.4 Application of RBV to SCM research

Arguably RBV has received much attention as a foundation to understand how supply chain collaboration could improve firm performance through a development of capability (Kotzab et al., 2003) and competitive advantage (Cao and Zhang, 2011; Collis and Montgomery, 1995). RBV proposes that collaboration between supply chain partners will build their competitive advantage in terms of speed, convenience and reliability of the supply chain operations (Walker et al., 2000).

RBV, like other theories, is not without its critics. The proposed Resource-Advantage (R-A) Theory for SCM research by Hunt and Davis (2008) was also questioned by Barney (2012) and Priem and Swink (2012). Such questions include several aspects of SCM e.g., the need for a demand perspective, level of SCM competition, boundary of the theory, relationships to economic theories of the firm, market imperfection and defensibility of RBV. Recently Hunt and Davis (2012) addressed such critics by extending their propositions in relations to the concepts of neoclassic and Austrian economics (Kraaijenbrink et al., 2010).

3.3.5 Relevance of RBV to this thesis

In this thesis, RBV theory is used to explain the impact of supply chain collaboration on competitive advantage and firm performance (Cao and Zhang, 2011). Particularly on the aspect of resource utilisation in the collaboration process (Barney, 2012; Squire, Cousins, Lawson and Brown, 2009). Although RBV is not a prescriptive theory (Priem and Butler, 2001), it can be used to explain the variation of the firm's sustained competitive advantage, which depends on acquiring and exploiting strategic resources (Barney, 2012). By sharing resources with supply chain partners firms can enhance the capabilities from their resources.

Such collaboration may include an investment in specific resources that yields valuable and scarce capabilities to the firm (Lei and Slocum Jr., 2005). Moreover, collaborative communication can also enhance social capital such as trust, commitment and intangible assets such as knowledge and problem solving skills between the firm and its supply chain partners (Cousins and Menguc, 2006; Rungtusanatham, Salvador, Forza and Choi, 2003). This can reduce transaction costs between collaborating partners (Williamson, 2008; Grover and Malhotra, 2003).

Building on the foundation of RBV, this thesis proposes that supply chain collaboration will give rise to sustained competitive advantage of the firm. This impact of supply chain collaboration is mediated by increased social capital i.e., inter-firm trust and commitment. Then sustained competitive advantage will improve firm performance.

3.4   Resource Dependency Theory

3.4.1   Foundation of RDT

In RBV firms can develop their competitive advantage by uniquely utilising their scarce resources, however in reality it is difficult to obtain such resources alone (BPI and CMO, 2009). Hence firms often need to share resources. Resource Dependency Theory (RDT) argues the role of dependence between firm in terms of resources (Fawcett et al., 2011; Ketchen Jr and Hult, 2007; Salancick, 1979). Therfore, RBV and RDT are very similar as both theories are based on the importance of resources. However, their focuses are different. RDT focuses on how firms become dependent on each other in order to gain required resources (Sarkis et al., 2011). Such resources include raw materials or other types of inputs (Pfeffer, 1978).

In inter-firm relationships, asymmetric interdependence is a key to mitigate environmental uncertainty (Ketchen Jr and Hult, 2007). When firms in the same supply chain collaborate, they usually become more dependent upon each other (Lei and Slocum Jr., 2005). In traditional supply chains, firms aim not to be over-dependent on other firms as they expect opportunism from others (Lui et al., 2009). Moreover, firms with high level of dependence on their supply chain partners tend to possess less power in the relationship (Ireland and Webb, 2007). On the other hand, in collaborative supply chains, resource dependencies are recognised as the sources of unintended and grave consequences, which can ruin collaborative parties (Crook and Combs, 2007). For example, Rossetti and Choi (2005) found that several aerospace manufacturers intended to increase the dependency of their suppliers by forcing their suppliers to re-

duce their profit margins. However, the suppliers decided to sell their products directly to the end customers, and the manufacturers ended up with dramatic losses (Rossetti and Choi, 2005).

3.4.2 Application of RDT to SCM research

From the supply chain collaboration perspective, resource dependencies can be employed to build social attributes i.e., trust or commitment between collaborative partners rather than being used to aggressively exploit the other partners (Ketchen Jr and Hult, 2007; Ireland and Webb, 2007). Even though RDT has not been widely applied in SCM research, this theory can be used to support the implementation of supply chain collaboration in terms of sharing resources to develop social capital between collaborating firms (Petersen et al., 2008).

3.4.3 Relevance of RDT to this thesis

In this thesis, RDT was used to support the causal relationship of sharing resources dimension of collaboration on the mediating variable, trust and commitment between supply chain partners. Therefore RDT can be applied to support a proposition that resource sharing between supply chain partners can build inter-firm trust and commitment between the firms.

3.5 Principal Agent theory

Principle Agent Theory (PAT) has been applied to understand the dynamics in supply chain relationships (Fayezi et al., 2012). In PAT, several problems in inter-firm transaction can arise from the division of ownership and control over economic transaction between the principal and the agent. Such problems include "*conflicting objectives, differences in risk aversion, outcome uncertainty, behaviour based on self-interest, and bounded rationality*" (Halldórsson et al., 2007, p. 287). According to PAT, the mechanism that

governs the relationship between the supply chain partners is the conflict between the two (Segars and Grover, 1998). The objective of PAT is to design and build the contract that minimise such agency problems (Manatsa and McLaren, 2008).

The "*most efficient contract*" should have both the appropriate mix between behavioural-based and outcome-based incentives in order to motivate the agent to behave in the benefit of the principal (Halldórsson et al., 2007; Eisenhardt, 1989; Logan, 2000).

3.5.1 Application of PAT to SCM research

In SCM, aligning the right mix of incentives in a supply chain relationship is critical (Halldórsson et al., 2007). Asymmetric information is the main cause of misalignment of incentives in the supply chain. Hence, creating a formal or informal contract with the right mix of reward and penalties can mitigate such misalignment (Wuyts and Geyskens, 2005; Narayanan and Raman, 2004; Baiman and Rajan, 2002). A summary of SCM research using PAT is presented in Table 3.3.

Table 3.3: Summary of key SCM research using PAT approach

Reference	Sample	Key independent variable(s)	Key dependent variable(s)	Key findings
Lassar and Kerr (1996)	Interview (40) & Survey (sample: 209, responses: 85) in electronics	Three strategies of cost leadership, differentiation, focus	Manufacturer-distributor relationship	To answer how competitive strategies influence inter-organisational relationships
Celly and Frazier (1996)	Manufacturing Interview (20) Ã¿ Survey (sample: 1031, responses: 254)	Environmental uncertainty, supplier/distributor characteristics	Coordination-efforts	To enhance the understanding of outcome- and behaviour-based coordination efforts through developing and testing a conceptual framework
Logan (2000)	Logistics Transportation Conceptual	Information technologies, understanding about norms and values, monitoring, stock ownership, long-term relationships, incentive alignment, trust	Outsourcing (user-provider)	To answer how both the PAT outsourcing user and provider can choose the appropriate partner for their outsourcing relationship and how can those relationships can best be maintained
Simatupang and Sridharan (2002)	Conceptual	Mutual objectives, integrated policies, appropriate performance measures, information sharing, incentive alignment	Collaboration	To examine reasons for conflict in PAT SC and explicate collaborative SC for mitigating these conflicts
Zsidisin and Ellram (2003)	Purchasing Survey (sample:1000, responses:261)	Information asymmetry, organizational objectives, and programm ability of supplier activities	Risk in the purchasing organisation-supplier relationship	To understand how purchasing organisations address risk and to test the relationship between supply risk sources and efforts to manage that risk.

Continued on next page

Table 3.3 – Continued from previous page

Reference	Sample	Key independent variable(s)	Key dependent variable(s)	Objective of study
Zsidisin et al. (2004)	Purchasing (procurement) Manufacturing Multiple case studies	Information systems, outcome uncertainty, goal conflict, relationship length, adverse selection, moral hazard	Assessment of risk in the purchasing organisation-supplier relationship	To explore, analyse, and derive common themes on tools and techniques that purchasing organizations implement for assessing supply risk.
Agrell and Norrman (2004)	Telecom (Modelling)	In-congruent business logic, asymmetric information, incentive structure	Risk sharing and joint coordination (2nd tier supplier-1st tier supplier- OEM)	To critically analyse two key coordination challenges in the telecommunication industry, in order to find theoretical as well as practical arguments for the development of new coordination mechanisms
Zsidisin and Smith (2005)	Aerospace Single case study	Outcome uncertainty, goal conflict, task programmability, adverse selection, moral hazard, performance monitoring	Disruption risk in the purchasing organisation-supplier relationship	To investigate the role of early PAT supplier involvement in managing supply risk
Halldórsson and Skjøtt-Larsen (2006)	Fast-moving consumer goods, Single case study	Goal congruence, risk preference, relationships length	Contract dynamics between buyer and provider of logistics services	To complement the static view of the transaction cost approach and the agency theory on governance structures and contracts by showing how relationship governance emerges and develops over time
Camuffo et al. (2007)	Air- conditioning Survey Â¿ interview	Environmental uncertainty, Risk averseness, moral hazard	Vertical inter-firm relationships and risk sharing (1st tier supplier-manufacturer)	To what extent buyers and suppliers share risk and whether and how the degree of risk sharing relates to supplier's financial, structural, and technological characteristics

Table 3.3 – Continued from previous page

Reference	Sample	Key independent variable(s)	Key dependent variable(s)	Objective of study
Morgan et al. (2007)	Qualitative fieldwork with retailer and supplier managers and primary data from 73 category managers in U.K. supermarket retailers (PLS).	Supplier opportunism, influence level, dependency, monitoring ability, punitive capacity, performance outcome, militant behaviour	Category management relationships (retailer- supplier)	To answer why retailers are either unconvinced or have failed to make focal supplier category management relationships work
Ritchie et al. (2008)	Manufacturing Longitudinal case study	NA.	Risk, performance	To evolve a holistic conceptual framework of SC risk management encompassing the twin dimensions of risk and performance.
Norrman (2008)	High-tech Multiple case studies	Contract and relational governance, incentive alignment. Asymmetric and hidden information, trust	Risk sharing (buyer-supplier)	To extend the knowledge of how risk and gain sharing (incentive alignment) in supply chains could be applied in practice
Cheng and Kam (2008)	Conceptual	Structure of network relationships, incentives, supply performance	Dynamics of risk in network collaboration	To develop a conceptual framework for analysing the differential risks in alternative supply network structures
Manatsa and McLaren (2008)	Conceptual	Information sharing, incentive alignment	NA.	To help explain the reasons firms are reluctant to share information and guide the design of incentives to redistribute risk and encourage information sharing in a supply chain.

Continued on next page

Table 3.3 – *Continued from previous page*

Reference	Sample	Key independent variable(s)	Key dependent variable(s)	Objective of study
Villena et al. (2009)	Manufacturing Survey (sample: 932, responses: 133)	Compensation and employment risk, environmental volatility	Integration	To develop guidelines for designing an employment and compensation system for the SC executives in order to encourage SC integration through the development of supply chain partnerships.
Vanany et al. (2009)	Manufacturing Multiple case studies & Focus group	Internal alignment	Relationships, creativity	To investigate how marketing and supply management (two principals) can achieve internal alignment in working with the supplier (agent) and to gain an understanding of how contractual agreements influence the alignment between the buying company and the service provider
Min et al. (2005)	Manufacturing Conceptual	Contractual mechanisms	Vulnerability	To propose using agency theory for assessing the likelihood of quality fade in buyer-supplier relationships and prescribing contractual mechanisms for reducing quality fade
Ciliberti et al. (2009)	Manufacturing Multiple case studies	Code of conduct (SA8000), moral hazard, adverse selection	Power imbalance in chain directors-partners (i.e. SMEs) relationship	To examine how a specific code of conduct (i.e. SA8000) can address the principal-agent problem, for SMEs, between chain directors and partners.
Nyaga et al. (2010)	Two separate surveys of 370 buyers and 255 sellers in USA	Supply chain collaboration, trust, commitment	Performance, satisfaction	Both buyers and sellers perceive that collaboration positively affect performance and relationship satisfaction via an increased trust and commitment.

Source: Developed from Fayezi et al. (2012, p. 559-561)

3.5.2 Application of PAT to this thesis

In this thesis, PAT was adopted to support an *incentive alignment* dimension of supply chain collaboration. Appropriate alignment of the incentives for the supply chain partners can build mutual trust and develop commitment among the two parties (Simatupang and Sridharan, 2005). An appropriate incentive alignment in the supply chains is expected to build trust and commitment between collaborating firms. Moreover, this will also improve intention of both partners to increase their performance to earn fair rewards. Furthermore, strong relationships in the supply chain will also be a source of competitive advantage (Simatupang and Sridharan, 2004).

3.6 Social Exchange Theory

Social Exchange Theory (SET) has developed from various disciplines since 1920s (Cropanzano and Mitchell, 2005; Malinowski, 1932; Mauss, 1925). SET stemmed from the economic theory of human behaviour, then further developed in Anthropology, Sociology, philosophy, and Social and behavioural psychology (see Table 3.4). However, they share a similar focus on relationships and interactions between actors. The theory focuses on how firms build relationships with their supply chain partners (Kingshott, 2006) and the norms of reciprocating benefits that persons act based on expected costs and benefits of the relationships (Blau, 1964).

3.6.1 Application of SET to SCM research

SET has been widely applied to examine organisational behaviours (Cropanzano and Mitchell, 2005) in the supply chains (Nyaga et al., 2010). Based on theoretical principal of SET foundation, when considering collaborative approaches, relational ties of the transacting firms is critical (Nyaga et al., 2010; Kingshott, 2006). Therefore trust and commitment have been found as key drivers in the collaboration-based relationships (Wagner et al., 2011; Nyaga et al., 2010; Griffith et al., 2006; Morgan and Hunt, 1994).

Table 3.4: Foundations of SET in different disciplines

Disciplines	Focus	Reference
Anthropology	Elements of social organization	Firth (1951)
Sociology	Social behaviour as exchange and norm of reciprocity	Homans (1958); Gouldner (1960); Homans (1961); Blau (1964); Emerson (1976)
Social psychology	Social psychology of groups and procedure	Thibaut and Kelley (1959); Thibaut and Walker (1978)
Behavioural psychology	Theory of learning, social foundations of thought and action	Skinner (1950); Bandura (1986)
Philosophy	A theory of justice	Rawls (1971)
Economics	Human behaviour in economic activities	Smith (1776); Ricardo (1817)

Trust and commitment are not considered coercive or controling but social mechanisms (Hon and Lu, 2010; Kwon and Suh, 2005). Hence when firms adopt bilateral mechanisms, they should focus on aligning incentives, not on preventing opportunism in the relationship (Kingshott, 2006; Ghoshal and Moran, 1996). Therefore there is the opportunity "*to become a self-fulfilling prophecy* "(Nyaga et al., 2010, p. 103).

In association with TCE, SET can be applied either when social exchange is in an economic transaction or when there is an economic exchange is in the social transaction (Cropanzano and Mitchell, 2005). Figure 3.3 illustrates how economic and social exchange can be analysed in either social and economic relationship.

In the context of supply chain collaboration, which is an economic transaction, social exchange usually takes place between supply chain partners (Williamson, 2005*b*; Koblun, 2011; Fawcett et al., 2011; Wagner et al., 2011). Hence SET contribute to this

Figure 3.3: Transactions and relationships in social and economic Exchanges

Type of Transaction

	Social Exchange	Economic Exchange
Type of Relationship		
Social relationship	**Cell 1: Match** Social Transaction in a social relationship	**Cell 2: Mismatch** Economic transaction in a social relationship
Economic relationship	**Cell 3: Mismatch** Social Transaction in an economic relationship	**Cell 4: Match** Economic transaction in an economic relationship

Source: Cropanzano and Mitchell (2005, p. 887)

issue using the concept of *credible commitment*, which refers to how a firm should give and receive commitment when the *"hazards of opportunism"* arises (Williamson, 1993, p. 459). The assumption on opportunism refers to the adoption of either rational or coercive control mechanism (Ghoshal and Moran, 1996), which remove the ability of social structure to affect firm performance (Uzzi, 1997). According to Powell (1990, p. 300), *"certain forms of exchange are more social-that is, more dependent on relationships"*. SET suggests that in the exchange relationships, social exchange attributes e.g., trust and commitment are critical determinants of firm performance (Palmatier, 2008).

3.6.2 Application of SET to this thesis

In this thesis, SET was applied to support the mediating role of trust and commitment in the mechanism of supply chain collaboration. By collaborating with supply chain partners (e.g., frequent communicating, joint team-working or sharing resources or information), firms can develop social capital (i.e., trust and commitment) in the exchange relationships. Such social attributes in the supply chain relationship will reduce opportunism that results in a reduction of transaction costs and improve the

performance of the firm.

3.7 Collaborative Network Theory

The key determinants of the performance of the firm not only include the effectiveness of the cooperation between the firm and its partner but also with the partners' partners (Halldórsson et al., 2007). Collaborative Network Theory (CNT) is used as the foundation of the reciprocal effect in inter-firm relationships (Oliver, 1990). Hence, the interactions between firms and other players in the tiers of the supply chain become more vital (Håkansson and Ford, 2002).

An effective relationship among supply chain partners can help facilitate a combination of the resources owned by the the firms. Resource combination results in better outcomes than those achieved by a single firm acting alone (Halldórsson et al., 2007). This combination can be called a quasi-organization (Håkansson and Snehota, 1995; Håkansson, 1987) or supply chain collaboration (Cao and Zhang, 2011; Simatupang and Sridharan, 2005). CNT argues that the value of the resources can be expanded by its combination with other resources, then building effective inter-firm relationships within the network or supply chain can be more important the resource possessions *per se* (Halldórsson et al., 2007). Therefore, the efforts of the firms in terms of creating successful relationships with their supply chain partners are important (Halldórsson et al., 2007).

The significant contribution of CNT to the determination of the inter-firm relationships is the role of *"personal chemistry"* between the supply chain partners. Such personal chemistry includes trust via supply chain collaboration such as communication as well as mutual adoption in terms of management systems and culture (Oliver, 1990). By establishing information sharing and collaborative communication, firms can build the relationships with their supply chain partners through the social exchange process

to improve their performance (Halldórsson et al., 2007).

In CNT, a network is believed to be in a state of dynamic momentum, rather than a point of optimal equilibrium (Halldórsson et al., 2007). Hence collaboration between firms and their supply chain partners aims to govern such dynamics, which includes both exchange process e.g., information, products (goods and services) and social exchange and adaptation process e.g., personal, technical, legal, logistics and administration process (Nyaga et al., 2010; Johanson and Mattsson, 1987). Based on CNT, a comparison of forms of economic organisation is presented in the Table 3.5.

Table 3.5: Comparison of Economic Governance Forms

Key feature	Forms		
	Market	**Network**	**Hierarchy**
Normative basis	Contract, property rights	Complementary strength	Employment relationship
Means of communication	Prices	Relational	Routines
Methods of conflict resolution	Haggling, resort to courts for enforcement	Norm of reciprocity, reputational concern	Administrative fiat, supervision
Degree of flexibility	High	Medium	Low
Amount of commitment among the parties	Low	Medium to high	Medium to high
Tone or Climate	Precision and/or suspicion	Open-ended, mutual benefits	Formal, bureaucratic
Actor preferences or choices	Independent	Interdependent	Dependent
Mixing of forms	Repeat transactions (Geertz, 1978), contract as hierarchical documents (Stinchcombe, 1985)	Status hierarchies, mutual partners, formal rules	Informal organisation (Dalton, 1957; Stagner, 1961), Market-likes features: profit centres, transfer pricing (Eccles, 1985)

Source: Adapted from Powell (1990)

3.7.1 Application of CNT to SCM research

In SCM, CNT has been applied to map the supply chain in terms of activities, actors and flows of the resources (Collis and Montgomery, 1995). The main focus of CNT is to develop long-term relationships based by building mutual trust between supply chain partners (Gadde and Håkansson, 2001; Fayezi et al., 2012).

3.7.2 Application of CNT in this thesis

In this thesis, CNT was used to explain the impact of collaboration on firm performance. Different types of supply chain collaboration are defined based on CNT. They are information sharing, frequent two-way communication. Moreover, CNT also explain the role of social capitals in the relationship such as trust and commitment in mediating the impact of supply chain collaboration on firm performance.

3.8 Conclusion

This chapter reviewed six relevant theories to supply chain collaboration and its outcomes. These theories were included in this thesis because they explain the benefits and/or the impacts firms may receive if they collaborate with their supply chain partners. The selection of theories in this chapter also consults several papers reviewing the applications of theories in SCM research (Chicksand et al., 2012; Soni and Kodali, 2012; Richey et al., 2010; Cousins, Lawson and Squire, 2006; Burgess et al., 2006). A summary of theoretical approaches to supply chain collaboration and relationships as well as their relevance to this thesis are summarised in Table 3.6. This chapter found that Transaction Cost Economics (TCE) is a dominant theory explaining the nature of relationship between the firms. This finding is consistent to other theoretical reviews (Chicksand et al., 2012; Wilding and Humphries, 2006), partly because the well-developed application of TCE to the outsourcing decisions (Williamson, 2008) and institutional analysis of the firm and its supply chain partners (Tate et al., 2011).

Table 3.6: Summary of different theoretical approaches

Theoretical views	TCE	SET	RBV	RDT	PAT	CNT
Managerial philosophy and focus	Minimize transaction costs	Build relationship	Create competitive advantages	Maximise resource utilisation	Sustain the long term relationship	Create a sustain network
Conceptual origins & grounding	Safeguard assets Economics	Focus on inputs Sociology	Resource utilisation and competitive advantages	Common and shared resources	Power and relationships	Interaction and partnerships
Underlying assumptions	Bounded rationality & opportunistic behaviour, Individuals act opportunistically Need for uncertainty reduction, Risk neutrality	Moral obligations between actors Inherent reciprocity, Interdependence through socialization	Only firm's resources that are valuable, rare, inimitable and non-substitutable can generate sustained competitive advantage.	Firms depend on resources own by their partners.	Bounded rationality, Asymmetric information, Goal conflicts	Trust and information sharing, Win-win situation, Bounded rationality
Governance Mechanisms	Contractual/legal Hierarchical	Trust, Relational norms Bilateral inputs required	Relationships between power and competitiveness.	Common resource	Relations (trust, commitment), Information (communication, information sharing),	Human interaction and relationship
Managerial Benefits & burdens	More partner control Greater internalized certainty Relational specifications in advance	Greater flexibility Interactive and adaptive, Higher efficiency	Differentiated competitive advantages	Maximised resource utilisation	Identifying the costs and benefits of SC integration	Network relationship
Application to this thesis	Role of transaction costs, trust, asset specificity, performance	Mediating role of trust and commitment	Resources exploitation, sustained competitive advantage, performance	Shared resources, trust and commitment	Risk sharing, incentive alignment, trust and commitment	Supply chain collaboration, trust and performance
References	Coase (1937); Williamson (2005b); Grover and Malhotra (2003)	Kingshott (2006)	Barney (2012); Wong and Karia (2010); Barney (1991)	Ketchen Jr and Hult (2007); Chicksand et al. (2012)	Fayezi et al. (2012); Logan (2000)	Halldórsson et al. (2007)

Note: TCE = Transaction Cost Economics, RBV = Resource Based View, SET = Social Exchange Theory, AGT = Agency Theory, RLV = Relational View, CNT = Collaborative Network Theory

In the next chapter (5), the research methods employed in this thesis will be presented with a discussion of the philosophical stance of the thesis. A link of this chapter to the next chapter in the thesis is shown in Figure 3.4
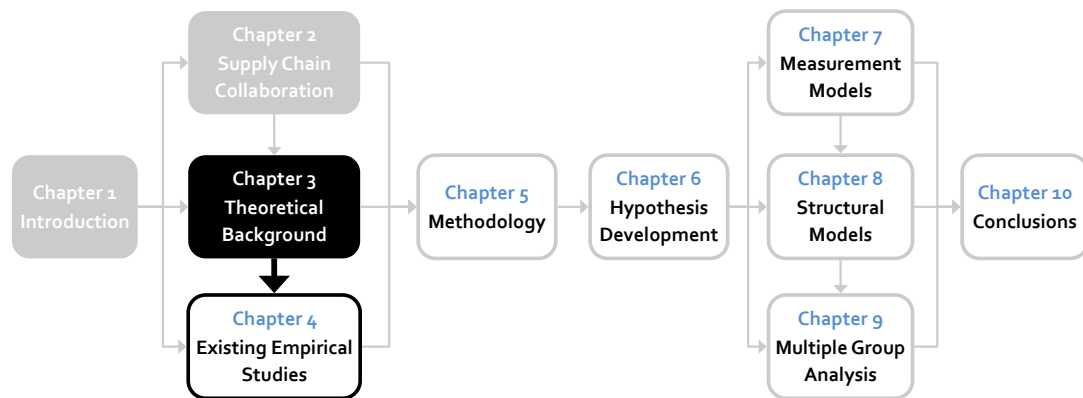
Figure 3.4: A direction of chapter 3 to the next chapter

Chapter 4

Tourism Supply Chains

If I have seen a little further,
it is by standing on the shoulders of
Giants.

Sir Isaac Newton (1642 - 1727)
An English physicist & mathematician

4.1 Introduction

This chapter presents the last part of the review chapters of this thesis, which is the tourism supply chains. This chapter is designed to be able to stand alone in the thesis. Hence readers who only would like to learn about the tourism supply chain. However the key role of this chapter is be a foundation of the thesis in terms of the research setting. By understand the nature of tourism supply chains, both similarities and differences from other types of supply chains, readers will be able to comprehend the way the thesis has been developed and how the research findings are discussed.

This chapter illustrate the development of the definition and framework of tourism SCM. This is the context of this thesis. Using this framework, research on tourism

SCM was systematically reviewed (Seuring and Gold, 2012). This chapter also presents the current state of tourism SCM research in Thailand - the country where data were collected for this study. This chapter aims to provide a fundamental understanding of the characteristics of the tourism sector and how SCM can be applied since it is a new sector that SCM research that has rarely been explored (Zhang et al., 2009). Position of this chapter in the thesis is presented in Figure 4.1.
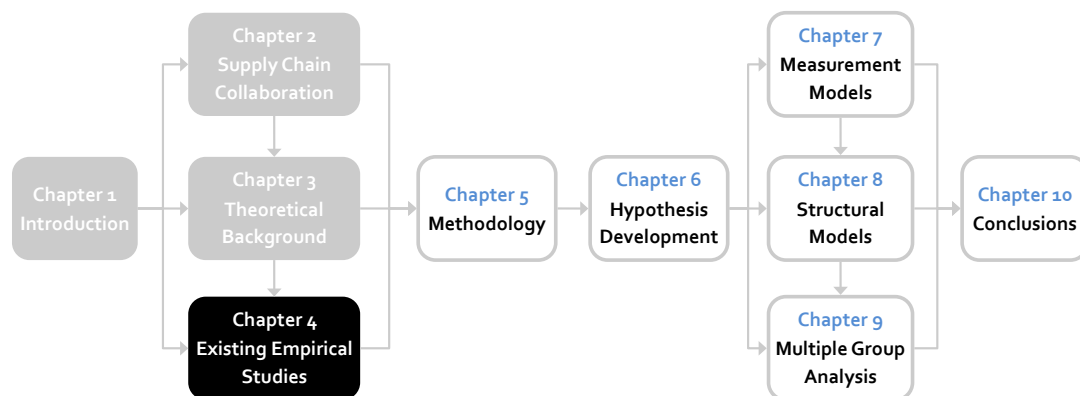
Figure 4.1: Position of the chapter in this thesis

4.2 Significance of the tourism sector

No matter what the economic climate, tourism has a significant impact on global and local economies (International Labour Organization, 2010; Antunes, 2000). During economic booms, the tourism (especially international tourism) sector absorbs wealth from people on trips away from their homes (Lee and Chang, 2008; Kim et al., 2006). On the other hand, during an economics crisis, domestic tourism is one of the key mechanisms for restoring the economy. Furthermore many governments perceive that tourism creates new jobs (Page, 2009; Seckelmann, 2002).

Tourism has been recognised as a complex system (Véronneau and Roy, 2009; McKercher, 1999; Smith, 1994; Jafari, 1974). Business management in the tourism industry needs to critically consider supply chain perspectives not only to increase their efficiency and profitability (Véronneau and Roy, 2009; Zhang et al., 2009) but also to ensure sustainability of the performance of the firm (Schwartz et al., 2008). Such sustained performance could be achieved through coordination or cooperation of the network of tourism firms (Lemmetyinen, 2010). Recently it was found that accommodation firms play a critical role in sustaining tourism supply chains (Font et al., 2008). Furthermore, research shows that economic benefit is a vital driver of sustainable tourism supply chains (TSC) for tour operators (Spasić, 2012).

4.3   Importance of tourism supply chain

Tourism Supply Chain Management (TSCM) is currently emerging as a new research agenda (Song, Liu and Chen, 2012; Zhang et al., 2009). One of the reasons for this is that SCM has already become a critical source of an organisation's competitive advantage (Cao and Zhang, 2011; Christopher, 2011) and sustainability of the tourism firms (Schwartz et al., 2008; Font et al., 2008). Thus SCM is considered to be a vital part of this kind of business. However, research on TSCM is still rather immature and very limited at the moment (Song, Liu and Chen, 2012; Zhang et al., 2009). Consequently, the objective of this section is to provide a research framework for TSCM research. This framework is then used to review the TSCM literature.

4.4   Defining the tourism supply chain

Since tourism supply chain is a relatively new topic (Zhang et al., 2009), there is a need to introduce the concept and definition (Song, Liu and Chen, 2012). To define the tourism supply chains, four steps were conducted. These four steps are (1) defining the tourism industry, (2) specifying special characteristics of tourism, (3) identifying

tourism supply chain components, and (4) outlining flows and processes. Details of each step are presented in the following sections.

4.4.1 Step 1: Defining the tourism industry

The terms **tourism**, **travel** and **hospitality** could mis-lead researchers (Pizam, 2009). Therefore, it is critical to clarify the definition of tourism. Firstly, services provided by the hospitality and travel industry are partly for tourism purposes. Moreover, there are also non-tourist customers in both the hospitality industry and the travel industry (Smith, 1988). Precisely, we can identify distinct activities in the tourism industry by considering whether they serve tourists (see Figure 4.2).
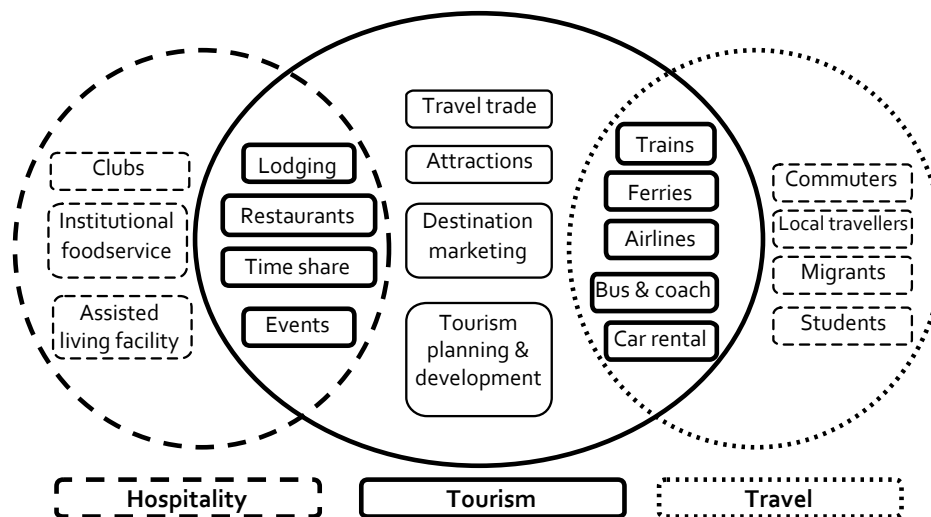
Figure 4.2: The Relationship between the Tourism, Hospitality and Travel Industries
Source: Based on Pizam (2009, p. 183).
Key: Bold oval is an area of the tourism sector; **dashed oval:** An area of the hospitality sector; **dotted oval:** An are of the travel sector.

4.4.2   Step 2: Specifying special characteristics of tourism

There are two main distinctive characteristics of the tourism industry. First, on the supply side, tourism is not a pure manufacturing or pure service industry (Page, 2009; Zhang and Murphy, 2009; Jafari, 1974). It is a mixture of products combining services and goods (Calantone and Mazanec, 1991). Tourism is a very complex system consisting of *"various different sectors with functional and spatial interconnectivity within"* (Leiper, 1979, p. 390).

Tourism supply chains (TSCs) consist of various parties that are highly connected (March and Wilkinson, 2009; Zhang et al., 2009; Eadington and Redman, 1991). Thus coordination in TSCs is required to ensure the flows of goods and services. Second, on the demand side, tourism demand has been recognised as being complicated (Sigala, 2008; Lafferty and van Fossen, 2001). High volatility and sensitivity to the disturbances requires an insightful knowledge to successfully manage tourism operations.

4.4.3   Step 3: Identifying tourism supply chain components

A generic supply chain usually comprises of raw material providers, suppliers, manufacturers, distributors, wholesalers, and retailers. However, it is not suitable to use this approach to describe the TSCs because it is a complex system that consists of various supply chains. Therefore, it could be more meaningful to use a correlation matrix approach (Figure 4.3) that is derived from the tourism supply chain links (Tapper and Font, 2004, p.4).

According to the figure 4.3, tourism supply chains consist of various components linking to each other. However, components in tourism supply chains can be classified by their functions as follows.

1. **Input providers (Raw materials)**

Tourism supply chain components	1.	2.	3.	4.	5.	6.	7.	8.	9.	10.	11.	12.	13.	14.	15.	16.
1. Transports to & from destinations	■															
2. Ground transport	★	■														
3. Ground operations	★	★	■													
4. Excursions & attractions	Δ	★	O	■												
5. Cultural, social and sport events	Δ	★	★		■											
6. Furniture and crafts				★		■										
7. Infrastructures, service & resources of destinations	O	O	Δ	O	O		■									
8. Energy and water supplies	O	★	★	O	O	★	O	■								
9. Waste recycling & disposal	Δ	Δ	★	O	O	★	★	★	■							
10. Foods production	O		★	★	Δ		Δ	★	★	■						
11. Laundry								★	★		■					
12. Caterings, foods and beverages	O			★	★		Δ	★	★	★		■				
13. Accommodations	O	★	★	O	O	★	★	★	★	★	★	★	■			
14. Tour operating	★	★	★	★	★	Δ	★	★	★	Δ	Δ	O	★	■		
15. Marketing & sales	O	O	★	★	★	O	O			Δ	O	O	O	★	■	
16. Customers	★	★	O	★	★	★	★	★	★	★	★	★	★	★	★	■

Figure 4.3: Correlations matrix of components in the tourism supply chains
Source: Extended from Tapper and Font (2004)

Key: ⋆ Supply chain link (Tapper and Font, 2004, p. 4)

O Critical correlation between TSC components

△ Moderate correlation between TSC components

Blank No significant correlation between TSC components

As the second tier supplier, input providers have a role of supplying resources and materials for service operations in the first tier (Zhang et al., 2009; Smith, 1994). Input providers can be classified into different types by materials they supply. However, one of the important input providers is the food suppliers or the food supply chain (Font et al., 2008; Telfer and Wall, 1996). Webster (2001) discussed the scope and structure of food supply chains from the sources of primary inputs (resources), they are the agriculture sector, wholesalers, retailers, and final customers (Smith, 1994).

2. **Service providers (service producers)**

Service providers (first-tier suppliers) are considered to be the core components of TSCs (Zhang et al., 2009; Tapper and Font, 2004), and are argued to be the dominant player (Harewood, 2008). These service providers such as hotels or airlines are in direct contact with the customers by delivering the services, although intermediaries (tour agencies or tour operators) may process transactions (Véronneau and Roy, 2009). Therefore, satisfaction of the tourists predominantly depends on the performance of service providers (Yilmaz and Bititci, 2006).

3. **Intermediaries: tour agencies and tour operators (product assemblers)**

Tour operators and tour agencies have a massive influence on TSCs (Johnston et al., 2012; Font et al., 2008; Schwartz et al., 2008). The critical role of the tour operator is controlling the flow of tourists and partly managing the tourism supply chain (Zhang et al., 2009; Muhcină and Popovici, 2008). Considering this vital role of tour operators as *"a gatekeeper of the tourism supply chain"* (Ioannides, 1998), they may be considered to be forth-party logistic service providers (4PLs), acting as architects, designing the supply chain. The role of intermediaries in the tourism supply chain is illustrated in Figure 4.4.

4. **Freight transport (physical flow connectors)**

In a typical supply chain, freight transport is the integrator of the physical flow
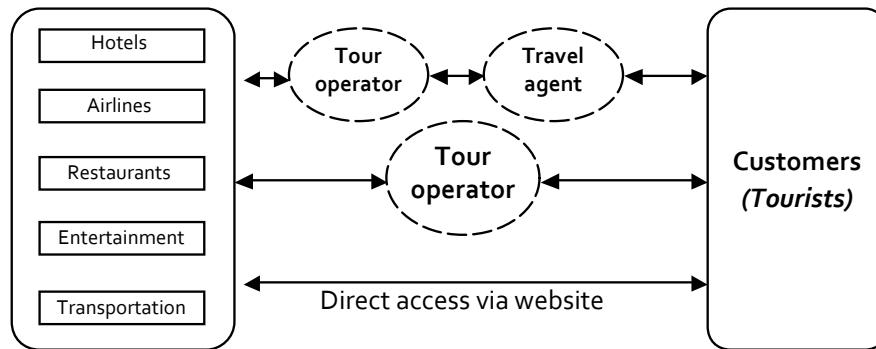
Figure 4.4: Intermediaries in Tourism Supply Chains

(Comelli et al., 2008). In TSCM, freight transport still has an important role to ensure the seamless transactions between input providers and service providers (Véronneau and Roy, 2009; Palhares, 2003). Various techniques for managing efficient transport operations in traditional supply chain, such as Vendor Managed Inventory (Disney et al., 2003) or Factory Gate Pricing (Potter et al., 2007), could be also applicable to TSCM.

5. **Passenger transport (customer flow enablers)**

Both freight transport and passenger transport plays a significant role in TSCM. Importantly the role of passenger transport is to seamlessly move the tourists along their trips (Duval, 2007; Fawcett, 2000).

6. **Supportive sectors**

According to the previous discussion, the tourism supply chain is considered a complex system. There are various supply chains embedded in a tourism supply chain (Muhcină and Popovici, 2008; Tapper and Font, 2004). Apart from the components of the tourism supply chain discussed previously, it is noteworthy to state that there are also other important components i.e., souvenirs, energy and waste management which are rarely studied (Zhang et al., 2009). Their role is to support the main operations of the tourism supply chain which is to deliver the services to customers or tourists.

4.4.4   Step 4: Outlining flows and processes

Finally flows and processes of the tourism supply chain were outlined by proposing a generic tourism supply chain model (Figure 4.5), which is derived from combining perspectives of both the demand and the supply side such as relationship with the supplier (Tao et al., 2009). In this model, there are three major flows including physical flow (Zhang et al., 2009), information flow (Bigné et al., 2008; Go and Williams, 1994), and customer or people flow (Djordevic and Arsić, 2010; Fawcett, 2000). To enable seamless information flow in the tourism supply chain, information technology such as the Internet has a critical role (Kaya and Azaltun, 2012).

The generic model of the tourism supply chain (Figure 4.5) represents components and flows in typical tourism supply chain that can be divided into three stages.

- **Stage 1: Before the trip**

  First, after making the decision to have a holiday, a future tourist arranges a trip via information inquiries and booking procedures with tour agencies or via the Internet. Then the prospective tourist can book the trip (as a whole or separately) with travel agencies or with tour operators. The tourist may also book such services directly with service providers (e.g., transports, accommodations or tourist attractions).

- **Stage 2: During the trip**

  The second stage is a combination of supply chains that deliver services to the tourists such as lodging (hotels), catering (restaurants), products (souvenirs) , and the passenger transport supply chains. There are two tiers of suppliers: the first tier are , service providers that serve directly customers (tourists). In the second tier are input providers who supply resources for service operations such as Foods and Beverages or equipment.

- **Stage 3: After the trip**
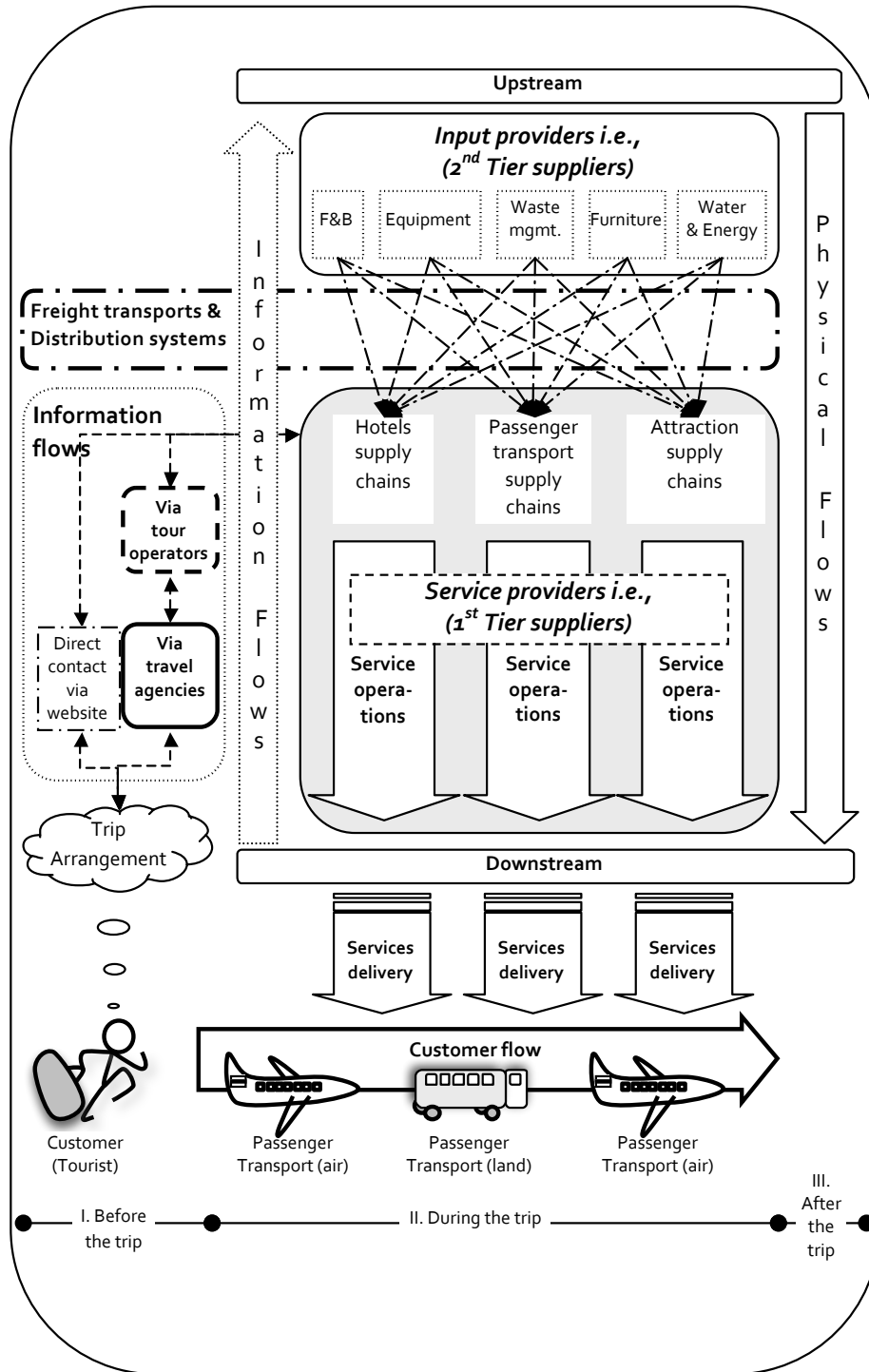
Figure 4.5: A generic model tourism supply chain

The third stage is after the trip. When the trip is completed, there may be activities between tourists and service providers or travel agencies. Such activities include customer feedback on the previous trip or continued marketing campaigns for future trips.

Despite tourism supply chain can be categorised into different stages, they are highly interrelated (Vieira et al., 2011). Hence collaboration between tourism supply chain partners is an important issues (Kaya and Azaltun, 2012; Chen and Yi, 2010). Next section will then discuss a topic of supply chain collaboration in tourism.

4.5   Supply chain collaboration in tourism

Collaborative partnerships have a critical influence on the success of the tourism supply chain (Cho, 2004). Based on discussions on supply chain collaboration in Section 2.3.5, intra-sector collaboration means the collaboration between a hotel and another hotel or accommodation provider (Selin, 1994). Inter-sector collaborations are the collaboration between firms in the different sectors but the same tier such as the collaboration between firms in *the accommodation* sector and *tourist attraction* sector (Zhang et al., 2009). These two sectors are in the tier of service providers.

4.5.1   Horizontal collaborations

Horizontal collaboration refers to the collaboration between firms in the same level of the supply chain (Barratt, 2004) such as between a hotel and other service providers e.g., theme park (Yang, Huang, Song and Liang, 2009). Although firms in the same sector may be recognised as the major business rivals that offer similar products, they could nevertheless undertake collaborative actions to increase their bargaining power with a common supplier or obtain benefit from economies of scale (Mentzer et al., 2001). Horizontal collaboration can also be classified into intra-sector and inter-sector collaboration based on the sectors of the collaborative partners (Simatupang and Sridharan, 2005). Intra-sector collaborations are the collaboration between the firms in the

same sector or industry.

4.5.2 Vertical collaborations

Vertical collaborations in supply chains refer to the collaborations between the firms and their partners that supply them the inputs (upstream collaboration) or the partners that they sell their products to (downstream collaboration) (Barratt, 2004).

- *Upstream collaborations*

  In order to ensure the sufficient inputs and material for internal production, collaborative activities with upstream partners may be needed. For the context of this thesis, a hotel may collaborate with its foods and beverage producers/ providers. Hotels and suppliers may develop an annual plan or ordering policy together. The planning process may be conducted by a joint team consisting people from both parties.

- *Downstream collaborations*

  Considering the tourism sector, a hotel may not always have direct contact with their customers, especially those who purchase package tours. Therefore, hotels may need to collaborate with the intermediaries, such as tour agencies or tour operators, in order to cope with the incoming demand and prepare for future demand.

Different types of collaborations in the tourism supply chains are illustrated in Figure 4.6.
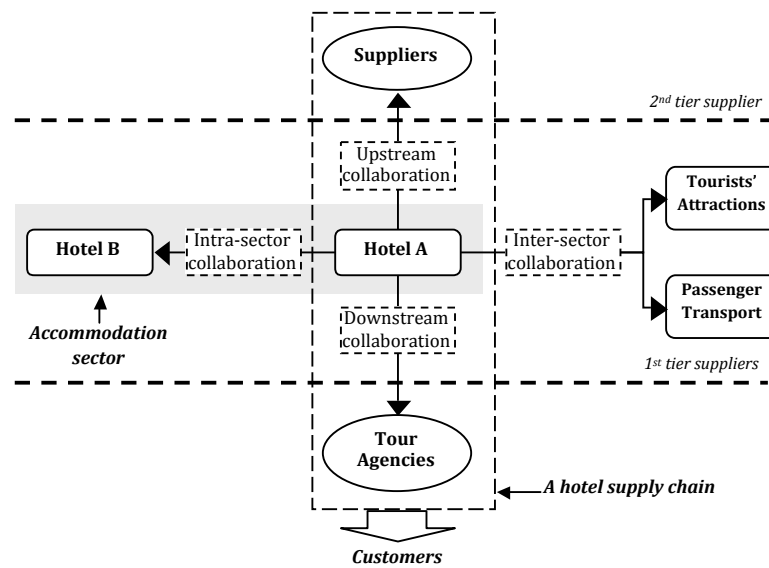
Figure 4.6: Collaboration activities of a hotel in the tourism supply chain
Source: Compiled by the author.

4.6 Systematic review of TSCM literature

As the aim of this chapter is to review and evaluate literature related to TSCM. The concept of TSCM outlined in the previous section is used as a framework for the review. Characteristics of TSCM research are also evaluated in terms of the research paradigms and in particular the methodologies used. Focus of this thesis is the area where SCM and tourism research are integrated. Topics and methods of the literature are analysed. Finally the gaps in the literature will be identified. This will also offer avenues for the research, which can make a wider impact on the supply chain management and tourism disciplines (McLoughlin, 2007).

4.6.1 Review procedures

To obtain the current state and evolution of TSCM research, a systematic literature search was conducted. This includes the use of search protocol and framework to conduct a content analysis of the selected studies. Literature search and data analysis were

conducted under the structured protocol and framework. This protocol provides a generalisability, validity and reproducibility of the results (Wilding and Wagner, 2012; Pilbeam et al., 2012; Seuring and Gold, 2012; Delbufalo, 2012).

In the review protocol, first literature searches were conducted in leading academic databases; **Scopus**, **ABI/INFORM Global (Proquest)**, **ScienceDirect** and **EBSCO** as well as **Google Scholar**. Second the keywords used in the search were *"tourism supply chain"*, *"travel supply chain"*, and *"hospitality supply chain"*. It was found that TSCM research is currently very limited. There were only 82 studies found in these databases.

4.6.2 Review findings

There were 82 TSCM publications found in the review during 1987 - 2012 (September), including some early-cited or in-press papers. Most of TSCM literature has been published in 2008 and 2009 (21 and 15 papers respectively). Figure 4.7 highlights the quantity of TSCM research and its trend over time. It was found that there are two stages of TSCM research.

The first stage is the era before 2008 where most publications were conceptual-framework papers and few empirical studies were found. This is consistent with the previous systematic literature review on general SCM research by Burgess et al. (2006), which found only one paper (Hovora, 2001) in the tourism sector.

Secondly, since 2007 the number of TSCM papers has rapidly increased (from 3 publications in 2007 to 18 publications in 2008), arguably due to the study by Tapper and Font (2004) since it has been widely cited in TSCM papers found. Moreover, since 2008 more empirical and analytical studies were published than conceptual framework papers.
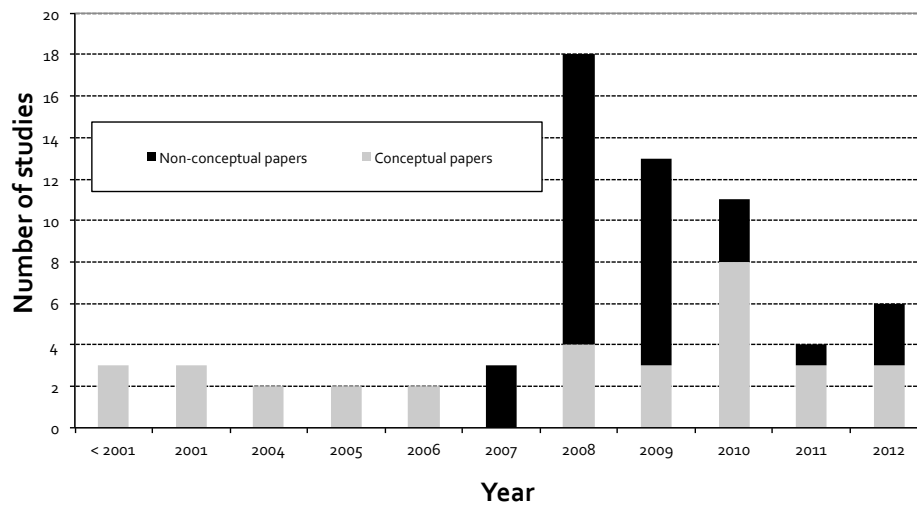
Figure 4.7: Trend in research on tourism supply chain management

Next, a content analysis was conducted to identify the main focus of each paper. The methodology and geographical scope of the research were classified. The findings show that half of the empirical studies were found in Europe whereas approximately one-third of empirical studies were in Asia. Surprisingly, only 12% of empirical studies were found in the Americas, all in Canada. Within Europe, most empirical studies were conducted in the UK, Spain and Finland (4, 2, and 2 studies respectively). Empirical studies on TSCM in Asia were only found in China and Thailand (9 and 5 studies respectively). It could be argued that empirical research on TSCM tends to be conducted mostly on popular tourist destinations.

Considering the research methodology, a case study approach was a dominant choice (23 studies). There were only three works using quantitative approaches. Moreover, the result shows that all studies conducted in Europe employed a case study approach. Details of the previous literature on TSCM can be found in Table 4.1.

Table 4.1: Summary of Tourism SCM Literature

Authors	Main Focus	Paper Type	Methods	Countries
Rondan-Cataluña and Rosa-Diaz (2012)	Segmentation though pricing strategy	Modelling	NA	NA
Rittichainuwat (2012)	Risk management of tourism suppliers	Empirical	Survey	Thailand
Holma (2012)	Interpersonal relationship in tourism triads	Empirical	Longitudinal Case study	Sweden
Chen (2012)	Website design for TSCM	Empirical	Internet data	Internet
Huang et al. (2012)	Competition in TSC	Analytical Model	Game theory	-
Espino-Rodríguez et al. (2012)	Hotel outsourcing	Empirical	Survey	Scotland & Taiwan
Nassiry et al. (2012)	Impact of strategic purchasing on service quality in hotel	Empirical	SEM	Malaysia
Song, Liu and Chen (2012)	Governance of tourism value chains	Review	-	-
Romero and Tejada (2011)	Multi-level approach in TSC	Conceptual	-	-
Borodako (2011)	Coordination	Empirical	Survey	Poland
Yan and Hong (2011)	Supplier network	Conceptual	-	China
Zhang (2011)	Research on TSCM	Conceptual	Literature Review	-
Christodoulidou et al. (2010)	Relationship between suppliers, website and travel agencies	Empirical	Multiple case studies	Worldwide (Internet)
Djordevic and Arsić (2010)	Logistics system of tourism	Conceptual	-	-
Presenza and Cipollina (2010)	Tourism stakeholder networks	Conceptual	-	-
Andreu et al. (2010)	e-business adoption & relational quality	Empirical	SEM	Spain
Akkaranggoon (2010)	SCM applications	Empirical	Case Study	Thailand
Chen and Yi (2010)	Mode selection in TSCM	Conceptual	-	China
Huang et al. (2010)	Competition in TSC	Analytical model	Game theory	-
Ke and Li-ying (2010)	SCM application in tourist attraction development	Empirical	Survey	China
Lemmetyinen (2010)	Tourism business network	Empirical	Case study	Finland
Baggio et al. (2010)	TSC Governance	Conceptual	-	-
Ruhanen et al. (2010)	TSC Governance	Literature review	-	-

Continued on next page

Table 4.1 – *Continued from previous page*

Authors	Main Focus	Paper Type	Methods	Countries
Kontogeorgopoulos and Chulikavit (2010)	Travel agents and tour operators	Empirical	Survey	Thailand
Fantazy et al. (2010)	SCM and performance in hospitality	Empirical	Survey & SEM	Canada
Yang, Li and Lan (2009)	Cooperative Trust in TSC	Analytical model	Game theory	-
Chen (2009)	Innovation in TSCM	Conceptual	-	China
d'Angella and Go (2009)	Collaborative tourism marketing	Empirical	Case study	Spain & Austria
Keating (2009)	Ethics in TSCs	Empirical	Case study	China
March and Wilkinson (2009)	Tourism partnership evaluation	Conceptual	-	-
Murphy and Smith (2009)	TSC relationship	Empirical	Survey	France
Page (2009)	Overall TSCM	Conceptual	-	-
Piboonrungroj (2009)	Methodological implications in TSCM	Conceptual	-	-
Rusko et al. (2009)	SCM in tourism destination	Empirical	Case study	Finland
Véronneau and Roy (2009)	TSCM practices	Empirical	Case study	Canada
Yang, Huang, Song and Liang (2009)	Competition dynamics	Analytical	Quantitative	-
Zhang and Murphy (2009)	SCM and destination marketing	Empirical	Case study	China
Zhang et al. (2009)	Overall TSCM	Conceptual	-	-
Adriana (2009)	Environmental TSCM	Empirical	Case study	UK
Tiedemann et al. (2009)	Hotel responsiveness & information sharing	Empirical	Survey	Europe
Pearce (2008)	Tourism distribution	Literature review	Conceptual Framework	New Zealand
Almeida et al. (2008)	TSC relationship	Empirical	Case study	Brazil
Bigné et al. (2008)	Adoption in travel agency supply chains	Empirical	Quantitative	UK
Dye (2008)	Collaboration	Descriptive	Case study	UK
Font et al. (2008)	Sustainable SCM	Empirical	Exploratory	UK & EU
Guo (2008)	Competition & relationship in TSCs	Empirical	Quantitative	China
Harewood (2008)	Coordination in supply chain	Analytical	Simulation	-
Johnston and Clark (2008)	Holiday supply chains	Conceptual	-	-
Muhcină and Popovici (2008)	Overall TSCM Conceptual	Conceptual	-	-

Continued on next page

Table 4.1 – *Continued from previous page*

Authors	Main Focus	Paper Type	Methods	Countries
Narayan et al. (2008)	Service quality measurement	Empirical	Quantitative	India
Piboonrungroj (2008)	Supply Chain Audit Method	Empirical	Case study	Thailand
Rodríguez-Díaz and Espino-Rodríguez (2008)	Tourist destination competitiveness & benchmarking	Empirical	Case study	Spain
Schwartz et al. (2008)	Sustainable SCM	Conceptual	-	-
Sigala (2008)	SCM & sustainable tourism	Empirical	Case study	Greece
Smith and Xiao (2008)	Overall TSCs (Culinary)	Empirical	Case study	Canada
Wei and Lu (2008)	TSCM and tourism development	Empirical	Case study	China
Xinyue and Yongli (2008)	TSC operations	Conceptual	-	-
Deale et al. (2008)	Culinary TSC in Shrimp	Empirical	Survey	USA
Pearce and Taniguchi (2008)	Performance measurement in TSC	Empirical	Case studies	New Zealand
Reid and Pearce (2008)	Tourism distribution	Empirical	Case study	New Zealand
Kaosa-ard et al. (2007)	Tourism Logistics	Empirical	Surveys and case studies	Thailand
Mitchell and Faal (2008)	TSCM and tourism development	Empirical	Case study	Gambia
Ogden and McCorriston (2007)	Supplier relationships in conference and event management	Empirical	Survey	UK
Schott (2007)	Distribution channels	Empirical	Qualitative	New Zealand
Novelli et al. (2006)	Tourism network and cluster	Empirical	Case study	UK
Walle and Steenberghen (2006)	Public transport and trip chains	Empirical	Quantitative	Belgium
Yilmaz and Bititci (2006)	Performance measurement	Conceptual	-	-
Kothari et al. (2005)	e-Procurement in hotel supply chains	Empirical	Case study	USA
Alford (2005)	Business Process Re-engineering	Conceptual	-	-
Hawkins (2004)	Sustainable tourism competitiveness	Empirical	Case study	Indonesia
Tapper and Carbone (2004)	Sustainable SCM	Conceptual	-	-
Tapper and Font (2004)	Overall TSCM	Conceptual	-	-

Continued on next page

Table 4.1 – *Continued from previous page*

Authors	Main Focus	Paper Type	Methods	Countries
Pearce et al. (2004)	Tourism distribution channel	Empirical	Interviews & survey	New Zealand
Georgantzas (2003)	Tourism dynamic of hotel value chain	Empirical	Historical data	Cyprus
Hovora (2001)	Logistics of airline service	Conceptual	-	-
King (2001)	Logistics of airline service	Conceptual	-	-
Lafferty and van Fossen (2001)	Integration in tourism	Conceptual	-	-
Antunes (2000)	Overall TSCM	Conceptual	-	-
Tremblay (1998)	Economic organisation of firm and inter-firm	Conceptual	-	-
Telfer and Wall (1996)	Tourism & food production	Empirical	Case study	Indonesia
Smith (1994)	Tourism production process	Conceptual	-	-
Go and Williams (1994)	Information technology	Conceptual	-	-
Selin (1994)	Collaborative alliance	Conceptual	-	-
Reid and Reid (1994)	Tourism supplier service	Conceptual	-	-
Buckley (1987)	Economic transaction in tourism	Conceptual	-	-

4.7 Discussion of tourism SCM literature

4.7.1 SCM research in Tourism

Considering a generic form of TSCs, the research framework on TSCM can be illustrated as in the Figure 4.8. There are three major focus points in the framework (designs, relations, and performance measurements). This framework was developed from the SCOR (Supply Chain Operations Reference) model (Supply Chain Council, 2010) since it covers all three stages in the tourism supply chain (before, during and after the trip). The framework consists of plan, source, make, deliver, and return operations.

First, the supply chain design is a critical starting point of TSCM. In TSCM, supply chains should be designed preliminarily based on the value of targeted tourists. The other aspects of the design process such as strategy, distribution or pricing could also
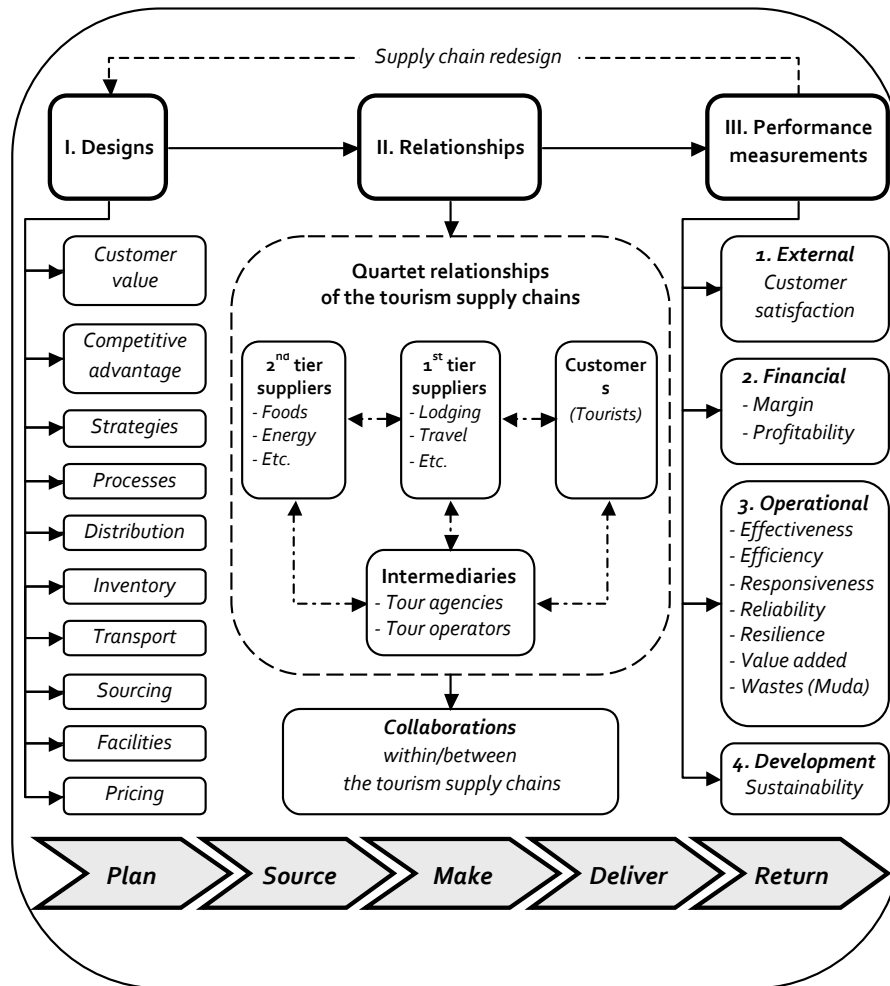
Figure 4.8: A research framework for tourism supply chain research

be considered (Bragg et al., 2011; Henkoff, 1994).

Second, the core of TSCM is the relationship among stakeholders. Unlike typical SCM that considers only buyer-seller relationships, in TSC there is a close coupling between multiple supply chain partners (e.g., first-tier suppliers, second-tier suppliers, travel agencies, tour operators and tourism service providers). Thirdly, performance measurement covers four aspects including external, financial, operational, and development that are considered in the balanced scorecard (Johnston et al., 2012).

The potential research agendas which could enable better understanding of the TSCs have been identified (e.g., inter-firm relationship, performance measurement and management). Furthermore, because SCM is a study of the relationships between each player along the supply chain, another vital research agenda could be the collaborations between TSC partners. To an extent, drivers and impacts of collaboration in TSCs can be the focal consideration (Zhang et al., 2009). Therefore this research aim to examine the outcomes of supply chain collaboration in tourism.

In terms of a research methodology, TSCM research could employ either qualitative or quantitative research methods or both (Zhang et al., 2009). The selection of the research method should be based on types of research questions and research objectives (Yin, 2008). Examples of methodological selection in TSCM research can be obtained in Zhang et al. (2009). In this review of TSC literature, most of the empirical studies have employed the case study approach to provide an in-depth analysis of a particular situation. However, concerning the level of generalisation of the research, survey-based research using advance statistical methods such as structural equation modelling (see Section 5.8) could generate a more reliable model of the TSCM (Song, Dwyer, Li and Cao, 2012).

4.7.2 Tourism SCM research in Thailand

Tourism is one of the significant economic sectors of Thailand (Kaosa-ard et al., 2006). The Thai government has played a significant role in promoting the tourism industry as a tool for economic development (Elliott, 1987). There has been much research on tourism in Thailand (Untong, 2012; Kaosa-ard et al., 2007). However, most of the studies focus on the demand side of tourism.

In terms of collaboration in the tourism supply chain, there are some studies at the macro-level of tourism collaboration. For example, a study of Wong et al. (2010) on the collaboration between countries in ASEAN (Association of South East Asian Nations) Few have studied the micro level of the collaboration in tourism supply chain. Koblun (2011) studied the cultural role in the business-to-business interactions between Thai inbound tour operators and European outbound tour operator. He found that supply chain collaboration can enhance capability of the tour operators to deal with uncertainty in the business.

Considering TSCM in the Thai hotel industry, Akkaranggoon (2010) studied applications of supply chain management in the hotel sector of Thailand with 20 cases. She found that most hotels still had a traditional arms-length relationship with their suppliers. Recently research on risk management of tourism service providers has become an emerging research theme (Rittichainuwat, 2012).

In conclusion, tourism is a key economic sector of Thai economy. It also have been a significance supports from the government. However SCM research in tourism is very limited compared to other sectors such as agriculture or automotive. Hence there is still a need for research that explore and explain the tourism SCM in the context of Thailand.

4.8 Conclusion

To understand the empirical research in supply chain management, the specific research contexts need to be thoroughly comprehended (Boyer and Swink, 2008). This chapter offers such knowledge for this research. The main contents of this chapter are based on the systematic literature review on tourism supply chain management during 1987-2012. The framework for tourism supply chain management research has been developed based on the works of Font et al. (2008); Zhang et al. (2009). The novel contribution of this chapter are the updated literature on tourism supply chain management and a bigger picture of the tourism supply chain management that includes the role of tourist flow in the chains. Hence the analysis of tourism supply chain management using the framework provided at the end of the chapter will offer a holistic view of the tourism supply chains.

This chapter defined the scope and structure of the tourism supply chain. The tourism SCM literature were systematically reviewed. Having laid this foundation of TSCM in this chapter, (on top of the concepts of SCM and related issues in Chapter 2 as well as relevant theories in Chapter 3), the next chapter will review the choice of research methods and will also justify the selection of research methods employed in this thesis (see Figure 4.9).

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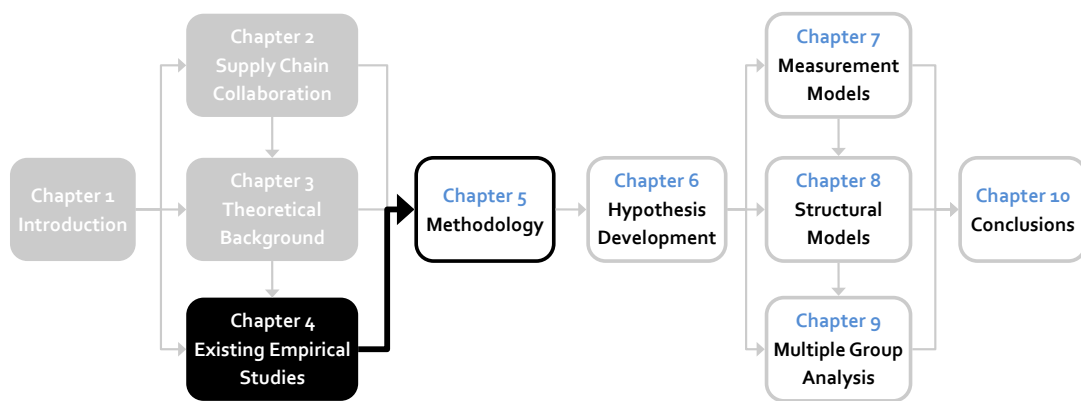
Figure 4.9: A direction of chapter 4 to the next chapter

Chapter 5

Methodology

Perfection is achieved,
not
when there is nothing more to add,
but
when there is nothing left to take away.

Antoine de Saint-Exupéry (1900-1944)
Pioneering aviator
& The author of "Le Petit Prince"

5.1   Introduction

This chapter presents the development of the research design and justification of the selection of the research methods used in this thesis. Prior to this chapter, the background literature of the study was presented in the previous three chapters. The reviewed literature cover supply chain collaboration (Chapter 2), tourism supply chains (Chapter 4) and related theories (Chapter 3). Since the literature review laid the foundation knowledge, the research methodology can now be presented.

Methodological implications of a research design for conducting this study were

justified as well as the reasons not to use other alternative methods. Based on the positivist's stance of a research philosophy, the proposed model, derived from relevant theories, is designed to be initially verified by semi-structured interviews. Then, a proposed model will be statistically tested by a Structural Equation Model using empirical data obtained from a questionnaire survey. To employ both qualitative and quantitative methods in this thesis, an *initiative* (Golicic and Davis, 2012) design, where findings from the initial qualitative method were used to inform the main quantitative methods. Position of this chapter in the thesis is presented in Figure 5.16.
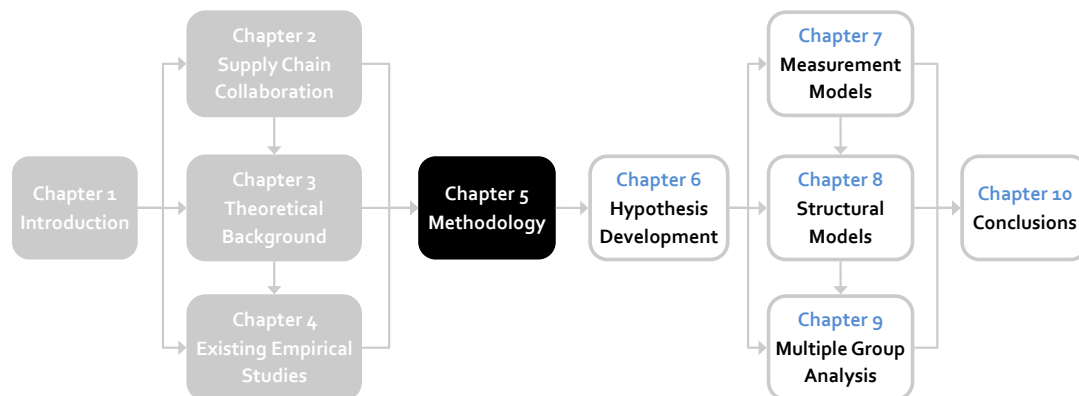
Figure 5.1: Position of the chapter in this thesis

5.2 Philosophical stance

5.2.1 Social science research paradigms

The research paradigm is central to the research design for all area of research (Mangan et al., 2004). Research paradigm, generally considered as "*the world view*", was defined by Kuhn (1970) as:

> *"People's value judgements, norms, standards, frames of reference, perspectives, ideologies, myths, theories, and approved procedures that govern their thinking and action"*

<div align="right">cited in (Gummesson, 1999, p.18)</div>

According to (Näslund, 2002, p. 323), *"[different] people view the world differently"*, thus researchers may design their research differently (Mangan et al., 2004). Based on a concept of a paradigm suggested by Kuhn (1970) and a quotation of Näslund (2002), research paradigms can be classified into different types. Such different paradigms are classified by (1) how they view the world and perceived truth, (2) relationships between research and researchers and (3) how the research studies the truth.

5.2.2 Research Philosophy

This research is designed based on the positivism. An ontology[1] of the positivists is that reality is observable and the objective world exists (Näslund, 2002). Moreover, the epistemology[2] of positivism is that researchers and what to be researched should be separated (Gummesson, 1999; Bryman and Bell, 2011). As positivism is the philosophical stance of this thesis, it will be specifically compared to other paradigm in terms of concept and definition (Gummesson, 1999; Mangan et al., 2004). A summary of comparisons between positivism and other paradigms on their ontology, epistemology and methodology can be found in Table 5.1.

5.2.3 Research philosophy in Supply Chain Management Research

The positivism perspective has played a fundamental role in SCM research (Golicic and Davis, 2012; Näslund, 2002; Mangan et al., 2004) due to the nature of the field that includes multi-disciplines i.e., engineering, business, and economics. Logistics research

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[1]The opinion of what is the truth. (Bryman and Bell, 2011)

[2]The interrelationship between researchers and what is to be researched. (Bryman and Bell, 2011)

Table 5.1: Summary of Characteristics of research perspectives

Orientation	Positivism	Post positivism (Realism)	Critical theory	Interpretive/ Constructivism
Ontology	**Nïave realism**: in which an understandable reality is assumed to exist, driven by immutable natural laws. True nature of reality can only be obtained by testing theories about actual objects, processes or structures in real world.	**Critical realism**: reality but only imperfectly and probabilistically apprehend able.	**Historical realism**: social reality is historically constituted; human beings, organisations, and societies are not confined to existing in a particular state.	**Realism**: local and specific constructed realities; the social world is produced and reinforced by humans through their action and interaction.
Epistemology	Dualist/ objectivist; verification of hypothesis through rigorous empirical testing; search for universal laws of principles; tight coupling among explanations, predictions and control.	Modified dualist/ objectivist/ objectivist; critical tradition/ community; finding probably true.	Transactional/ subjectivist; knowledge is grounded in social and historical practices; knowledge is generated/ justified by a critical evaluation of social systems in the context of researchers' theoretical framework adopted to conduct research.	Transactional/ subjectivist; understanding of the social world from the participants' perspective; through interpretation of their meanings and actions; researchers' prior assumptions, beliefs, values, and interests always intervene to shape their investigations.
Methodology	Hypothetical deductive experiments/ manipulative; verification of hypotheses; chiefly quantitative. Operationalising concepts so they can be measured.	Modified experimental/ manipulative; falsification of hypotheses; may include quantitative methods.	Dialogic/ dialectical; critical ethnography; interpretive case study; action research.	Mixed/multiple methods combined of hermeneutical/ dialectical; interpretive case study; action research; holistic ethnography

Source: Bryman and Bell (2011), Grubic and Fan (2010), Guba and Lincoln (1998), Easterby-Smith et al. (2002), Victoria J. Wass (1994)

has benefited greatly from the development of generalised theory and knowledge according to its scientific background (Mangan et al., 2004). In the positivism paradigm, a deductive approach using statistical methods are employed to develop the research model or hypotheses based on the literature and theories, which are then tested with empirical data. Therefore the core of positivism is to test the hypotheses.

On the other hand, a non-positivism paradigm contributes the critical benefit to the logistics research especially in terms of managerial insight rather than direct interpretation (Mangan et al., 2004). More in-depth and information-rich research is the major contribution of non-positivism perspective to the logistics research due to its concentration and focus on the context of the empirical findings. The author's own philosophical stance lies in that of a positivist who perceives that knowledge is out there and can be observed in the real world via a systematic approach.

5.2.4 Philosophical stance of this thesis

Positivism (objectivist paradigm) (Grubic and Fan, 2010) is employed as a philosophical stance of this thesis as the author believes that the world and the knowledge can be observed and tested empirically (Bryman and Bell, 2011). It is also expected that the result could be generalised to other cases. Even though this study employs multiple methods analysis, a positivism stance is justified since the purpose of the qualitative methods is to facilitate the design of main survey methods in terms of informing the hypotheses and validate the instrumentals used in the model (Boyer and Swink, 2008; Singhal et al., 2008), rather than to obtain in-depth understanding of particular phenomenons of the case (Voss et al., 2002) in its own right.

5.3   Research methods in Supply Chain Management research

Although SCM research has been around for a few decades, there are several reviews on the uses of research methods in SCM research i.e., Mentzer and Kahn (1995), Sachan and Datta (2005), Burgess et al. (2006), Giunipero et al. (2008) and Chicksand et al. (2012). Table 5.2 compares the results obtained from these review papers to illustrate the changes and trend in the research methods used in SCM research.

Based on these reviews, generally surveys have been the most popular method (Mentzer and Kahn, 1995; Kotzab et al., 2005; Sachan and Datta, 2005; Burgess et al., 2006; Giunipero et al., 2008; Chicksand et al., 2012). Case studies have been also used extensively especially in the supply and purchasing types of SCM research (Chicksand et al., 2012). The uses of archival study method and mathematical modelling has increased (Mentzer and Kahn, 1995; Sachan and Datta, 2005) whereas ethnography and action research methods are not so popular in SCM research. This section will briefly discuss the key applications of these research methods in SCM research.

5.3.1   Survey methods

5.3.1.1   Nature of survey methods

The main purpose of using survey research is to test the theories with empirical data (Forza, 2002). A survey is a relatively inexpensive and non-invasive method to measure aspects of logistics and supply chain management (Mentzer and Kahn, 1995). This method is often used by positivists since it can target what the researcher wants to study within a conceptual framework or a particular theory (Boyer and Swink, 2008; Flynn et al., 1990).

Table 5.2: Types of research methodologies used in supply chain research

Type of research methods	Mentzer and Kahn (1995)[a]	Sachan and Datta (2005)[b]	Burgess et al. (2006)[c]	Giunipero et al. (2008)[d]	Unit: Percentage(%) Chicksand et al. (2012)[e]
Survey	54.3	34.6	23	61	36.3
Simulation	14.9	5.0	NA	9	3.3
Interviews	13.8	6.8	NA	NA	NA
Archival studies	9.6	20.8	NA	NA	NA
Mathematical modelling	4.3	10.4	7	NA	2.8
Case study	3.2	16.1	31	11	34.6
Conceptual model	NA	6.3	39	9	12.7
Literature Review	NA	NA	NA	3	2.4

Note: NA: Not available

[a] JBL during 1978-1993

[b] JBL, SCMIJ, IJPDLM during 1999-2003

[c] ABI/Inform Global Proquest database 1999 - 2003 (100 randomly selected papers)

[d] JSCM, IJPDLM, JOM, IJLM, JBL, IJOPM, IMM, MS, DS during 1997-2006

[e] SCMIJ, JPSM, JSCM during 1994-2010.

Journal abbreviations:

JSCM	Journal of Supply Chain Management
IJPDLM	International Journal of Physical Distribution and Logistics Management
JOM	Journal of Operations Management
IJLM	International Journal of Logistics Management
JBL	Journal of Business Logistics
IJOPM	International Journal of Operations and Production Management
IMM	Industrial Marketing Management
MS	Management Science
DS	Decision Science
SCMIJ	Supply Chain Management: an International Journal
JPSM	Journal of Purchasing and Supply Management

5.3.1.2 Survey methods in SCM reserach

Survey research has been a dominant research method in supply chain management (Kotzab, 2005; Rungtusanatham, Choi, Hollingworth, Wu and Forza, 2003; Soni and Kodali, 2012; Flynn et al., 1990). A recent review of the literature in SCM by Soni and Kodali (2012) found that more than half of empirical research in SCM (316 out of 619 papers) used a survey method. Before that, Mentzer and Kahn (1995) investigated methods used in the publications of Journal of Business Logistics. They found that more than half of the papers employed survey-based methodologies (see Table 5.2).

5.3.1.3 Critiques on survey methods

Although a survey method is the most common method in supply chain research (Boyer and Swink, 2008), it also has limitations e.g., perception measurement (Singhal et al., 2008; Mangan et al., 2004), bias from single source of data (Näslund, 2002), and potential respondents' interpretation bias due to their knowledge and information limitation and low response rate (Boyer and Swink, 2008). However, these limitations can be overcome by employing proper statistical techniques to mitigate them (Singhal et al., 2008). Schoenherr and Mabert (2008) produced a good example of how to deal with the low response rate (5.4%) in their research by using various techniques to address potential bias such as random sampling techniques or independent variable test (Bryman and Bell, 2011; Boyer and Swink, 2008).

5.3.2 Case studies

5.3.2.1 Nature of case study methods

Case studies are often advocated to be a qualitative research method (Näslund, 2002), mainly used to build theory rather than test theory (Jaspers, 2007). Case study method can employ both quantitative and qualitative approaches (Eisenhardt, 1989; Yin, 2008; Ellram and Edis, 1996). Case study is an appropriate method when research questions

are *how* and *why* and when researchers cannot control the environment surrounding the research area.

An outstanding strength of a case study method is the depth of the understanding through contextualising the cases that can be obtained (Yin, 2008; Eisenhardt and Graebner, 2007; Voss et al., 2002). However, a case study method is a time and cost intensive approach. Moreover it provides a relatively low number of publications from the efforts made and the results obtained. Furthermore, it is recognised as a risky research method (Yin, 2008). However, the case study approach is a popular method in logistics and supply chain research due to the high degree of complexity in real world supply chains (Ellram and Edis, 1996).

5.3.2.2 Case study methods in SCM research

In SCM research, case studies are still largely dominant by positivists (Näslund, 2002). Nevertheless, case studies under non-positivism can be conducted (Näslund, 2002) e.g., by the critical realist paradigm (Aastrup and Halldórsson, 2008). In the case study method, researchers collect data via in-depth interviews rather than using closed-end questionnaires (Dubois and Araujo, 2007). Hence, the complex phenomenon can be explored in-depth. Moreover researchers can also investigate the underlining reason of what has been observed. In SCM research, the case study has been still under-used with less than twenty percent of empirical studies in logistics and SCM journals (da Mota Pedrosa et al., 2012).

5.3.3 Simulation and Mathematical modelling

5.3.3.1 Nature of simulation and mathematical modelling

A distinction between computer simulation and mathematical modelling is the ability to cope with the complexity of the research problems. Mathematical modelling is hard to implement when the research problem is large or complex. Computer simulation

is preferable in such a situation (Bertrand and Fransoo, 2002). Nevertheless, the result from a mathematical model is more rigorous in terms of generalisation and potential to generate a new theory (Bertrand and Fransoo, 2002). The computer-based simulation is also involved with a number of procedures that briefly includes: conceptual model; scientific model; solution; proof of the solution, and the insight related to the problem and solution (Bertrand and Fransoo, 2002).

5.3.3.2 Simulation and modelling methods in SCM research

Another traditional method used in SCM research is the mathematical modelling and simulation. Both computer simulation and mathematical modelling have been widely used in logistics and supply chain research (Mentzer and Kahn, 1995). From 1978 to 1994, almost 20% of publications in Journal of Business Logistics employed either simulations or mathematical modelling, second only to case-based methodology. Simulation and mathematical modelling are quantitative model-based methodologies, developed from scientific management (Bryman and Bell, 2011). Using this method, problems found in the real world are understood by formulating a conceptual model and conducting an experiment (Croson and Donohue, 2002). To do so, there are assumptions to be made in the model such as supply chain structure or ordering policy (Bertrand and Fransoo, 2002). Key contributors of this methodology are summarised in the Table 5.3

5.3.4 Ethnography

Based on the interpretivist's perspective, ethnography, also known as participant observation method, is opposite to the positivism (Näslund, 2002). Ethnography argues that "*positivism paradigm fails to capture the true nature of human behaviour*" (Hammersley and Atkinson, 1994). However, structured data can be collected in ethnography if appropriate. Ethnography method was often applied with grounded theory (Goulding,

Table 5.3: Key contributors in simulation and mathematical modelling methods in SCM

Topic	Authors
Stochastic models of manufacturing systems	Buzacott and Shantikumar (1993)
Logistics of production and inventory	Graves et al. (1993)
Factory physics	Hopp and Spearman (1996)
Quantitative models for supply chain management	Tayur et al. (1998)
Local search in combinatorial optimization	Aarts and Lenstra (1997)

Source: Adapted from Bertrand and Fransoo (2002)

2005). Further details of application of ethnography method in SCM related research can be found in Richey et al. (2010); Eisenhardt and Graebner (2007); Pålsson (2007) and Eisenhardt (1989). Randall and Mello (2012) also provided a guide to conduct a grounded theory study in SCM research.

5.3.5 Action research

Action research can be defined as *ethnographic case studies with the contribution of practical solution of practical problem* (Näslund, 2002). The distinction between action research and ethnography or case study is the intention to solve the problem and evaluate the proposed solution (Silverman, 2010). Moreover, action research is related to system thinking (Checkland, 2003), which could be applied in Logistics and supply chain research (Näslund, 2002). Further details of application of action research method in SCM related research can be found in Näslund et al. (2010); Näslund (2002).

5.4 Research Design

5.4.1 Research setting

The tourism sector was selected for several reasons. First its economic contribution in the global economy is significantly large. According to the World Tourism Organization, the estimated receipts from international tourism in 2011 was at USD 1,030 billion, increased from USD 928 billion in 2010 (+3.9%) despite several economic dif-

ficulties (UNWTO, 2012).

The tourism sector in Thailand is recognised as one of the world's most desirable tourist destinations and data accessibility of the researcher. First, in 2009 Thailand was ranked 12th and 17th in the world in terms of the number of the international tourist arrivals and international tourist receipts respectively (UNWTO, 2012). The second reason was access to the data and information in the tourism industry in Thailand. The author has done more than ten research projects in this area since 2005. Therefore, the author has both experience in data collection and contacts with key gatekeepers in the industry across the country.

For the purposes of this research, based on Zhang et al. (2009), the scope of a tourism supply chain was defined as a supply chain with a hotel as a focal firm linking with a supplier and a travel agent (see Figure 5.2).
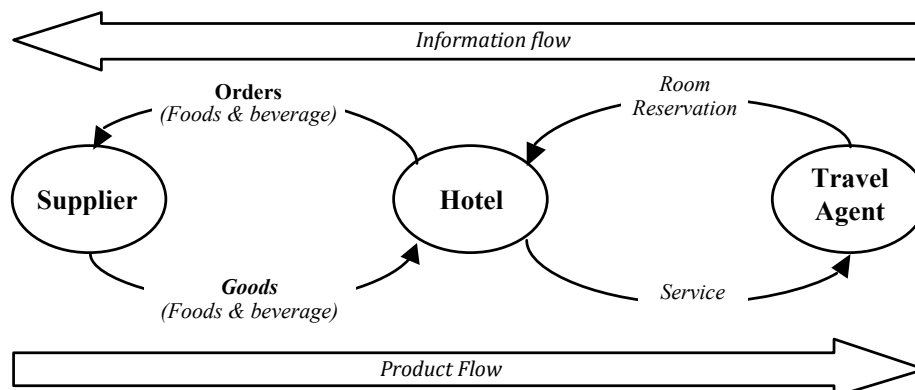
Figure 5.2: A scope of tourism supply chain in this thesis

5.4.2 Research strategy

Appropriate selected research method depends on a type of research question asked (Yin, 2008; Bartezzaghi, 2007). Researchers may employ a single type of method or

combine alternative methods together (Mangan et al., 2004). However, the use of multiple methods in order to triangulate research findings has recently been embraced (Boyer and Swink, 2008; Matthyssens, 2007; Näslund, 2002).

The advantage of using multiple-method research is to avoid weaknesses of a particular method (Näslund, 2002; Mangan et al., 2004; Ramsay, 2007; Boyer and Swink, 2008; Carter and Rogers, 2008). Combining qualitative and quantitative methods could help cross-validate results of a particular method (Batenburg, 2007). Even though the proper research method of this research is considered as survey based on its question form of *'what'* (see Figure 5.6), there is a need for combining other methods for a couple of reasons: facilitation and triangulation (Bryman and Bell, 2011). However, it should be noted that this research is based on the positivist paradigm. The inclusion of qualitative methods into this study is to aid some processes and provide depth to the research.

5.4.3 Research approach

The research approach of thesis has developed from the framework proposed by Mentzer and Kahn (1995) with an abductive reasoning approach (Kovács and Spens, 2005). The framework of abductive reasoning is illustrated in Figure 5.3.

According to Bryman and Bell (2011) there are four ways to combine multiple methods (see Figure 5.4). This thesis applies a multi-method quantitative studies approach. In this approach, quantitative method is the predominant method and qualitative methods are designed to facilitate and contextualise the quantitative study (Mangan et al., 2004; Boyer and Swink, 2008).

Based on the framework (Figure 5.5) suggested by Mentzer and Kahn (1995), research design begins with idea generation, followed by two forms of theory induction: literature review and real world observation to provide substantive justification for the conceptual framework. Theories also suggest hypotheses and constructs are included.
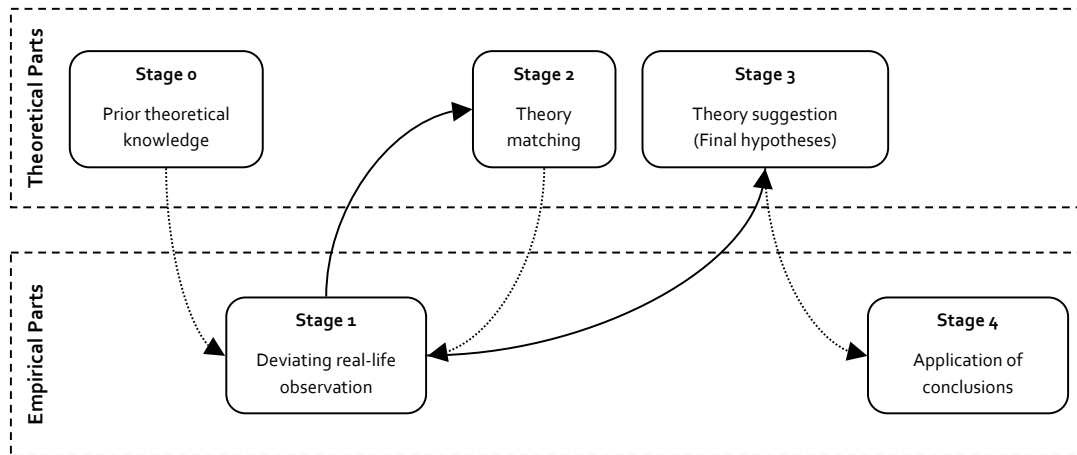
Figure 5.3: Overview of abductive reasoning approach

Source: (Kovács and Spens, 2005, p. 139)
Key: → Deductive approach, -→ Inductive approach.
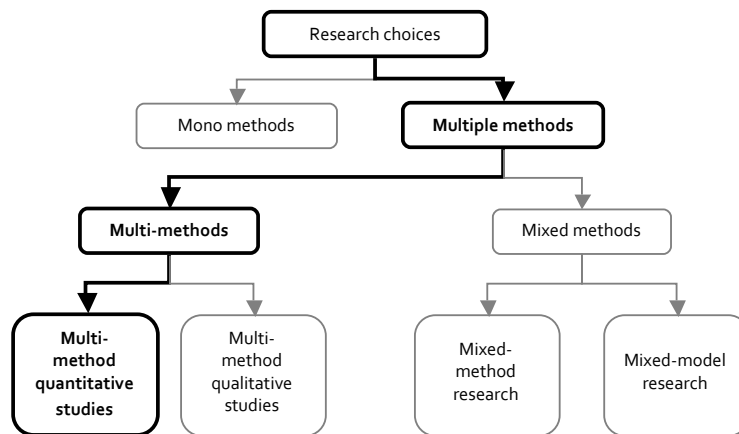
Figure 5.4: Choices of multiple methods
Source: Hair Jr et al. (2010)

Both hypotheses and constructs can be modified by the observations. Measures are developed to represent constructs used in the hypotheses. After hypotheses and constructs are developed, they can be examined using appropriate methods. Results obtained from the analysis will be discussed in the final stage of the research.

A holistic view of the thesis's research design is illustrated in Figure 5.7. The process begins with building a conceptual framework based on literature review. Then in-depth interviews and focus group will be employed to verify the framework and derive the proposed model. This qualitative method is used to facilitate the conceptualisation process (Boyer and Swink, 2008; Voss et al., 2002). Accordingly, two research methods are combined in order to cross check the findings. Survey-based research is considered as the predominant method in this study. This survey method is discussed in the following sections to gain a comprehensive understand of the research design. As SCM, especially in tourism (Duval, 2007; Zhang et al., 2009) is a complex system with multi-facet interconnectivity, hence there is a need for multiple methods to address SCM research (Spens and Kovacs, 2012; Sanders and Wagner, 2011).

5.4.4 Selection of research methods

There are several types of research methods in supply chain management. Each of them is suitable for different types of research questions and circumstances (Bryman and Bell, 2011; Yin, 2008). Therefore, the research method should be selected based on the type research questions asked (Bryman and Bell, 2011; Yin, 2008; Dul and Hak, 2007). As this research has an initial question of *"How does supply chain collaboration affect firm performance?"* This type of question could fit with a case study or even ethnography. However, since the research has adopted TCE to be an underlying conceptual framework, there are 14 hypotheses made as discussed previously. Thus, a case study or ethnography may not be an appropriate method. Moreover, in line with a positivist's stance, this thesis also aims for a generalisation of findings and results.
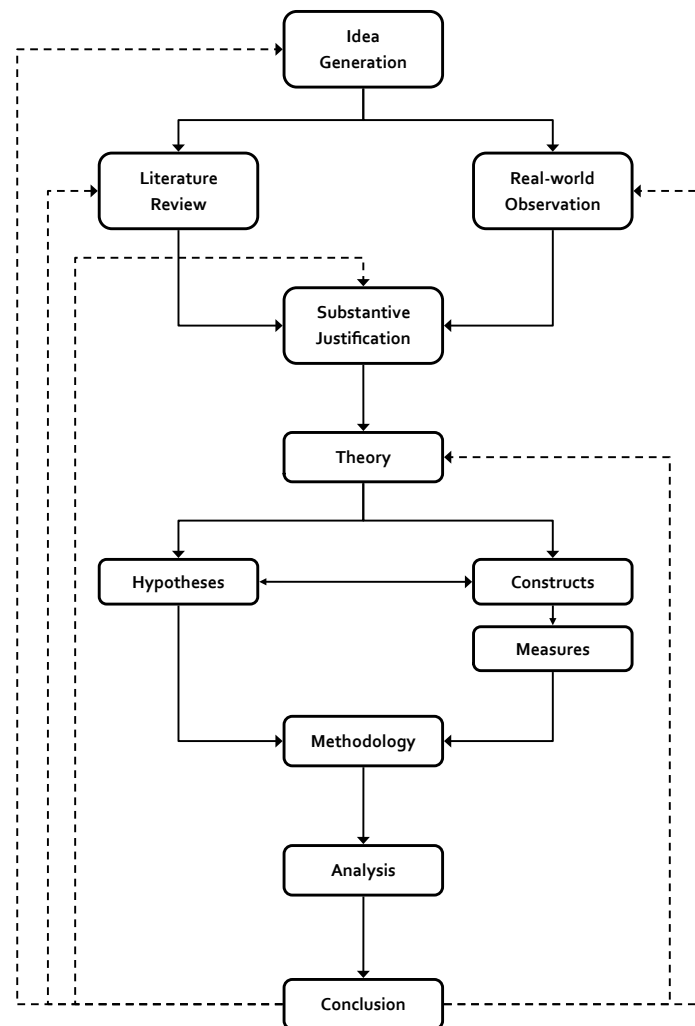
Figure 5.5: The Mentzer's research framework
Source: (Mentzer and Kahn, 1995, p. 234)
Key: → Feed forward, ⇢ Feedback.

5.4.4.1 Multiple methods

Qualitative methods were used to facilitate the hypotheses and measurement development process as well as to contextualise the findings from the quantitative results (De Beuckelaer and Wagner, 2007). Recently there is more research in logistics and SCM that combines qualitative and quantitative approaches via the use of mixed methods (Spens and Kovacs, 2012). A holistic view of our multiple-method approach is shown in Figure 5.7.

First a conceptual framework was developed and key variables were identified based on a literature review. This was followed by a case study and focus group interviews. These qualitative methods were used to facilitate the hypothesis development (Dubois and Araujo, 2007). To develop the research hypotheses multiple case studies were conducted to generate insights into the issues studied (Voss et al., 2002). Then data were collected from a survey to validate the developed research hypotheses using appropriate statistical methods. Details of the survey method and multiple cases studies will be discussed in the following sections.

Accordingly, at the stage of testing research hypotheses, the survey method is an appropriate method for the current study (see Figure 5.6). Moreover, this study also focuses on the phenomenon in supply chain collaboration in tourism. Therefore, this is a kind of empirical study using real data. Figure 5.4 shows how research methods will be used. The bold arrows and shadowed boxes are the selected choice of this study. This framework offers a criteria for selecting an appropriate research method based on type of research question.

Furthermore, the data for this study are specifically about collaboration. There is little existing information and data. Most of the available secondary data were general information of the tourism sector, not applicable for the purpose of this thesis. Hence,

there is a need to collect primary data in order to have proper and up-to-date data. Moreover, empirical studies usually use the data that are tailored for a particular purpose. According to the discussion above, this study selects survey as a research method.
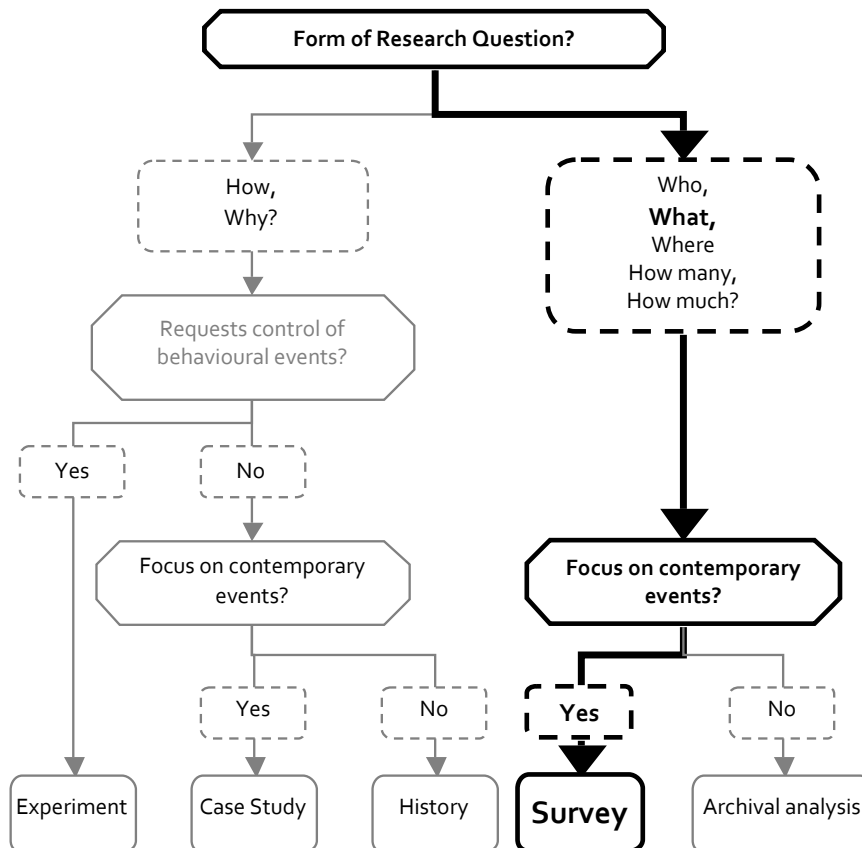
Figure 5.6: Selection of research method
Source: Hair Jr et al. (2010)

5.4.5 Ethical issues

This thesis considers ethical issues on the confidentiality of the information provided by the samples in both the case study and the survey. The author followed the proce-

dure of the Cardiff Business School to ensure ethical approval was obtained from the school. The ethical approval forms were completed and related document i.e, interview outline and a sample of questionnaire were submitted to the school. All documents were approved for both pre-survey fieldwork and the main survey (See Appendix A).

5.4.6 Research methods

This thesis uses data, theory, and methodological triangulations for the research validation and robustness (Boyer and Swink, 2008; Singhal et al., 2008; Mangan et al., 2004; McGrath, 1981). Therefore, in order to answer each research question stated previously this study will utilise multiple methods combining both quantitative and qualitative approach (Soni and Kodali, 2012; Mangan et al., 2004). The set of data collection and analysis methods in this research are presented in the Figure 5.7.

After this section, the research methods of this thesis, comprising of three main parts are presented:

1. Pre-survey fieldwork included: exploratory case study, focus group interviews and multiple case study were conducted to facilitate the conceptualisation of the research model and hypotheses (Spens and Kovacs, 2012; Boyer and Swink, 2008; Yin, 2008; Voss et al., 2002);

2. Instrument development methods included interviews, Q-sort, pre-test and pilot study were conducted to develop the measurement scale for the constructs in the research model and hypotheses (Churchill and Iacobucci, 2002; Mentzer and Kahn, 1995; Churchill, 1979) and;

3. Large-scale survey methods (Structural Equation Models) including measurement models; structural model; and multiple group analysis were conducted to validate the scales and test for the significance of the research hypotheses (Bagozzi and Yi, 2012; Shah and Goldstein, 2006; Mentzer and Kahn, 1995).
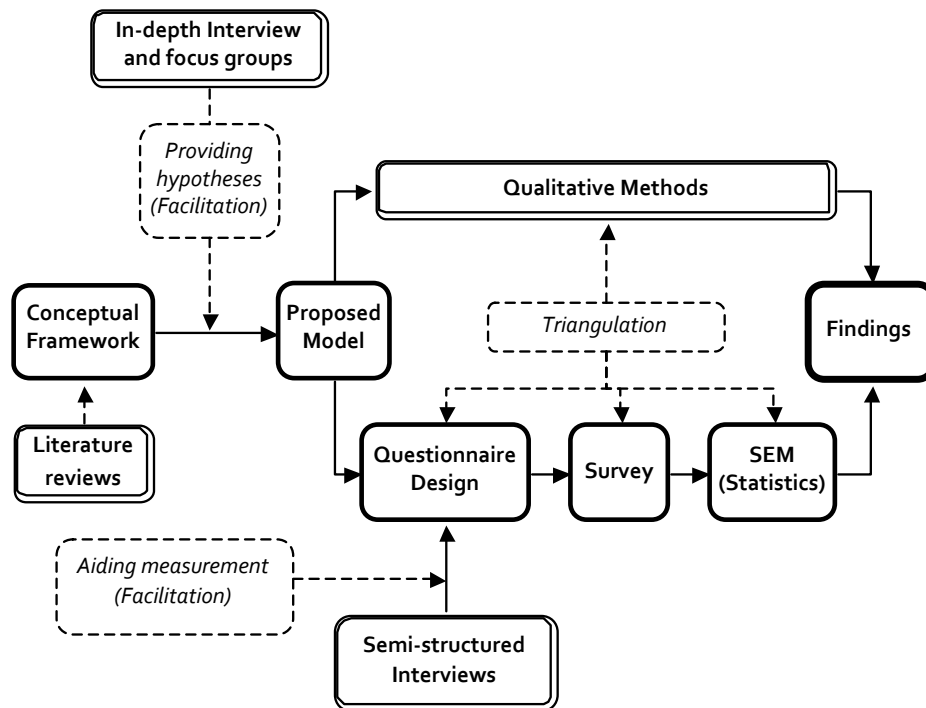
Figure 5.7: Research design of this thesis

Key: Dashed boxes are the areas where qualitative methods were designed to facilitate and triangulate the survey methods.

5.5 Qualitative fieldwork methods

In order for the author to familiarise himself with current industry practice an exploratory case study was conducted (Meredith, 1998) to explore the research problem in depth (Yin, 2008, p. 4). In this exploratory case study various aspects of the case were investigated. Hence the case hotel was selected due to access to in-depth knowledge and data via the gatekeeper who has a personal contact with the author (Voss et al., 2002).

5.5.1 An exploratory case study

During the case study operations of the hotel were mapped using a combination of direct observation and in-depth interviews with executives and managers in Food and Beverage department as well as those in the Sales and Marketing departments. The study also included semi-structured interviews with four members of staff and executives occupying the roles of the Food and Beverage Manager; the Director of Sales; the Executive Chef and the Finance Manager. The questions used for these interviews are shown in Appendix C. The flow charts were produced as the results of the case study. This explotory case study helps inform the context of this study and contextualise the conceptual framework.

5.5.2 Focus-group interviews

To validate the findings from the case study above, two focus groups were conducted. The first group consisted of six academics: three specialising in SCM; and three from the tourism management field. Six managers from hotels, suppliers and travel agents made up the second group. The focus group not only validated the case study findings but also gave insight to developing the conceptual model (Voss et al., 2002). The focus group interviews were specifically focused on identifying different types of collabora-

tive activities as well as how the collaboration affected the performance and relationships between supply chain partners of the hotel i.e., suppliers and travel agencies.

5.5.3 Multiple-case study

In the second stage of the research, the impacts of supply chain collaboration were investigated across the supply chains. In terms of triangulation, the multiple case studies provided real life observations to inform the initial research framework and develop the hypotheses (Yin, 2008; Eisenhardt, 1989). In the multiple-case studies data were mainly collected from structured interviews to gain insight of the cases (Eisenhardt and Graebner, 2007; Voss et al., 2002). Moreover, the findings from the interviews were also triangulated with other sources of information such as company documents and archival data. The multiple case studies were conducted under the guidance of the case study protocol (Yin, 2008) to ensure the reliability and validity of the research.

Moreover, multiple case studies also provide findings that can be used to contextualise the results from the statistical findings (Richey et al., 2010). Figure 5.8 illustrates the multiple case study method implemented in this study. Typically, structured interviews are considered as prime sources of data in the case-study research (Voss et al., 2002). However case study may be also supported by unstructured interviews, interactions, participant observations, and archival data (Yin, 2008). A research protocol is designed in order to ensure the reliability and validity of the research (Lambert et al., 2004). It is a critical tool for conducting a data collection process (Voss et al., 2002). Therefore, the case study protocol is equally important as questionnaire design in survey-based research.

Considering data analysis, a two-step analysis is employed in this study namely with-in cases and cross-cases analysis (Eisenhardt and Graebner, 2007; Ellram and Edis, 1996). First, patterns within a case are analysed. Moreover, since the research
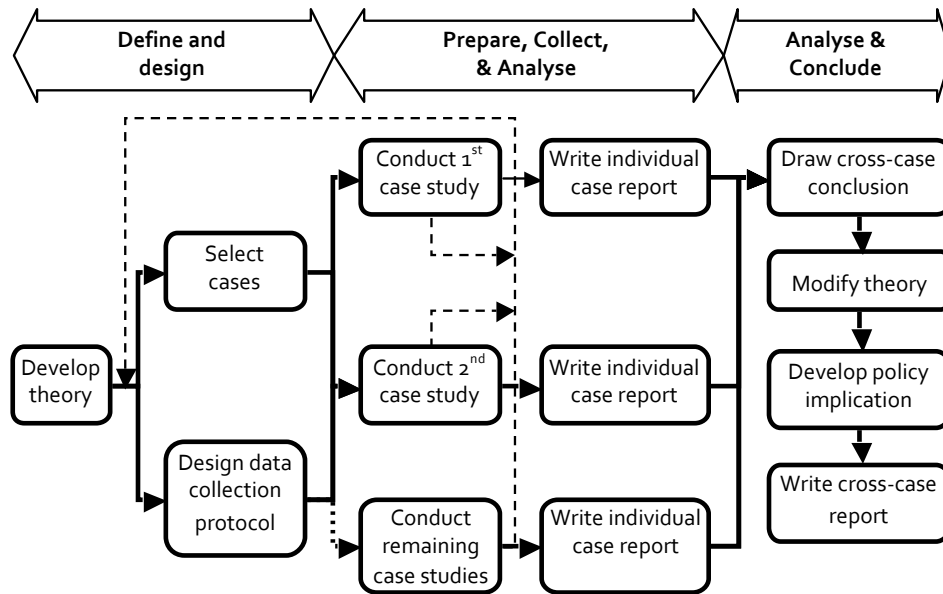
Figure 5.8: Multiple case study framework
Source: (Yin, 2008, p. 50)

objective is to test the hypothesis, expected causalities are captured by various qualitative techniques such as cause-and-effect analysis. Within-cases analysis is critical in terms of sufficient information in order to be able to search for cross-case patterns.

5.5.3.1 Case selection

Six tourism supply chains were selected using theoretical sampling (Yin, 2008), controlling the locations i.e., province (Pearce, 1979) and hotel management system i.e., international chain hotels, local (domestic) chain hotels and non-chain (independent) hotels (Pine and Qi, 2004; Baum and Ingram, 1998). The number of cases in this study is in the recommended range of 2-8 cases proposed by Meredith (1998, 452) and 4-10 cases as advocated by Eisenhardt (1989, p. 545). The number of cases in publication in SCM was also between 4-10 cases (42.60 % of 169 papers) (Barratt et al., 2011).

5.5.3.2 Data collection in multiple case study

Since the research questions at this stage were now well specified and the time to access the cases was limited, a pre-structured approach was used to collect, code and analyse the data (Miles and Huberman, 1994, 83-85). Data were collected from multiple sources to triangulate and improve reliability (Lambert et al., 2004). First five executives were interviewed in each case. These five interviewees were the Operations Manager, the Foods and Beverage Manager, the Purchasing Manager, the Executive Chef and the Director of Sales. Analysis included archives relating to the transactions between firms and their supply chain partners including ordering records, quantitative data and minutes of meetings.

Multiple sources of data from each case were used to measure levels of collaborative efforts, trust, commitment, transaction costs, competitive advantage, and firm performance between the firms and their supply chain partners. The measurements were determined based on information from interviews, documents and statistical data related to the transaction between the firms and their partners.

5.5.3.3 Data analysis of multiple case study

To address the potential problem of construct validity, two independent evaluators were used to judge the level of each variable (Handfield, 2011; Eisenhardt, 1989). The first evaluator was the author. The second was a tourism expert from the Tourism Business Association. First, the evaluators independently analysed the field notes and interview transcripts. Both evaluators reviewed each other's analysis and agreed the results. The results were then presented to the participants in the cases. Feedback from the participants was also used to revise the results.

5.5.4   Post-hoc survey Interview

To further explore the quantitative results obtained from the Structural Equation Modelling (SEM), a post-survey study interview was conducted with six respondents who were purposively selected from the survey respondents (Handfield, 2011). To reflect all the views of the three main supply chain members, six interviewees were selected, two from each firm type: hotels; suppliers and travel agents. This post-survey qualitative exploration provided further understanding of the underlying meaning of the different magnitudes of the coefficients in the model (Yin, 2008).

5.5.5   Methodological rigour in qualitative methods

According to Flynn (2008, p. 66), *"high quality research must use the most rigorous research methods possible"*. Rigour and relevance of qualitative methods in SCM have received more attention whilst such methods have been used more and more (Borgström, 2012). To assess rigour of qualitative methods employed in this thesis, criteria consisting of four aspects (i.e., confirmability, credibility, transferability and dependability) was considered (Goffin et al., 2012). Such criteria for assessing methodological rigour for qualitative methods is summarised in Table 5.4.

5.6   Questionnaire development

After having a set of pre-validated measurement scales, reliability of the data was aimed to be achieved. To do so, a questionnaire was carefully designed using the nine-step procedure (see Figure 5.9) suggested by Churchill (1979). Given, the difficulties in data collection in the field of supply chain management and related disciplines (Van Weele, 2007), this systematic approach will also ensure the effective utilisation data collection. The approach employed nine steps, which are presented as follows:

Table 5.4: Criteria for Assessing Methodological Rigour for Qualitative Methods

Criteria	Definition	Remedies	References
Confirmability	Assesses whether the interpretation of data is drawn in a logical and unprejudiced manner (Riege, 2003) and free of researcher bias. Integrity of the findings is assured by objectively establishing a link between data and findings.	Ensure anonymity of the respondents.	Riege (2003)
Credibility	Refers to the degree to which research findings were verified by interviewees or peers as realities may be interpreted in multiple ways. The purpose of this test is to demonstrate that the inquiry was carried out in a credible way.	Verify data by asking interviewees to review	(Riege, 2003).
Transferability	Refers to the degree to which the understanding obtained in one study can be transferred to explain phenomena observed in other contexts through analytical generalization. Erlandson et al. (1993) argue that full generalizability to other settings is impossible as no two contexts are identical. However, according to them a comprehensive understanding of one context justifies making useful interpretations about similarities and differences in other contexts.	Use theoretical sampling	Erlandson et al. (1993)
Dependability	In assessing reliability, all stages of the research process - including data collection, coding, and all other processes of preparing and analysing data - need to be described as accurately as possible to attain a high degree of transparency. In qualitative research this is described as providing a dependability audit that outlines the process followed that allows for traceability.	Use case study protocol and interview guideline	(Halldórsson and Aastrup, 2003).

Sources: Adopted from Goffin et al. (2012); Gibbert et al. (2008); Yin (2008); Riege (2003); Voss et al. (2002); Eisenhardt (1989).
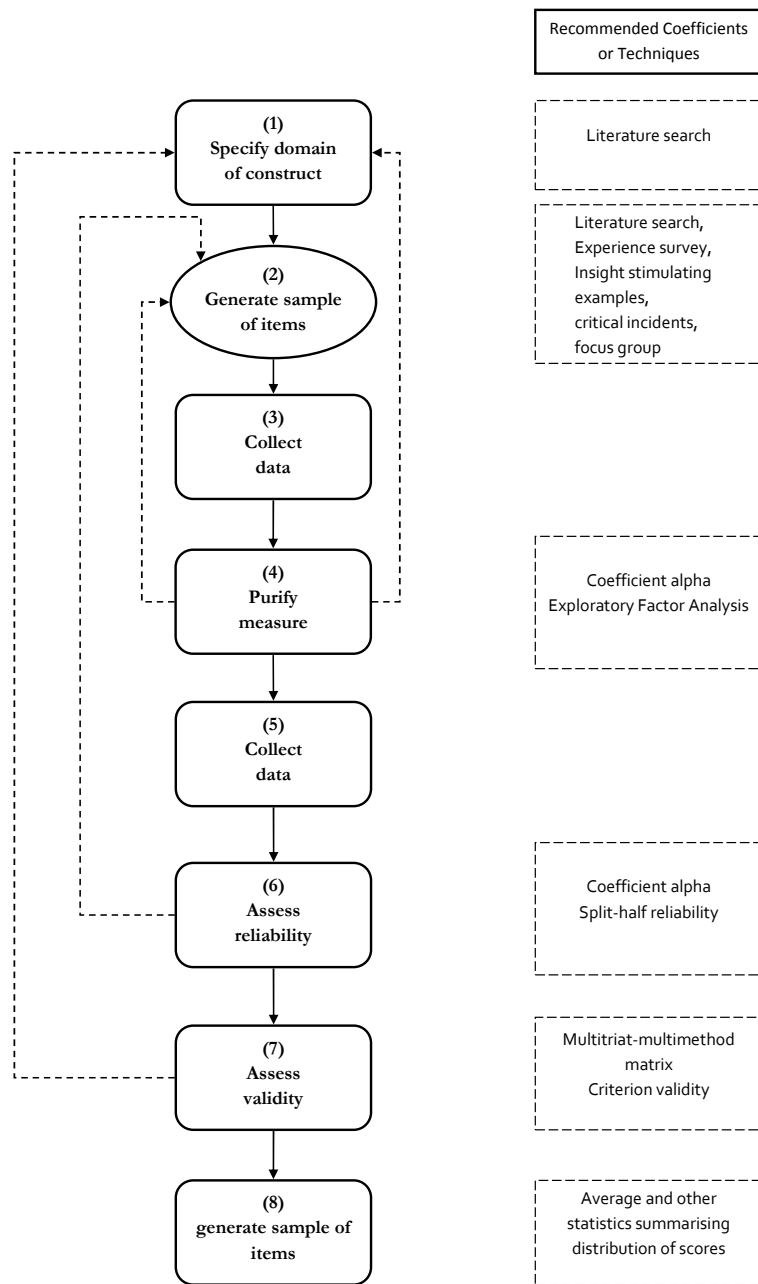
Figure 5.9: Procedure for developing measures

Source: Adapted from (Churchill, 1979, p. 66)

5.6.1   Step 1: Information sought

The development of individual questions was driven by the construct of interest and their definitions. Therefore constructs included in the research model are operationalised in this stage to define the meaning and scope. Measurement scales used in the previous literature may be adopted at this stage. Details of this stage are presented in Section 6.7.1.

5.6.2   Step 2: Types of questionnaire and method of administration

Type of questionnaire and method of an administration is a structured questionnaire in order to ensure that all respondents will be subjected to the same content and order. This process concerns how the required information should be gathered and through what method. With reference to the current study, given the context of interest, structured questionnaires were to be the most appropriate. Key benefits of the structured questionnaire include;

- The length of time used to complete the questionnaire could be better controlled.

- The structured approach ensured that all respondents will be subjected to the same content and order.

5.6.3   Step 3: Individual question generation and content

The main objective of this step is to ensure content validity. Extensive literature review should be conducted to find an appropriate set of questions (Hair Jr et al., 2010). If there is no existing set of such questions, researchers then have to develop a new question or modify the existing one. A procedure to develop the question (measures) in this study is presented in Section 6.7 (Chapter 6).

5.6.4 Step 4: Form of response

In this study, a Likert (1932) type method of summated ratings was used. Respondents were asked to record their opinion ranging from strongly agree to strongly disagree (Albaum, 1997). This scale was suitable for the study as it provides an interval or ratio based. This is the most powerful scale for statistical analysis (Hair Jr et al., 2010). Another critical process is to avoid ambiguity of the questionnaire.

5.6.5 Step 5: Question wording

In order to avoid ambiguity and to unsure the relevancy, each question has to be presented in the most simple manner. Jargon should be avoided in the questionnaire. If it is necessary to have some terminology or jargon, comprehensive descriptions should be given.

5.6.6 Step 6: Question sequence

Once the form of response and appropriate question wording had been determined, the next step includes the sequence of the questionnaire. Question sequence is very important in order to ensure a logical flow. Therefore, the appropriate arrangement of question in the questionnaire is a critical factor. A proper sequence, which may be justified in the pre-testing, can avoid the ambiguity of the respondent that may violate the validity of the data.

5.6.7 Step 7: Questionnaire physical characteristics

Good physical characteristics of the questionnaire not only encourage respondents to participate in the study but also enable the completion of the questionnaire by the respondent. The questionnaire was as a A5 size booklet. This size is widely used (Hair Jr et al., 2010) in order to enable respondents to easily carry. A clear font type (Corbel) and size (12 points) was used in a well-organised format. This allows respondents to comfortably understand and compete the questionnaire (Bryman and Bell, 2011).

5.6.8 Step 8: Re-examination and revision of questionnaire

After the questions and contents of questionnaire is initially designed, it should be revised. The revised questionnaire will be pre-tested by potential respondents in order to actually check for any error in the questionnaire (see details in Section 6.7.4). This process also provides an opportunity to foresee the potential problems. A critical re-examination of every detail of the questionnaire was undertaken. Error and ambiguity should be minimised or preferable removed.

5.6.9 Step 9: Questionnaire pre-testing

Pre-testing is essential component of questionnaire development. This process will allow researcher to practically check any error or incomplete or improper occur in the questionnaire. Potential problem can also be identified during and after questionnaire pre-testing. Reliability of the data was tested using Cronbach's alpha (Cronbach, 1951; Shevlin et al., 2000). Then, the new measurement models were then tested by a Structural Equation Model using R (R Development Core Team, 2012) with a package called *lavaan* (Rosseel, 2011). Details of the questionnaire pre-testing are presented in Section 6.7.4.

5.6.10 Questionnaire translation

The questionnaire was initially designed in English. Since most tourism practitioners in Thailand use Thai language as their first language, the questionnaire was translated to the Thai language. A collaborative and iterative translation approach was applied (Douglas and Craig, 2007) to ensure conceptual equivalence. Two experts were employed as translators, one from an association of tourism business in Thailand and another from a language institute of one of the top universities in Thailand. Both experts translated the questionnaire into Thai independently. Then, as a moderator of the translation process, both versions were merged. The final questionnaire was approved by both translators. The process of the collaborative translation of the questionnaire is

illustrated in the Figure 5.10.

5.6.11 Questionnaire distribution

5.6.11.1 Pilot study

To test the questionnaire, copies of the questionnaire were distributed to 234 participants attending the Annual General Meeting (AGM) of Chiang Mai Tourism Business Association (CMTBA) held in Chiang Mai province of Thailand in April 2009. The respondents were asked to give their perception and opinion of their firms in relation to their most familiar supply chain partner, which currently collaborate with, in order to ensure the reliability of the data (Sriram et al., 1992). Thirty six responses were received and analysed in the pilot study.

5.6.11.2 Main survey

In the main survey, questionnaires were distributed via on-line survey, in order to increase both the internal and the external validity of the data from the survey (Dillman, 2007; Grant et al., 2005). Using the survey method, there is a critical issue about the response rate (Dillman, 2007). Most survey studies tend to have quite a low response rate (usually less than 50%). In order to cope with this potential problem, the researcher made contact with two gate keepers of the population in this study. The first one is a government agency (*Tourism Authority of Thailand* or TAT) and the second one is executive in the tourism practitioner association (*Thailand Tourism Association*).

5.7 Large-scale survey methods

Large-scale survey methods consist of five main parts: (1) survey administration methods, (2) non-response bias testing, (3) common method bias testing, (4) normality testing, (5) measurement and structural model testing (or structural equation models).
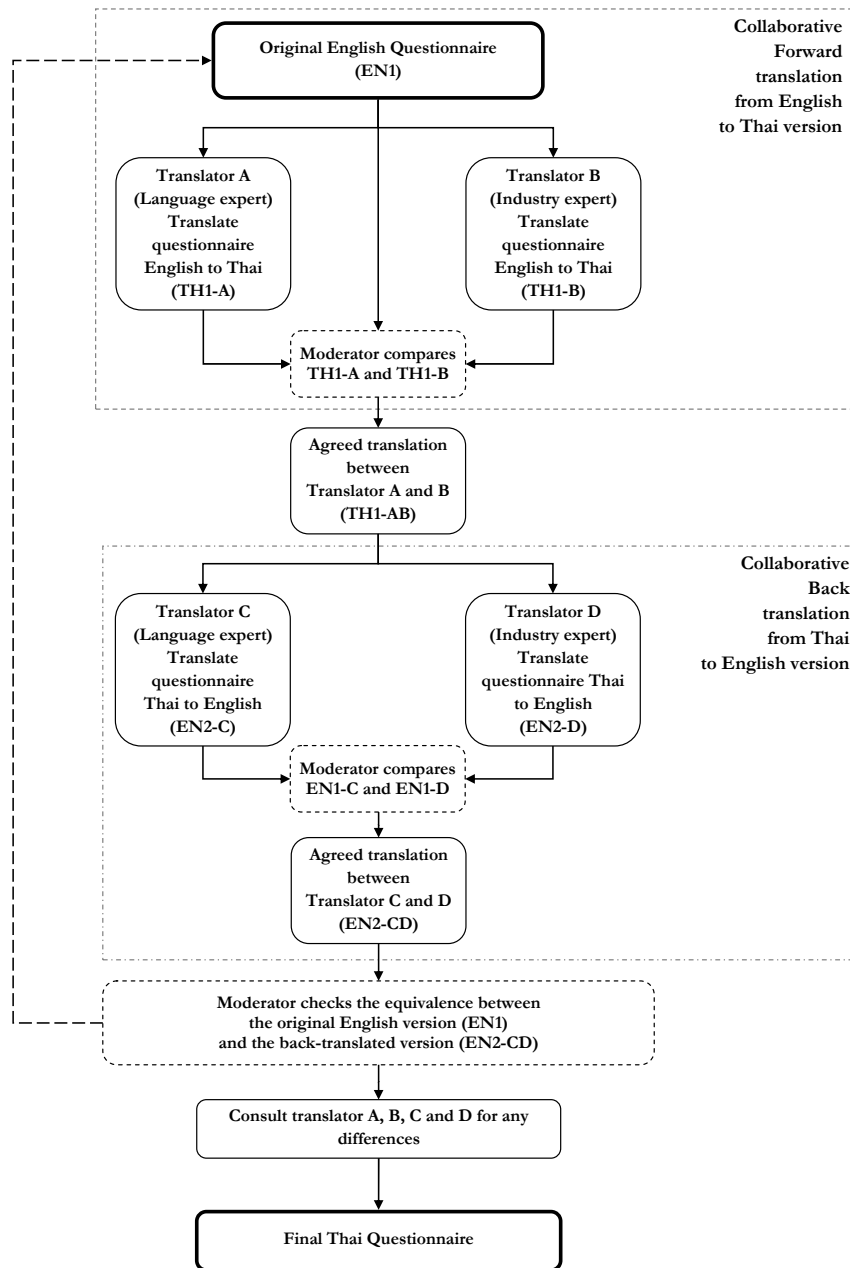
Figure 5.10: The process of collaborative translation of the questionnaire

5.7.1 Common method variances

Common Method Variances or Bias (CMV or CMB), introduced by Cambell and Fiske (1959*a*), can be defined as "*variance that is attributable to the measurement method rather than to the constructs the measures represent*" (Podsakoff et al., 2003, p. 879). As it is a common agreement among most researchers that CMB could affect research findings, many researchers have studied the potential causes and impact of CMB (Bagozzi and Yi, 1990; Bagozzi et al., 1991; Cambell and O'Connell, 1982; Conway, 1998; Cote and Buckley, 1987, 1988; Kline et al., 2000; Lindell and Brandt, 2000; Lindell and Whitney, 2001; Millsap, 1990; Parker, 1999; Smither et al., 1989; Scullen, 1999; Williams and Anderson, 1994; Williams and Brown, 1994). Such potential sources of Common Method Biases problem can be summarised in the Table 5.5.

During the questionnaire development process, there are several steps which Common Method Biases may influence in the process of questionnaire responses (Podsakoff et al., 2003). Such influences can be summarised in the Table 5.6.

5.7.2 Data analysis

A structural equation model (SEM) was used to test the hypotheses with data collected from the survey. More details about SEM are discussed in-depth in the Section 5.8.

5.8 Structural Equation Modelling (SEM)

5.8.1 Introduction

A significant foundation of the SEM was arguably started in the conference entitled "*Structural Equation Models in the Social Sciences*" where Jöreskog (1973); Keesling (1973); Wiley (1973) presenting the general framework that combines factor analysis and path analysis, which at that time called the **Joreskog-Keesling-Wiley** Model or JKW Model (Kline, 2011). Then Jöreskog and van Thillo (1972) invented software called "*LISREL*"

Table 5.5: Summary of Potential Sources of Common Method Biases

Potential Cause	Definition
Common rater effects	*Any artefactual covariance between the predictor and criterion variable produced by the fact that the respondent providing the measure of these variables is the same (Podsakoff et al., 2003).*
• Consistency motif	The propensity for respondents to try to maintain consistency in their responses to questions.
• Implicit theories	Respondents' beliefs about the covariation among particular traits, behaviours, and/or outcomes (illusory correlations).
• Social desirability	The tendency of some people to respond to items more as a result of their social acceptability than their true feelings.
• Leniency biases	The propensity for respondents to attribute socially desirable traits, attitudes, and/or behaviors to someone they know and like than to someone they dislike.
• Acquiescence biases	The propensity for respondents to agree (or disagree) with questionnaire items independent of their content (yea- & nay-saying).
• Mood state	The propensity of respondents to view themselves and the world around them in generally negative terms (negative affectivity) or positive terms (positive affectivity).
• Transient mood state	The impact of relatively recent mood-inducing events to influence the manner in which respondents view themselves and the world around them.
Item characteristic effects	*Any artifactual covariance that is caused by the influence or interpretation that a respondent might ascribe to an item solely due to specific properties or characteristics the item possesses. (Podsakoff et al., 2003).*
• Item social desirability	The fact that items may be written in such a way as to reflect more socially desirable attitudes, behaviours, or perceptions.
• Item demand characteristics	Items may convey hidden cues as to how to respond to them.
• Item ambiguity	Items that are ambiguous allow respondents to respond to them systematically using their own heuristic or respond to them randomly.
• Common scale formats	Artifactual covariation produced by the use of the same scale format (e.g., Likert scales, semantic differential scales,"faces" scales) on a questionnaire.
• Common scale anchors	The repeated use of the same anchor points (e.g., extremely, always, never) on a questionnaire.
• Positive & negative wording	The fact that the use of positively (negatively) worded items may produce artifactual relationships on the questionnaire.
Item context effects	*Any influence or interpretation that a respondent might ascribe to an item solely because of its relation to the other items making up an instrument (Wainer and Kiely, 1987).*
• Item priming effects	The positioning of the predictor (or criterion) variable on the questionnaire can make that variable more salient to the respondent and imply a causal relationship with other variables.
• Item embeddedness	Neutral items embedded in the context of either positively or negatively worded items will take on the evaluative properties of those items.
• Context-induced mood	When the first question (or set of questions) encountered on the questionnaire induces a mood for responding to the remainder of the questionnaire.
• Scale length	If scales have fewer items, responses to previous items are more likely to be accessible in short-term memory and to be recalled when responding to other items.
• Grouping items/constructs	Items from different constructs that are grouped together on the questionnaire may decrease intra-construct correlations and increase inter-construct correlations.
Context effects	*Any artifactual covariation produced from the context that measures are obtained (Podsakoff et al., 2003).*
• Variables measured within the same context	Measures of different constructs measured at the same point in time (or in the same location or using the same medium) may produce artifactual covariance independent of the content of the constructs themselves.

Source: Adopted from (Podsakoff et al., 2003; Wainer and Kiely, 1987)

Table 5.6: Influence of Common Method Bias on the Questionnaire Process

Stages of the responses process	Activities in each stage	Potential common method biases
Comprehension	Attend to questions and instructions, represent logical form of question, identify information sought, and link key terms to relevant concepts	Item ambiguity
Retrieval	Generate retrieval strategy and cues, retrieve specific and generic memories, and fill in missing details.	Measurement context, question context, item embeddedness, item inter-mixing, scale size, priming effects, transient mood states, and item social desirability.
Judgement	Assess completeness and accuracy of memories, draw inferences based on accessibility, inferences that fill in gaps of what is recalled, integrate material retrieved, and make estimate based on partial retrieval.	Consistency motif (when it is an attempt to increase accuracy in the face of uncertainty), implicit theories, priming effects, item demand characteristics, and item context- induced mood states.
Response selection	Map judgement onto response category	Common scale anchors and formats and item context-induced anchoring effects
Response reporting	Editing response for consistency, acceptability, or other criteria	Consistency motif (when it is an attempt to appear rational), leniency bias, acquiescence bias, demand characteristics, and social desirability

Source: Adopted from (Podsakoff et al., 2003)
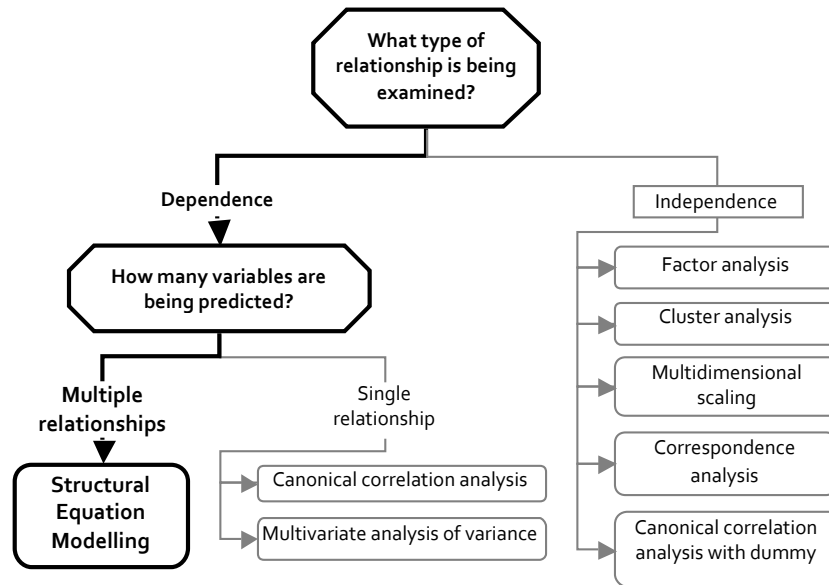
Figure 5.11: Multivariate Data Analysis Methods

to examine the SEM. These developments have a great contribution to various disciplines such as education, psychology, social sciences, behavioural sciences and business and management (Bagozzi and Yi, 2012; Chin, 1998; Anderson and Gerbing, 1988).

Structural Equation Modelling is a multivariate technique that analyse the covariance structure of variables. The structural model consists of two main models namely latent variable model and measurement model. According to the recommendation of Hoyle and Panter (1995), this thesis reports SEM results by describing the development of conceptual model and followed by the results of measurement models, structural model and model diagnosis.

As SEM is generally known for Covariance-Based SEM (CBSEM), SEM can be also fitted with Partial Least Square method (PLS SEM), originally developed by Herman Wold (Wold, 1966; Mateos-Aparicio, 2011). PLS SEM is normally adopted as an al-

ternative of SEM (Vinzi et al., 2010) especially where assumptions of CBSEM is not satisfied such as sample size or normality (Peng and Lai, 2012).

SEM method is different from other multivariate techniques in several ways (Bagozzi and Yi, 2012; Bentler, 2010; Iacobucci, 2009). First, SEM allows an estimation of a series of separate, but interdependent, causal relationships simultaneously. Second, in SEM, measurement errors and random errors can be included in the model as well as remove potential for estimation. Finally, SEM can effectively deal with multicollinearity. SEM, however, theory-driven approach of conducting SEM is strongly suggested (Hair Jr et al., 2010).

5.8.2 Philosophical foundation of SEM

"SEMs provide a useful forum for sense-making and in so doing link philosophy of science criteria to theoretical and empirical research." (Bagozzi and Yi, 2012, p. 12). Such sense-making forum covers theoretical, empirical, and spurious meaning. A holistic view of philosophical framework in SEMs can be illustrated in the Figure 5.12.

5.8.2.1 Theoretical meaning

Considering a theoretical meaning of the model, the theoretical concepts of each construct (A, F and C) are interpreted via construct specification and operationalisation (Bagozzi and Yi, 2012) (noted as CS and triangles in Figure 5.12).

5.8.2.2 Empirical Meaning

"Empirical meaning refers to the observational content associated with theoretical constructs after spurious meaning, if any, has been removed" (Bagozzi, 2011, p.265). This process can be addressed by linking conceptual (theoretical) constructs to manifest (observed) variables i.e., correspondence rules. There are three types of correspondence rules; *the operational definition, partial interpretation, and causal indicator models* (Bagozzi and Yi, 2012, p.265).
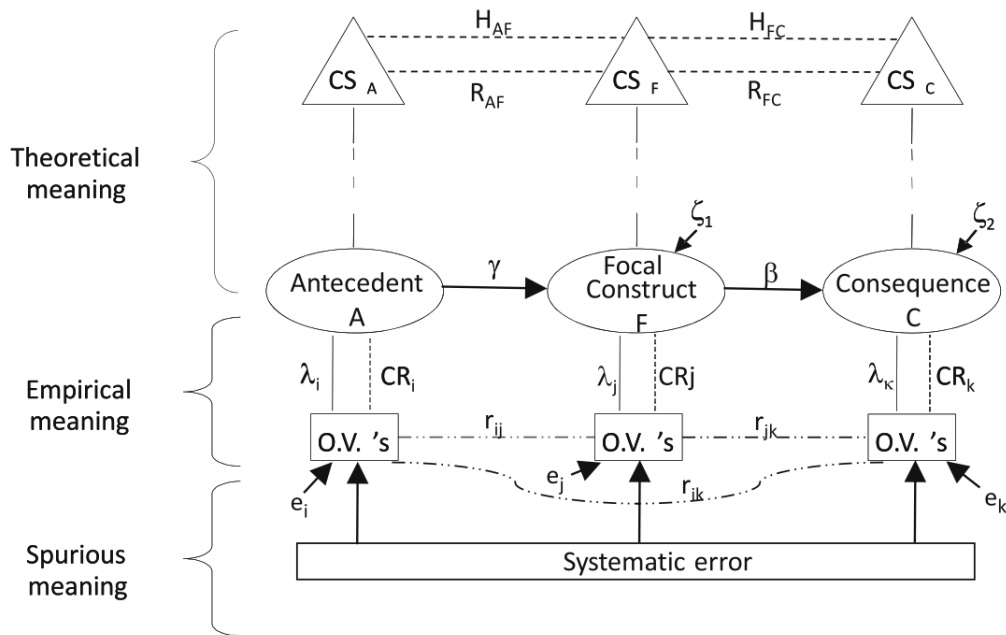
Figure 5.12: A Framework for Theoretical, Empirical, and Spurious Meaning consideration in Structural Equation Models

Source: (Bagozzi, 2011)

Key:

◯	=	Theoretical or latent variable;
▢	=	Observed or manifest variables;
▲	=	Conceptual specification and/or theoretical definition;
→	=	Inferred (e.g., estimated) causal path;
———	=	Inferred (e.g., estimated) relation (i.e., factor loading) between latent and manifest variable;
- - - - -	=	Correspondence rule;
-→	=	Causal specification;
— - - —	=	Relationship between latent variable and its conceptual specification/theoretical definition;
— ·· — ·· —	=	Indicates which observed variables are involved in the correlations;
CS	=	Conceptual specification and/or theoretical definition;
CR	=	Correspondence rule for antecedent, focal construct, and consequence;
r's	=	Observed correlations among manifest variables;
$\gamma, \beta, \lambda's$	=	Parameter estimates;
H	=	Theoretical hypothesis;
R	=	Rationale behind theoretical hypothesis;
ζ	=	Theoretical error;
O.V.'s	=	Observed variables;
e	=	Random error.

5.8.2.3 Spurious Meaning

"*Spurious meaning refers to contamination of empirical meaning and resides in one or more of three sources: random error, systematic error, and measure specificity*" (Bagozzi, 2011, p.267). The initial step of measurement model can help minimise spurious meanings. However, if there is a condition that does not allow it to do so, spurious meanings can be also statistically controlled for. Bagozzi et al. (1991, pp. 438-443) provided examples and detailed discussions on how different types of spurious meaning are controlled. When there is a systematic bias, spurious meaning of the SEM is more included (Bagozzi, 2011).

5.8.3 Motivation of SEM

SEM is considered as "*an extension of factor analysis and regression*" (Iacobucci, 2009, p. 673). On the other hand, (multiple) regression is a simplified form of SEM (Bagozzi and Yi, 2012; Iacobucci, 2009; Hair Jr et al., 2010). The advantages of SEM over regression models are as follow.

1. SEM is able to validate a model with multiple dependent variables simultaneously. Regression can do so with two separated regression models, which less parsimonious than a simultaneous approach to fit in a single model in SEM (Bagozzi and Yi, 2012). Hence mediation effects can be also simultaneously tested in SEM, rather than using a two sequential steps in regression (Iacobucci, 2009).

2. SEM can model measurement error of the construct, which can not be incorporated in regression. This advantage makes SEM perform better than regression in terms of model improvement (due to poor measure specification) and also reduce multicollinearity problems (Iacobucci, 2009).

5.8.4 Benefits of SEM

"*SEM provides a statistical approach for understanding the nature of the key constructs, as well as the influence of the constructs upon one another.*" (Priester, 2010, p.206). SEM

has been frequently used to test and hypotheses and explore novel conceptual framework in operations and supply chain management research (Shah and Goldstein, 2006). Bagozzi and Yi (2012) summarised benefits of SEM as follows.

1. Provides integrative function (a single umbrella of methods under leading programs).

2. Helps researchers to be more precise in their specification of hypotheses and operationalisations of constructs.

3. Takes into account reliability of measures in tests of hypotheses in ways going beyond the averaging of multi-measures of constructs.

4. Guides exploratory and confirmatory research in a manner combining self-insight and modeling skills with theory. Works well under the philosophy of discovery or the philosophy of confirmation.

5. Often suggests novel hypotheses originally not considered and opens up new avenues for research.

6. Is useful in experimental or survey research, cross- sectional or longitudinal studies, measurement or hypothesis testing endeavours, within or across groups and institutional or cultural contexts.

Hence SEM has been widely applied in various disciplines including operations and SCM (Shah and Goldstein, 2006) and tourism management (Reisinger and Turner, 1999), especially in tourism development (Hallak et al., 2012; Ballantyne et al., 2011; Yoon et al., 2001).

5.8.5 SEM in SCM research

In SCM research, SEM has become one of the preferred statistical methods used to test the relationships between latent constructs (Shah and Goldstein, 2006). The important output of SEM is the statistically proven theoretical model. It has an advantage over linear regression analysis in terms of SEM allows more than one relationships in the

model whereas linear regression can deal with only one relationship. This study employed a SEM procedure in Figure 5.13 suggested by (Hair Jr et al., 2010).

5.8.6   Introduction to SEM

SEM can be considered as a combination between factor analysis and a path model (Hair Jr et al., 2010; Weston and Gore, 2006). Therefore, SEM model can be divided into two parts: a measurement model and a latent variable model (Jöreskog and van Thillo, 1972; Fox, 2006). First, the measurement models aim to validate the latent constructs and their measurement items (Iacobucci, 2009). The method that evaluate the measurement model is called Confirmatory Factor Analysis or CFA (Jöreskog and van Thillo, 1972). CFA is an important part of SEM as it allows an inclusion of the latent variable in the model (Hair Jr et al., 2010). Latent variables are variables that cannot be measured directly (Byrne, 2010). Hence, it is critical to operationalise the latent variables based on theories or previous knowledge (Shah and Goldstein, 2006).

Second, the latent variable model aims to test the causal relationships between the latent variables in the measurement model (Hair Jr et al., 2010). The latent variable model is also called the *structural model* (Kline, 2011). The role of the structural model is to test the hypotheses (Iacobucci, 2009).

5.8.7   Keys issues in SEM

Although SEM has been widely used in several disciplines (Kline, 2011), there are some ambiguities in the method (Bagozzi, 2010). Two main issues related to SEM are associated with data and the approach. First, sample size and data screening are critical in SEM (Hair Jr et al., 2010). Sample size is an important issue in SEM as it affect various other issues e.g., model complexity, level of significance and estimation methods (Kline, 2011; Bagozzi, 2010; Iacobucci, 2009; Bentler, 2010).

5.8.7.1 Sample size in SEM

Sample size is one of the critical issues in SEM, however there is no straightforward approach to this issue as it depends on several conditions e.g., model complexity, theoretical background (Fabrigar et al., 2010; Hair Jr et al., 2010). Sample size depends on a number of factors e.g., model complexity and statistical power (Hair Jr et al., 2010). Considering model complexity, a ratio of 10-20:1 of observations to an estimated parameter is also suggested (Kline, 2011), with a minimum of 5:1 (Hair Jr et al., 2010).

Kline (2011) suggested that sample size in SEM can be catagorised into three levels: small (sample < 100), medium (100 < sample < 200), and large (sample > 200). In general, a large sample size (> 200) is suggested for a complex model (Fabrigar et al., 2010; MacCallum et al., 1996; Hulland et al., 1996). A critical sample size of at least 200 has been proposed for SEM analysis (Hair Jr et al., 2010; Bentler, 1990) has been proposed and widely used (Fan and Sivo, 2007). In this study there were four groups of samples, then each group also requires at least 200 samples.

Moreover, SEM is generally required normal distributed data (Weston and Gore, 2006; Bentler, 2010). In other multivariate statistical methods such as regression, multicollinearity is a critical problem in hypothesis testing i.e., Type II error (Hair Jr et al., 2010). However, in SEM, it is unclear and many SEM studies have not reported the test for multicollinearity. However, a Monte Carlo simulation by Grewal et al. (2004) showed that multicollinearity in SEM could potentially be problematic if the multicollinearity is greater than 0.8 or is between 0.6 - 0.8 but composite reliability is low and sample size is small.

5.8.8 SEM approach: one-step or two-step approach?

Another important issue associated to SEM is the approach to fit the model with the data. There are two main approaches to do so: a one-step and two-step approach (Anderson and Gerbing, 1988). A single step approach SEM is to fit both the measurement and the structural model simultaneously. This approach is recommended for the model with well-established constructs and hypotheses (Hair Jr et al., 2010). On the other hand, the two-step approach suggests to fit the measurement model(s) first. Then the structural model can be estimated if the measurement models were validated (Anderson and Gerbing, 1988). By achieving a required level of model fit in the first step, it is more likely to have better fit structural model (Anderson and Gerbing, 1988). Hence, the two-step approach has been widely used in the literature (Bagozzi and Yi, 2012; Ramanathan and Gunasekaran, 2012; Kline, 2011; Hair Jr et al., 2010; Iacobucci, 2009; Hulland et al., 1996). Therefore, the two-step approach (Anderson and Gerbing, 1988) was employed in this study.

5.8.9 Procedural steps in SEM

Based on the two-step approach suggested by Anderson and Gerbing (1988), there are also other issues in SEM such as sample size and missing data (Hair Jr et al., 2010). To ensure a proper conduct of SEM, a six-stage procedure (Figure 5.13) was suggested (Hair Jr et al., 2010). This procedure is similar to the framework recommended by Garver and Mentzer (1999). Hence, this study also used this procedure to fit the model. These six steps are discussed in this section.

5.8.10 Procedural steps in SEM

Similar to other quantitative methods, SEM will be valid only if specific assumptions are met. SEM can be considered as a hybrid of factor analysis and path analysis (Hair Jr et al., 2010; Weston and Gore, 2006). This thinking categorises SEM into two main
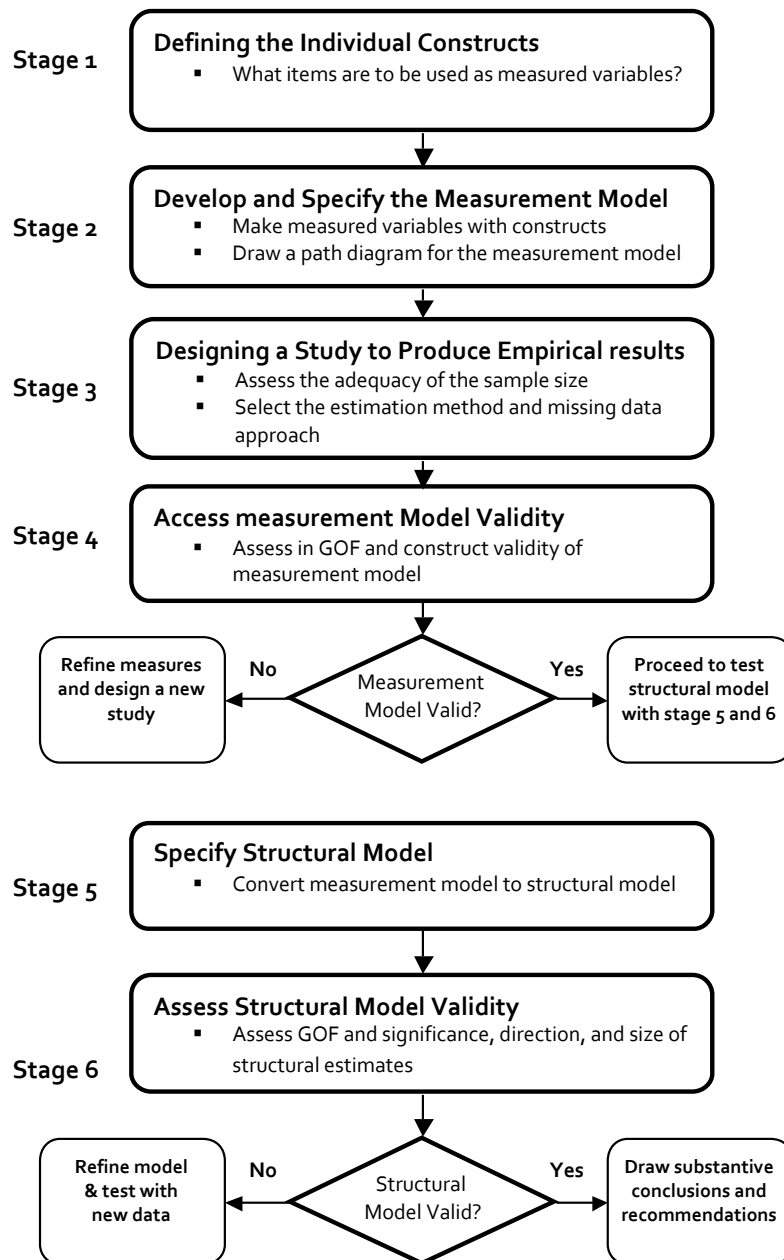
Figure 5.13: Process in Structural Equation Models

Source: Adapted from Hair Jr et al. (2010, p. 654)

components; the measurement model and the structural model. The measurement is a sub model of the structural model that enables researchers to evaluate how well the indicators combine to identify underlying latent variables. In behavioural sciences, theoretical latent variables of interest are often unable to be directly measured (Byrne, 2010). Thus, researchers need to operationally define the latent variables in terms of indicators that represent it. Measuring these indicators, therefore, constitutes the direct measurement of observed variables, albeit the indirect measurement of a latent variable. In contrast to the measurement model, the structural model is a "*set of one or more dependence relationships linking the model construct*" describing interrelationships amongst latent constructs (Hair Jr et al., 2010, p. 634).

Despite the widespread usage of SEM, there are several issues related to its application: issues related to data, and the one- or two-step approach issue. The first issue relates to sample size and data screening. Sample is a main concern for the application of SEM (Chou and Bentler, 1995). It is established that the measurement indices (e.g. significance testing of parameter estimates, model misspecification, model complexity, estimation procedure) in SEM are either directly or indirectly related to sample size (Hair Jr et al., 2010). There is, however, no consensus to this issue except to suggest that complete, normally distributed data require smaller samples than missing or non-normal distributed data (Weston and Gore, 2006). Previously, it is suggested that 10 to 20 participants per estimated parameter would result in a sufficient sample (Kline, 2011).

However, sample size may also depend on a number of factors (Hair Jr et al., 2010) such as the desired power, the null hypothesis being tested, and the overall model complexity (MacCallum et al. 1996). It is also suggested that when testing sophisticated models, large number of samples should be used (Hulland et al. 1996; MacCallum et al. 1996). Recently, Kline (2005) offered guidance on how to categorise sample numbers: small (sample < 100), medium (100 < sample < 200), and large (sample > 200). The

present study required a minimum number of 200 respondents to examine the conceptual model as it is considered to be a complex model.

5.8.10.1 Stage 1: Defining individual constructs

Construct development is critical for SEM. Hypothesis testing cannot be reliable if the constructs are not well-defined (Hair Jr et al., 2010). There are two approaches to obtain measurement scales. First, established scales may be adopted. Second, if there is no such existing scales that fit with the research context, researchers have to develop a new scale or modify the existing one (Hair Jr et al., 2010). In this study, scales from prior studies were adopted and modified using an approach recommended by Churchill (1979). The details of scale development in this thesis is presented in Section 6.7 (Chapter 6).

5.8.10.2 Stage 2: Developing and specifying the measurement model

After the scale items were specified, the measurement model can be developed and specified (Iacobucci, 2009). There are three parts in the specification of the complete measurement models: relationship between items and constructs, correlations between constructs and error terms for each items (Hair Jr et al., 2010). However, correlation among error terms could be specified (Marsh and Hocevar, 1985).

5.8.10.3 Stage 3: Designing a study to produce empirical results

When the measurement models are specified and identified considering their constructs and measurement items, the next step is associated with the design and estimation of the study and the model (Hair Jr et al., 2010). In terms of the study design, there are three main issues: (1) type of data used (either covariance or correlation matrix), (2) effects of missing data and the remedies, and (3) sample size (Bagozzi and Yi, 2012).

5.8.10.4 Stage 4: Assessing the measurement model validity

When the measure models properly specified and sufficient data obtained, and estimation technique decided, then the next step is to assess the validity of the measurement model (Bentler, 2010; Bagozzi and Yi, 2012). Validity of the measurement model is based on two key parts: (1) level of goodness-of-fit, and (2) the supporting evidence (Hair Jr et al., 2010). There are several evaluation criteria for goodness-of-fit in SEM. Goodness-of-fit (GOF) indices for SEM are summarised in Table 5.7. The table also offers the criteria guideline for different levels of acceptable fit of each measure. However, such guideline is a generic criteria. The use of this guideline must consider other factors such as sample size, model complexity or contexts of the study. GOF indices are discussed in details in the Section 5.8.15.

5.8.10.5 Stage 5: Specifying the structural model

With measurement model validated, the relationships among them can be now examined. Specify the causal relationships should be based on the theoretical justification or real-life observation (Hair Jr et al., 2010). Evidences from the previous studies can be used to support the arguments. Equations or diagram may be produced to specify the structural model (Bentler, 2010). Moreover, in specifying the relationships, constructs can be specified to be intercorrelated or dependent on the other construct (Bagozzi, 2011). Both types of relationships also need theoretical supports and/or evidences from the real world observation (Bentler, 2010).

5.8.10.6 Stage 6: Assessing structural model validity

The final stage of SEM is to assess the validity of the relationships specified in the previous stage. The evaluation criteria used in this stage are similar to those used to assess validity of the measurement model (Hair Jr et al., 2010). However, the difference between assessing validity of the measurement model in stage 4 and the structural model are two folds. First, the evaluation of the structural model emphasises on the

coefficient of the causal relationships specified as hypotheses (Bentler, 2010). Second, the assessment can be compared to the competing or rival structural models if the relationship among the constructs can be specified differently (Iacobucci, 2009). The competing models are also based on the theoretical justification or real-life observation (Bagozzi, 2011).

5.8.11 Scale evaluation

To evaluate the developed scales, three aspects are considered. They are reliability, validity and generalisability (Malhotra and Birks, 2005) (see Figure 5.14).
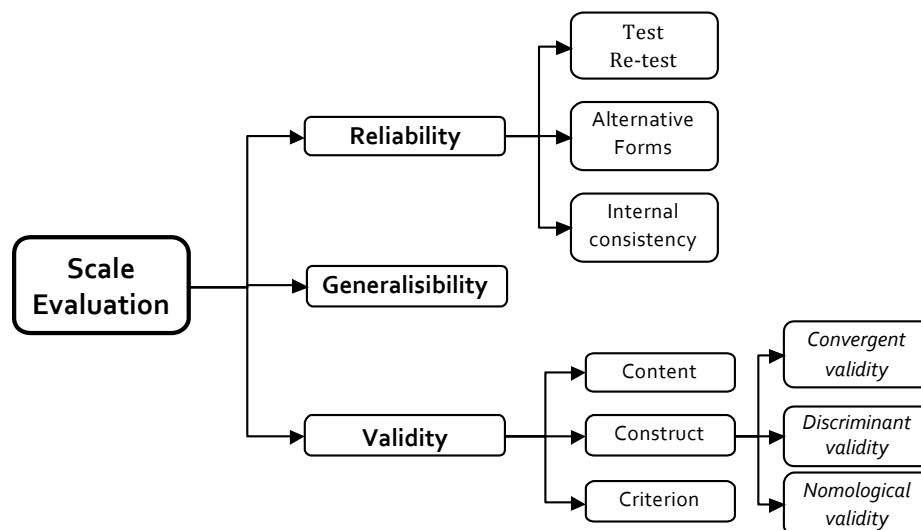
Figure 5.14: Scale evaluation

Source: (Malhotra and Birks, 2005, p.312)

5.8.12 Reliability and validity assessment

As most of the measures usually reflect not only theoretical meaning of the focused construct but also measurement error (Bagozzi et al., 1991). Such error is recognised as a critical problem in measuring constructs (Hair Jr et al., 2010). Hence it is important to validate the construct and refine the measures before testing the hypotheses

([Bagozzi et al., 1991](#)). Convergent and discriminant validity were proposed by [Cambell and Fiske](#) ([1959*b*](#)) as two aspects of construct validity . Convergent validity refers to the degree to which item associated to a specific construct are sharing high proportion of their covariance ([Hair Jr et al., 2010](#)).

5.8.13 Model modification

In SEM, if the initial conceptualised model does not fit well with the data, one may modify the model using Modification Index (MI) or Lagrange Multiplier (LM) in Econometrics but reason(s) to do so need to be reported for cross-validation ([Bentler, 2010](#)). As model modification is used in the last step of SEM to revise the proposed model to better fit with the data, it is considered a data-driven approach. Therefore, is was not employed in this study.

5.8.14 Reliability

Reliability for a factor measurement can be assessed with an index computed from the findings in a CFA. Reliability of an individual measurement item (ρ_i) can be calculated using the following formula [5.1](#).

> **Reliability of an individual measurement item**
>
> $$\rho_{\,indicator\,i} = \frac{\lambda_i^2(factor)}{\lambda_i^2(factor) + \theta_{ii}} \tag{5.1}$$
>
> Where
>
> λ_i is the factor loading of an indicator i on its hypothesised construct.
>
> θ_{ii} is the variance of the error term of the indicator i.

The reliability of all items loaded to a factor (i.e., *Composite Reliability* or CR or

$\rho_{composite}$) can be computed with the formula 5.2

> **Composite Reliability (CR)**
>
> $$\rho_{composite} = \frac{(\Sigma\lambda_{ij})^2(factor)}{(\Sigma\lambda_{ij})^2(factor) + \Sigma\theta_{ii}} \tag{5.2}$$
>
> Where
>
> λ_{ij} is the factor loading of an indicator i on construct j.
>
> θ_{ii} is the variance of the error term of the indicator i.

5.8.15 Assessing the Model Validity

5.8.15.1 Construct validity

> *"Do not confuse the finger pointing to the moon with the moon."*

> *(Ancient Chinese proverb)*

According to (Bagozzi and Yi, 2012, p. 18),

> *"Construct validity is the extent to which indicators of a construct measure what they are purported to measure. Unlike reliability, which is limited to the degree of agreement among a set of measures of a single construct, construct validity addresses both the degree of agreement of indicators hypothesized to measure a construct and the distinction between those indicators and indicators of a different construct(s)."*

Hence construct validity is the test to ensure that the constructs are measured correctly in order to be used to test their relationships in the hypotheses in the next steps of SEM. Construct validity can be assessed by considering Goodness of Fit values in the CFA model, which are discussed in detailed in Section 5.8.18.

5.8.15.2 Convergent validity

Convergent validity can be assessed using three methods.

1. **Factor loadings** Factor loading of each construct should be greater than 0.5 or preferably 0.7.

2. **Average Variance Extract** In CFA, AVE should be greater than 0.5.

3. **Reliability** CR should be greater than 0.6 or preferably 0.7.

Convergent validity is satisfied when each factor loading is more than two times its standard error (Anderson and Gerbing, 1988). It is recommended that each loading should be significant at the $p < 0.01$ to ensure convergent validity (Hair Jr et al., 2010).

5.8.15.3 Discriminant validity

Discriminant validity was assessed using four methods.

1. **Inter-correlation < 0.60**

   Correlations between different latent variables (inter-correlation values) should be less than 0.60 to ensure discriminant validity.

2. **Average Variance Extracted**

   Average Variance Extracted (AVE) were also computed to assess discriminant validity. AVE measures "*the amount of variance captured by a construct in relation to the variance due to random measurement error*" (Gaur et al., 2011, p. 1,768). AVE can be calculated using the formula 5.3 (Fornell and Larcker, 1981, p. 46):

Average Variance Extracted (AVE)

$$AVE = \frac{\sum_{i=1}^{p} \lambda_{yi}^2}{\sum_{i=1}^{p} \lambda_{yi}^2 + \sum_{i=1}^{p} Var(\epsilon_i)} \qquad (5.3)$$

Values in the above equation (5.3) is the "*sum of the square of the standardized factor loadings, whereas the denominator is the numerator plus the sum of the variance due to random measurement error for each loading*"(Gaur et al., 2011, p. 1,769). The AVE values should not be less than the 0.50 to ensure discriminant validity (Fornell and Larcker, 1981).

3. **Constrained Analysis Method**

   Constrained analysis method can be conducted by fitting a model with a fixed correlation between a pair of two constructs (e.g., inter-firm trust and transaction cost) to unity (1.0). Discriminant validity is supported if a χ^2 different test shows a support for the original model (Anderson and Gerbing, 1988).

4. **Measurement item**

   Discriminant validity can be also ensured by checking if each item loads on only one construct (Hair Jr et al., 2010).

5.8.15.4   Nomological validity and face validity

Face validity is arguably the most important validity and must be ensured before CFA. In this thesis, CFA is ensured by asking the experts from both industry and academia to evaluate the constructs and their items in the structured interviews.

Nomological validity can be examined by checking if the correlations among constructs in the measurement models theoretically and/or logically sound. Such correlations can be obtained from the correlation matrix of the constructs.

5.8.16   Multiple-Group Analysis

In the case when there are more than one sample group, one may test if the model is equivalently fitted across different sample groups. Moreover, one may test for the significant difference of each parameter. Multiple group SEM allow the analysis of not

only the validation of the conceptual model and hypotheses but also it can be used to test for potential moderating factors of path coefficients.

One of the objectives of this thesis is to compare and contrast independent samples representing different supply chain partners' perceptions (hotels, suppliers and travel agents) on supply chain collaboration and relationships. On the other hand, it also examines if the perceptions of each supply chain partners are equivalent. The multiple group analysis is satisfied if the overall conceptual model is well fitted and hypotheses are statistically supported across different perceptions.

Such an objective can be achieved by a multiple group SEM analysis. In a multiple SEM analysis, invariance test is performed to examine if causal relationships in the structural model are equivalently significant across different sample groups (Nyaga et al., 2010; Wong et al., 2011).

5.8.17 Presenting SEM results

There is no consensus on how to present SEM results (Bagozzi and Yi, 2012). Some researchers e.g., Bentler (2010) suggest a simple equation with diagram form, others such as Iacobucci (2009) recommended a mathematical form (matrix algebra) and a diagrams with Greek letters. This research presents the model in both forms.

5.8.18 Fit Indices

General suggestions of the fit indices that should be reported in the SEM analysis are χ^2 value (with its df, and p-value), RMSEA, NNFI (or TLI), CFI (or RNI), and the SRMR (Iacobucci, 2010; Bagozzi, 2010).

5.8.18.1 Chi-square: χ^2

Chi-square statistic tests the null hypothesis that the covariance matrix of the specified (conceptual) model is not different from the covariance matrix of the observed (collected) data ($H_0 : \Sigma = \hat{\Sigma} = S$) (Anderson and Gerbing, 1988). Hence, χ^2 test is a general test of the fitness of the model and the data. Good fit model is expected to obtained non-significant χ^2 test result (Marsh and Hocevar, 1985). χ^2 can be computed using the formula 5.4.

Chi-square (χ^2)

$$\chi^2 = N[tr(S\Sigma^{-1}) + log|\Sigma| - log|S| - (p+q)|] \tag{5.4}$$

Degrees of freedom $(df) = [k(k+1)/2] - t$

Where

Σ = Covariance matrix of the specified model;

S = Covariance matrix of the data;

p = Number of observed endogenous variables;

q = Number of observed exogenous variables;

k = p + q;

t = number of parameters freely estimated.

However there are some limitation of the use of χ^2 to judge whether the model is validated. The following are the properties of the χ^2 test (Iacobucci, 2010).

1. It increases as function of degree of freedom, hence the concern for N. The previous paragraph shows that even if the model fit very well, if a sample were say of size 1,000, then the χ^2 would be approximately 1,000.

2. χ^2 ranges from zero to very high. It is zero when the saturated model is fit (i.e., all

possible paths are in the model to be estimated). It is at its highest on any data set for the model of independence (i.e., no paths are entered into the model).

3. χ^2 penalises models with a large number of variables (i.e., it is large when there are many variables).

4. χ^2 reduces as parameters are added to the model (much like an R^2 would increase as one adds predictors). However, adding parameters means the model is getting more complex, and less parsimonious.

5. χ^2 can be used to compare the fits of nested competing models, where model A is a restricted version of B, and the result is distributed χ^2 with degrees of freedom equal to $(df_A) - (df_B)$. To say A is a restricted version of B is to say that model A is nested in model B; i.e., Model B estimates more parameters. Whereas in model A, more parameters are fixed (usually to zero) and not estimated. The χ^2 is also affected by N. If two models are not nested, they may be compared using descriptive goodness-of-fit measures, such as Akaike's Information Criterion (AIC) or an adjusted goodness-of-fit index (AGFI).

5.8.18.2   Standardised Root Mean Square Residuals (SRMR)

RMR stands for "*root mean square residual*". Residuals refer to "*the differences between the data in S and the model in* $\hat{\Sigma}$ (Iacobucci, 2010). The mean of such residuals is calculated on average.

Root Mean Square Residual (RMR)

$$RMR = \sqrt{\frac{\sum_{i=1}^{p} \sum_{j=1}^{i} (s_{ij} - \hat{\sigma})^2}{k(k+1)/2}} \tag{5.5}$$

where $k = p + q$

The square root of residuals are a "*standard deviation*" scale. As the matrices *S* and

$\hat{\Sigma}$ are covariance matrices, then the standardised index can be easily interpreted. The values of RMR and SRMR range from 0 to 1, which can be computed as the formula 5.5 and 5.6 respectively (Browne et al., 2002).

> **Standardised Root Mean Square Residual (SRMR)**
>
> $$SRMR = \sqrt{\frac{\sum_{i=1}^{p} \sum_{j=1}^{i} [(s_{ij} - \hat{\sigma})/s_{ii}s_{jj}]^2}{k(k+1)/2}} \tag{5.6}$$

Similar to the χ^2, "*RMR and SRMR are badness-of-fit indices, higher values indicate worse fits*" (Iacobucci, 2010). If the conceptual model is perfectly fitted with the data, RMR and SRMR will equal to zero (Browne et al., 2002). Considering the SRMR:

1. Hu and Bentler (1999, p. 27) recommend that the value of SRMR "*close to 0.09*" shows a reasonable fit, which infers that "*the model was not overly likely to have been the result of too many type I or type II errors*" (Iacobucci, 2010, p. 96).

2. According to simulation testing, it was found that SRMR was "*more sensitive to model misspecification than to sample size or violations of distributional assumptions*" (Iacobucci, 2010). Hence, when SRMR is not lower than the cut-off value, there is likely to be problematic in the measurement and/or structural (path) models.

5.8.18.3 Root Mean Square Error of Approximation (RMSEA)

Root Mean Square Error of Approximation (RMSEA), some called *Ramsey*, is similar to SRMR, but is calculated and behaves differently (Steiger, 2009). RMSEA can be computed with the formula 5.7 below.

Root Mean Square Error of Approximation (RMSEA)

$$RMSEA = \sqrt{\frac{(X^2 - df)}{df(N-1)}} \qquad (5.7)$$

However, RMSEA has some limitations. In various simulation testing, RMSEA tends to give a lower value than what should be (that is over-rejects valid models) for the small samples ($N < 250$) but tend to have a larger value when adding more variables in the model (Fan and Sivo, 2007; Hu and Bentler, 1998; Kenny and McCoach, 2003). Therefore, SRMR is a more reliable index, however RMSEA is suggested to be reported along with SRMR (Bagozzi, 2010).

5.8.18.4 CFI and other incremental Fit Indices

The Comparative Fit Index (CFI) is well-known in its background (Bagozzi, 2010). According to the problem of χ^2 test that almost always rejects the null hypothesis, there is a need to develop a other goodness-of-fit indices Bentler (2010). Therefore, another class of evaluation criteria was created. This class, called model comparison, or incremental fit indices suggested by Bentler and Bonett (1980). They argued that an evaluation criteria for SEM should compare the proposed model with an idealised model, not a straw-model (the null). Two main indices in this class are Normed Fit Index (NFI) and CFI. First NFI was developed (Bagozzi, 2010). The NFI is defined as follows equation 5.8:

Normed Fit Index (NFI)

$$NFI = (\chi^2_{null} - \chi^2_{model})/\chi^2_{null} \tag{5.8}$$

where

χ^2_{model}	is	The fit of the model of interest
χ^2_{null}	is	The fit of the model of independence which estimates variances, but no covariances (no link between any construct and all variables are considered to be independent)

The value of NFI ranges from 0.0 - 1.0. NFI was heavily criticised its potential biases e.g., bias in sample size as NFI is underestimated in small-size samples and difficult to interpret across samples (Ding et al., 1995; Marcoulides and Schumacker, 1996; Marsh and McDonald, 1988). Hence a new index, Comparative Fit Index (CFI), was created to overcome these problems. CFI can be computed using the formula 5.9 below.

Comparative Fit Index (CFI)

$$CFI = 1 - \frac{max((\chi^2_{model} - df_{model}, 0)}{(max(\chi^2_{null} - df_{null}), 0)} \tag{5.9}$$

For model parsimony, the model comparison is conducted by subtracting χ^2 and its degree of freedom of the model. Hence models are likely to fit worse (larger χ^2) if the degree of freedom is low (or there is a few estimated parameters) (Bagozzi, 2010). Moreover, if the satisfied fit of the model (small χ^2) is obtained by using many degree of freedom for the model with many parameter, it will be penalised. By comparing the focal model to the null model using ratio, it reflects the extent to which there is other

relationships presents in the data rather than just interdependence (Kline, 2011).

Therefore in the case that there is no relationships presents in the data, and the interdependence exists, the χ^2 of the proposed model and the null model will be closed. Moreover if degree of freedom of both proposed and null model are the same, then CFI will be 0 since the value of the ratio would be 1. Hence, the greater value of CFI represent the higher level of relationships exists in the data, on top of interdependence in the simplistic model. Rigdon (1996) argued that CFI is forgiving in exploratory models.

Other indices considered as the incremental indices are TLI (Tucker-Lewis index), BL89 (Bollen's fit index), RNI (relative noncentrality index), Gamma hat, and Mc (McDonald's centrality index). In general, the CFI has been shown a strong performance including power and robustness to assess the goodness of fit of the model (Hu and Bentler, 1998). The full summary of all fit indices is in Table 5.7. However, five indices (χ^2 and its degrees of freedom and p-value, SRMR, RMSEA, TLI and CFI) previously discussed, are reported in this study as they are sufficient to explain the model validations (Iacobucci, 2010, 2009; Browne et al., 2002; Hu and Bentler, 1998).

5.8.19 Choices of SEM Software

The execution of SEM has been mainly dominated by proprietary software i.e., *LISREL* (Jöreskog and Sörbom, 1997), *Mplus* (Muthén and Muthén, 1998-2012), *AMOS* (Arbuckle, 1995), *EQS*, *SAS* and *Stata* (v.12). However, one may run SEM with add-on packages in an open-source statistical software call *R*. Such packages are **sem** (Fox, 2006), **lavaan**(Rosseel, 2011, 2012) and **OpenMx** (Boker et al., 2011*a*,*b*). This section reviews the application of SEM with various software including their advantages and limitations.

Table 5.7: Goodness-of-Fit Indices in Structural Equation Modelling

Fit index	Description	Acceptable Fit
1. Absolute Fit Indices		
1.1 Chi-square (χ^2)	Chi-square statistics are only meaningful taking into account the degree of freedom. Also regarded as a measure of absolute fit and parsimony. Value close to 1 indicates good fit but value over than 1 imply over fit.	Non significant χ^2 at least p-value > .05
1.2 Chi-square to degree of freedom ratio ($\frac{\chi^2}{df}$)	Test of null hypothesis that the estimated variance-covariance matrix deviates from the sample. Greatly effected by sample size. The larger the sample, the more likely it is that p-value will imply a significant different between model and data.	Value on 3 or less except the large sample (> 750)
1.3 Standardised Root Mean Residual (SRMR)	Representing a standardised summary of the average covariance residuals. Covariance residuals are the differences between observed and model-implied covariance.	Value < .05[a], .05 − .10[b]
1.4 Standardised Square Error of Approximation (RMSEA)	Representing a comparison of the square residuals for the degree of freedom.	Value < .05[a], .05 − .08[b]
1.5 Goodness-of-fit index	Representing a comparison of the square residuals for the degree of freedom.	Value > .95[a], .90 − .95[b]
2. Incremental Fit Indices		
2.1 Adjusted Goodness-of-fit Index (AGFI)	Goodness-of-fit adjusted for the degree of freedom. Less often used due to not performing well in some applications. Value can fall outside 0-1 range.	Value > .95[a], .90 − .95[b]
2.2 Normed Fit Index (NFI)	Represent a comparative index between the proposed and more retracted, nested baseline model (null hypothesis) not adjusted for the degree of freedom.	Value > .95[a], .90 − .95[b]
2.3 Tucker-Lewis Index (TLI)	Comparative index between proposed and null models adjusted for the degree of freedom. Can avoid extreme underestimation and overestimation and robust against sample size. Highly recommended as the index of choice.	Value > .95[a], .90 − .95[b]
2.4 Comparative Fit Index (CFI) identical to Relative Non-centrality Index (RNI)	Comparative index between proposed and null models adjusted for the degree of freedom. Interpret similarly as NFI but may be less affected by sample size. Highly recommended as the index of choice.	Value > .95[a], .90 − .95[b]
2.5 Bollen's Incremental Fit Index (IFI)	Comparative index between proposed and null models adjusted for degree of freedom.	Value > .95[a], .90 − .95[b]
3. Parsimony Fit Indices		
3.1 Akaike Information Criterion (AIC)	Comparative index between alternative models	Value closer to 0 better fit and greater parsimony.
3.2 Parsimony Normed Fit Index (PNFI)	PNFI and PCFI take into account both model being evaluated and the baseline model	Higher value indicates better fit in comparison to alternative model(s)
3.3 Parsimony Comparative Fit Index (PCFI)		

Note: [a] is a good fit level and [b] is an adequate fit level.
Source: Adapted from (Kline, 2011; Bentler, 2007; Byrne, 2010; Hair Jr et al., 2010; Hu and Bentler, 1999; Anderson and Gerbing, 1988; Hu and Bentler, 1998; Maruyama, 1998; Hu and Bentler, 1995)

5.8.19.1 R (Software / Programming language

"R is a free software environment for statistical computing and graphics. It compiles and runs on a wide variety of UNIX platforms, Windows and MacOS." (R Development Core Team, 2012)

At the moment there are four active packages that can be used to fit SEM (Rosseel, 2012).

Main Packages Packages sued for fitting SEM models are as follows.

- **sem** (Fox, 2006)

  The first R package for SEM *"fit by maximum likelihood assuming multinormality, and single-equation estimation for observed-variable models by two-stage least squares."*

- **OpenMx** (Boker et al., 2011*a*,*b*)

  A very active package that *is free and open source software for use with R that allows estimation of a wide variety of advanced multivariate statistical models*, contributed by experts in both *R* and *SEM* (Boker et al., 2011*a*,*b*).

- **lavaan** (Rosseel, 2011, 2012)

  A more user-friendly package for SEM, compared to sem and OpenMx. Its command language is similar to those of *Mplus*. Hence it is perhaps the most user-friendly package for SEM to date. Most of SEM application can be analysed with **lavaan**. However, it is still limited to only continuous data, not for categorical data (Rosseel, 2012).

- **semPLS** (Armin Monecke, 2012)

  Fitting Structural Equation Model Using Partial Least Squares.

- **plspm** (Gaston Sanchez, 2012)

  R package dedicated to Partial Least Squares (PLS) methods (CRAN, plsmodeling.com).

Table 5.8: Complementary packages for SEM in R

Package	Description	Author(s)
SEMplusR:	Functions, examples and datasets to learn, use and teach Structural Equation Modeling (SEM)	Piboonrungroj (2012)
SEMModComp	Model Comparisons for SEM [CRAN link, Additional Documents]	Levy (2009)
semGOF	an add-on package which provides fourteen goodness-of-fit indeces for structural equation models using sem package.[CRAN]	Sanchez and Aluja (2012b)
stremo	Functions to help the process of learning structural equation modelling [CRAN link]	Carvalho et al. (2011)
	Functional Integration Analysis in R [CRAN link]	Roelstraete (2012)
FIAR:		
semTools	Useful tools for structural equation modeling [CRAN link]	Pornprasertmanit, Miller, Schoemann and Rosseel (2012)
simsem	SIMulated Structural Equation Modeling	Pornprasertmanit, Miller and Schoemann (2012)
pathmox	R package dedicated to segmentation trees in PLS Path Modeling	Sanchez and Aluja (2012a)

Complementary packages

There are several *R* packages developed to complement the SEM analysis such as computing more Goodness of Fitness indices or providing preliminary and/or post-hoc for main SEM model fitting. Such packages are summarised in Table 5.8.

5.8.19.2 Mplus

"Mplus is a statistical modeling program that provides researchers with a flexible tool to analyze their data. Mplus offers researchers a wide choice of models, estimators, and algorithms in a program that has an easy-to-use interface and graphical displays of data and analysis results. Mplus allows the analysis of both cross-sectional and longitudinal data, single-level and multilevel data, data that come from different populations with either observed or unobserved heterogeneity, and data that contain missing values." (Muthén and Muthén, 1998-2012, p. 1)

Mplus has been developed by Muthén and Muthén (1998-2012) since 1985 . The aim was to provide researchers a powerful and advanced statistical techniques. The current version of Mplus (6) allow users to do the following statistical techniques: Regression analysis; Path analysis; Exploratory factor analysis; Confirmatory factor analysis; Structural equation modeling; Growth modeling; Discrete-time survival analysis; Continuous-time survival analysis.

5.8.19.3 Alternative SEM software

LISREL

LISREL (**Li**near **S**tructural **Rel**ations) is the first software developed specifically for SEM by Jöreskog and Sörbom (1997) since 1970s (Jöreskog and van Thillo, 1972). Hence LISREL has been widely used in the early stage of the SEM (Reisinger and Turner, 1999). Lisrel is considered as an advance SEM software, however limited in time series analysis (Cziráky, 2004). Lisrel has developed to cover other applications rather then SEM as the followings (Scientific Software International, Inc., 2012).

- PRELIS for data manipulations and basic statistical analyses.

- MULTILEV for hierarchical linear and non-linear modeling.

- SURVEYGLIM for generalized linear modeling.

- CATFIRM for formative inference-based recursive modeling for categorical response variables.

- CONFIRM for formative inference-based recursive modeling for continuous response variables.

- MAPGLIM for generalized linear modeling for multilevel data.

This research mainly uses *R* to analyse the data because *R* is a widely used software in both academia and in many well-known companies such as *"Google, Pfizer, Merck, Bank of America, the InterContinental Hotels Group and Shell"* (Vance, 2009). Moreover *R* is open-source software, then the author can verify the way coefficients are computed. Furthermore *R* is also free to download and able to run in various platforms (Windows,

Macintosh and Linux) (R Development Core Team, 2012), so anyone can reproduce the results obtained. This can enhance the reproducibility and transparency of the research.

5.9 Conclusion

Research methodology is a critical part of the research, the selection of the research methods is based on the research questions. Since there are more then one research question in this thesis and they are sequential, the development of the research design consisting a set of research methods is justified in this chapter. As the implementation of both qualitative and quantitative research methods in a single study usually stems the question on research philosophy, this chapter also explain the philosophical stance of the author and how it apply to the research methodologically. Considering the contexts, this chapter illustrated a step-by-step approach for conducting multiple methods research in supply chain collaboration. Figure 5.15 (Saunders et al., 2007) represents a holistic view of this research design. The bold texts are those of selected choices in the research.

Quantitative procedure is the predominant method. The use of the semi-structured interview in the early stage is designed to facilitate the hypothesis validation and also aid the measurement of the model. Moreover, multiple case studies are employed to collaborate with quantitative findings in order to achieve triangulation. This procedure is the integration of different research methods to study the single phenomenon in order to avoid sharing the same weakness (Voss et al., 2002).

This study adopts an abductive approach (Kovács and Spens, 2005). First, a conceptual framework was created from the relevant theories and literature. Based on this framework, research hypotheses were developed with findings from empirical observation by using qualitative methods.
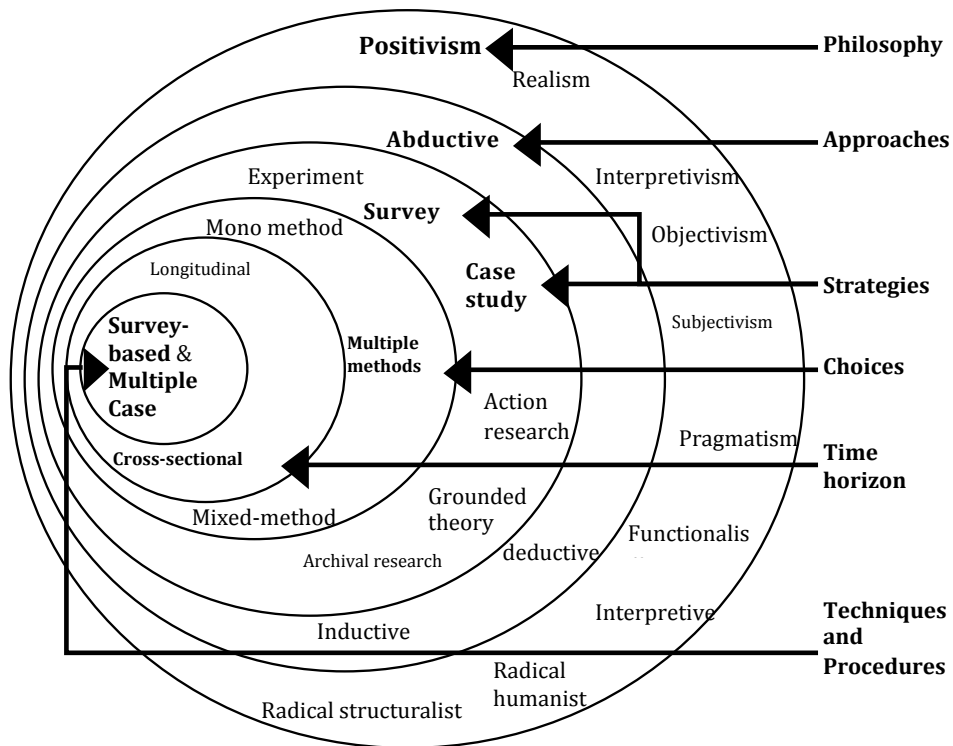
Figure 5.15: Research onion of this thesis

Source: Adapted from Saunders et al. (2007)

Moreover, this research uses primary data from a survey as there are no secondary data available. Consequently, a questionnaire for cross-sectional data that are suitable for this study is needed for the data required. Furthermore, the questionnaire survey is more economic and less time-consuming than face-to-face interviews. Questionnaire surveys may have some issues to consider such as reliability or common method bias. However, a proper questionnaire design and some statistical techniques have been already designed to cope with these problems.

A statistical method used to test hypotheses in the thesis (Structural Equation Models) was also discussed in-depth including various issues such as validity, reliability. Furthermore, choices and selection of computer software used to fit the model were presented in this chapter.

Employing the research methodology proposed in this chapter, results in terms of data descriptives, measurement model (confirmatory factor analysis), hypothesis testing (full SEM) and a comparison of different perspectives (multiple group SEM) will be presented and discussed in the next three chapters (Chapter 7, 8 and 9). A link of this chapter to the next chapter in the thesis is showed in Figure **??**
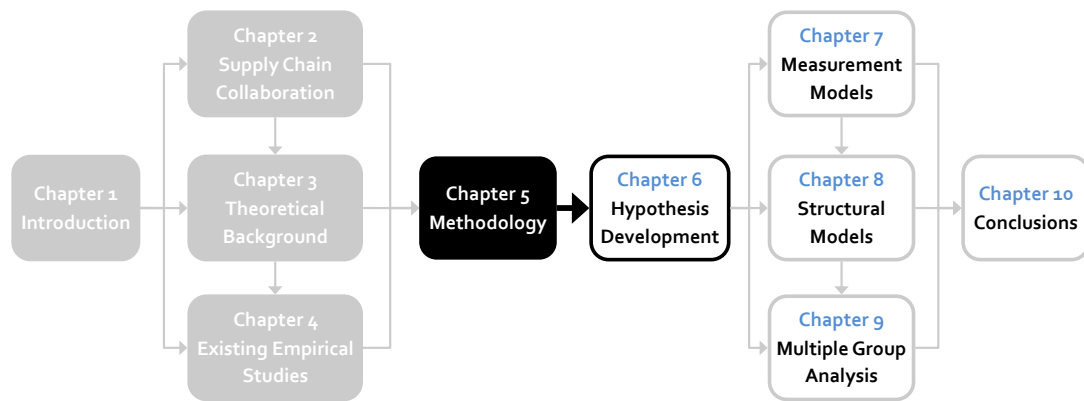
Figure 5.16: A direction of chapter 5 to the next chapter

❈

Chapter 6

Hypothesis and Scale Development

A claim of proof of cause and effect must carry with it an exploration of the mechanism by which the effect is produced.

William G. Cochran (1909 - 1980)
British statistician

6.1 Introduction

The aim of this chapter is to present the way research hypotheses and the research model were developed. Moreover, the chapter also illustrates the opreationalisation of the constructs used in the research model. Both research hypotheses and measurement scales are developed based on the SCM literature review (Chapter 2), relevant theories (Chapter 3) and the tourism supply chain (Chapter 4). This chapter is organised into three main sections: (1) Meta analysis, (2) pre-survey fieldwork and (3) measurement development.

First this chapter presents a meta analysis of the existing empirical studies on outcomes of supply chain collaboration. This lays out the foundation of the research model. Second, the model is contextualised using qualitative methods. Third the development of measurement scales specified in the hypotheses is also presented. The position of this chapter in the thesis is presented in Figure 6.1
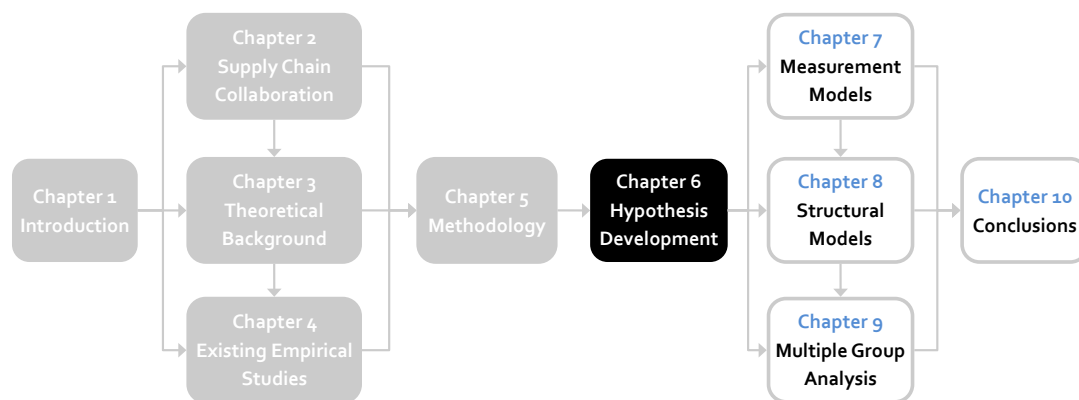
Figure 6.1: Position of the chapter in this thesis

6.2 Meta Analysis

6.2.1 Motivation for the Meta analysis

Meta analysis is a systematic tool that helps researchers summarise relationships between variables/constructs using evidence from previous empirical studies (Hunter and Schmidt, 2004). The results from a Meta analysis can draw insights into relationships that still have no consensus on its validation and direction (Rothstein et al., 2005).

In supply chain management there are several review studies but most of them used a narrative approach to summarise the existing studies (Chen and Paulraj, 2004b; Sachan and Datta, 2005; Seuring and Gold, 2012; Wilding and Wagner, 2012). The

problem is, a narrative approach cannot precisely summarise the quantitative results of research that have examined relationships between variables. Only the direction of the relationship and a very board summary (e.g., low, medium, high) are presented with this kind of review study (Williams et al., 2006). However, there are many SCM studies that quantified the relationships between focal variables and their outcomes e.g., trust and performance. Therefore to summarise the quantitative studies, a quantitative approach should be used (Hunter and Schmidt, 2004). Such a method that quantitatively summarises empirical results of the previous studies is known as "**Meta analysis**" (Hunter and Schmidt, 2004; Rothstein et al., 2005).

Meta analysis is a systematic procedure to search and quantitatively summarise quantitative results of observed correlations between variables or constructs considering reliability and confidence of the results (Hunter and Schmidt, 2004; Rothstein et al., 2005). Moreover, Meta analysis can be used to identify if there is a need to conduct more studies or if there are enough results available to conclude that a correlation exists (Hunter and Schmidt, 2004). Meta analysis has been widely used in various fields such as medicine (Higgins and Thompson, 2002), psychology (Williams et al., 2006), and business (White, 1996).

6.2.2   Rationale for Meta analysis

In SCM, there are only a few studies that have summarised literature using Meta-analytic procedures. For examples, White (1996) summarised in terms of positive, negative and non-significant results of the previous studies on the interested hypotheses. Mackelprang and Nair (2010) used the meta-analytic technique to summarise the impact of Just-in-time manufacturing practices on the firm performance. Recently Delbufalo (2012) used Meta analysis to summarise the outcome from inter-organisational trust.

Although there are many studies on inter-firm or supply chain collaboration, the

question of whether inter-firm collaboration has an equivalent impact on performance across a supply chain is increasingly a subject of debate. A Meta analysis of literature on collaboration is needed.

6.2.3 Meta analysis of SCM research

Studies examining supply chain collaboration and firm performance have reported mixed and inconsistent findings (Flynn et al., 2010). For example, in collaboration - performance studies, some found that supply chain collaboration has improved performance (Koufteros et al., 2007; Petersen et al., 2005; Ragatz et al., 2002; Cousins and Menguc, 2006). Others, however, have found no relationship between supplier integration and operational performance (Stank, Keller and Daugherty, 2001) or a negative relationship (Swink et al., 2007; Koufteros et al., 2005; Stank, Keller and Closs, 2001).

Although Delbufalo (2012) has conducted a Meta analysis for inter-organisational trust and its 33 outcome constructs, some relevant papers were ignored e.g., Nyaga et al. (2010); Robson et al. (2008); Maloni and Benton (2000). Hence, several information and outcome constructs of trust were omitted from Delbufalo (2012)'s Meta analysis. Moreover, some results were not correct. Delbufalo (2012) claimed that some studies used exploratory and /or confirmatory factor analysis, which in fact used SEM. Sofyahoğlu and Öztürk (2012) recently conducted a Meta analysis on the relationship between supply chain integration and firm performance. However supply chain collaboration was not included in their analysis. Hence; there is still a need to have a proper and complete Meta analysis on trust to provide the right answers.

In this thesis, the Meta analysis covers the causal relationships of supply chain collaboration on firm performance and their mediating variables i.e., trust, commitment, and competitive advantage.

6.2.4 Meta analytic procedures

Following the Meta-analytic procedures suggested by Hunter and Schmidt (2004), each correlation was first corrected for attenuation using its reliability measure if such information is reported. If reliability of a measure with multiple items is not reported, this missing value will be replaced by a weighted averaged value of reliability of other studies that reported reliability of such a construct (Judge and Ilies, 2002). For a single-item measure, weighted average of reliability value (by sample size) of other studies was used (Williams et al., 2006).

Correlations depend on statistical artifacts e.g., reliability and sampling error (Rothstein et al., 2005). A chi-square test can be used to test for the sufficient variance when the artefacts are controlled for. To suggest that inconsistent results are totally explained by statistical artefacts sufficient variance is needed.

The zero-order Pearson product-moment correlation coefficient is used as the effect size metric. If correlations are not reported Student's *t* and F-ratios with one *degree of freedom* were used instead. This is computed by the formulae suggested in Hunter and Schmidt (2004, p. 272).

Then, when correlations were corrected, the estimated true correlation (r_t) between supply chain collaboration and each of its outcomes is computed (Hunter and Schmidt, 2004). Next the standard deviation of population (S_p^2) was estimated. To obtain rich information, 5 percent confidence of the corrected can be computed. Furthermore the fail-safe N is computed for each factor to assess the potential publication bias. The analysis considered 39 studies examining five key outcomes of supply chain collaboration focused in this research (firm performance, competitive advantage, trust, commitment and transaction costs). This results of the meta-analysis are presented in the Table 6.1.

6.2.5 Meta analysis results

A summary of research examined relationships between collaboration, and its outcomes variables is presented in the Table 6.1.

Table 6.1: Summary of meta analysis of the outcomes of supply chain collaboration

Outcome	α	k	n	r	r_t	sd_t	95% CI		ES	χ^2	Nfs
Firm performance	0.82	10	9,122	0.35	0.32	0.08	0.25	0.44	L	213.98	298.23
Competitive Advantage	0.77	3	2,319	0.54	0.49	0.02	0.42	0.53	L	142.86	645.67
Trust	0.85	9	7,681	0.37	0.27	0.02	0.20	0.33	M	126.19	711.23
Commitment	0.78	4	972	0.45	0.38	0.03	0.28	0.45	L	91.543	615.89

Notes:

α	=	Average reliability measure of the variables;
k	=	Number of samples in each study;
n	=	Total number of observations in all k samples;
r	=	Mean uncorrected correlation;
r_t	=	Weighted average of corrected correlation;
sd_t	=	Estimated standard deviation of the population;
ES	=	Effect size;
χ^2	=	Chi-square test for variance unaccounted for across the studies;
Nfs	=	fail-save N;
*	=	$p < 0.01$.

6.2.6 Discussions on meta analytic results

The analysis examined four key outcomes of supply chain collaboration. They are firm performance, competitive advantage, trust and commitment. Effect sizes are presented in Table 6.1 with their 95% confident interval. According to Cohen (1960), correlations less than 0.10 are considered to be *small* (S), correlations ranging from 0.10 to 0.30 are *medium* (M), and correlations greater than 0.30 are *large* (L). Reliability, number of studies and total sample size of each outcome constructs are also illustrated in Table 6.1.

The results show that supply chain collaboration was found to have a positive impact on these four constructs. Based on the results, competitive advantage is ranked as the highest impact of supply chain collaboration (corrected correlation = 0.49). This may be due to the relationships between the utilisation of the resources in the collaborative activities found in the supply chain collaboration measurement and the developed capacity measured in competitive advantage (Cao and Zhang, 2011). Firm performance was found to have a high impact with corrected correlation of 0.32. However, with relatively high standard deviation, the 95% confident interval of performance is considerably board (0.25-0.44). This may be a results of the mixed findings in the literature.

Considering social construct, commitment was found to have a high effect size with a corrected correlation of 0.38. This is relevant the various literature that supported the role of commitment in developing supply chain relationship (Akintoye et al., 2000; Vieira et al., 2011; Krause et al., 2007). However, trust was found to have a comparatively lower impact than other construct with a corrected correlation of 0.27. This outcomes could due to the argument that trust has a key role as a mediator rather than being a final outcomes of the supply chain collaboration (Vieira et al., 2011; Wagner et al., 2011; Welty and Becerra-Fernandez, 2001). Therefore, although trust may has a lower effect size than other key outcomes but it can produce an indirect effect through other construct such as transaction costs (reduction) (Welty and Becerra-Fernandez, 2001; Kwon and Suh, 2005; Williamson, 2008). However, according to the literature review in Chapter 2 and 3, empirical research has rarely include the the transaction costs construct in the model simultaneously with supply chain collaboration, trust and performance. Hence, it is interesting to examine the indirect effect of trust on firm performance via transaction cost.

6.3 Initial fieldwork

The previous section presented the Meta analysis of the outcomes of supply chain collaboration based on the literature and theories discussed in Chapter 2 and 3. Hence this section further explores the impact of supply chain collaboration on the firm performance using qualitative methods (Lambert et al., 2004). The findings from the initial fieldwork comprises of three parts: (1) exploratory case study, (2) focus-groups, and (3) multiple case studies.

6.3.1 Exploratory case study

In-depth interviews offer an opportunity to qualitatively analyse information from the respondents to facilitate literature review in supporting the research hypotheses (Richey et al., 2010; Grant and Banomyong, 2010).

6.3.1.1 Collaboration in the tourism supply chains

In this case study, it was found that only upstream collaboration was used to fulfil the operations needs of the hotel. Marketing is the main objective of the other types of collaboration. This could reveal that marketing strategy has a dominant position in the tourism industry. Collaborations between the case hotel and its suppliers are also partly designed to serve their marketing strategy such as sales and promotion. A key player is the Tourism Business Association who bring firms in the tourism industry together.

However, most of the activities in the association are those of marketing. This section aims to focus on the vertical collaboration between hotels and suppliers/travel agents which predominantly serves the operations and supply chain management objectives of the hotel. A summary of main characteristics of four types of collaborations

is presented in Table 6.2.

Table 6.2: Comparisons of hotel collaboration in the tourism supply chain

| | Horizontal Collaboration | | Vertical Collaboration | |
	Intra-sector Collaboration	**Inter-sector Collaboration**	**Upstream Collaboration**	**Downstream Collaboration**
Main objectives	Marketing	Marketing	Supply chain, logistics and marketing	Marketing, supply chain and operations
Partners	Other accommodation providers e.g., hotels and guest-house.	Other tourism service providers e.g., tourist attractions and passenger transport.	Input providers (second-tier suppliers e.g., foods and beverage suppliers, energy providers.	Intermediaries i.e., tour operators and tour agencies.
Process	Destination promotion e.g., via road show, travel expo etc.	Combine service and sell as a package e.g. rooms and cultural shows and dinner with a discounted price	- Supplier selection - Order fulfilment and replenishment - Sales and promotion	Meeting, information sharing about room booking and reservation, demand forecasting
Drivers (expected benefit)	Inter-person relations, mutual benefit of promoting the destination	Inter-person relations, customer needs	Inventory control, service level, product availability	Revenue and demand management
Costs	Communication, meeting planning, organising events etc.	Communication, planning and meeting etc.	- Search cost - Cost of Quality checking	Communication, costs when the hotel host the inspection visit by tour operators

6.3.1.2 Vertical collaboration

Focusing on upstream collaboration, the relationships between the hotel and its food and beverage suppliers were analysed. This section describes the supplier selection

process, ordering procedure and their associated transaction costs.

6.3.1.3 Collaboration with food suppliers

Although products from nation-wide meat providers have a higher level of quality, the hotel tends to select the local food and beverage providers because the price offered by the local firms is generally cheaper and they also offer a longer credit period (45 days for local firms and 30 days for the nationwide suppliers). For products with a sole supplier, contracts will be signed annually. This kind of products are; (1) ham, bacon and sausages, (2) sirloin steak, (3) coffee, (4) orange juice, and (5) beer. There is no electronic system installed for communication or information sharing. Products are delivered by pick-up trucks.

The hotel may obtain information about the price of each item by market research undertaken by the food and beverage department and the accounting section. The database is updated monthly prior to the auction of foods and beverage. The purchasing processes for foods and beverage of the hotel case was illustrated in the Figure 6.2.

Selection of the Food and beverage provider will be conducted by auction every month. There are approximately 4-5 suppliers involved in this auction. There are four main types of food and beverage suppliers, (1) fresh vegetables, (2) fruits, (3) dry or fresh foods, and (4) meat such as poultry. Before the hotel implemented the auction system, the purchasing system consisted of simply buying materials at the fresh food market.

Direct purchasing is usually employed in the non-international chain hotels. The auction system was introduced by the hotel last year in order to ensure a transparent procurement system. The morning of the 25th of every month is the deadline for the suppliers to submit their offering price via facsimile. The auction committee (consisting of the food and beverage manager, financial manager, executive chef and purchasing manager) will meet in the afternoon to select suppliers. Since there are many items
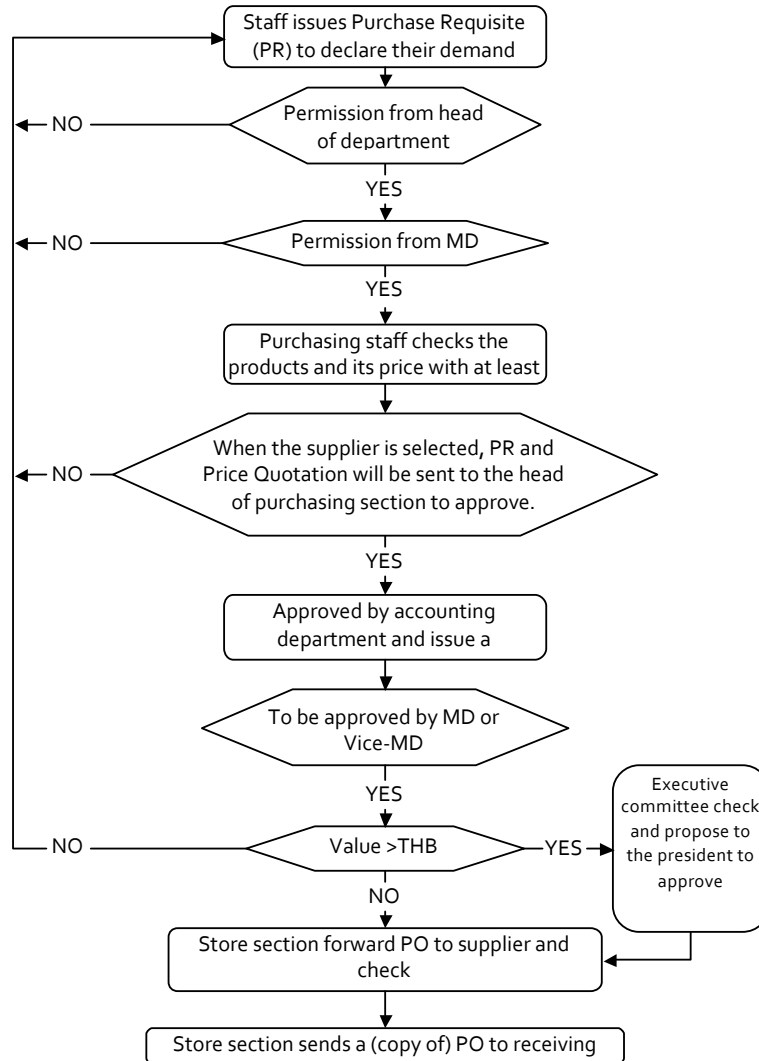
Figure 6.2: Purchasing processes for foods and beverage of the hotel case

Keys:
MD: Managing director of the hotel,
THB: Thai Bath (currency),
PO: Purchasing order

(>100) in the price offering list, some suppliers may offer the best price for some items but not for all items. Then the supplier who has the highest number of the cheapest items will be contacted and negotiated to change the prices to equal the lowest offers in the auction.

At the end of each day, stock levels are checked and orders are placed to bring the inventory level up to a desired level. Orders are placed each evening and delivered the following morning. Orders in the morning are delivered in the evening of the same day. Every item is checked for quantity and quality according to the contract by the chef or his representative. Products will be immediately returned to the supplier if any failure is found. Buffer stocks are kept in the main store. Each of the three kitchens just store materials for the current day operations. The ordering and replenishing process of the food and beverage section of the case hotel is illustrated in the Figure 6.3.
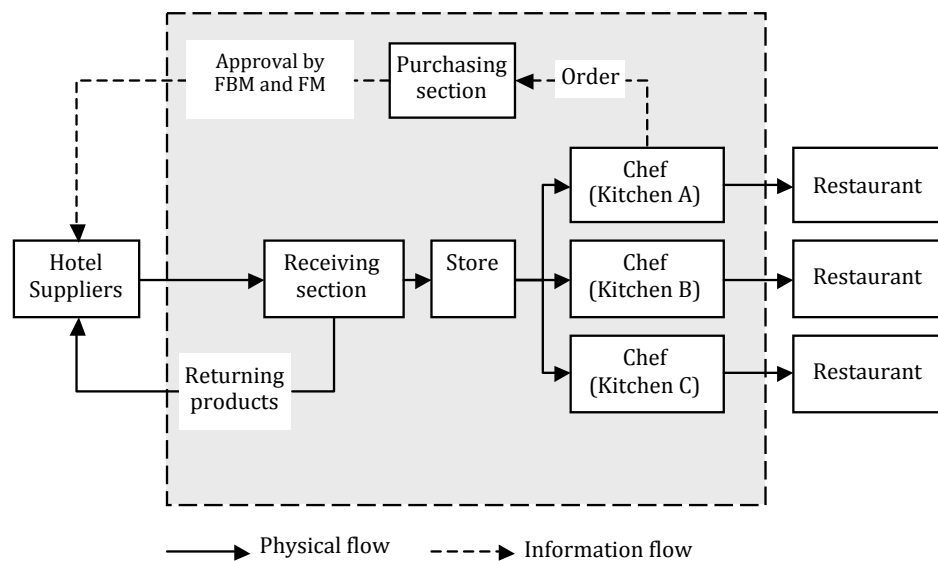
Figure 6.3: Internal food and beverage operations process of the hotel case

6.3.1.4 Collaboration with beverage suppliers

There are two main types of drinks considered in the hotel; beer and carbonated-soft drinks. As the market structure of these suppliers is an oligopoly (two main suppliers offer two major brands of an almost homogeneous product) these suppliers tend to avoid the price-war trap by offering incentives such as support, sponsorship, and future cooperation to the hotel. The selection of drink suppliers is also influenced by the inter-personal relationships of decision-makers. Then the contract will be signed on an annual basis.

An ordering process is the same as the fresh food and ingredients (daily ordering and delivery). The hotel has no contract with the whisky supplier, as this is not a high volume seller in the hotel (whisky is usually an important drink for hotels that have a pub or disco). For wine, the supplier will place their products in the hotel and the bill will be settled at the end of the month. In this manner, the hotel does not have to pay for the wine (using consignment stock[1]). Furthermore, the wine supplier usually gives a lump sum money to the hotel in order to promote their products.

6.3.1.5 Transaction cost of collaborations

Although there is a low level of collaboration in the case study, there are transaction costs incurred when the case hotel searches for the best suppliers and contacts those who are selected. There are two main sources of transaction costs found in the case study.

First, the hotel has a search cost in order to find appropriate suppliers. This could be a consequence of asymmetric information in the supply market which contrasts with the assumption about the perfect rationality of the hotel. This process not only considers the offering price but also other factors such as inter-organisational trust and

---

[1]Consignment stock is inventory that is in the possession of the customer, but is still owned by the supplier (Valentini and Zavanella, 2003)

inter-personal relationships.

The auction system of the case hotel creates a documentation cost for preparing the list of items and the standard offering form, and a communication cost with the perspective suppliers. The time that the four top officers have to spend to select the appropriate suppliers is considered as another search cost that the hotel indirectly pays in term of their salaries.

Second, the transaction cost for quality checking also incurs when the hotel receives the products from their suppliers. In the case hotel, the quality checking process requires one officer to check whether the delivered products are the same as what they ordered in terms of quality and quantity. In this case, 100% inspection were conducted to ensure supplier quality. Furthermore, service quality of suppliers will be considered in the next auction.

In this case study, it was found that the hotel focused on its relationships with its main food and beverage suppliers and a travel agency. To do so, they shared important (but not confidential) information between suppliers such as sales and promotion activities of major beverages (for example, beer and wine) as well as occupancy rates and room rates (promotions) with the travel agent. As an example of the type of responses we received, the Foods and Beverage manager stated;

> *"We always inform our suppliers of any promotions on their product. We will have to make sure that they manage to cope with the peak demand during the promotion."*

By sharing such information, the hotel expected benefits from marketing (higher sales) and operational aspects (product replenishment and delivery). One of the informant (Food and Beverage Manager) stated that;

"Having all critical information shared between our marketing people and the production team in the suppliers has made our transactions nearly perfect".

Hence, investment in people or equipment may be needed from their long-term partners. Moreover, suppliers and travel agents with a higher logistics performance are those who collaborated with the hotel by regularly sharing and updating important information. They also undertook joint teamwork and planning as well as investing in specific equipment and / or special training to create a mutual understanding among the supply chain partners. Such collaborative efforts have built trust between supply chain partners, which then enables smooth business operation.

This exploratory case study highlighted the importance of human factors on the impact of collaborative activities by building trust between supply chain partners. Trust is important as it produces positive outcomes in terms of logistics performance and relationship satisfaction.

6.3.2   Focus-group interviews

In each of the two focus groups questions were asked to validate the findings from the case study relating to the common types of supply chain collaboration and their application in the tourism sector. Consistent with the literature and findings from the case study, it was found that members of the focus groups strongly believed that inter-firm trust is an immediate outcome of supply chain collaboration.

Moreover inter-firm trust can improve logistics performance by reducing many unnecessary processes such as quality checking or performance monitoring. Inter-firm trust was reported to have a psychological impact on the relationship. The focus group also suggested that joint teamwork or joint activities may have the most impact on inter-firm trust. The reason being people from different companies have opportunities to build their inter-personal relationships by working jointly on common activities.

Due to ambiguity in the literature on the causal direction of the relationship between inter-firm trust and collaboration, the focus group members agreed this may result in a chicken or egg causal dilemma, but suggested inter-firm trust is more likely to come after collaboration. Most of the members believed that in practice supply managers tend to build trust by collaborating with supply chain partners first. Then, the level of inter-firm trust depends on the results obtained from the collaboration. Hence, we conjecture that supply chain collaboration impacts logistics performance by increasing inter-firm trust which results in increased satisfaction.

6.3.3 Multiple case studies

The results of the cross-case comparison (see Table 6.3), which are simplified in tabular form (Åhlström, 2007; Srai and Gregory, 2008), are used to propose the hypotheses introduced in the next section. The results show that firms that have a higher logistics performance are those who implemented more than one type of supply chain collaborative activity. Since the results are qualitatively collected and presented, it is difficult to compare the impact of supply chain collaboration on inter-firm trust.

Moreover, the collective impact of implementing two types of collaboration at the same time has not been validated by the multiple case studies. However, the results from multiple case studies have extended the findings from the first stage that hinted the potential of both direct and indirect effects of supply chain collaboration on firm performance. Hence, the following hypotheses are proposed based on the literature review, a single case study, focus-group interviews and the multiple cases in the next section.

6.3.4 Discussions

In the multiple case studies, it was found that supply chain partners who have higher levels of trust tend to have better logistics performance. This is consistent to the pre-

Table 6.3: Findings from Multiple case study

Aspect	Case A	Case B	Case C	Case D	Case E	Case F
Characteristics Management	International	Local	Non-chain	International	Local	Non-chain
System	chain	chain		chain	chain	
Destination	Island	Island	Island	Mainland	Mainland	Mainland
Location	Shopping area	City centre	Beach	Suburb, Riverside	Shopping area	Shopping area
Supplier *(Main product)*	Carbonated drinks	Poultry	Alcohol drinks	Carbonated drinks	Poultry	Alcohol drinks
Travel agent *(Main tourists)*	European, Australian	Australia, Thai	European, Thai	European Thai	European, French	Thai,
Collaborative Efforts						
- Information sharing	High	Moderate	Low	High	Moderate	High
- Joint activities	High	High	Moderate	Low	High	High
- Dedicated investment	High	Moderate	High	High	Moderate	Moderate
- Goal congruence	High	Moderate	Low	High	Moderate	High
- Collaborative communication	High	High	Moderate	Low	High	High
- Incentive Alignment	High	Moderate	High	High	Moderate	Moderate
- Risk sharing	High	Moderate	High	High	Moderate	Moderate
- Shared resources	High	Moderate	Low	High	Moderate	High
- Joint knowledge creation	High	High	Moderate	Low	High	High
- Synchronised decision	High	Moderate	High	High	Moderate	Moderate
Inter-firm Trust						
- Calculative	High	High	Moderate	Moderate	High	High
- Affective	High	Moderate	Low	Moderate	Moderate	High
Commitment						
- Input	High	High	Moderate	Moderate	High	High
- Attitudinal	High	Moderate	Low	Moderate	Moderate	High
- Temporal	High	Moderate	Low	Moderate	Moderate	High
Competitive advantage						
- Efficiency	High	High	Moderate	Moderate	Moderate	High
- Flexibility	High	High	Moderate	Moderate	Moderate	High
- Responsiveness	High	Moderate	Low	Low	Moderate	High
- Quality	High	Moderate	Low	Low	Moderate	High
Firm Performance	High	High	Moderate	Moderate	High	High
- Economic						
- Operations	High	Moderate	Moderate	Low	Moderate	High
- Logistics	High	High	Moderate	Moderate	Moderate	High
- Relational	High	High	Moderate	Low	Moderate	High

Source: Multiple case studies.

vious studies that better relationship can lead to better firm performance especially in logistics activities (Daugherty et al., 2009).

Such a relationship was found in the case studies, but according to the systematic review in Section 4, this has not been tested in the literature. Some studies considered both performance and satisfaction as outcomes of the collaboration but the relationship between the two was not considered (Nyaga et al., 2010). Even though there are some studies that have investigated the relationship between performance and satisfaction (Ou et al., 2010), they have not dealt with the logistics performance. Hence, it was proposed that better logistics performance leads to higher levels of relationship satisfaction between firms.

Moreover, impacts of such collaborative activities on inter-firm trust, found in the case studies, concur with the findings in the literature (Min et al., 2005; Jap and Ganesan, 2000; Nyaga et al., 2010). Findings from the multiple-case studies suggest that joint activities could give rise to inter-partner trust in the supply chain. Firms that make dedicated investment in systems, equipment and human resources can build and maintain higher levels of inter-firm trust.

6.4 Conceptualisation

Various theoretical frameworks have been adopted to explain the impact of supply chain collaboration. These frameworks include not only well-established theories such as transaction cost economics, resource based view, transaction exchange theory and collaborative network theory (Holweg and Pil, 2008; Nyaga et al., 2010) but also conceptual frameworks validated in the operations management and SCM literature (Fynes et al., 2005). The collaborative governance framework (Nyaga et al., 2010) was used to develop the conceptual model since it considers both economic and social exchange

aspects of the impact of supply chain collaboration. In the following sections the previous literature was reviewed on the three main components of our research framework: mechanisms, the impact of supply chain collaboration and its mediating factors.

6.4.1 Logic underlying a research model

> "... if you want to achieve outcome **O** in context **C**, then use intervention type **I** through specified generative Mechanisms **M**."

<div align="right">

(Denyer et al., 2008, p. 397)

</div>

Based on the **Outcomes-Context-Intervention- Mechanisms (O-C-I-M)** logic derived from the quotation above, research framework of this thesis was developed. The O-C-I-M approach has been adopted recently to understand the supply chain governance and its impacts on performance (Pilbeam et al., 2012). The context of the model are the uncertainty in the business environment and in behaviour of the supply chain partner. Specificity of the asset required in the transaction, both reflected in the level of transaction costs, is also considered as the context of the model. Supply chain collaboration is considered as an intervention. Outcomes of the supply chain collaboration are sustained competitive advantage and performance of the firm. The mechanisms that mediate these impacts are trust and commitment between supply chain partners. Details of each component are summarised in the Table 6.4. Based on this logic the next section explain how research hypotheses are proposed.

6.5 Research hypotheses

To advance the literature on the impact of supply chain collaboration this thesis extended the collaborative governance framework, which incorporates both economic and social relational impact of Nyaga et al. (2010) and Rinehart et al. (2004), using findings from the qualitative studies at the early stages of this study. According to the

Table 6.4: The C-I-M-O components of Design Propositions

Component	Construct in this study	Explanation
Context (C)	Transaction costs (uncertainty and asset specificity	The surrounding (external and internal environment) factors and the nature of the human actors that influence behavioural change. They include features such as age, experience, competency, organizational politics and power, the nature of the technical system, organizational stability, uncertainty and system interdependencies. Interventions are always embedded in a social system and, as noted by (Pawson and Tilley, 1997), will be affected by at least four contextual layers: the individual, the interpersonal relationships, institutional setting and the wider infrastructural system.
Interventions (I)	Supply chain collaboration	The interventions managers have at their disposal to influence behaviour. For example, leadership style, planning and control systems, training, performance management. It is important to note that it is necessary to examine not just the nature of the intervention but also how it is implemented. Furthermore, interventions carry with them hypotheses, which may or may not be shared. For example, *financial incentives will lead to higher worker motivation.*
Mechanisms (M)	Trust and commitment	The mechanism that in a certain context is triggered by the intervention. For instance, empowerment offers employees the means to contribute to some activity beyond their normal tasks or outside their normal sphere of interest, which then prompts participation and responsibility, offering the potential of long-term benefits to them and/or to their organization.
Outcome (O)	Sustained competitive advantage and firm performance	The outcome of the intervention in its various aspects, such as performance improvement, cost reduction or low error rates.

Source: Adapted from Denyer et al. (2008, p. 397)

multiple-case study. These are: ten dimensions of supply chain collaboration, which are *joint activity; dedicated investment; information sharing; goal congruence; collaborative communication; incentive alignment; risk sharing; knowledge transfer; synchronised decision; and resource pooling.*

Moreover, these were collaborative efforts, mechanisms and outcomes. It was also found that such collaborative efforts, via the mechanism of trust and commitment building between supply chain partners, influenced both logistics performance and relationship satisfaction.

Based on cognate theories discussed in the previous section, research hypotheses are proposed in this section. Relevant studies are also provided to support the hypotheses.

6.5.1 Direct effects of supply chain collaboration

Key outcomes of inter-firm collaboration have been actively discussed by academics (Nyaga et al., 2010; Ireland and Webb, 2007; Spekman et al., 1998) and by industrialists (Engel, 2011; Bragg et al., 2011). Even though many firms have benefited from collaborative activities with their supply chain partners (Cooke, 2011), many others have found collaboration difficult or may even have failed to collaborate (Holweg et al., 2005). This issue could be a result of the lack of sufficient understanding of the mechanism in which inter-firm collaboration makes an impact (Sheu et al., 2006) or the lack of trust between supply chain partners (Barratt, 2004). Failures can lead to a breach of the collaborative agreement and can damage inter-firm relationships in the long term (Serapio Jr. and Cascio, 1996). Moreover firms were found to view their competitive advantage differently, by focusing on either cost or differentiation (Vachon and Klassen, 2008; Cousins, 2005).

Some researchers have argued another role of supply chain collaboration. It could

be as a mediator between supply chain relationship and performance (Droge et al., 2012). Collaboration such as Joint activities, categorised as a *"socialisation mechanism"*, was also found to mediate the impact of supplier performance on the performance of the focal firm (Cousins et al., 2008). Hence the following hypothesis was proposed.

Hypothesis 1

H_1: ***Collaboration*** *has a positive impact on* **firm performance**.

The resource-based view suggests that collaboration in the supply chain enhances the competitive advantage of the collaborating firms . There are two main aspects of this argument (Barney, 2012). Resource sharing between supply chain partners can enhance utilisation of the resources and reduce risk in their business environment, which can give rise to the sustained competitive advantage of the firms. Moreover, better communication between firms was found to increase responsiveness of the supply chain, which in turn gave rise to increased competitive advantage of the firms (Chen et al., 2004). Verdecho et al. (2012) argue that collaboration between firms by establishing common goals and performance measurement system can help increase competitiveness of the collaborating firms. Hence the following hypothesis is proposed.

Hypothesis 2

H_2: ***Collaboration*** *has a positive impact on* **sustained competitive advantage**.

In supply chain collaboration, joint activities are argued to be the essence of collaboration. When firms work closely together, they tend to understand each other more and this creates commitment among the parties. Hence the following hypothesis is proposed.

> ### Hypothesis 3
>
> H_3: ***Collaboration*** *has a positive impact on* ***commitment****.*

However, considering the collective impact of the collaborative activities, the findings from the multiple-case studies suggest firms are likely to receive greater benefit from collaboration when they implement various collaborative activities together. Some studies have considered interaction effects of SC collaboration but often the interaction effect which collaboration was viewed as a moderator of other constructs e.g., supplier capabilities (Squire, Cousins, Lawson and Brown, 2009; Wu et al., 2006).

In the literature, integration with suppliers was found to increase relational capital between firms including trust (Petersen et al., 2008; Lawson et al., 2009). This is supported by an experiment study by Cassar and Rigdon (2011). This impact of information sharing was also found in the tourism supply chain (Tiedemann et al., 2009). Moreover, information sharing has been found to create the understanding in the partnership that leads to a higher level of trust (Doney and Cannon, 1997; Monczka et al., 1998; Nyaga et al., 2010) even though some papers argued that trust affects collaboration such as (Vieira et al., 2011) . Hence the following hypothesis is proposed.

> ### Hypothesis 4
>
> H_4: ***Collaboration*** *has a positive impact on* ***trust****.*

6.5.2 Outcomes of inter-firm trust

Based on the review in the section 2.6, trust plays a vital role in supply chain collaboration. A development of trust between supply chain partners can result in five key outcomes: increased commitment, reduction in transaction cost, enhanced competitive advantage and improved performance of the firm.

6.5.2.1 Trust and commitment

Arguably a key outcome of trust between supply chain partners is the commitment between the two. Based on the trust-commitment framework proposed by Morgan and Hunt (1994), inter-firm trust embedded in the relationship provides a foundation for the collaborating firms to make a commitment to their supply chain partners.

Moreover, among many other factors, trust is arguably the key driver of commitment between the collaborating firms (Wu et al., 2004). In supply chain relationships, commitment between supply chain partners is hardly established without trust between the two (Chen et al., 2011).

Impact of trust on commitment between the firm has been examined widely in the literature (Kwon and Suh, 2005; Hansen et al., 2002).Many studies have suggested the positive impact of trust on commitment (Bae, 2012; Vieira et al., 2011; Kwon and Suh, 2005; Morgan and Hunt, 1994). Andreu et al. (2010) has also found this in the tourism sector. In collaborative supply chains, trust and commitment relationship has found to be a key mechanism in the supply chain relationships (Welty and Becerra-Fernandez, 2001). Hence the following hypothesis is proposed.

> **Hypothesis 5**
>
> H_5: ***Trust*** *has a positive impact on* ***commitment***.

6.5.2.2 Trust and transaction costs

Based on transaction cost economics, it is believed that firms perceive that their partner will take advantage of them if opportunistic behaviours cannot be detected (Williamson, 2005*b*). Thus, monitoring and quality checking of processes need to be implemented because firms do not trust their partners. Moreover, uncertainty may also cause trans-

action costs to be incurred.

In the literature, it has been argued that trust can mitigate transaction costs that may incur when firms make a collaborative activity (Pilbeam et al., 2012; Gulati and Nickerson, 2008). Trust could eliminate unnecessary activities (Rooks and Matzat, 2010) that firms need to do to prevent opportunistic behaviour of the collaborating partners (Sako and Helper, 1998; Kwon and Suh, 2005). Hence the following hypothesis is proposed.

Hypothesis 6

H_6: ***Trust*** *has a negative impact on* ***transaction costs****.*

6.5.2.3 Trust and sustained competitive advantage

According to RBV, trust between interacting parties provides them capabilities that give them competitive advantage over other competing firms (Williamson, 2005*b*; Langlois, 1992). Lack of trust also lead to the problem in efficiency of the firms (Huck et al., 2012). Previous literature provides evidence that capabilities can be developed though reduction of opportunistic behaviour (Morgan et al., 2007). Hence the following hypothesis is proposed.

Hypothesis 7

H_7: ***Trust*** *has a positive impact on* ***sustained competitive advantage****.*

6.5.2.4 Trust and firm performance

Trust is argued to be a critical factor in developing relationships in the supply chain (Morgan and Hunt, 1994; Simatupang and Sridharan, 2005; Christopher, 2011). Build-

ing inter-partner trust may produce better collaborative performance (Johnston et al., 2004; Robson et al., 2008) via cost reduction due to economies of scale (Maloni and Benton, 2000), which can then improve firm performance (Katsikeas et al., 2009).

In the literature, trust is claimed to be a critical factor in developing relationships in the supply chain (Christopher, 2011; Simatupang and Sridharan, 2005). Building inter-partner trust could eliminate unnecessary activities that firms need to conduct to prevent opportunistic behaviour. When firms believe that their partner is trustworthy, transaction costs such as those associated with monitoring can be reduced. Moreover, firms with high levels of trust tend to produce better collaborative performance (Robson et al., 2008) and also tend to maintain their commitment (Nyaga et al., 2010). Hence the following hypothesis is proposed.

Hypothesis 8

H_8: ***Trust*** *has a positive impact on* ***firm performance***.

6.5.3 Impact of commitment

When a transaction requires specific investment, the cost of such a transaction will increase. Firms may expect that their partners would take an advantage of them if opportunistic behaviour cannot be easily detected (Williamson, 2008). However when firms recognise behavioural deviation (uncertainty) from their partners, they should monitor partner performance in order to prevent damages from opportunism. Therefore, commitment between supply chain partners can reduce such costs. This argument leads to the following hypothesis.

> **Hypothesis 9**
>
> H_9: ***Commitment*** *has a negative impact on* ***transaction costs.***

Similar to the impact of trust, commitment has been arguably considered to improve relationships between collaborating partners. Previous studies found that commitment develops competitiveness of the collaborating firm (Nyaga et al., 2010) through increased coordinating capability (Bae, 2012). Hence the following hypothesis is proposed.

> **Hypothesis 10**
>
> H_{10}: ***Commitment*** *has a positive impact on* ***sustained competitive advantage***.

Moreover, better collaboration performance lead to higher levels of commitment between collaborating firms (Krause et al., 2007; Brown et al., 1995). Hence, long-term relationships in supply chain could be established by an increased collaboration performance driven by a higher level of trust (Hansen et al., 2002). Hence the following hypothesis is proposed.

> **Hypothesis 11**
>
> H_{11}: ***Commitment*** *has a positive impact on* ***firm performance.***

6.5.4 Impacts of transaction costs

6.5.4.1 Developing competitive advantage

When firms perceive that there is an increasing level of uncertainty in their transaction either in terms of behavioural uncertainty or uncertainty caused by external factors, they tend to have higher transaction cost to prevent or reduce the impact of such uncertainty e.g., spend more time to monitor performance of their supply chain partners

or creating extra activities to check the quality of the supplied products. Therefore, a reduction in transaction cost will give both parties the edge over competitors. Hence the following hypothesis is proposed.

> **Hypothesis 12**
>
> H_{12}: ***Transaction costs*** *negatively affects* ***sustained competitive advantage.***

6.5.4.2 Improving firm performance

Based on TCE, firms maximise their performance using transaction costs to decide whether to operate a particular activity themselves (in their hierarchy) or to outsource it (to the market) (Williamson, 2005*b*). However, a hybrid form such as supply chain collaboration offer an optimal outcome for the transacting firms. Supply chain collaboration allows firms to exploit their resources by working together more closely but still keep the firm ownership (Williamson, 2008). In such collaborative relationships, initial transaction costs are still incurred (Gaur et al., 2011).

However after a successful collaboration programme, transaction costs can be reduced by developing trust and commitment as discussed earlier (Katsikeas et al., 2009). The reduction in transaction costs will improve performance of the collaborating parties as they can avoid non-value added activities such as unnecessary monitoring of processes (Lui et al., 2009; Noordewier et al., 1990).

Case studies also suggest that the reduction in transaction cost will also enable the flow of the collaborative activities, which is key to improve performance of the firms in various aspects e.g., financial and operational performance (BPI and CMO, 2009). Therefore, the following hypothesis is proposed.

> **Hypothesis 13**
>
> H_{13}: ***Transaction costs*** *have a positive impact on* ***firm performance***.

6.5.5   Impact of sustained competitive advantage

RBV has a significant role in explaining how competitive advantage can give rise to firm performance (Hunt and Davis, 2012; Priem and Butler, 2001). Most of the studies applying RBV have examined or explored the impact of (sustained) competitive advantage on firm performance (Barney et al., 2001). Hence the following hypothesis is proposed.

> **Hypothesis 14**
>
> H_{14}: ***Sustained competitive advantage*** *positively affect* ***firm performance***.

The summary of the research hypotheses in this thesis are summarised with their supporting literature in Table 6.5.

Table 6.5: The summary of the research hypotheses

	Cause	+/-	Effect	Theory	Reference
H_1	Collaboration	→ +	Performance	TCE, RBV, CNT	Ramanathan and Gunasekaran (2012); Cao and Zhang (2011); Wagner et al. (2010); Sheu et al. (2006); Li et al. (2006); Simatupang and Sridharan (2005, 2004); Stank, Keller and Daugherty (2001); Ellinger et al. (2000)
H_2	Collaboration	→ +	Competitive advantage	RBV	Squire, Cousins, Lawson and Brown (2009); Mitchell and Faal (2008); Li et al. (2006); Tuten and Urban (2001); Kumar and van Dissel (1996); Spekman et al. (1998); Barney (1991)
H_3	Collaboration	→ +	Commitment	TCE, SET	Vieira et al. (2011); Nyaga et al. (2010); Zhang and Murphy (2009); Mitchell and Faal (2008); Welty and Becerra-Fernandez (2001); Akintoye et al. (2000); Jap and Ganesan (2000); Monczka et al. (1998)
H_4	Collaboration	→ +	Trust	TCE, SET, RBV, CNT	Cassar and Rigdon (2011); Nyaga et al. (2010); Monczka et al. (1998)
H_5	Trust	→ +	Commitment	SET, RBV, CNT	Presenza and Cipollina (2010); Kwon and Suh (2005); Morgan and Hunt (1994)
H_6	Trust	→ –	Transaction costs	RBV, CNT	Pilbeam et al. (2012); Vieira et al. (2011); Gaur et al. (2011); Rooks and Matzat (2010); BPI and CMO (2009); Katsikeas et al. (2009); Lui et al. (2009); Gulati and Nickerson (2008); Faems et al. (2008); Poppo et al. (2007); Ryu et al. (2007); Kingshott (2006); Kwon and Suh (2005); Welty and Becerra-Fernandez (2001); Jap and Ganesan (2000); Joshi and Stump (1999); Sako and Helper (1998); Nooteboom et al. (1997); Chiles and McMackin (1996)
H_7	Trust	→ +	Competitive advantage	RBV, CNT	Pilbeam et al. (2012); Huck et al. (2012); Chen and Yi (2010); Nyaga et al. (2010); Ireland and Webb (2007); Ireland et al. (2002); Jap (2001); Maloni and Benton (2000)
H_8	Trust	→ +	Performance	RBV, CNT	Pilbeam et al. (2012); Huck et al. (2012); Gaur et al. (2011); Nyaga et al. (2010); Squire, Cousins and Brown (2009); Hansen et al. (2002); Welty and Becerra-Fernandez (2001); Doney and Cannon (1997)
H_9	Commitment	→ –	Transaction costs	RBV, CNT	Vieira et al. (2011); Chen et al. (2011); Krause et al. (2007); Kingshott (2006); Kwon and Suh (2005); Welty and Becerra-Fernandez (2001); Jap and Ganesan (2000); Gundlach et al. (1995)
H_{10}	Commitment	→ +	Competitive advantage	RBV, CNT	Fawcett et al. (2011); Nyaga et al. (2010); Mitchell and Faal (2008); Welty and Becerra-Fernandez (2001)
H_{11}	Commitment	→ +	Performance	RBV, CNT	Jap and Ganesan (2000); Nyaga et al. (2010); Krause et al. (2007); Hansen et al. (2002); Welty and Becerra-Fernandez (2001); Brown et al. (1995)
H_{12}	Transaction costs	→ –	Competitive advantage	RBV, CNT	BPI and CMO (2009); Morgan et al. (2007); Burgess et al. (2006); Cousins (2005,?); Afuah (2001); Langlois (1992); Sriram et al. (1992)
H_{13}	Transaction cost	→ –	Performance	TCE	Gaur et al. (2011); Lui et al. (2009); BPI and CMO (2009); Katsikeas et al. (2009); Gulati and Nickerson (2008); Morgan et al. (2007); Welty and Becerra-Fernandez (2001); Noordewier et al. (1990)
H_{14}	Competitive advantage	→ +	Performance	RBV, CNT	Nyaga and Whipple (2011); Squire, Cousins, Lawson and Brown (2009); Ray et al. (2004); Chen and Paulraj (2004b); Cousins and Spekman (2003); Barney (2001, 1991)

6.6   Multiple group comparisons

One of the aims of this thesis is to examine the perspective of different supply chains partners on the impact and mechanisms of supply chain collaboration on firm performance. Tourism supply chain was selected partly due to their multi-level characteristics. This study will compare the perspective of tourism service providers and tour operators. These are considered to be the first-tier supplier and the intermediary players respectively. Therefore, four sample groups were included in the main survey covering two aspects of tourism service providers and tour operators. The framework for multiple group comparisons is illustrated in Figure 6.4.
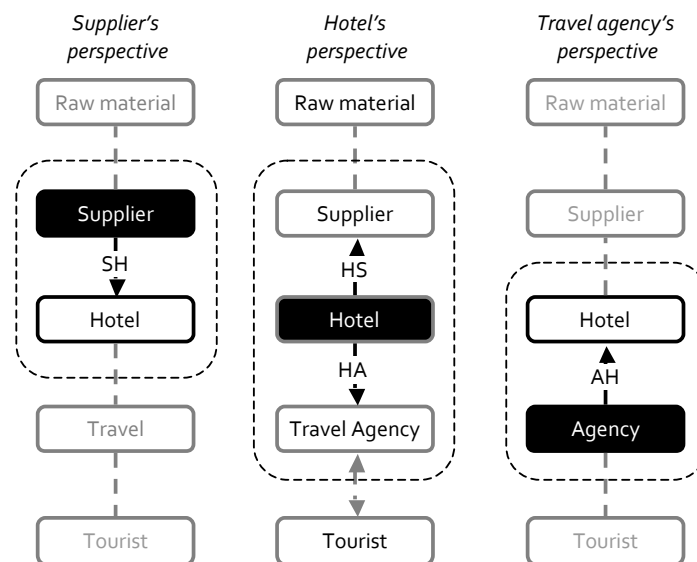
Figure 6.4: A framework for multiple group comparisons

Key:
Shaded boxes: Respondent group that provides their feedback based on the relationship with the group pointed by the arrow.
SH is a perspective of **S**uppliers on **H**otels.
HS is a perspective of **H**otels on **S**uppliers.
AH is a perspective of travel **A**gents on **H**otels.
HA is a perspective of **H**otels on travel **A**gents.

6.7 Instrument development

The "*instrument development*" stage consists of five steps. First (1) *Item generation* via theoretical foundation and literature review (Cao and Zhang, 2011; Zhang et al., 2003; Nahm et al., 2003; Churchill, 1979). Then questionnaire items were evaluated through (2) *Structured interviews* with managers and academics in tourism & supply chain management (Nahm et al., 2003). Next (3) the *Q-sort method* was used to assess initial convergent and discriminant validity of the measurement with academicians (Cao and Zhang, 2011; Swafford et al., 2006; Nahm et al., 2003). To validate the items (4) *Pre-testing of questionnaire* with experts from academia and professionals was conducted. Finally (Zhang et al., 2003; Nahm et al., 2003) (5) *Pilot study* was proceeded to check the validity and reliability of the instruments (Zhang et al., 2003; Nahm et al., 2003).

6.7.1 Item generation

Comprehensive literature review was conducted to form the foundation for developing an initial list of measurement items of each component of the constructs in this study. As suggested by Churchill (1979), existing scales were adopted from the literature (Doney and Cannon, 1997; Monczka et al., 1998; Kwon and Suh, 2005; Nyaga et al., 2010). Details of the operationalisation of all six constructs are presented in the following sections.

6.7.1.1 Supply chain collaboration

According to the discussions in the section 2.3, in this thesis supply chain collaboration was defined as "*at least two firms in the same supply chain working together to achieve their mutual goals*" (Simatupang and Sridharan, 2005; Mentzer et al., 2001; Sriram et al., 1992). Based on previous studies, supply chain collaboration was operationalised as a ten aspect construct i.e., information sharing (Monczka et al., 1998), joint activities (Ellinger et al., 2000), dedicated investments (Rinehart et al., 2004), goal congruence,

(Cao and Zhang, 2011), collaborative communication (Cao and Zhang, 2011; Goffin et al., 2006; Tuten and Urban, 2001), incentive alignment (Simatupang and Sridharan, 2005), risk reward sharing (Lambert et al., 1999), joint knowledge creation (Malhotra et al., 2005), synchronised decision (Simatupang and Sridharan, 2002), resource sharing (Harland et al., 2004).

6.7.1.2 Trust

Inter-firm trust was operationalised into two aspects: cognitive and affective trust (McAllister, 1995; Atkinson and Butcher, 2003). Discussions of trust are presented in Section 2.6.

6.7.1.3 Commitment

A commitment scale that is defined in three dimensions (instrumental and normative commitment): compliance, identification, and internalization) was adopted from (Mavondo and Rodrigo, 2001; Brown et al., 1995).

6.7.1.4 Transaction costs

Transaction costs construct was operationalised as a six dimensional construct including four dimensions (effort, problem, advantage, monitor) developed by Grover and Malhotra (2003) and adding two more dimensions (opportunity cost and governance problem) based on the literature (Williamson, 2008; Harewood, 2008; McLaren et al., 2002) and the fieldwork findings. Discussions of transaction costs are presented in Section 3.2.

6.7.1.5 Sustained competitive advantage

Sustained competitive advantage was operationalised into four aspects: efficiency, flexibility, responsive and quality (Wong and Karia, 2010; Chen and Yi, 2010; Ou et al., 2010; Lei and Slocum Jr., 2005; Hawkins, 2004; Hart, 1995; Barney, 1991, 1986). Sus-

tained competitive advantage are discussed in detailed within the concept of RBV in Section 3.3.

6.7.1.6 Firm performance

Performance scale was edited to fit with the research context of tourism management using literature (Sainaghi, 2010; Phillips and Louvieris, 2005).

The detailed discussions of relevant theories and relevant literature can be found in the Chapter 3. A summary of definitions of constructs used in this thesis are illustrated in the Table 6.6.

Table 6.6: Construct Definitions

Construct	Definition	Sources
Supply Chain Collaboration	Ten aspects of supply chain collaborations were defined according to the literature as follows.	
- Information Sharing	*Critical information is conveyed to a firm's partners.*	Monczka et al. (1998).
- Joint Activities	*Each party is willing to give and take in the relationship.*	Ellinger et al. (2000)
- Dedicated Investments	*Investments refer to investment made by a firm that are dedicated to the relationship with a specific partner.*	Rinehart et al. (2004)
- Goal congruence	*The extent to which supply chain partners perceive their own objectives are satisfied by accomplishing the supply chain objectives.*	Cao and Zhang (2011)
- Collaborative Communication	*The contact and message transmission process among supply chain partners in terms of frequency, direction, mode, and influence strategy. Open, frequent, balanced, two-way, multilevel communication is generally an indication of close inter-organizational relationships.*	Cao and Zhang (2011); Goffin et al. (2006); Tuten and Urban (2001)
- Incentive alignment	*The process of sharing costs, risks, and benefits among supply chain partners*	Simatupang and Sridharan (2005)

Continued on next page

Table 6.6 – *Continued from previous page*

Construct	Definition	Sources
- Risk & reward sharing	*A particular degree of relationship among chain members as a means to share risks and rewards that result in higher business performance than would be achieved by the firms individually*	Lambert et al. (1999)
- Joint knowledge creation	*The extent to which supply chain partners develop a better understanding of and response to the market and competitive environment by working together*	Malhotra et al. (2005)
- Synchronised decision	*The process by which supply chain partners orchestrate decisions in supply chain planning and operations that optimize the supply chain benefits.*	Simatupang and Sridharan (2002)
- Resource sharing	*The process of leveraging capabilities and assets and investing in capabilities and assets with supply chain partners. Resources include physical resources, such as manufacturing equipment, facility, and technology*	Harland et al. (2004)
Inter-firm Trust	Relationship partners perceive each other as credible and benevolent.	Nyaga et al. (2010)
Commitment	A desire to continue a relationship because of a positive affect toward the partner, categorised into three dimensions: input, attitudinal and temporal.	Nyaga et al. (2010); Gundlach et al. (1995)
Transaction cost	A cost incurred in making an economic exchange with another organisation.	Grover and Malhotra (2003); Williamson (2008)
Sustained Competitive Advantage	A firm have a competitive advantage when it is implementing a value creating strategy not simultaneously being implemented by current or potential competitors. Sustained competitive advantage depends on the possibility of competitive duplication, not simply by being competitive advantage over a certain time.	Barney (1991); Cao and Zhang (2011); Walker et al. (2000)
Firm performance	An ability to perform the promised logistics activities including ordering, delivery and forecasting in terms of time, quality, quantity.	Stank, Keller and Daugherty (2001)

Note: Ten constructs in italic are the lower-order construct of supply chain collaboration.

6.7.2 Structured interviews

After creating the measurement item lists, each item was evaluated via structured interviews with 11 tourism practitioners in Thailand and four scholars in supply chain management and tourism management, the selection was based on their expertise (publication records) in supply chain collaboration. These structured interviews were conducted to validate the definition and item clarity for each item at both construct and sub-dimension level from both an academic and practical perspective. Ambiguous and redundant items were revised and modified based on the feedback from the structured interviews.

6.7.3 Q-sort method

After the structured interviews, modified items were proceeded into the two rounds of Q-sorting by two independent judges in each round. Two judges were a tourism practitioner and SCM academician specialised in collaboration. The aim of Q-sorting is to check for the discriminant and convergent validity (Boon-itt and Paul, 2001; Nahm et al., 2003) and initial degrees of construct reliability and content validity (Moore and Benbasat, 1991). The assessment was conducted by asking the judges to independently sort all the items into the appropriate dimension (construct) based on their own decision (Segars and Grover, 1998). Decisions were based on the similarities and differences among the items (Swafford et al., 2006). If items were put into their categories in the Item generation stage, their convergent validity was justified (Nahm et al., 2003). Those items that were consistently placed in the unexpected categories were revised and modified. In the Q sorting, three measures were considered to assess the instruments as followings:

1. **Inter-judge raw agreement score**: Ratio of the total number of items all judges placed into a particular measure to the total number of items (Moore and Benbasat, 1991; Perreault Jr. and Leigh, 1989). The value of 0.65 or more is considered

acceptable (Altman, 1991; Perreault Jr. and Leigh, 1989), see Table 6.8.

2. **Item placement ratio (or hit ratio)**: The total number of the items that were place to the expected category divided by twice the number of all items.

3. **Cohen's Kappa**: The proportion of agreement of the judges (Cohen, 1960).

The Cohen's Kappa value is calculated using data from Table 6.7 containing number of items each judge suggest to accept or reject to a particular category.

Table 6.7: Information for computation of Cohen's Kappa values

		Judge 1		
		Accept	**Reject**	**Total**
Judge 2	**Accept**	X_{11}	X_{12}	X_{1+}
	Reject	X_{21}	X_{22}	X_{2+}
	Total	X_{+1}	X_{+2}	**N**

Based on information in Table 6.7, the Cohen's Kappa (k) value can be computed based using Formula 6.1:

Cohen's Kappa (k)

$$k = \frac{N_i * X_{ii} - \Sigma_{i+(X_{i+}X_{+i})}}{N^2 - \Sigma_i(X_{i+}X+i)} \tag{6.1}$$

Where:

N_i: total number of items;

x_{ii}: number of items agreed on by two judges;

X_{i+}: number of items in the ith row;

X_{+i}: number of items in the ith column.

According to Altman (1991), the Cohen's Kappa (K) value can be evaluated using the criteria in Table 6.8.

Table 6.8: Criteria for interpreting Cohen's Kappa value

Value of K	Strength of agreement
< 0.20	Poor
0.21 - 0.40	Fair
0.41 - 0.60	Moderate
0.61 - 0.80	Good
0.81 - 1.00	Very good

Source: Altman (1991)

Once two rounds of Q-sorting were completed (k > 0.85), sorted item were reviewed again by four independent academics. These four reviewers were selected based on their expertise in SCM and particularly collaboration and relationship, to suggest for the further revisions. The suggestions included dropping and modifying items as well as including new items. According to these suggestions, items were further revised before the pre-test.

6.7.4   Pre-testing of questionnaire

After the Q-sort, lists of items and definitions for each dimension were distributed to six reviewers. Three were experts in the field conducting research in supply chain collaboration and/or relationship. The rest were two potential respondents from the tourism industry. They evaluated each item and indicated whether to keep, delete, or modify, and suggested generating new items if they felt that the domain of the construct was not covered.

6.7.5 Pilot study

A pilot study was conducted with 36 tourism firms' executives. Corrected item-total correlation (CITC) was computed to purify the measurement scales. To test for uni-dimentionality, exploratory factor analysis was conducted (Hair Jr et al., 2010). Reliability was assessed using Cronbach (1951)'s alpha. In the pilot study, items will be deleted or modified if they yield unacceptable CITC (< 0.3), factor loading (< 0.3) or reliability (< 0.7) (Churchill, 1979).

Considering the results of this pilot study, Cronbach's alpha (the proportion of variation of the item that explain the total variation of the construct) of all constructs (between 0.803 and 0.971) were above the suggested values of 0.7 (Cronbach, 1951). The final measurement scales used in this thesis are presented in Table 6.9 and 6.10.

6.8 Conclusion

This chapter posits the key elements of the thesis, which are the research model (hypotheses) and the constructs. Both hypotheses and constructs were developed systematically based on both literature and the primary fieldwork to ensure validation and the relevance of the model and constructs. In this chapter, a Meta-analytic procedures were followed to quantitatively summarise the previous empirical studies concerning key constructs associated with supply chain collaboration impacts on firm performance. The research model of this thesis is derived from the theory of transaction cost economics and the literature in supply chain management along with organisational and related studies. Fourteen hypotheses have been proposed and discussed with their underlying theoretical approaches and supporting studies. These hypotheses are proposed based on relevant theories and related supportive literature (see Figure 6.5).

Table 6.9: Measurement Scales for supply chain collaboration

Measurement item	Source
Supply chain collaboration	
My firm and our supply chain partner . . .	
- **Information Sharing**	Simatupang and
. . . have informed each others in advance of changing needs.	Sridharan (2005);
. . . have expected that useful information will be shared.	Nyaga et al. (2010);
. . . have expected to keep each other informed about any critical change.	Li et al. (2006)
- **Joint activities**:	Nyaga et al. (2010)
. . . had a joint team.	
. . . conducted joint planning to anticipate & resolve operational problems.	
. . . made joint decisions about ways to improve overall cost efficiency.	
- **Dedicated investments & resources sharing**:	Nyaga et al. (2010);
. . . invested substantially in personnel.	Cao and Zhang
. . . provided proprietary expertise and/or technology.	(2011)
. . . dedicated significant investment.	
- **Goal congruence**:	Simatupang and
. . . agree on the goals of the supply chain.	Sridharan (2005)
. . . agree on the importance of collaboration across the supply chain.	
. . . agree on improving supply chain performance as a whole.	
- **Decision synchronization**:	Flynn et al. (2010)
. . . jointly plan on promotional events.	
. . . jointly develop demand forecasts.	
. . . jointly work out solutions.	
- **Incentive alignment**:	Simatupang and
. . . co-develop systems to evaluate and publicize each other's performance.	Sridharan (2005)
. . . share costs e.g., loss on order changes.	
. . . share benefits e.g., saving on reduced inventory costs	
- **Risk sharing**:	Norrman (2008);
. . . share any risks that can occur in the supply chain	Agrell and Nor-
. . . help each other to mitigate risk in our supply chain as a whole.	rman (2004)
. . . do not push risk to another party.	
- **Synchronised performance management**:	Prajogo and Ol-
. . . use metrics to assess SC performance as a whole	hager (2012);
. . . work together to improve SC performance	Simatupang and
. . . help each other to reduce SC cost.	Sridharan (2002)
- **Collaborative communication**:	Paulraj et al. (2008)
. . . have frequent contacts on a regular basis.	
. . . have open and two-way communication.	
. . . have many different channels to communicate.	
- **Joint knowledge management**:	Malhotra et al.
. . . jointly search and acquire new and relevant knowledge.	(2005); Hardy et al.
. . . jointly assimilate and apply relevant knowledge.	(2003)
. . . jointly learn the intentions and capabilities of our competitors.	

Table 6.10: Measurement Scales for other constructs

Measurement item	Source
Inter-firm Trust	Morgan and Hunt (1994)
- My firm can understand this supplier well.	
- This supplier is genuinely concerned that we succeed.	
- My firm trust this supplier keeps our best interests in mind.	
- This supplier considers our welfare as well as its own.	
Commitment	Morgan and Hunt (1994)
My firm and supply chain partner . . .	
. . . expect this relationship to continue for long time.	
. . . are committed to this supplier.	
. . . have taken significant effort & investment in building our relationship.	
Transaction cost:	Grover and Malhotra (2003)
In developing an association with this supply chain partner;	
- It is very complicated and difficult to write a contract.	
- It is very difficult to monitor the performance of this supplier.	
- It is costly, in time and effort, to monitor partner's performance.	
- It takes a lot of effort to solve problems in our relationship.	
- This partner tends to take advantage from my hotel with guile.	
- This partner will not break any agreements and contracts.	
- It is very costly to loose what we have invested in this relationship.	
- There is always a need to modify agreements in our contract.	Fieldworks and Williamson (2008)
- It is very difficult to assess the performance of this supplier.	
- Our investment in resources in not productive.	
- We should better select other suppliers.	
- There is an alternative supplier that we did not identify.	
Sustained competitive advantage:	Ireland et al. (2002)
My firm has an sustained advantage over our competitors in terms of . . .	
. . . efficiency.	Fawcett et al. (2011); Teece et al. (1997)
. . . flexibility.	Squire, Cousins, Lawson and Brown (2009); Rossetti and Choi (2005)
. . . responsiveness.	Squire, Cousins, Lawson and Brown (2009); Chen et al. (2004)
. . . quality.	Nyaga and Whipple (2011); Li et al. (2006)
Firm performance:	
The relationship with this supply chain partner help my firm . . .	
. . . increase profitability.	Yee et al. (2008)
. . . improve our operations.	Cox (1999); Min et al. (2005)
. . . reduce our logistics costs.	Stank, Keller and Daugherty (2001)
. . . improve our relationship.	Nyaga et al. (2010)
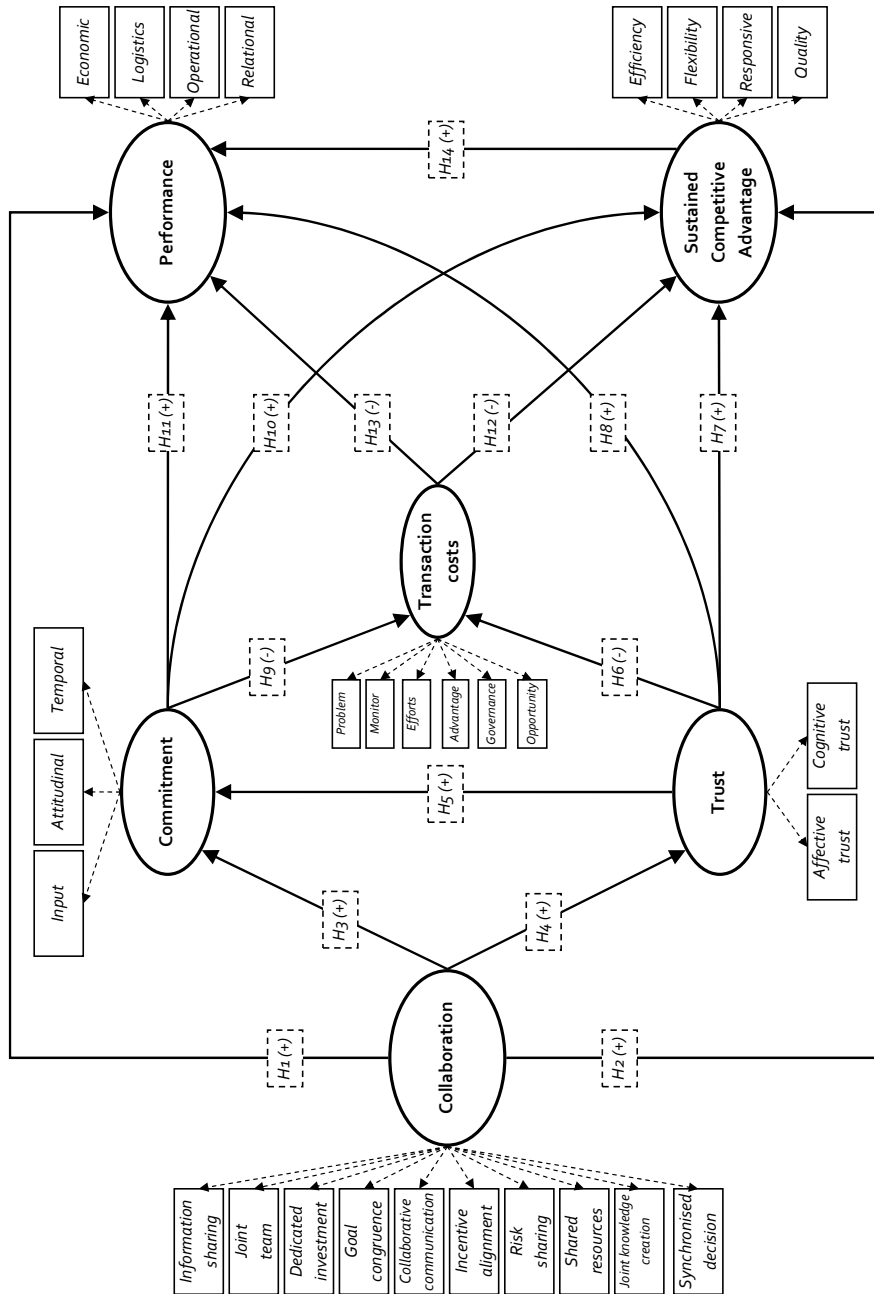
Figure 6.5: The Proposed Research Model

In the next three chapters (7, 8 and 9), research hypotheses will be proposed and the constructs developed in this chapter will be empirically examined using Confirmatory Factor Analysis, Structural Equation Modelling and Multiple Group Analysis. A link of this chapter to the next chapter in the thesis is shown in Figure 6.6.
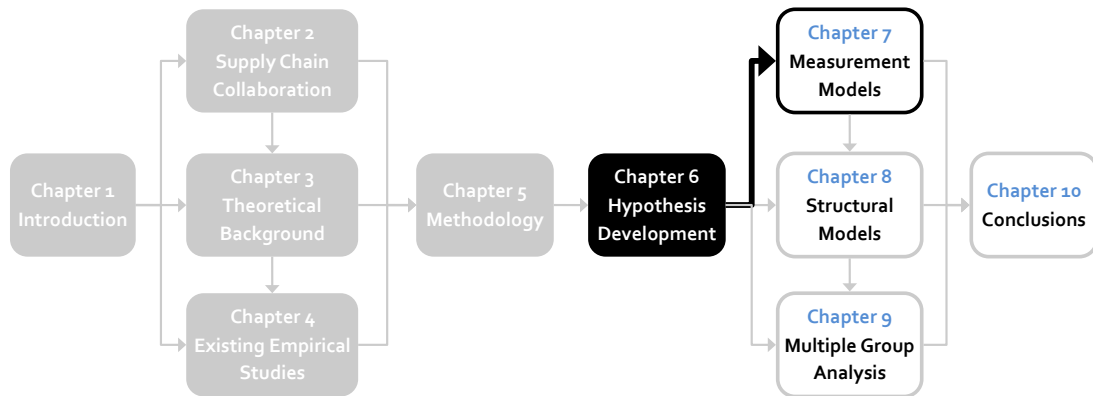
Figure 6.6: A direction of chapter 6 to the next chapter

Chapter 7

Measurement Models

> An *approximate answer to the right problem* is worth a good deal more than an *exact answer to an approximate problem.*
>
> *John Tukey (1915 - 2000)*
> *American statistician*

7.1 Introduction

As the operationalisation of the constructs in the research model was presented in the previous chapter (chapter 6), the next step of the research is to validate such constructs with the empirical data. That step is ten illustrated in in chapter. The role of this chapter in the thesis is to show the procedures for construct validation. Only if the construct validation are satisfactory, the hypotheses positing the causal relationships between such constructs can be tested. In this chapter the construct validation method used is called Confirmatory Factor Analysis (CFA). CFA is used to validate the measurement model developed from literature and initial fieldwork with the data collected from a survey. Related measurement assessments, discussed in the Chapter 5 (e.g., discrim-

inant validity or reliability), are also presented in this chapter. This chapter presents the validation of measurement scales developed in the previous chapter. The position of this chapter in the thesis is presented in Figure 7.2.
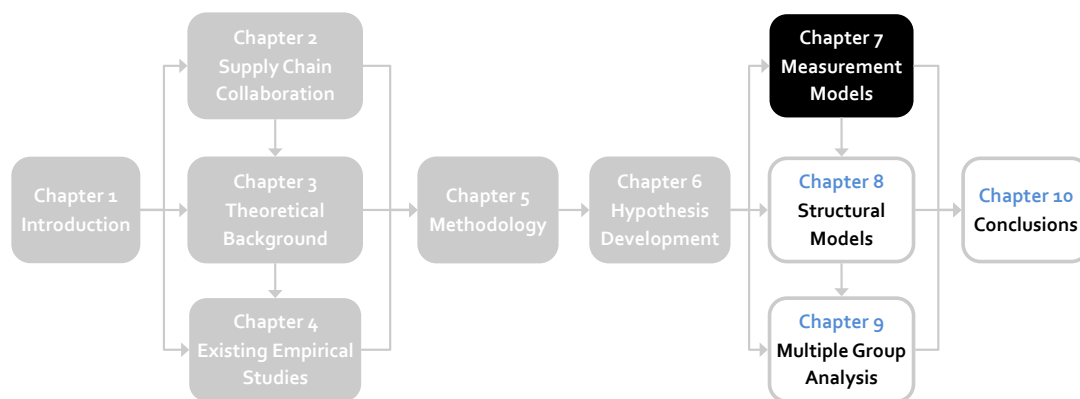
Figure 7.1: Position of the chapter in this thesis

7.2 Data diagnosis

7.2.1 Response Rate & Non-response bias

The data collection was conducted within a period of eight weeks during September - October 2011. The list of hotels was obtained from the Hotel Association, the list of travel agency was obtained from Tourism Authority of Thailand and a list of suppliers was obtained from the Tourism Business Association. There are 3,390 firms in the three lists. The questionnaire was distributed through e-mail consisting a link to an on-line questionnaire to all 3,390 firms. 853 completed questionnaires were received, resulting in a response rate of 25.162%, greater than previous relevant studies in the tourism industry e.g., Fantazy et al. (2010) (10.5 %). This sample size is considerably acceptable when comparing to the recent firm-level SCM studies conducted in Thailand ($n = 151$ in Wong et al. (2011)) and in the tourism industry ($n = 101$ in Andreu et al. (2010)).

Since the on-line survey was designed to allow only those who completed all the necessary questions to be submitted, all 853 responses were usable for the data analysis.

7.2.2 Sample demography

The overall profile of the data is presented in the Table 7.1. As only food and beverage suppliers are included in this study, profile of the data includes types of foods and beverage they supplied to the hotel, their locations and number of years in the business as well as duration that they collaborate with the hotels (years).

Table 7.1: Profile of sample hotels

Variable	Hotels	Suppliers	Unit: percentage Travel agents
Number of response	212	216	213
About the hotel			
Location			
- Bangkok	21.56	25.19	26.37
- Chiang Mai	22.44	21.44	22.19
- Phuket	15.44	12.47	11.44
- Pattaya	16.37	11.34	15.56
- Others	11.19	16.56	11.44
Management system			
- International chain	30 .21	5.39	15.32
- Domestic chain	25.34	18.27	22.61
- Non-chain	44 .45	76.34	62.07
Number of staffs (full-time equivalence)	321.34	113.68	21.97
Years in business	21.21	32.29	13.23
About the informant			
Experience in the tourism sector (years)	10.36	14.51	13.11
Experience in the firm (years)	5.23	9.14	8.67

Note: Each hotel provided their information on two partners (one supplier and one travel agent).

7.2.3   Data profile

Data were obtained from a national survey of 853 firms in the tourism supply chains in Thailand. This sample size is considered acceptable in supply chain management research which is difficult to obtain large samples and high response rates (De Beucke-laer and Wagner, 2012). Data were checked and cleaned to ensure its validity (Hair Jr et al., 2010).

7.3   Confirmatory Factor Analysis (CFA) Results

This section presents the procedures used to conduct a confirmatory factor analysis (CFA) to ensure that measurement of the five constructs are valid. Prior to CFA, data were analysed to check for the necessary conditions; (1) missing data, (2) normality of data, (3) uni-dimensionality and convergent validity, (4) reliability, (5) discriminant validity, and (6) second-order construct validity.

7.3.1   Measure validity and reliability

Construct validity can be classified into unidimensionality, reliability, convergent validity and discriminant validity

7.3.1.1   Normality

Multivariate normality of the data was also assessed via *Shapiro-Wilk* normality test using `mshapiro.test()` command in **R**. There is no evidence of violation of any of the regression assumptions found (W = 0.9446, *p*-value = 0.001581).

7.3.1.2   Unidimensionality and convergent validity

To assess for the unidimentioanl and convergent validity, CFA of all measurement models were conducted (Rungtusanatham, Choi, Hollingworth, Wu and Forza, 2003). Two second-order constructs (supply chain collaboration and transaction cost) were tested

separately. All of first-order constructs were tested in the same model.

The result shows that the loading scores (Jöreskog, 1969) were larger than a cut-off point of 0.70 suggested in Hair Jr et al. (2010); Nunnally (1978). Confirmatory Factor Analysis (Jöreskog, 1969) of the measurement model show acceptable fit indices (e.g., Table 7.7 for supply chain collaboration construct). Moreover, AVE of all constructs are greater than 0.5. Factor loadings of each measurement item are greater than twice of standard error and significant at $p < 0.05$ (Hair Jr et al., 2010). Therefore, constructs used in the model show discriminant validity.

7.3.1.3 Discriminant validity

To test for the discriminant validity, a pairwise comparison was conducted through comparing constrained-correlation CFA model with the unconstrained model. Discriminant validity is satisfied if there is a significant difference between the χ^2 values of the two models (at least $p < 0.05$) (Jöreskog, 1969; Jöreskog and Sörbom, 1997). This test was conducted for all constructs with four groups of sample. The result of discriminant validity is presented in Table 7.2, which shows significant results of all pairs ($p < 0.05$). Hence Discriminant validity of the models is satisfied.

7.3.1.4 Reliability

To ensure reliability of the survey data we assessed the internal consistency of the measurement using composite reliability (CR). All constructs have an acceptable internal reliability with a CR greater than 0.70 (Hair Jr et al., 2010; Nunnally, 1978).

Table 7.2: Discriminant validity test

Constructs			χ^2 **Difference**	**Significant level**
COL	vs.	TRS	11.32	= 0.022
COL	vs.	COM	20.45	< 0.001
COL	vs.	TSC	3.34	< 0.001
COL	vs.	SCA	5.57	= 0.013
COL	vs.	PFM	21.30	= 0.021
TRS	vs.	COM	45.31	< 0.001
TRS	vs.	TSC	3.76	= 0.017
TRS	vs.	SCA	39.23	= 0.027
TRS	vs.	PFM	19.01	= 0.009
COM	vs.	TSC	2.91	< 0.001
COM	vs.	SCA	10.03	< 0.001
COM	vs.	PFM	9.78	< 0.001
SCA	vs.	PFM	1.12	= 0.029

Key: COL = Supply Chain Collaboration, **PFM** = Performance, **SCA** = Sustained Competitive Advantage, **COM** = Commitment, **TRS** = Trust, **TSC** = Transaction Costs.

7.3.1.5 Non-response bias

Non-response bias was tested by comparing means of each construct between the early response sample received during the first two weeks) and late responses received during the third and forth week (Armstrong and Overton, 1977). The results show that there is no difference between two group ($p > 0.05$). Then there is no potential non-response bias found in this study.

7.3.2 Common Method Variance

Since the survey data were collected from a single respondent in the same survey, common methods variance (CMV) can be a problem. To ensure avoidance of common method bias, procedural control was conducted. Statistical tests were used to assess any potential problem of common method bias (Podsakoff et al., 2003). Procedural methods used are as followed:

1. Using mid-to-senior-level managers and leaders who have hight level of relevant knowledge (Mitchell, 1994);

2. Adopting of measurement items from the previous related studies to ensure quality of the scales (Lindell and Whitney, 2001);

3. Using collaborative translation (Douglas and Craig, 2007) to *improve comprehension* of the scales (Podsakoff et al., 2003);

4. Assuring respondents the confidentiality and anonymity of their responses (Fugate et al., 2009); and

5. Separating the measurement items of exogenous variables from those of criterion variables to *"create some proximal separation"* (Podsakoff et al., 2003).

Then statistical methods used to assess potential common method bias are as followed:

1. Harman's one-factor test was used to examine the possibility of the CMV problem (Podsakoff and Organ, 1986; Podsakoff et al., 2003). In this test we ran a principal component factor analysis using Varimax rotation method with all variables in the model. The results of the factor analysis reveal that four factors explain 72.05% of the variance of the variables with 21.79% by the first extracted factor. Hence, there was neither evidence that a single factor emerged nor any factor explaining most of the variance. Hence, the common methods bias is not a serious problem with the data.

2. Using a *"theoretically unrelated marker variable"* (Podsakoff and Organ, 1986; Lindell and Whitney, 2001)

   An experience in the industry of the respondent was included as a marker variable for this study. The model with the marker variable show significantly worse model comparing to the proposed model ($p, 0.05$). Hence, this test show no potential CMB problem.

3. Testing two single-factor measurement models where all measurement items are freely loaded on a single latent construct (Podsakoff and Organ, 1986).

The single-factor models showed insufficient fit, rejecting the hypothesis that there is a general factor that accounts for the majority of the covariance across the measures. In summary, the results indicated a lack of common method variance.

7.3.3 CFA results of first-order constructs

Goodness-of-fit indices of the first-order constructs are presented in the Table 7.3. All goodness-of-fit indices of the four sample groups are acceptable: $\chi^2/df < 2$; CFI > 0.95; TLI > 0.95; RMSEA < 0.075; and SRMR < 0.075.

Table 7.3: Goodness-of-fit indices CFA results of first-order constructs

Goodness-of-fit Indices	Estimate (*p*-value)				Cut-off value
	SH	**HS**	**HA**	**AH**	
χ^2 **/ Degree of freedom**	1.637	1.707	1.660	1.765	< 2.00
CFI	0.988	0.987	0.988	0.987	> 0.95
TLI	0.985	0.984	0.984	0.984	> 0.95
RMSEA	0.054	0.057	0.056	0.060	< 0.075
SRMR	0.022	0.021	0.024	0.023	< 0.075

7.3.3.1 Discussion of factor loadings

The estimated factor loadings of the first-order constructs: trust, commitment, sustained competitive advantage and performance constructs are presented in the Table 7.4. All factor loadings are high (> 0.70) with *p*-value > 0.001, which present construct validity. In terms of reliability, all constructs have acceptable Cronbach's α values (> 0.70), according to Hair Jr et al. (2010).

Table 7.4: CFA results of first-order constructs

Variables	Standardised Estimate			
	SH	**HS**	**HA**	**AH**
Trust (TRS)				
TRS1	0.946	0.931	0.929	0.961
TRS2	0.954	0.934	0.961	0.980
TRS3	0.945	0.926	0.905	0.968
TRS4	0.939	0.910	0.948	0.949
Commitment (COM)				
COM1	0.922	0.926	0.930	0.931
COM2	0.917	0.915	0.922	0.921
COM3	0.917	0.915	0.912	0.912
Sustained Competitive Advantage (SCA)				
SCA1	0.932	0.931	0.871	0.915
SCA2	0.924	0.924	0.910	0.953
SCA3	0.933	0.934	0.940	0.955
SCA4	0.922	0.921	0.923	0.960
Performance (PFM)				
PFM1	0.963	0.963	0.962	0.971
PFM2	0.926	0.926	0.929	0.947
PFM3	0.965	0.964	0.966	0.970
PFM4	0.957	0.958	0.956	0.968

7.3.4 Second-order constructs

7.3.4.1 Validation methods for second-order constructs

The second-order CFA model tests for the factor loading scores of the first-order factors (e.g., information sharing, incentive alignment or risk sharing) on their second-order factor (e.g., supply chain collaboration). The second-order constructs should be proposed based on theoretical justification or real life observations, and not driven by the data. Evaluation criteria to validate higher-order CFA suggested by (Hair Jr et al., 2010, p. 758) are as follows:

Table 7.5: Conditions and evaluation criteria for higher-order CFA

Criteria	Description
Theoretical conditions	- The higher-order factor model must have a theoretical justification. - The higher-order factor model should be used only in relationships with other constructs of the same general level of abstraction. - At least three first-order constructs should be used to meet the minimum conditions for identification.
Empirical conditions	- The higher-order factor model exhibit adequate fit. - The higher-order factors predict other related lower constructs adequately and as expected. - The higher-order factor model exhibit equal or better predictive validity and the lower-factor model.

Source: (Hair Jr et al., 2010, p. 758)

According to the evaluation criteria for the higher-order construct, which is the second-order construct in this case, there are two conditions: theoretical and empirical conditions(Hair Jr et al., 2010). Since the theoretical conditions were ensured by the theories and previous studies discussed in the Chapter 6, this section presents will then present and discuss only the empirical (statistical) supports for the second-order constructs.

7.3.4.2 CFA results of supply chain collaboration

First considering the validation of the second-order construct, all the important fit indices of the second-order model of all four groups are statistically accepted. Moreover, the χ^2 tests show that the second-order model is not statistically different from the first-order model ($p > 0.99$). Given the theoretical justification and model parsimonious, the second-order model is validated due to their superior statistical results than the first-order model (Hair Jr et al., 2010).

Considering the empirical supports for the validation of the second-order of the supply chain collaboration constructs, all goodness-of-fit indices of the four sample groups are acceptable: $\chi^2/df < 2$; CFI > 0.95; TLI > 0.95; RMSEA < 0.075; and SRMR < 0.075. This satisfied result of the second-order CFA of the supply chain collaboration constructs is consistent with the findings of the previous studies (Cao and Zhang, 2011). The key goodness of fit indices of the supply chain collaboration construct were presented in the Table 7.6.

Table 7.6: Tests for second-order constructs of supply chain collaboration

Sample Group	Model	χ^2(df)	CFI	TLI	RMSEA	SRMR	p-value (χ^2)
SH	1st order	541.24(360)	0.978	0.974	0.048	0.018	> 0.999
	2nd order	550.11(395)	0.981	0.979	0.043	0.018	
HS	1st order	525.45(360)	0.979	0.975	0.047	0.018	> 0.999
	2nd order	534.15(395)	0.983	0.981	0.041	0.018	
HA	1st order	515.67(360)	0.981	0.977	0.045	0.018	> 0.999
	2nd order	525.82(395)	0.984	0.982	0.040	0.018	
AH	1st order	494.51(360)	0.983	0.980	0.042	0.018	> 0.999
	2nd order	541.96(395)	0.983	0.980	0.042	0.020	

Key: SH = Suppliers' perspectives on hotels, HS = Hotels' perspectives on supliers, HA = Hotels' perspectives on travel agents, AH = Travel Agents' perspectives on hotels

Then, the factor loading of each first-order construct and the associated measurement items can be assessed. The results of the CFA for the supply chain collaboration construct are presented in the Table 7.7[1].

Considering the significance and the magnitude, all factor loading are high (> 0.70) with *p*-value > 0.001. Thus construct validity is ensured (Bagozzi and Yi, 2012; Kline, 2011). Actually they are all greater than 0.90, which are considerably very high comparing to the previous studies on the supply chain collaboration construct in various contexts such as impacts on long-term partnerships (Ramanathan and Gunasekaran, 2012), relationships with trust (Ha et al., 2011), impacts on collaborative advantages (Cao and Zhang, 2011), and the comparisons between perceptions of buyers and sellers (Nyaga et al., 2010).

Considering all four models, first-order factors whose factor loading is greater than 0.95 are incentive alignment, information sharing, dedicated investment and joint activities. These factors are those that have been widely adopted and validated in the previous research (Cao and Zhang, 2011; Nyaga et al., 2010) in also in the context of tourism industry (Tiedemann et al., 2009) as of this thesis. Other first-order factors whose factor loading values are relatively high (only < 0.95 in a model) also include collaborative communication, risk sharing. However, other first-order factors also considered as the validated components of supply chain collaboration due to their high and statistically significant loading.

When comparing the factor loading in four models, it was found that value of some first-order factors are relatively high (>0.95) in a model using data from the perception of hotels on suppliers. Such outstanding factor in terms of magnitude are incentive alignment (0.982) and synchronised decision (0.967). This can be interpreted that hotels could arguably focus more on the alignment of incentive and decision with their

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[1]The R code for CFA is presented in Appendix D.1

Table 7.7: CFA results of supply chain collaboration

Latent variables:	Standardised Estimate			
	SH	HS	HA	AH
Joint Activity: JA	**0.966**	**0.968**	**0.970**	**0.995**
JA1	0.890	0.890	0.887	0.882
JA2	0.910	0.910	0.907	0.904
JA3	0.886	0.889	0.884	0.896
Dedicated Investment: DI	**0.981**	**0.970**	**0.982**	**0.985**
DI1	0.876	0.877	0.873	0.866
DI2	0.914	0.916	0.912	0.912
DI3	0.883	0.884	0.883	0.889
Information Sharing: IS	**0.981**	**0.953**	**0.990**	**0.956**
IS1	0.903	0.905	0.908	0.864
IS2	0.913	0.915	0.907	0.925
IS3	0.826	0.828	0.819	0.837
Goal Congruence: GC	**0.945**	**0.933**	**0.940**	**0.936**
GC1	0.918	0.921	0.908	0.907
GC2	0.891	0.891	0.893	0.891
GC3	0.878	0.879	0.883	0.887
Collaborative Communication: CC	**0.965**	**0.935**	**0.962**	**0.958**
CC1	0.900	0.902	0.897	0.883
CC2	0.917	0.919	0.919	0.911
CC3	0.872	0.872	0.874	0.888
Incentive Alignment: IA	**0.968**	**0.982**	**0.964**	**0.963**
IA1	0.904	0.904	0.900	0.904
IA2	0.887	0.889	0.888	0.887
IA3	0.888	0.892	0.892	0.888
Risk Sharing: RS	**0.951**	**0.982**	**0.952**	**0.949**
RS1	0.871	0.873	0.873	0.874
RS2	0.932	0.931	0.930	0.930
RS3	0.887	0.889	0.886	0.883
Knowledge Transfer: KT	**0.944**	**0.948**	**0.943**	**0.938**
KT1	0.898	0.901	0.894	0.896
KT2	0.888	0.889	0.887	0.884
KT3	0.897	0.897	0.898	0.902
Synchronised Decision: SD	**0.930**	**0.967**	**0.932**	**0.935**
SD1	0.876	0.879	0.878	0.876
SD2	0.890	0.893	0.889	0.891
SD3	0.927	0.925	0.925	0.924
Resource Pooling: RP	**0.932**	**0.947**	**0.928**	**0.924**
RP1	0.892	0.895	0.887	0.864
RP2	0.900	0.901	0.902	0.896
RP3	0.896	0.893	0.900	0.901

Note: All coefficients are statistically significant at $p < 0.001$.

supplier as the transactions are normally led by the suppliers especially with foods and beverage suppliers (Harewood, 2008; Fantazy et al., 2010).

7.3.4.3 CFA results of transaction cost

All key goodness-of-fit indices of the four sample groups are acceptable: $\chi^2/df < 2$; CFI > 0.95; TLI > 0.95; RMSEA < 0.075; and SRMR < 0.075. Moreover, statistical comparison between the first-order and the second-order model showed an insignificant result, which means there is no significant different between the two models. The results confirming the validation of the transaction cost as a second-order construct is consistent to the findings of Grover and Malhotra (2003). However, some aspects of the transaction costs were excluded in the measurement developed in the Grover and Malhotra (2003) as stated below.

> *"However, it does not include the measurement of transaction costs associated with governance problems (safeguarding, adaptation, and performance evaluation) or opportunity costs (failure to invest in productive resources, maladaptation, and failure to identify alternate partners)"* *(Rindfleisch and Heide, 1997).*

The findings of this thesis offer a boarder view of transaction costs by including the aspect of opportunistic behaviours of the firms and their supply chain partners (Villena et al., 2011; Vieira et al., 2011; Manatsa and McLaren, 2008; Morgan et al., 2007) as well as governance problem incurred in the supply chain relationships (Pilbeam et al., 2012; Tate et al., 2011; Williamson, 2010; Rindfleisch and Heide, 1997). The results of the validation of the transaction costs construct were presented in the Table 7.8.

Considering the model coefficients, all factor loading are high (> 0.70) with p-value > 0.001, which present construct validity. The estimated coefficients in the CFA for the transaction cost construct are presented in the Table 7.9.

Table 7.8: Tests for second-order constructs of transaction costs

Sample Group	Model	χ^2(df)	CFI	TLI	RMSEA	SRMR	p-value (χ^2)
SH	1st order	79.941(48)	0.995	0.993	0.056	0.010	> 0.213
	2nd order	96.550(50)	0.995	0.995	0.056	0.010	
HS	1st order	79.470(48)	0.995	0.993	0.055	0.010	0.270
	2nd order	95.815(50)	0.995	0.993	0.056	0.010	
HA	1st order	103.98(48)	0.990	0.986	0.074	0.009	0.101
	2nd order	108.56(50)	0.990	0.986	0.074	0.009	
AH	1st order	60.886(48)	0.997	0.996	0.036	0.008	0.2073
	2nd order	64.034(50)	0.997	0.996	0.036	0.009	

Key: SH = Suppliers' perspectives on hotels, HS = Hotels' perspectives on supliers, HA = Hotels' perspectives on travel agents, AH = Travel Agents' perspectives on hotels

Table 7.9: CFA results of transaction cost

Latent variables:	Standardised Estimate			
	SH	**HS**	**HA**	**AH**
Governance	**0.925**	**0.927**	**0.916**	**0.920**
TSC1	0.929	0.928	0.916	0.918
TSC2	0.924	0.923	0.916	0.922
TSC3	0.926	0.925	0.926	0.933
Opportunistic behaviours	**0.925**	**0.924**	**0.926**	**0.992**
TSC4	0.924	0.923	0.919	0.925
TSC5	0.928	0.927	0.928	0.939
TSC6	0.927	0.926	0.928	0.934
Problems	**0.925**	**0.924**	**0.927**	**0.909**
TSC7	0.928	0.927	0.929	0.913
TSC8	0.923	0.922	0.920	0.900
TSC9	0.926	0.925	0.925	0.914
Opportunity costs	**0.926**	**0.927**	**0.926**	**0.925**
TSC10	0.921	0.920	0.920	0.922
TSC11	0.929	0.928	0.929	0.928
TSC12	0.929	0.928	0.929	0.927

Note: All coefficients are statistically significant at $p < 0.001$.

7.4 Conclusion

As mentioned in the methodology chapter (chapter 5), the role of this chapter is to test if the measurement scales of the constructs used in the research model that were developed from literature and initial fieldwork are statistically fit with the real data from the large scale survey. As a results presented in this chapter, all the constructs' measurement scales are statistically satisfied. Furthermore, other important issues related to the scale validation were also assessed and statistically acceptable. Therefore, the measurement developed can be used to test the research hypotheses in the structural model in the next chapter as showed in Figure 7.2
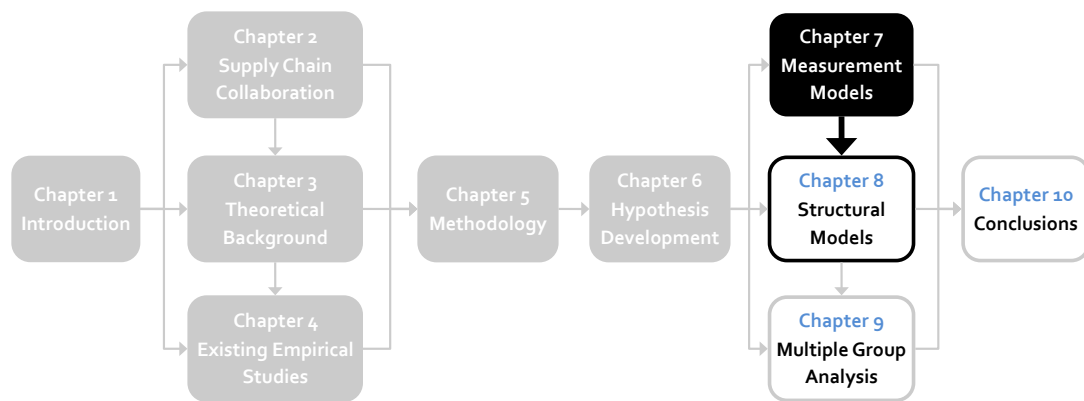
Figure 7.2: A direction of chapter 7 to the next chapter

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Chapter 8

The Structural Model

> If the ***result confirms*** the hypothesis, then you've ***made a measurement***.
>
> If the ***result is contrary*** to the hypothesis, then you've ***made a discovery***.
>
> *Enrico Fermi (1901 - 1954)*
> *Nobel prize winning Physicist*

8.1 Introduction

Once the measurement scales were statistically validated and assessed in the previous chapter (7), their causal relationships can be tested in the structural model (or latent variable model). Therefore the role of this chapter is present the procedure for testing if the hypotheses developed from the literature and real-world observations (in Chapter 6) are supported by the data. Results of this chapter will also contribute to the body of knowledge in SCM and will also provide managerial insights for supply chain managers. A position of this chapter in the thesis is presented in Figure 8.1
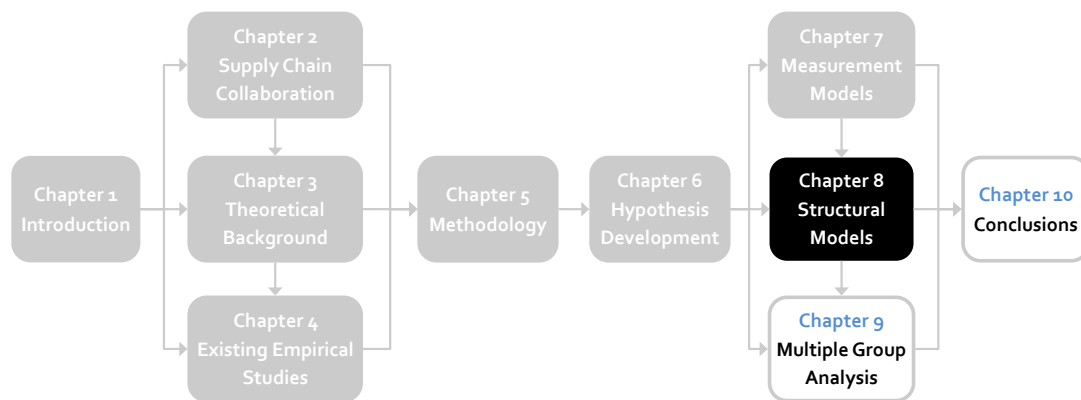
Figure 8.1: Position of the chapter in this thesis

8.2 Hypothesis testing

By satisfying the measurement models for the constructs in section 7.3, the path model of latent variable illustrated in Figure 8.2 was empirically tested with statistical software titled *R* using two packages: **lavaan** (Rosseel, 2012, 2011) and **SEMplusR** packages (Piboonrungroj, 2012). To ensure the validity of the software the model was also cross-validated with the SEM results from another well-known software for SEM called *Mplus* software (Muthén and Muthén, 1998-2012). This section presents the results of the hypothesis testing with the full SEM model, followed by a discussion of the findings.
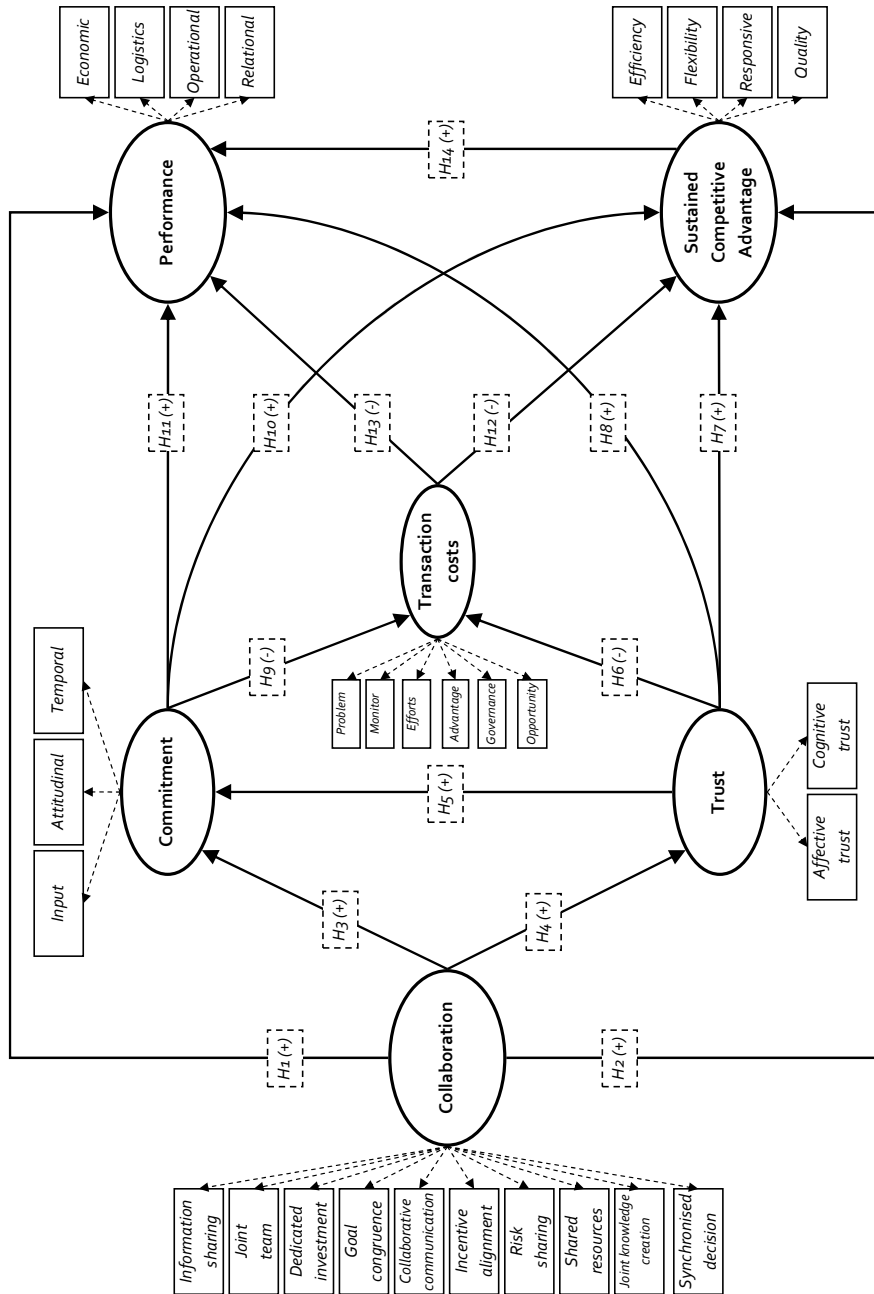
Figure 8.2: The research hypotheses

8.2.1 Control variables

An inclusion of variables that may influence key endogenous variables can reduce sources of undesirable variance in the model (Wagner et al., 2012). Such variables are known as *"control variables"*. In this study firm size (Wu et al., 2006) and duration of relationships are the control variables (Ergeneli et al., 2007).

8.2.2 Latent variable model

Goodness-of-fit indices are highly acceptable for all four sample groups. All goodness-of-fit indices of the four sample groups are acceptable: $\chi^2/df < 2$; CFI > 0.95; TLI > 0.95; RMSEA < 0.075; and SRMR < 0.075. The results of the structural model of four sample groups are presented in the Table 8.1. Coefficients of the paths in the model are presented in Table 8.2. The R code used to fit the full SEM model is presented in Appendix D.2.

Table 8.1: Goodness-of-fit indices of the structural model

Goodness-of-fit Indices	Sample groups				Cut-off value
	SH	HS	HA	AH	
χ^2 / **Degree of freedom**	1.380	1.386	1.309	1.391	< 2.00
CFI	0.971	0.971	0.975	0.968	> 0.95
TLI	0.970	0.969	0.974	0.966	> 0.95
RMSEA	0.042	0.042	0.038	0.043	< 0.075
SRMR	0.065	0.069	0.068	0.074	< 0.075

Table 8.2: SEM full model results

	Hypothesis			Standardised Estimate			
				SH	HS	HA	AH
H_1	COL	→	PFM	0.106*	0.120*	NS.	0.096*
H_2	COL	→	SCA	NS.	NS.	NS.	NS.
H_3	COL	→	COM	0.630***	0.245***	0.302***	0.325***
H_4	COL	→	TRS	0.213**	0.625***	0.600***	0.581***
H_5	TRS	→	COM	0.150*	0.634***	0.302***	0.543***
H_6	TRS	→	TSC	NA	-0.513***	-0.459***	-0.379***
H_7	TRS	→	SCA	0.076*	0.452***	0.397***	0.505***
H_8	TRS	→	PFM	NS.	NS.	-0.161*	NS.
H_9	COM	→	TSC	-0.662***	-0.244**	-0.330***	-0.398***
H_{10}	COM	→	SCA	0.429***	0.191*	0.243**	NS.
H_{11}	COM	→	PFM	NS.	NS.	NS.	0.281***
H_{12}	TSC	→	SCA	-0.076*	-0.452***	-0.335***	-0.338***
H_{13}	TSC	→	PFM	-0.300***	-0.291***	-0.276***	-0.394***
H_{14}	SCA	→	PFM	0.609***	0.639***	0.640***	0.249***

Note: ***$p < 0.001$, **$p < 0.01$, *$p < 0.05$, NS. Not significant ($p > 0.05$).

8.3 Discussions

8.3.1 Significance of the hypotheses

The latent model in SEM presented in this chapter shows statistical support for the model. Only hypothesis 2 that was not statistically supported by any group ($p < 0.05$). Most of the hypotheses were statistically supported by one or more sample groups ($p < 0.05$). Considering the significance of the coefficients in the four models, it was found that there is only one hypothesis whose coefficient is insignificant ($p < 0.05$) for all four models. The only insignificant coefficient (for all models) is the second one positing that supply chain collaboration improves sustained competitive advantage. This results were consistent with the arguments in the previous studies in supply chain collaboration in general (Spekman et al., 1998; Nyaga et al., 2010; Cao and Zhang, 2011) as well as particularly in the tourism sector (Hawkins, 2004). However, this result should not interpret that supply chain collaboration cannot increase sustained compet-

itive advantage because such an insignificant path is only a direct impact but there are also indirect impacts. Such indirect paths are mediated via various factors i.e., increase in trust, commitment and reduction in transaction costs.

In the literature, Cao and Zhang (2011) examined a similar relationship stating that supply chain collaboration positively increase collaborative advantage and they found a statistical significance of such impacts. However, first in Cao and Zhang (2011), there is no mediating variable between supply chain collaboration and sustained collaborative advantage. Moreover, supply chain collaboration construct in Cao and Zhang (2011) is narrower than the one in this thesis and sustained collaborative in Cao and Zhang (2011) and sustained competitive advantage is a different construct and was operationalised differently.

8.3.2 Trust and commitment

In general, findings suggest that supply chain collaboration can build trust and commitment between firms (coefficients range between 0.213 to 0.630). Considering the four samples, It was found that the impacts of supply chain collaboration on trust are obviously greater than one on commitment in three samples (0.625, 0.600 and 0.581 for the impacts on trust and 0.245, 0.302 and 0.325 for the impacts on commitment). Such results were not found in the model using the perspective of suppliers on hotels where the impact on commitment is greater (0.630 and 0.213).

The results are consistent with the study by Nyaga et al. (2010) where the impact of information sharing on commitment is higher than the one on trust based on the perspective of supplier. This finding can be interpreted that suppliers are more concern about making commitment than building trust (Welty and Becerra-Fernandez, 2001). Suppliers usually prefer to have a long-term partners in order to establish the operations since suppliers are those who invest in the collaboration development between

the supply chain partners (Vieira et al., 2011; Welty and Becerra-Fernandez, 2001). In the recent literature, Laseter and Gillis (2012) also showed the important of commitment from the aspects of suppliers.

8.3.3 Transaction costs

One of the key expected novel contribution is the empirical examination of the mediating roles of transaction costs in the supply chain relationships as widely mentioned in the literature (Tate et al., 2011; Gulati and Nickerson, 2008; Williamson, 2008; Grover and Malhotra, 2003; Hobbs, 1996; Langlois, 1992). The results in the structural model for all samples show strong and significant mediating roles of transaction costs.

Considering the perspective of suppliers on hotels, it was found that commitment has a significantly high impact on the reduction of transaction costs (-0.662). Also based on the perspective of travel agents on hotels, commitment was found the stronger impacts on transaction costs than one of trust (-0.398 and -0.379 for the impacts of commitment and trust on transaction cost respectively). Considering the perspective of hotels on suppliers and travel agents, it was found that both trust and commitment can significantly reduce transaction costs in the supply chains. However, from the hotels' perspective, it was found that the impacts of trust on the reduction of transaction costs are greater than those of commitment (-0.513 and -0.459 for the impacts of trust and -0.244 and -0.330 for those of commitment). Such results are consistent to both arguments in the literature (Welty and Becerra-Fernandez, 2001; Maloni and Benton, 2000) and the previous empirical studies (Nyaga et al., 2010; Kwon and Suh, 2005).

8.3.4 Roles of competitive advantage

Sustained competitive advantage was proposed to be developed as a result of the higher level of supply chain collaboration. However, in the SEM outcomes it was found that the direct impacts of supply chain collaboration on sustained competitive advantage

for all four sample groups. Such results show that the impacts of supply chain collaboration on sustained competitive advantage was mediated by other factors including trust and commitment as well as the reduction in transaction costs, which were discussed previously. Such a results was arguably a novel contribution as previous studies usually examined only the direct impacts (Chan et al., 2012; Squire, Cousins, Lawson and Brown, 2009).

8.3.5 Firm performance

The ultimate outcome of an implementation of supply chain collaboration, improved firm performance (Handfield et al., 2009; Manatsa and McLaren, 2008; Simatupang and Sridharan, 2004). Based on related theories and previous studies, the research model developed in this thesis proposed that such impacts are both directly from the collaboration itself and mediated by some factors including trust, commitment, transaction cost and sustained competitive advantage.

The results of SEM found that sustained competitive advantage played a significant mediating role from the perspective of hotels and supplier (coefficients ranges between 0.609 to 0.640), whilst commitment was the key mediating factor from the travel agents perspective (0.281). The direct effect of commitment on firm performance was statistically significant only for the travel agent perspective. Such a result confirmed that in the service-based transaction an intermediary organisations (travel agents in this case) would focus on establishing the long-term commitment. Such a long term relationships is critical to ensure the continuity of the transaction as they can be easily canceled (Vieira et al., 2011; Grant, 2005). This result is arguably consistent with the previous results of the study by Andreu et al. (2010) that also examined the role of commitment from the travel agents' perspective. A study of Nyaga et al. (2010) also found a stronger impact of commitment on firm performance from the buyers' perspective than sellers' perspective.

8.4 Conclusion

This chapter present one of the key chapters on the empirical testing of the causal relationships between the constructs related to supply chain collaboration, its outcomes and their mechanism or mediating variables. Such hypotheses were tested in the structural equation model. The results in this chapter are mostly consistent with those in the literature. The significance of the hypotheses and the magnitudes of the coefficients were discussed in relations to the related literature and the findings from the initial fieldwork and the followed up interviews. The critical role of this chapter is to be the main empirical evidence confirming the validity and reliability of the research model. The novel implication stems from the results presented in this chapter is the extended model on the outcomes of supply chain collaboration and it outcomes that was also statistically supported by an empirical evidences.

Then, when the full model (both measurement model in Chapter 7 and the latent variable model in this chapter) was successfully supported by the data, further analysis in the next chapter (Chapter 9). Such analysis is the multiple group analysis, which is used to assess for the equivalence of the research model with multiple sample groups. Those groups are four perspective of hotels, suppliers and travel agents on their supply chain members. Such a link of this chapter to the next chapter in the thesis is shown in Figure 8.3
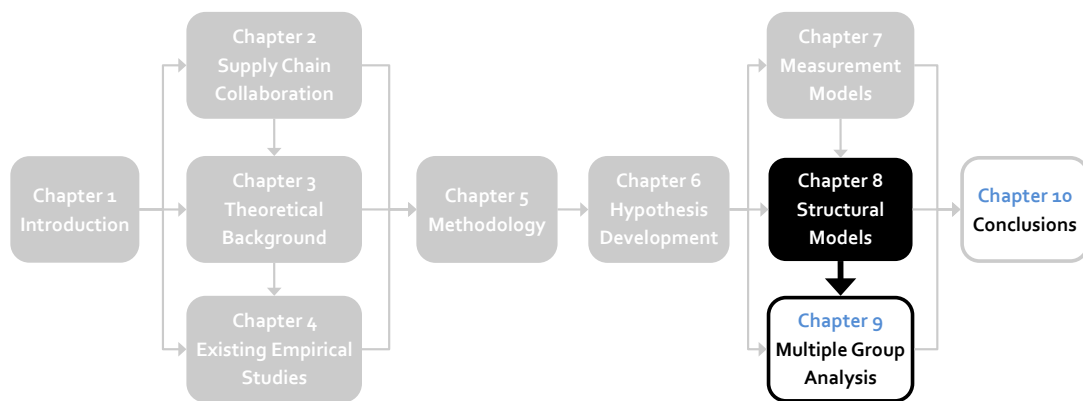
Figure 8.3: A direction of chapter 8 to the next chapter

Chapter 9

Multiple-Group Analysis

Research is to see what everybody
else has seen, and to think what
nobody else has thought.

Albert Szent-Gyorgyi (1893 - 1986)
Nobel prize winning physiologist

9.1   Introduction

Although SCM research has been widely conducted, most of the research questions
that were studied and answered are those of the basic and fundamental ones (Quinn,
2012). Hence currently there is a call for advanced studies that examine more complex
problems in SCM (Fawcett and Waller, 2011). Such complex problems, especially in a
survey research, include a multiple group analysis or a multi-level modeling. Recently
A comparison of the causal relationship across the sample groups or a multiple group
analysis have recently received more attention (Wong et al., 2011; Cao and Zhang, 2011;
Vandenberg and Lance, 2000). The main reason is that the findings of a multiple group
analysis offer an in-depth insights in both advanced theoretical contribution and man-

agerial insights (Nyaga et al., 2010).

Since there are four groups in the survey, the main objective of This chapter presents a comparison of the relationships between partners in different tiers of the supply chain. It focuses on tourism supply chains due to their multi-echelon characteristics. This study then compares the perspective of tourism service providers and tour operators. These are considered to be the first-tier supplier and the intermediaries respectively. Therefore, the survey consists of four groups of samples, two are hotels' perspectives on suppliers (HS) and travel agents (HA) and the perspective of suppliers and travel agent on hotels (SH and AH respectively).

These four samples represent two dyadic relationships in tourism i.e., goods-based transactions (hotels and suppliers) and service-based transactions (hotels and travel agents). Hence results of this chapter will provide novel knowledge on the differences between how goods-based and service-based transactions influence the impact of supply chain collaboration and mediations proposed (in Chapter 6) and tested (in Chapter 8) earlier in this thesis. The position of this chapter in the thesis is presented in Figure 9.1.

9.2 Multiple-Group Analysis Procedure

Prior to testing for validation of the hypotheses across groups, measurement models have to be assessed to ensure the equivalent validation. To do so, a six step process of invariance testing of the measurement models in group comparisons for SEM suggested by Hair Jr et al. (2010) was conducted as follows.
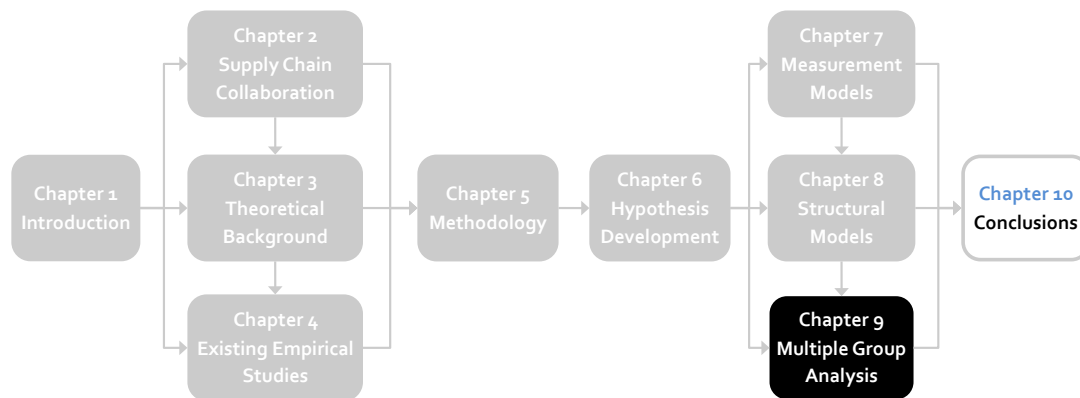
Figure 9.1: Position of the chapter in this thesis

9.2.1 Step 1: Configural Invariance

First, configural invariance is examined. Configural invariance demonstrates that the basic structure of the factor is equivalently validated across all the groups (Kline, 2011). In the measurement model (CFA) the number of constructs and associated items must be the same in all groups. Furthermore, CFA results in each group should reach the satisfactory levels of model fit as in the CFA validation for a single group case. Based on the measurement theory, this stage is conducted to demonstrate that the constructs are *congenetic across the groups* (Hair Jr et al., 2010).

9.2.2 Step 2: Metric Invariance

This stage consists of an empirical comparison between multiple CFA groups. This stage also examine the equivalence of the factor loadings in the CFA models. Satisfaction in this stage provides a conceptual equivalence of the measurement meaning across groups (Hair Jr et al., 2010). However, although factor loadings are equivalently validated for both groups, each factor loading is still individually estimated (Kline, 2011). To test for an equivalence of CFA models, computed $\triangle \chi^2$ should be greater than 0.05 for 5% level of significance.

9.2.3 Step 3: Scalar Invariance

This stage tests the equivalence of the means (intercepts) of the variables loading on each construct (Hair Jr et al., 2010). To compare the average score (level) across the groups, scalar invariance test has to be satisfied (Kline, 2011).

9.2.4 Step 4: Factor Covariance Invariance

This stage constrains the covariance between constructs. This is performed to test if constructs are related across groups (Hair Jr et al., 2010).

9.2.5 Step 5: Factor Variance Invariance

This stage is conducted to test the equivalence of the constructs across the groups. Correlations of the latent constructs will be equivalent across group if the test for equivalence of factor variance is satisfied (Hair Jr et al., 2010).

9.2.6 Step 6: Error Variance Invariance

Finally, invariance of the error terms for each variable is tested (Hair Jr et al., 2010) to detect if error of the variable variances are equivalent across the group (Kline, 2011).

Once these four steps were conducted, the hypothesis testing can be proceeded. The results of these six steps are presented in the next section.

9.3 Supplier versus Hotel perspective

Results of an invariance test comparing supplier and hotel perspective of the research model were presented in the Table 9.1. The results show that Model 1-4 have highly acceptable fit indices. This establish the invariant of the measurement model (Hair Jr et al., 2010). Then, the coefficient of the path (hypotheses) were tested for the difference between the perspectives of suppliers and hotels. Results of the comparison of

coefficients of the supplier and Hotel perspectives are illustrated in the Figure 9.2.

Table 9.1: Results of an invariance test between perspectives of suppliers and hotels

Model	χ^2	df	p-value	CFI	RMSEA	BIC	Sig.
M1: Configural invariance	1084.263	790	<0.001	0.982	0.042	26858.401	
M2: Weak invariance (equal loadings)	1084.595	819	<0.001	0.984	0.039	26683.019	1.000
M3: Strong invariance (M2 + intercepts)	1084.741	838	<0.001	0.985	0.037	26568.042	1,1
M4: M3 + means	1084.802	849	<0.001	0.986	0.036	26501.452	1.000

9.4 Agent versus Hotel perspective

Next, the same procedure was repeated to assess the difference between the service-based transaction between hotels and travel agents. The results show that Model 1-4 have highly acceptable fit indices. This establish the invariant of the measurement model (Hair Jr et al., 2010). Then, the coefficient of the path (hypotheses) were tested for the difference between the perspectives of suppliers and hotels. Results of the comparison of coefficients of the supplier and Hotel perspectives are illustrated in the Figure 9.3.

Table 9.2: Results of an invariance test between perspectives of travel agents and hotels

Model	χ^2	df	p.	CFI	RMSEA	BIC	Sig.
M1: Configural invariance	1068.585	790	<0.001	0.983	0.041	26509.059	-
M2: Weak invariance (equal loadings)	1072.614	819	<0.001	0.984	0.038	26337.578	1.00
M3: Strong invariance (M2 + intercepts)	1077.413	838	<0.001	0.985	0.037	26227.387	1.00
M4: M3 + means	1080.518	849	<0.001	0.986	0.036	26163.918	<0.001
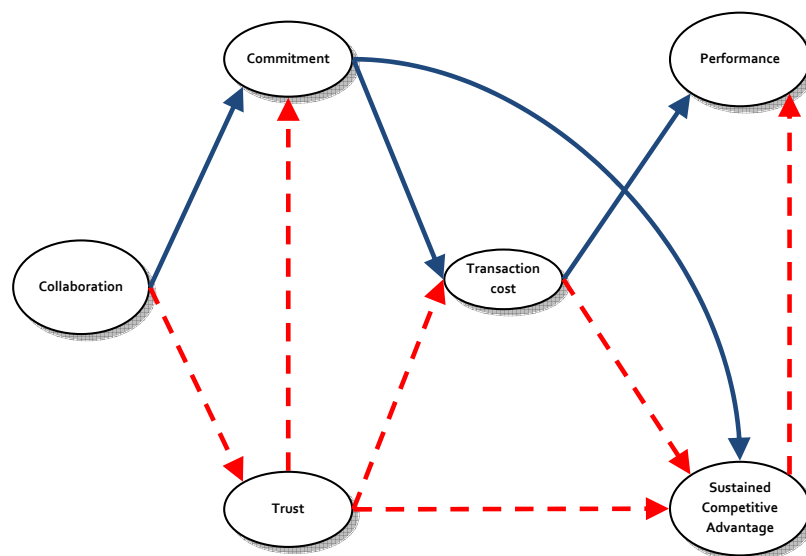
Figure 9.2: Invariance test results: paths of supplier vs. hotel differences.

Note: The arrows represent causal effects that are significantly different between supplier and hotel perspective on their dyadic relationships.

Solid arrows: Suppliers emphasise these effects more than hotels.

Dashed arrows: Hotels emphasise these effects more than suppliers.
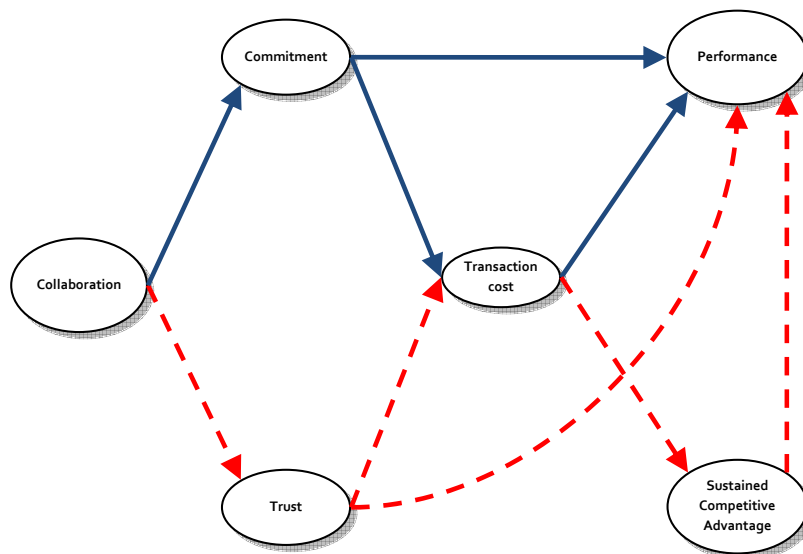
Figure 9.3: Invariance test results: paths of travel agent vs. hotel differences.

Note: The arrows represent causal effects that are significantly different between supplier and hotel perspective on their dyadic relationships.
Solid arrows: Travel agents emphasise these effects more than hotels.
Dashed arrows: Hotels emphasise these effects more than travel agents.

9.5 Discussion

The multiple group SEM results show the differences between perspectives of supply chain partners. Despite the overall model is validated for all four groups for both measurement and the structural model, there were some significant different in terms of effect size. This means all sample groups perceive the impact of supply chain collaboration on firm performance in a similar ways. However, they emphasis differently.

The multiple group SEM reveal the significant role of transaction costs that mediate the impact of trust and commitment (from supply chain collaboration) to sustained competitive advantage and performance. This supports the literature especially in transaction cost economics and social exchange theory (Williamson, 2008; Joshi and Stump, 1999; Kwon and Suh, 2005).

Based on the multiple group SEM results, it was found that hotels as a focal firm emphasis on the impact of supply chain collaboration on firm performance by the development of trust. This was found in both comparison with suppliers and travel agents. In parts, hotels may need to ensure if they can receive products (goods and services) as promised or as in the contract. By developing trust via collaborative activities, hotel can reduce transaction costs. Then they can develop competitive advantage and improve performance. However, there was an unexpected result on the direct impact of trust on performance. It was found that hotel perceive a negative impact of trust on performance in the relationship with travel agents.

According to the case study and the literature, hotels have to deal with higher level of uncertainty when interacting based on service e.g., room booking or reservation (Romero and Tejada, 2011; Song, Liu and Chen, 2012). Hence, trust may cost them in terms of performance. However, this also trade-off with the benefits they may gain from the indirect effect of trust through the reduction in transaction costs and the de-

velopment of sustained competitive advantage.

Considering the partners of hotels, suppliers and travel agents both emphasised on the impact of supply chain collaboration on performance via developing commitment. This reflects that both suppliers and travel agents require long-term commitment (Brown et al., 1995), so as in the service transaction of travel agents (Vieira et al., 2011). Especially in tourism, these firms need to develop commitment in order to improve the performance and competitiveness over their rivals (Collis and Montgomery, 1995).

9.6 Conclusion

This chapter presents a multiple group analysis of SEM to test if the proposed model can be applied to different perspective from different supply chain partners. A multiple group SEM procedure was conducted to check the equivalence of such different perspectives by comparing two pairs. They are hotel-supplier and hotel travel agents.

The results of multiple group SEM show the different emphasis (trust and commitment) of supply chain partners on the same focus (impact of supply chain collaboration on firm performance). Despite their differences, all four perspectives share the same overview of the impact of supply chain collaboration on firm performance and the mediating mechanism, which are resulted in the highly satisfied goodness-of-fit indices of the structural model. The results of multiple group analysis in this chapter are consistent with the previous studies (Nyaga et al., 2010) in terms of the different focus of buyers and sellers in developing supply chain relationship through collaboration. However, a novel contribution of this chapter is that it is the first the compare different perspective including both service-based and goods-based transactions in the supply chain.

This chapter is the third part of the model testing chapters in this thesis, which will be used to inform the discussions of the findings of the thesis in general in the last chapter as illustrated in the Figure 9.4.
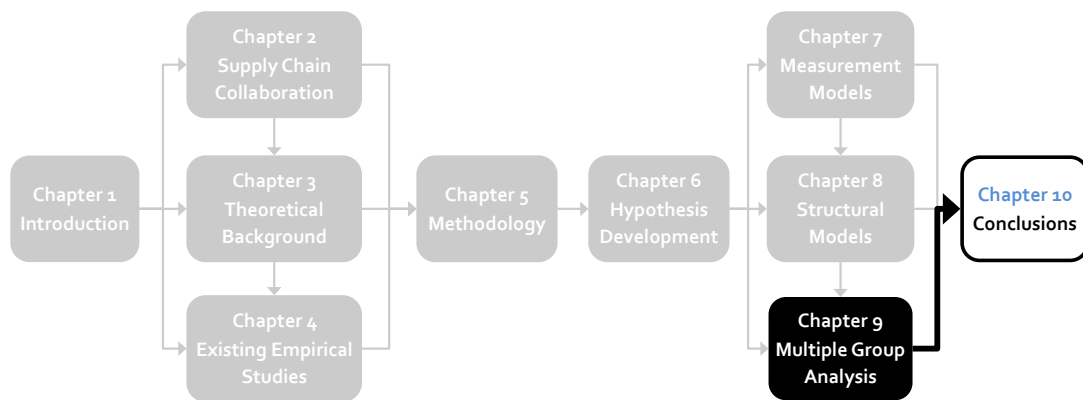
Figure 9.4: A direction of chapter 9 to the next chapter

❉

Chapter 10

Conclusions and Implications

> All truths are easy to understand
> once they are discovered;
> the point is to discover them.
>
> *Galileo Galilei (1564 - 1642)*
> *Revolutionary scientist & philosopher*

10.1 Introduction

As SCM has arguably become the core mechanism for enterprise (Gunasekaran and Ngai, 2012*a*) to cope with dynamics of their business in the uncertain economic climate (Chan et al., 2012). However many firms still struggle to succeed in implementing collaboration in their supply chains. Adversarial relationships was common practice in the tourism industry (Stabler et al., 1997). Recently various SCM techniques including collaboration have been introduced to various sectors including tourism. SCM often advocates a collaborative approach; as it is at the supply chain level that competition acts, not at the firm level (Christopher, 2005). However, collaboration between firms in the tourism supply chains is considered more complex than those in the manufactur-

ing and retail supply chains due to its disparate suppliers and short product life (Zhang et al., 2009).

Moreover, to deliver tourism products, dealing with customers' emotions and feelings is inevitable (Buckley, 1987). Because of this complexity, managing collaboration in the tourism supply chain is challenging. Even though there is a trend of supply chain collaboration in the tourism industry, it was found that academic research does not keep pace with this trend (Zhang et al., 2009).

In this thesis, empirical research in supply chain collaboration has examined the causal relationships between constructs such as the collaborative activities, trust, commitment, transaction cost and performance. However, the casual directions between each constructs are not clear. Some argue that trust affects collaboration whereas others have proposed the opposite. This thesis provided evidences to address this issue.

The position of this chapter in the thesis is presented in Figure 10.1
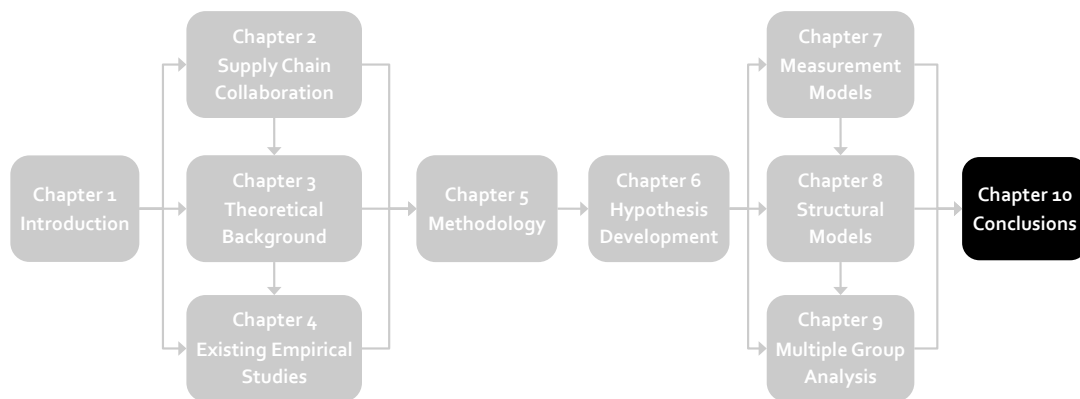
Figure 10.1: Position of the chapter in this thesis

10.2 Conclusion regarding the research questions

10.2.1 Dimensions of supply chain collaboration

The first set of research questions are associated to dimensions of supply chain collaboration as followings:

> **RQ 1.1** *What are the dimensions of supply chain collaboration found in the existing literature?*
>
> **RQ 1.2** *How important are these dimensions?*

10.2.1.1 RQ 1.1

This thesis highlights various aspects of supply chain collaboration. Existing literature showed different measures of supply chain collaborations. This thesis proposed ten dimension construct of supply chain collaboration, which has rarely done before. Ten attributes of supply chain collaboration were developed based on the literature review in the Chapter 2 and theories in the Chapter 3. They are information sharing (Monczka et al., 1998), joint activities (Ellinger et al., 2000), dedicated investments (Rinehart et al., 2004), goal congruence, (Cao and Zhang, 2011), collaborative communication (Cao and Zhang, 2011; Goffin et al., 2006; Tuten and Urban, 2001), incentive alignment (Simatupang and Sridharan, 2005), risk reward sharing (Lambert et al., 1999), joint knowledge creation (Malhotra et al., 2005), synchronised decision (Simatupang and Sridharan, 2002), resource sharing (Harland et al., 2004). This conceptualisation is consistent with categorisation of resource process and relational aspect of supply chain collaboration in the literature (Cao and Zhang, 2011), which has not been tested empirically. Therefore, results of this study contribute a richer insight of dimensions of supply chain collaboration.

10.2.1.2 RQ 1.2

The SEM results show that all ten dimensions of supply chain collaboration have considerably high loading (>0.90) (Hair Jr et al., 2010) in the Confirmatory Factor Analysis model in the Chapter 7. Considering the magnitude of the these loading factors, the most influential factors with standardised estimates > 0.95 for all four sample groups include joint activities, information sharing, dedicated investment and incentive alignment.

10.2.2 Outcomes of supply chain collaboration

The second set of research questions are associated to outcomes of supply chain collaboration as followings:

> **RQ 2.1** *What are the dimensions of collaboration outcomes found in the existing literature?*
>
> **RQ 2.2** *How important are these collaboration outcomes?*

10.2.2.1 RQ 2.1

This thesis advances the literature on inter-firm relationship management by proposing and empirically testing the model of causal relationship between the main constructs e.g., collaboration, trust, transaction costs and performance. This study also explicitly includes the transaction costs construct as a mediating variable of the impacts of trust and commitment on firm performance.

10.2.2.2 RQ 2.2

This research is conducted in both a product and service environment. This study highlights the importance of supply chain collaboration in building trust between supply chain partners. Response to the call for the research on supply chain of the tourism firms (Zhang et al., 2009) especially in developing countries (Thomas et al., 2011), this

thesis presented the analysis of impacts of supply chain collaboration, which are inter-firm trust, commitment, reduced transaction cost, sustained competitive advantage and firm performance. The results of this research are consistent with the recent research (Ramanathan, 2012), who found that collaboration could increase forecast accuracy.

10.2.3   Mediating variables

The third set of research questions are associated to mediating variables of the impacts of supply chain collaboration on its outcomes as followings:

> **RQ 3.1**   *What are the mediator of the impact of collaboration on*
> *its outcomes in the existing literature?*
>
> **RQ 3.3**   *How important are these mediator?*

10.2.3.1   RQ 3.1

The SEM results of this study supports the conceptual framework that trust and commitment mediate the impact of supply chain collaboration on the firm performance (Delbufalo, 2012; Nyaga et al., 2010). This emphasises the critical role of trust and commitment as social capital in the success of supply chain collaboration. CFA shows the importance of resource-oriented items such as shared resources. This is consistent with the previous literature (Teller et al., 2012).

10.2.3.2   RQ 3.2

The results also show that both trust and commitment improve firm performance directly and indirectly. The indirect effects were found to be mediated by two main factors: transaction costs and sustained competitive advantage. While transaction costs have been argued as a key factor in the supply chain relationships, they are rarely examined empirically. Therefore this thesis supports the importance of transaction costs reduction for improving the firm performance. Another mediator of trust and commitment is the sustained competitive advantage (SCA). SEM results show that SCA can be

developed through social capitals i.e., trust and commitment. Hence, considering both transaction costs and SCA, the results highlight the impact of trust and commitment in both cost reduction and development in competitive advantage of the firm. Such effects are the key to improve performance of the collaborating firms.

10.2.4 Equivalence of the structural relationships

The fourth set of research questions are associated to the equivalence of the structural relationships across different supply chain members as followings:

> **RQ 4.1** *Do suppliers and buyers perceive the equivalent results in RQ1-RQ3?*
>
> **RQ 4.2** *Do service providers and intermediaries perceive the equivalent results in RQ1-RQ3?*

10.2.4.1 RQ 4.1

The results of multiple group SEM show that both suppliers and buyers (hotels) confirm the research model. However, there is a key difference in terms of the mechanism that mediate the impact of supply chain collaboration. Whilst hotels were found to prefer to emphasis on trust building mechanism, suppliers were found to more rely on the development of commitment.

10.2.4.2 RQ 4.2

According to the findings of the multiple group analysis of SEM, the results are similar to the comparison between hotel-supplier relationship. In the relationships with travel agents, hotels also focus on trust rather then commitment. On the other hand, travel agencies emphasis more on commitment as the key mediator.

10.2.4.3 Discussions

The multiple group analysis of SEM reveals that trust has higher influence from the perspective of the hotels, but commitment are more important for hotels' supply chain partners. According to the post-hoc interviews, it was found that trust is a critical factor for hotels as they are committed to the supply chain partner. Moreover, the performance is considerably depends on the behaviour of their partners. On the other hand, commitment is a critical mediator of the hotels' partners since their performance depends on the long-term commitment to the hotel. Therefore, hotels may ensure long-term commitment to their supply chain partners. Suppliers and travel agencies should develop trust with the hotel. Both trust and commitment mechanism can be established and developed through supply chain collaboration.

10.3 Theoretical contributions

10.3.1 Theories on tourism supply chain management

There is a growing consensus that a single company no longer competes in the market-place but rather its supply chain that competes (Christopher, 2011; Huang et al., 2012; Simatupang and Sridharan, 2002). Therefore, tourism is also a sector that inevitably has to consider SCM. Various research topics suggested in this thesis could extend the scope of the existing SCM research. The findings from this thesis enable researchers in both tourism and SCM areas to explore other types of impacts of supply chain collaboration or its antecedents. Based on the conceptual model provided, researchers may also adopt this model with revisions on the scale and validate with the data from other sectors or other countries.

10.3.2 Theories on supply chain collaboration

Considering the contribution to relevant theories in supply chain collaboration , relationship and performance. First, Transaction Cost Economics, which has been widely

used to explain the existence and boundary of the firm (Williamson, 2008), this research has developed the measurement for transaction costs in the supply chain initiated by (Grover and Malhotra, 2003) by adding the aspects of opportunity cost of selecting the wrong partner and opportunistic cost from the selected partners. Recently, TCE has been extended to inter-firm relationship in supply chains (Hobbs, 1996). However, a measurement of transaction costs has rarely been tested empirically. Grover and Malhotra (2003) attempted to do so but that measurement was limited to an industrial context and did not cover transaction costs related to the governance problem and the opportunity costs. Thus, this research revisited the measurement of transaction costs using both industrial and service perspectives. Moreover, the transaction costs metric was developed by including governance and the opportunity cost. Then a revised transaction costs metric was tested with empirical data from the tourism supply chains in Thailand using a structural equation model (SEM).

Furthermore, the effect size of the relationship from the perspectives of different supply chain members was also compared. Moreover, product-based and service-based transactions were also compared through a multiple group SEM analysis.

A multiple group analysis of SEM (MG-SEM) has been rarely used in SCM research. To conduct MG-SEM, two or more independent groups of sample need to be collected, which is timely and expensive (Bryman and Bell, 2011). This is a main reason that MG-SEM is not often conducted despite its potential values in rich contributions. This study conducted the MG-SEM for two pairs of samples (four independent sample groups). This is based on the nature of products in the transactions: goods and services.

The MG-SEM is important because relationships in the supply chains are multi-directional and involve different types of firm and dyads. The results show that all perspectives support the conceptual framework. In goods-based transactions, buyer and seller firm view supply chain collaboration and its impact on firm performance

similarly. this is also applied in the service-based transactions (service providers and intermediaries).

However, the level of importance on each dimensions are different across groups. This shows that even though supply chain collaboration can be applied in the dyadic relationships that based on both goods and services, firms may to to focus on different dimensions in order to improve the performance and relationship. This result is consistent with the previous research that buyers and suppliers have different effects of information sharing (Whipple et al., 2002).

10.4 Practical contributions

Although many previous studies have found significant benefits from supply chain collaboration, managers still struggle to achieve these. Using a structural equation modelling approach, the issue of supply chain collaboration in the tourism sector in Thailand was examined to gain an understanding of how supply chain collaboration impacts upon firm performance. It was found that firms can enhance the benefits from supply chain collaboration if their employees work together with supply chain partners in a joint team. Using structural equation models, the survey of the tourism sector in Thailand confirmed these findings. The study also suggests that supply chain collaboration increases firm performance by enhancing inter-firm trust and commitment, which then reduce transaction costs in the supply chains.

10.5 Managerial and policy implications

10.5.1 Managerial implications

This thesis offer an managerial insights for the supply chain managers in terms of the different aspects supply chain partners toward the relationships. Whilst the focal firm (hotels) emphasis on the trust building mechanism, whereas a long-term commitment are more important for their supply chain partners i.e., suppliers and travel agents. This insights has advanced the findings in the study of Nyaga et al. (2010) that compared buyer's and seller's perspectives with a less comprehensive model of the impacts and mechanism of supply chain collaboration.

10.5.2 Policy implications

According to the results from this thesis, it is important for the policy makers not only to emphasis on developing marketing campaigns to help the tourism industry but also facilitate the development of the supply chain collaboration between tourism firms in order to improve their performance as a whole. Such improvement in the performance of the whole tourism supply chain will then increase the competitiveness of the tourism sector of a destination. This findings are consistent with various studies that propose that tourism development should also consider the improvement in the performance of the logistics and supply chain management such as passenger logistics (Fawcett, 2000) especially for the small firms (Thomas et al., 2011). This implication for the tourism policy makers also agreed by several Thai researchers in tourism and supply chain management (Rittichainuwat, 2012; Atthirawong et al., 2011; Kaosa-ard et al., 2007).

10.6 Limitations

10.6.1 Data

Collecting data from a single sector (tourism) in one country offers rich internal validity, but the generalisability of the results may be limited (Bryman and Bell, 2011). However, the sample size of this thesis was relatively greater than most of the survey research in SCM in general, which normally used small sample data (De Beuckelaer and Wagner, 2012).

10.6.2 Methodology

Even though this thesis applied both qualitative case study Yin (2008); Silverman (2010) and quantitative survey methods to capture depth and details of the phenomenon, it only capture the truth at one time (Bryman and Bell, 2011). Therefore the dynamics of the impacts of supply chain collaboration (Wang, 2008; Holweg et al., 2005) on those proposed outcomes are limited in the results of this thesis.

10.7 Avenue for future research

The results of this thesis lead to several future research avenues that could be explored to gain greater insight into how the mechanisms of supply chain collaboration work.

10.7.1 Meta analysis

Recently Mackelprang et al. (2012) proposed to conduct a meta-analysis on the impact of supply chain integration on firm performance. This thesis may be a benchmark for the future meta-analysis studies in SCM in terms of both methodology and the results.

10.7.2 Model replication

First, the same set of hypotheses could be empirically tested in different settings i.e., different countries and different sectors. Second, multiple group analysis of different

views, such as seller-buyer, for example see Nyaga et al. (2010), can be applied to test the impact of supply chain collaboration on firm performance.

10.7.3   Matched pair sample

Since this study examines the different perspective of the impact of supply chain collaboration using four sample groups. Examining this model using data in the matched dyad will offer the mutual agreement on each construct. An example of studies using matched dyad sample include Nooteboom et al. (1997).

10.7.4   Longitudinal examination

Third, since supply chain collaborations are dynamic in nature their effects may have a multiplicative impact over time. Hence, a longitudinal study using the hypotheses in this paper would advance the literature on the dynamics of relationships between supply chain collaboration and inter-firm trust.

10.7.5   Tourism SCM research

Potential research agendas which could enable further understanding of the tourism supply chains have been identified. Furthermore, because SCM is a study of the relationships between each player along the supply chain, another vital research area could be the collaborations of the tourism SCM research. To an extent, drivers and impacts of collaboration in tourism supply chains can be the focal consideration. The conceptual model used in this thesis is similar to the one proposed by Song, Dwyer, Li and Cao (2012). In their article the impact of structure of tourism firms (including collaboration) on firm performance is also argued to be mediated by both transactional and relational mechanism. Thus, there are emerging topics in the literature that are still have gaps. Five potential research agendas were outlined with specific research questions that should be answered.

In terms of research methodology, tourism SCM research could employ either qualitative or quantitative research methods or both (Spens and Kovacs, 2012; Singhal et al., 2008; Snijders and Vos, 2007; Sachan and Datta, 2005). Various research methods can be selected based on the research question (Yin, 2008; Singhal et al., 2008; Voss et al., 2002). Examples of methodological selection in tourism SCM research can be obtained in (Zhang et al., 2009). Nevertheless, it was found that most of the empirical studies have employed the case study approach to provide an in-depth analysis. However, concerning the level of generalisation of the research, survey-based research using advance statistical methods such as structural equation modelling or econometrics could offer a more reliable model insight into how tourism supply chain behave.

10.8 Conclusion

Although many previous studies have found significant benefits from supply chain collaboration, managers still struggle to achieve these. Using a multiple method approach, the issue of supply chain collaboration in the tourism sector in Thailand was explored to gain an understanding of how supply chain collaboration impact firm performance. It was found that firms can enhance the benefits from supply chain collaboration if their employees work together with supply chain partners in a joint team. Using structural equation models, the survey of the tourism sector in Thailand confirmed these findings. The study also suggests that supply chain collaboration increases firm performance by enhancing inter-firm trust and commitment, which then reduce transaction costs in the supply chains.

❈

Appendix A

Ethical Approval Documents

A.1 Initial fieldwork

A.1.1 Ethical Approval Form

CARDIFF BUSINESS SCHOOL ETHICAL APPROVAL FORM:
PHD THESIS RESEARCH
(For guidance on how to complete this form, please see http://www.cf.ac.uk/carbs/research/ethics.html)

For Office Use: Ref	Meeting

Does your research involve human participants? Yes ☒ No ☐
If you have answered 'No' to this question you do not need to complete the rest of this form, otherwise please proceed to the next question

Does your research have any involvement with the NHS? Yes ☐ No ☒
If you have answered **Yes** to this question, then your project should firstly be submitted to the NHS National Research Ethics Service. Online applications are available on http://www.nres.npsa.nhs.uk/applicants/ . It could be that you may have to deal directly with the NHS Ethics Service and bypass the Business School's Research Ethics Committee.

Name of Student: *PAIRACH PIBOONRUNGROJ*

Student Number: *0741258*

Section: *Logistics and Operations Management*

Email: *piboonrungrojp@cardiff.ac.uk*

Names of Supervisors: *1. Dr. Stephen Disney (Primary)*
2. Dr. Takamichi Hosoda (secondary)
3. Dr. Hatanto Wong (Third)

Supervisors' Email Addresses: *1. DisneySM@cardiff.ac.uk (Primary)*
2. HosodaT@cardiff.ac.uk (secondary)
3. WongH@cardiff.ac.uk (Third)

Title of Thesis: *Logistics and Supply Chain Management in the Tourism Industry*

Start and Estimated End Date of Research: *April – September 2009*

Please indicate any sources of funding for this research: *Royal Thai Government*

---

1. Describe the Methodology to be applied in the research

This pilot study aims to validate the significance of the research as well as the research questions and possibility to use the proposed methodology.

Therefore, in this pilot study, interviews using questionnaires will be employed.
The interview outline and questionnaire are in the attached documents.

Please note that I will be sending a personal covering letter with each email questionnaire copy that goes out to the target person. I also intend to contact the people having in the study and will meet with them to explain my research project work.

pilot-phd_ethicsform-090211.doc   Version: 12/02/2009

2.	*Describe the participant sample who will be contacted for this Research Project. You need to consider the number of participants, their age, gender, recruitment methods and exclusion/inclusion criteria*

The participants of this pilot study are workers in a selected hotel in Chiang Mai, Thailand. There will be 10 head of each department in the hotel with no age and gender restriction. The selection criteria will be based on their positions and responsibilities.

3.	*Describe the consent and participant information arrangements you will make, as well as the methods of debriefing. If you are conducting interviews, you* __must__ *attach a copy of the consent form you will be using.*

The consent form states clearly the interviewees have all right to withdraw from the interview anytime. The interviewee will be treated in the research as anonymous. All data will be strictly preserved as highest confidential level. The research will not give any specific information to guide any identification of the personal information.

The first day of the fieldwork will be the presentation day. The presentation will debrief and describe every aspect of the data collection methods.

4.	*Please make a clear and concise statement of the ethical considerations raised by the research and how you intend to deal with them throughout the duration of the project*

The ethic considerations that raised by this research is the confidential of the data and information of the work efficiency of the particular observed operator. This information could affect their works if they did not satisfy their supervisors. I intend not to disclose any name and use the anonymous for every participants both individual level and organisational level throughout the duration of the research project.

Persons involved in the research will be informed that they are taking part on a voluntary basis. Storage of confidential data will be explained.

PLEASE NOTE that you should include a copy of your questionnaire

NB:	Copies of your signed and approved Research Ethics Application Form together with accompanying documentation must be bound into your Dissertation or Thesis.

5.   *Please complete the following in relation to your research:*

		Yes	No	n/a
(a)	Will you describe the main details of the research process to participants in advance, so that they are informed about what to expect?	☒	☐	☐
(b)	Will you tell participants that their participation is voluntary?	☒	☐	☐
(c)	Will you obtain written consent for participation?	☒	☐	☐
(d)	Will you tell participants that they may withdraw from the research at any time and for any reason?	☒	☐	☐
(e)	If you are using a questionnaire, will you give participants the option of omitting questions they do not want to answer?	☒	☐	☐
(f)	Will you tell participants that their data will be treated with full confidentiality and that, if published, it will not be identifiable as theirs?	☒	☐	☐
(g)	Will you offer to send participants findings from the research (e.g. copies of publications arising from the research)?	☒	☐	☐

PLEASE NOTE:
If you have ticked **No** to any of 5(a) to 5(g), please give an explanation on a separate sheet.
(Note: N/A = not applicable)
There is an obligation on the lead researcher to bring to the attention of Cardiff Business School Ethics Committee any issues with ethical implications not clearly covered by the above checklist.

Two copies of this form (and attachments) should be submitted to Ms Lainey Clayton, Room F09, Cardiff Business School.

Signed

Print Name   PAIRACH PIBOONRUNGROJ

Date   11ᵗʰ February 2009

SUPERVISOR'S DECLARATION
As the supervisor for this research I confirm that I believe that all research ethical issues have been dealt with in accordance with University policy and the research ethics guidelines of the relevant professional organisation.

Signed

                                                                                                (Primary supervisor)
Print Name   Dr. STEPHEN DISNEY

Date   11ᵗʰ February 2009

STATEMENT OF ETHICAL APPROVAL
This project has been considered using agreed School procedures and is now approved.

Signed

                                                                                                (Chair, School Research Ethics Committee)
Print Name   J. Soran

Date   17/02/09

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A.2 Main study

A.2.1 Ethical Approval Form

CARDIFF BUSINESS SCHOOL ETHICAL APPROVAL FORM:
PHD THESIS RESEARCH
(For guidance on how to complete this form, please see http://www.cf.ac.uk/carbs/research/ethics.html)

For Office Use: Ref	Meeting

Does your research involve human participants? Yes ☒ No ☐
If you have answered 'No' to this question you do not need to complete the rest of this form, otherwise please proceed to the next question

Does your research have any involvement with the NHS? Yes ☐ No ☒
If you have answered **Yes** to this question, then your project should firstly be submitted to the NHS National Research Ethics Service. Online applications are available on http://www.nres.npsa.nhs.uk/applicants/ . It could be that you may have to deal directly with the NHS Ethics Service and bypass the Business School's Research Ethics Committee.

Name of Student: *PAIRACH PIBOONRUNGROJ*

Student Number: *0741258*

Section: *Logistics and Operations Management*

Email: *piboonrungrojp@cardiff.ac.uk*

APPLICATION
RESEARCH ETHICS COMMITTEE
CARDIFF BUSINESS SCHOOL
CARDIFF UNIVERSITY

Names of Supervisors: *1. Dr. Stephen Michael Disney (Primary supervisor)*
2. Dr. Hatanto Wong

Supervisors' Email Addresses: *1. DisneySM@cardiff.ac.uk (Primary supervisor)*
2. WongH@cardiff.ac.uk

Title of Thesis: *Logistics and Supply Chain Management in the Tourism Industry*

Start and Estimated End Date of Research: *November 2009 – September 2011*

Please indicate any sources of funding for this research: *Royal Thai Government*

---

1. Describe the Methodology to be applied in the research

This research will employ questionnaire survey and case study method.

Questions in a questionnaire are obtained from literature and the previous pilot study. The questionnaire will be distributed to hotels and tour and travel agents in Thailand by mail. Data obtained from the survey will be analysed using Econometrics and statistical methods.

Case studies will include four data collection methods; interviews, company documentations, archival data, and process mapping.

Main-phd_ethicsform-0900907.doc   Version: 30/09/2009

2. *Describe the participant sample who will be contacted for this Research Project. You need to consider the number of participants, their age, gender, recruitment methods and exclusion/inclusion criteria*

Survey samples are hotels and tour and travel agents that are members of the Tourism Business Associations in Thailand. Six tourism supply chains will be included in the case studies by selecting six different hotels as focal firms. The selection of the cases will consider accessibility and their consents to participate in this research.

3. *Describe the consent and participant information arrangements you will make, as well as the methods of debriefing. If you are conducting interviews, you **must** attach a copy of the consent form you will be using.*

The consent form clearly states that participants have all right to withdraw from the research anytime. The participants will be treated in the research as anonymous. All data will be treated with full confidentiality. Before the data collection the participants will be debriefed and described every aspect of the data collection process.

4. *Please make a clear and concise statement of the ethical considerations raised by the research and how you intend to deal with them throughout the duration of the project*

An ethic consideration of this research is confidentiality of the data. Survey data will be analysed by quantitative method that will ensure anonymity of the participating firms. In case studies, no name will be disclosed. The use of anonymous will ensure the full confidentiality.

Research participants will be informed that they are taking part on a voluntary basis. Storage of confidential data will be also explained.

PLEASE NOTE that you should include a copy of your questionnaire

NB: Copies of your signed and approved Research Ethics Application Form together with accompanying documentation must be bound into your Dissertation or Thesis.

Main-phd_ethicsform-0900907.doc   Version: 30/09/2009

5. **Please complete the following in relation to your research:**

		Yes	No	n/a
(a)	Will you describe the main details of the research process to participants in advance, so that they are informed about what to expect?.	☒	☐	☐
(b)	Will you tell participants that their participation is voluntary?	☒	☐	☐
(c)	Will you obtain written consent for participation?	☒	☐	☐
(d)	Will you tell participants that they may withdraw from the research at any time and for any reason?	☒	☐	☐
(e)	If you are using a questionnaire, will you give participants the option of omitting questions they do not want to answer?	☒	☐	☐
(f)	Will you tell participants that their data will be treated with full confidentiality and that, if published, it will not be identifiable as theirs?	☒	☐	☐
(g)	Will you offer to send participants findings from the research (e.g. copies of publications arising from the research)?	☒	☐	☐

PLEASE NOTE:
If you have ticked **No** to any of 5(a) to 5(g), please give an explanation on a separate sheet.
(Note: N/A = not applicable)
There is an obligation on the lead researcher to bring to the attention of Cardiff Business School Ethics Committee any issues with ethical implications not clearly covered by the above checklist.

Two copies of this form (and attachments) should be submitted to Ms Lainey Clayton, Room F09, Cardiff Business School.

Signed

Print Name   *PAIRACH PIBOONRUNGROJ*

Date   *11ᵗʰ September 2009*

SUPERVISOR'S DECLARATION

As the supervisor for this research I confirm that I believe that all research ethical issues have been dealt with in accordance with University policy and the research ethics guidelines of the relevant professional organisation.

Signed

(Primary supervisor)

Print Name   *Dr. STEPHEN MICHAEL DISNEY*

Date   *11ᵗʰ September 2009*

STATEMENT OF ETHICAL APPROVAL

This project has been considered using agreed School procedures and is now approved.

Signed

(Chair, School Research Ethics Committee)

Print Name

Date   26/10/2009

Main-phd_ethicsform-0900907.doc   Version: 07/09/2009

A.2.2 Consent Form

APPLICATION APPROVED
RESEARCH ETHICS COMMITTEE
CARDIFF BUSINESS SCHOOL
CARDIFF UNIVERSITY

CARDIFF
UNIVERSITY

PRIFYSGOL
CAERDYD

CARDIFF BUSINESS SCHOOL
RESEARCH ETHICS

Consent Form - Anonymous data

I understand that my participation in this project will involve a personal interview and questionnaire about the operations of the hotel I work which will require approximately an hour of my time.

I understand that participation in this study is entirely voluntary and that I can withdraw from the study at any time without giving a reason.

I understand that I am free to ask any questions at any time. If for any reason I experience discomfort during participation in this project, I am free to withdraw or discuss my concerns with the student's supervisor, Dr. Stephen Disney (DisneySM@cardiff.ac.uk).

I understand that the information provided by me will be held totally anonymously, so that it is impossible to trace this information back to me individually. I understand that, in accordance with the Data Protection Act, this information may be retained indefinitely.

I also understand that at the end of the study I may request some additional information and feedback about the purpose and results of the study by applying to the University

Name of student conducting the research: Mr. Pairach Piboonrungroj

Name of student's supervisor: Dr. Stephen M. Disney

....

(...)

Research participant

A.2.3 Interview Outline

CARDIFF
UNIVERSITY

PRIFYSGOL
CAERDYD

Student name: Mr. Pairach Piboonrungroj (0741258)
Principal supervisor: Dr. Stephen M. Disney

The Type of questions in the interviews

The questions will relate to the positions of the interviewees in the firm. Types of questions include overview of their works, roles and responsibilities. The participants will be asked about the following topics

- Business strategy or plan,
- Supplier sources, procedures,
- Management structure,
- Marketing,
- Human resource,
- Transport,
- Type of customers.

Others business aspect, which related to hotel management may be included in the interviews. However these types of asked questions for each interviewee are generally based on their positions, roles and responsibilities in the firm.

A.2.4 Questionnaire (First page)

ʃSDG

APPLICATION APPROVED
RESEARCH ETHICS COMMITTEE
CARDIFF BUSINESS SCHOOL
CARDIFF UNIVERSITY

CARDIFF
UNIVERSITY

PRIFYSGOL
CAERDYⅮⅮ

Questionnaire
Supply Chain Relationship in Tourism

In answer this questionnaire, please note that:

- Your answers are **STRICTLY CONFIDENTIAL** and intended for academic research only – study result will simply be exhibited in aggregate form.
- Your contribution toward the successful outcome of this study is **INVALUABLE**; please answer all questions as honestly as possible.

Pairach Piboonrungroj
PhD candidate

Logistics Systems Dynamics Group
Cardiff Business School, Cardiff University
Room D46, Aberconway Building, Colum Drive
Cardiff, Wales, United Kingdom, CF10 3EU

Appendix B

Interview Protocol

B.1 Letter

B.1.1 English version

To whom it may concern

My name is Pairach Piboonrungroj. I am a PhD student in Cardiff University, UK. My research theme is about tourism supply chains. This questionnaire you are holding is a part of my research that aim to understand the tourism supply chain by collecting the data about the process and the operations management in the hotel you work.

The data you will provide in this questionnaire will be treated with the highest confidentiality. Your name and your hotel title will not be identified or disclosed without the evidence of your permission. You also have all rights not to answer any question if you do not want to. However, it would be very grateful if you can provide us the information related to the questions we asked. If you would like to have the final report of this study, please kindly give us your information below.

Thank you so much for your cooperation.

Pairach Piboonrungroj

PhD student
Logistics Systems Dynamics Group
Cardiff University
D46 Aberconway Building
Cardiff, United Kingdom
CF10 3EU

Do you want to have the final report of this study?
☐ Yes
☐ No

If yes, please kindly give us the following information for the report delivery purpose.
Your name ....
☐ A PDF copy (to prevent the global warming and climate change) to this email
....@...........................
☐ A printing copy to the following address

Company name ....
House number ....
Street/Road ....
District/City ....
Province/County ....
Country ....
Postcode ....

B.1.2 Thai version

30 พฤศจิกายน 2552

เรียน ท่านผู้บริหารโรงแรม
เรื่อง ขอสัมภาษณ์และเยี่ยมชมโรงแรม

กระผมนายไพรัช พิบูลย์รุ่งโรจน์ นักศึกษาระดับปริญญาเอก มหาวิทยาลัยคาร์ดิฟฟ์ ณ ประเทศสหราช
อาณาจักร ปัจจุบันกำลังทำวิทยานิพนธ์เรื่องการจัดการโลจิสติกส์และโซ่อุปทานในอุตสาหกรรมท่อง
เที่ยว กระผมมีความสนใจในสองประเด็นหลักคือ การจัดการโลจิสติกส์ และ การจัดการโซ่อุปทาน
(logistics and supply chain management) โดยเฉพาะในส่วนของแผนกอาหารและเครื่องดื่ม ของ
โรงแรมในจังหวัดเชียงใหม่และภูเก็ต ซึ่งสามารถแบ่งออกเป็นหัวข้อคำถามย่อยได้ดังนี้

การจัดการโลจิสติกส์ (การจัดการการไหลเวียนของสินค้า)
1.   การเลือกผู้จำหน่ายวัตถุดิบ *(Suppliers)* เช่น โค้ก หรือ เป๊ปซี่, ช้าง หรือ สิงห์
2.   วิธีการสั่งซื้อวัตถุดิบ *(Purchasing and Procurement)* เช่น สั่งของทุกวัน และ ใครตัดสินใจ
3.   การจัดเก็บวัตถุดิบ *(Stock and Inventory Management)* เช่น เก็บที่ครัว หรือ มีที่เฉพาะ
4.   การวางแผนการให้บริการ อาหารและเครื่องดื่ม *(Foods and Beverage Operations)*

การจัดการโซ่อุปทาน (ความสัมพันธ์ระหว่างโรงแรมกับบริษัทอื่นๆ)
1.   ความสัมพันธ์ระหว่างโรงแรมกับบริษัทที่ร่วมทำธุรกิจด้วย ได้แก่ ผู้จำหน่ายวัตถุดิบ *(Suppliers)*
      และ บริษัททัวร์ *(Tour operators and Travel agencies)* เป็นอย่างไร?
2.   ปัจจัยอะไรที่จะช่วยสร้างให้โรงแรมมีความสัมพันธ์ที่ดีกับบริษัทดังกล่าว
3.   ในการติดต่อกับ ผู้จัดจำหน่าย และ บริษัททัวร์นั้น มีขั้นตอนอย่างไร? และเกิดต้นทุนอะไรบ้าง?
4.   ทำไมโรงแรมถึงติดต่อธุรกิจกับบางบริษัทมากกว่าและยาวนานกว่า บริษัทอื่นๆ?
5.   การจัดกิจกรรมร่วมกันระหว่างโรงแรมกับบริษัทดังกล่าวนั้น มีผลให้ความสัมพันธ์ระหว่างบริษัท
      ดีขึ้นหรือไม่ ทำไม?
6.   ปัจจัยอะไรที่มีผลต่อผลการดำเนินธุรกิจระหว่างโรงแรมกับ ผู้จำหน่ายวัตถุดิบ และ บริษัททัวร์?

ข้อมูลที่ได้จากการสัมภาษณ์และเยี่ยมชมการทำงานของโรงแรมนั้นถือเป็นความลับสูงสุด และจะถูกใช้
ในวิทยานิพนธ์ของกระผมเท่านั้น และจะไม่มีการเปิดเผยชื่อโรงแรม รวมทั้งชื่อและตำแหน่งของท่าน
และไม่มีการให้ข้อมูลใดๆ ที่จะทำให้ทราบที่มาของแหล่งข้อมูลได้ นอกเสียจากจะได้รับการยินยอมจาก
ท่านอย่างเป็นทางการเสียก่อน และจะมีการส่งสรุปรายการศึกษาให้ท่านทราบหากท่านมีความ
ต้องการหลังจากวิทยานิพนธ์นี้เสร็จสิ้น สุดท้ายนี้กระผมขอขอบพระคุณท่านเป็นอย่างสูงที่เสียสละเวลา
อันมีค่าให้กระผมเข้าสัมภาษณ์และเปิดโอกาสให้เยี่ยมชมการทำงานในโรงแรมของท่าน

ขอแสดงความนับถือ

ไพรัช พิบูลย์รุ่งโรจน์
นักศึกษาระดับปริญญาเอก
มหาวิทยาลัยคาร์ดิฟฟ์ ประเทศสหราชอาณาจักร

B.2 Questions and Topics

Semi-structured interview: Questions and Topics

1. **Interview topics about Firm profile**
   (a) Firm size
   (b) Location
   (c) Main products (goods and/or services)
   (d) Supply chain strategies
   (e) Supply chain network
   (f) Markets
   (g) Demand patterns

2. **Questions about operations, logistics and supply chain management**
   (a) How does your company select suppliers?
   (b) What is a purchasing procedure of your company?
   (c) How does your company manage inventory?
   (d) Please describe Foods and Beverage Operations Planning of your company
   (e) Could you identify logistics costs in your company?

3. **Interview topics about supply chain collaboration and relationships management**
   (a) Definition of collaboration
   (b) Types of collaboration
   (c) Benefits of collaboration
   (d) Costs of collaboration
   (e) Barrier of collaboration
   (f) Relationship between with partners (suppliers and travel agencies)
   (g) Factors building relationship with partners
   (h) Communication cost with supplier and tour agency
   (i) Whether collaboration affect their long-term relationship
   (j) Inter-firm relationship management

B.3 Case study visit

Appendix C

Questionnaire

C.1 Cover letter

To whom it may concern

My name is Pairach Piboonrungroj. I am a PhD student in Cardiff University, UK. My research theme is about tourism supply chains. This questionnaire you are holding is a part of my research that aim to understand the tourism supply chain by collecting the data about the process and the operations management in the hotel you work.

The data you will provide in this questionnaire will be treated with the highest confidentiality. Your name and your hotel title will not be identified or disclosed without the evidence of your permission. You also have all rights not to answer any question if you do not want to. However, it would be very grateful if you can provide us the information related to the questions we asked. If you would like to have the final report of this study, please kindly give us your information below.

Thank you so much for your cooperation.

Pairach Piboonrungroj

PhD student
Logistics Systems Dynamics Group
Cardiff University
D46 Aberconway Building
Cardiff, United Kingdom
CF10 3EU

Do you want to have the final report of this study?
☐ Yes
☐ No

If yes, please kindly give us the following information for the report delivery purpose.
Your name ....
☐ A PDF copy (to prevent the global warming and climate change) to this email
.....................................@...........................
☐ A printing copy to the following address

Company name ....
House number ....
Street/Road ....
District/City ....
Province/County ....
Country ....
Postcode ....

C.2 English version
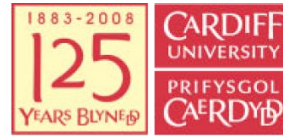
Questionnaire
Supply Chain Relationship in Tourism
(Hotel and Supplier)

In answer this questionnaire, please note that:

- Your answers are **STRICTLY CONFIDENTIAL**
  and intended for academic research only
  – study result will simply be exhibited in aggregate form.

- Your contribution toward the successful outcome of this study is
  INVALUABLE; please answer all questions as honestly as possible.

- There is no right or wrong answer,
  please just answer according to your opinion.

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PiboonrungrojP@cardiff.ac.uk

C.3 Thai version

C.3.1 Translation by CMU Language Institute

C.3.1.1 Stamped cover page

LSDG

CARDIFF UNIVERSITY
PRIFYSGOL
CAERDYⱢ

แบบสอบถาม

ความสัมพันธ์ห่วงโซ่ซัพพลายในการท่องเที่ยว

(ผู้ให้บริการและซัพพลายเออร์)

ในการตอบแบบสอบถามนี้ โปรดหมายเหตุว่า:

- คำตอบของท่านเป็น**ความลับ** และมีวัตถุประสงค์ทางวิชาการเท่านั้น ผล
  การศึกษาจะแสดงในรูปแบบทางสถิติ
- การสนับสนุนของท่านเพื่อผลสำเร็จของการศึกษาครั้งนี้เป็น**สิ่งที่มีค่าอย่างยิ่ง**
  กรุณาตอบทุกคำถามตามความเป็นจริง

ไพรัช ไพบูลย์รุ่งโรจน์

นักศึกษาปริญญาเอก

โลจิสติกส์ซิสเตมส์ไดนามิกส์กรุ๊ป
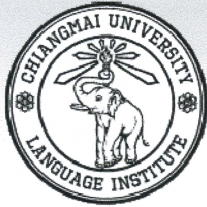
คณะวิชาบริหาร มหาวิทยาลัยคาร์ดิฟ

ห้อง D46 อาคารเอเบอร์คอนเวย์ โคลัม ไดร์ฟ

เมืองคาร์ดิฟ ประเทศเวลส์

Language Institute
CHIANG MAI UNIVERSITY

C.3.1.2 Receipt from CMU Language Institute

SALES RECEIPT

239 Huay Kaew Rd, T.Suthep, A. Muang, Chiang Mai 50200
Phone 053-943-761 Fax 053-943-754
contact@teflcmu.com

RECEIPT # **001**
DATE: DECEMBER 14, 2009

SOLD TO **Mr. Pairach Piboonrungroj**
(Cardiff University)

QTY	ITEM #	DESCRIPTION	UNIT PRICE	DISCOUNT	LINE TOTAL
		Translation			1800

TOTAL DISCOUNT		
SUBTOTAL	1800
SALES TAX	
TOTAL	1800

CHIANG MAI UNIVERSITY LANGUAGE INSTITUTE

Language Institute
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C.3.2 Final Thai Questionnaire

แบบสอบถาม
ความสัมพันธ์ในโซ่อุปทานการท่องเที่ยว
(ระหว่างบริษัททัวร์ กับ ธุรกิจที่พัก)

สำหรับแบบสอบถามนี้

- คำตอบของท่านนั้นถือเป็น "<u>ความลับขั้นสูงสุด</u>" ที่จะนำไปใช้วิเคราะห์ทาง
  วิชาการเท่านั้นและจะไม่มีการเผยแพร่เพื่อการอื่นอย่างเด็ดขาด
- ข้อมูลของท่านมีความสำคัญอย่างมากต่องานวิจัยนี้ที่จะมีประโยชน์ต่อการ
  พัฒนาการท่องเที่ยวของประเทศไทย
- คำว่า "องค์กรของท่าน" หมายถึง บริษัท หรือ ห้างร้านที่ท่านทำงานอยู่ใน
  ปัจจุบัน

นายไพรัช พิบูลย์รุ่งโรจน์
นักศึกษาระดับปริญญาเอก
กลุ่มวิจัยพลวัตรระบบโลจิสติกส์ มหาวิทยาลัยคาร์ดิฟฟ์
สหราชอาณาจักร

C.4 Pilot test

Appendix D

R Code

D.1 CFA code

This appendix provides R code (syntax) used to fit a CFA model (measurement model) in this thesis.

Listing D.1: R Code for Confirmatory Factor Analysis

```
1  ####################################################
2  # Second-order CFA for Supply Chain Collaboration
3  SCC.CFA2.model <-'
4  JA =~ JA1 + JA2 + JA3
5  DI =~ DI1 + DI2 + DI3
6  IS =~ IS1 + IS2 + IS3
7  GC =~ GC1 + GC2 + GC3
8  CC =~ CC1 + CC2 + CC3
9  IA =~ IA1 + IA2 + IA3
10 RS =~ RS1 + RS2 + RS3
11 KT =~ KT1 + KT2 + KT3
12 SD =~ SD1 + SD2 + SD3
13 RP =~ RP1 + RP2 + RP3
14 #Second-level construct
15 SCC =~ JA + IA + RS + SD + RP + DI + IS + GC + CC + KT
16 '
17 fit.SCC.CFA2 <- cfa(SCC.CFA2.model, data=tour.df)
18 summary(fit.SCC.CFA2, standardized=TRUE, fit.measures=TRUE)
19 fitMeasures(fit.SCC.CFA2, c("cfi", "rmsea"))
```

D.2   SEM code

This appendix provides R code (syntax) used to fit a SEM model (full model) in this thesis.

Listing D.2: R Code for Full Structural Equation Model

```
 1  tour.sem <- '
 2    # latent variables
 3    # 1.Collaboration
 4    JA =~ JA1 + JA2 + JA3
 5    DI =~ DI1 + DI2 + DI3
 6    IS =~ IS1 + IS2 + IS3
 7    GC =~ GC1 + GC2 + GC3
 8    CC =~ CC1 + CC2 + CC3
 9    IA =~ IA1 + IA2 + IA3
10    RS =~ RS1 + RS2 + RS3
11    KT =~ KT1 + KT2 + KT3
12    SD =~ SD1 + SD2 + SD3
13    RP =~ RP1 + RP2 + RP3
14    SCC =~ JA + DI + IS + GC + CC + IA + RS + KT + SD + RP
15
16    # 2.Trust
17    TRS =~ TRS1 + TRS2 + TRS3 + TRS4
18
19    # 3. Commitment
20    COM =~ COM1 + COM2 + COM3
21
22    # 4.Transaction Cost
23    TSCa =~ TSC1 + TSC2 + TSC3
24    TSCb =~ TSC4 + TSC5 + TSC6
25    TSCc =~ TSC7 + TSC8 + TSC9
26    TSCd =~ TSC10 + TSC11 + TSC12
27    TSC =~ TSCa + TSCb + TSCc + TSCd
28
29    # 6.Sustained competitive advantage
30    SCA =~ SCA1 + SCA2 + SCA3 + SCA4
31
32    # 7.Performance
33    PFM =~ PFM1 + PFM2 + PFM3 + PFM4
34
35    # regression
36    TRS ~ SCC
37    COM ~ SCC + TRS
38    TSC ~ TRS + COM
39    SCA ~ TRS + COM + TSC + SCC
40    PFM ~ TSC + TRS + COM + SCA + SCC
41
42
```

```
43     '
44   tour.sem.fit <- sem(tour.sem, data=tour.df,)
45   summary(tour.sem.fit, standardized=TRUE, fit.measures=TRUE)
```

Epilogue

I hear, I forget.
I see, I remember.
I do, I understand.

Confucius (551 BC - 479 BC)
Chinese philosopher & reformer

This research idea stems from both of my experience doing research in the tourism sector for more than two years after graduating from Chiang Mai School of Economics in 2005 and knowledge I have gained during my MSc course at Cardiff Business School. In SCM, firms in the same supply chain need to work together (collaborate) to enhance their performance as a whole in order to compete with other (firms in the other) supply chains.

However, my experience found that tourism firms have rarely work together to achieve the mutual benefit. Evidence of sharing information or resources with their suppliers are limited. If suppliers or firms were force to do so, they tend to share inaccurate information or limited resources. These are partly because the fear of opportunism behaviours of the other. Therefore, I hope that my thesis would make a credible, reliable evidences for the tourism firms to be confident to collaborate with

their supply chain partners for the benefit of the whole supply chain. Although I completed the thesis and found such evidences, I can only hope that my thesis would make an impact I wish.

Recently I have found that my work has been acknowledged by Catto-Smith (2012) in The Bangkok Post on 22nd February 2012 (one of the Top English Newspapers in Thailand) in an article titled "*The significant value of the tourism supply chain*" (alternative link in traveling in Thailand.info). Even though it was not a proper referencing (no in-text citation), at least my research outputs have reached to the wider audiences, on top of those in the academics (in which I have presented my PhD works in seven academic conferences around the world (UK, France and definitely Thailand).

Now I have done my '**duty**' for today. I have learnt so many things in the past four year plus of this PhD journey. Thinking about my future duty to contribute back to the people of Thailand who indirectly supported my study through their tax, I shall continue producing '**knowledge**' a least as rigorous as this thesis.

❦

Just Today,
Do Your Duty Fully

What has passed, don't bother seeking.
And don't wish for what hasn't arrived.
The days keep on passing never to return
And future days never quite come to pass.

Whoever sees clearly the manifest present
In all its truth brightly and openly
Without the usual shakes and trembles
Can face things as they are and proceed.

So don't delay in performing the duty of today,
For nobody can know when death will come.
We are powerless to delay or push aside
Death and his great armies.

Venerable Buddhadasa Bhikkhu
(1906 - 1993)
Thai Buddhist monk
&
A pioneer in the promotion of the inter-religious understanding,
honoured in
The UNESCO's List of Great International Personalities.

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