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# Antecedents and Consequences of Global Supply Chain Process Integration

Ayman Amin Omar
*University of Tennessee - Knoxville*

To the Graduate Council:

I am submitting herewith a dissertation written by Ayman Amin Omar entitled "Antecedents and Consequences of Global Supply Chain Process Integration." I have examined the final electronic copy of this dissertation for form and content and recommend that it be accepted in partial fulfillment of the requirements for the degree of Doctor of Philosophy, with a major in Business Administration.

John T. Mentzer, Major Professor

We have read this dissertation and recommend its acceptance:

Theodore P. Stank, Matthew B. Myers, Robert T. Ladd

Accepted for the Council:

Carolyn R. Hodges

Vice Provost and Dean of the Graduate School

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# Antecedents and Consequences of Global Supply Chain Process Integration

**A Dissertation**
**Presented for**
**Doctor of Philosophy Degree**
**The University of Tennessee, Knoxville**

**Ayman Amin Omar**
**August 2008**

## DEDICATION

This dissertation is dedicated to my parents Amin and Amal, and my loving wife Noha. Thank you for being a constant source of encouragement, inspiration, and happiness in my life.

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## Abstract

Global business executives and researchers recently highlight the importance of understanding the dynamics of supply chain process integration in a global context. The literature still lacks studies that provide a comprehensive understanding of the major antecedents and consequences of supply chain process integration from a global perspective. This dissertation builds on several theoretical foundations such as the resource based view (RBV), the relational view (RV) of the firm and transaction cost analysis (TCA) to develop a framework that explains the drivers and outcomes of global supply chain process integration.

This global study responds to these challenges through exploring the antecedents and consequences of global supply chain process integration for 320 supply chain and purchasing managers that source from over 33 countries. A theoretical framework is proposed that builds on research in strategic management, supply chain management, and international business and tests 8 proposed hypotheses. One new construct – global supply chain process integration – is developed and tested. Another construct, logistics performance, is modified from its existing form in the current literature.

Significant results and good fit indices tested with structural equation modeling generate a number of interesting implications for global supply chain managers and researchers. For executives and strategists who are concerned about better managing their supply chains, this study provides insights for how manufacturing firms can develop a competitive edge through a higher level of flexibility by integrating its supply chain processes with its global suppliers. The study also provides empirical evidence on how supplier flexibility in a global environment can lead to improvements in process and firm performance.

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# CHAPTER 1 – INTRODUCTION

## SUPPLY CHAIN MANAGEMENT

Supply chain management has become a very popular topic for both practitioners and researchers in the past two decades (Christopher 2005). A supply chain is defined as a set of three or more companies directly linked by one or more of the upstream and downstream flows of products, services, finances, and information from a source to a customer (Mentzer et. al. 2001). A supply chain includes suppliers/vendors, manufacturers, distributors, and retailers that are interconnected by transportation, information and financial infrastructure. Supply chain members are interconnected by a significant physical flow that includes raw materials, work-in-process inventories, finished products and returned items, as well as the associated flows of information and finances that accompany the physical flows. The goal of a supply chain is to maximize customer value and minimize system-wide costs for each participant (Cagliano, Caniato and Spina 2006). To achieve this goal, businesses must now compete as an integral part of a supply chain and no longer as individual firms (Cagliano, Caniato and Spina 2006; Green and Inman 2005).

This notion of competing as a supply chain has drawn attention to the best methods and approaches to supply chain management. In order to enhance and refine supply chain management techniques and approaches, one must first understand the definition of supply chain management. The Council of Supply Chain Management Professionals (2007) defines supply chain management as:

> "*Supply Chain Management 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****."*

Mentzer et. al. (2001) defined supply chain management as:

*"Supply chain management is the* ***systemic, strategic coordination*** *of the* ***traditional business functions within*** *a particular company and* ***across businesses*** *within the supply chain, for the purposes of* ***improving the long-term performance*** *of the individual companies and the* ***supply chain as a whole.****"*

Both definitions stress the necessity of collaboration and coordination of business functions "within" and "across" organizations or companies. The implementation of supply chain management requires the integration of processes across the supply chain, starting from sourcing, to manufacturing all the way to distribution (Mentzer et. al. 2001). Successful supply chain management requires internal and external integration of member firms in the supply chain (Green and Inman 2005). The focus of this dissertation will be on the external component of supply chain process integration. The focus will also be on global supply chains where at least one member is located in a different country.

## SUPPLY CHAIN INTEGRATION

Supply chain integration is the quality of collaboration and coordination that exists among organizational entities (Grant 1996; Heath and Staudenmayer 2000; Jacobides 2005; Kogut and Zander 1996). Collaboration is an attitudinal approach across organizations emphasizing continuous relationships (Ellinger, Daugherty and Keller 2000; Kahn and Mentzer

1996). Supply chain coordination occurs when actions across different supply chain members are aligned. The result is a more efficient and effective flow of products and information (Sahin and Robinson 2002). Supply chain integration not only requires the alignment of interests, but also the alignment of actions (Grant1996; Heath and Staudenmayer 2000; Jacobides 2005; Kogut and Zander 1996). ***Supply chain integration*** is defined in this dissertation as the collaboration and coordination among different supply chain members.

## SUPPLY CHAIN PROCESS INTEGRATION

In an attempt to maintain a competitive rigor in the market and ensure a degree of flexibility, companies are collaborating and coordinating across different supply chain processes (Morgan and Monczka 1996) resulting in supply chain process integration. ***Supply chain process integration*** is defined as the level of collaboration and coordination that exists within different supply chain processes across organizations.

Supply chain processes are structured and measured sets of activities and functions designed to produce specific outcomes for the customer or market being served (Mentzer et. al. 2001). Lambert and Cooper (2000) identified eight key supply chain business processes: customer relationship management, customer service management, demand management, customer order fulfillment, manufacturing flow management, procurement, product development and commercialization, and returns (Croxton, Dastague and Lambert 2001). Srivastava, Shervani and Fahey (1999) listed the following as examples of supply chain processes: supplier selection and qualification, establishing and managing inbound and outbound logistics, designing work flow and production management, acquiring and maintaining process technologies, order processing, managing multiple channels, and managing customer services. Another listing of

supply chain processes includes planning, acquiring, making, delivering, product and process design, capacity management, and returns management (Melnyk, Stank and Closs 2000).

The focus of this dissertation is on the integration of supply chain processes that interface with a company's supplier such as inbound logistics (Srivastava, Shervani and Fahey 1999), procurement, and returns management (Lambert and Cooper 2000; Srivastava, Shervani and Fahey 1999). This dissertation will investigate how process integration can lead to a higher level of supplier flexibility and how that can improve a firm's logistics performance. Flexibility is defined in this context as the ability of an organization to respond to changes in the environment, such as shifting levels of demand or changing risk levels in the market, in a timely manner and with the least amount of resources (Golden and Powell 2000; De Toni and Tonchia 2001; Stalks, Evans and Shulman 1992). Logistics performance was chosen as one of the outcome performance measures for this dissertation because of the boundary spanning nature of logistics across firms, both upstream and downstream (Novack, Rinehart and Wells 1992). Another important aspect of logistics processes is their potential impact on firm performance. An improvement in the performance of logistics processes can improve firm performance by improving customer satisfaction, reducing order processing costs, and reacting quicker to changes in the environment (Daugherty and Pittman 1995; Mcginnis and Kohn 1990).

## GLOBAL SUPPLY CHAIN PROCESS INTEGRATION

The purpose of this dissertation is to examine the direct antecedents of global supply chain process integration, the impact of global supply chain process integration on supplier flexibility, and the impact of supplier flexibility on logistics and firm performance. ***Global supply chain process integration*** is the collaboration and the coordination that takes place across

different supply chain processes, where at least one firm is located across borders. Cross-border supply chain members are those that operate and exist cross nationally. Identifying the major drivers and antecedents, as well as outcomes, of global supply chain process integration will help both researchers and practitioners understand how to better manage their supply chains in a rapidly growing global environment.

The remainder of this chapter examines the theoretical justification for the research and its specific goals as well as the gaps in the literature. Research objectives are then discussed, followed by contributions expected from the dissertation. The chapter concludes with a description of the organization of the entire dissertation.

## THEORETICAL JUSTIFICATION

### RESOURCE DEPENDENCE THEORY

Resource dependence (RD) theory emerged in the seminal article by Emmerson (1962), which stated that dependence is a function of power. The power of "A" over "B" is directly proportional to the dependence of "B" over "A" (Emmerson 1962; Handfield 1993; Pfeffer and Salancik 1978). Power is defined as the ability to evoke change in another's behavior (Wilkinson 1973). Power is also defined as the ability of a channel member to control the decision variables in the marketing strategy. Dependence of "B" on "A" is defined as the inability of "B" to operate without the involvement of "A" and where the costs of switching from "A" to someone else are high or not possible (Emmerson 1962; Handfield 1993; Pfeffer and Salancik 1978). The RD theory is largely based on the concept of dependence; where one actor does not entirely control all the conditions necessary for an action or a desired outcome (Handfield 1993).

The lack of self sufficiency introduces uncertainty in the decision making of a firm (Heide 1994). The RD theory assumes that the primary objective of managers is to operate in more stable environments (Handfield 1993). Firms will try to reduce uncertainty and manage dependence by purposely structuring their exchange relationships as a means of establishing formal or semi-formal links (Ulrich and Barney 1984). In the face of uncertainty, firms may develop stronger coordination mechanisms with other firms (Cyret and March 1963; Handfield 1993; Heide 1994). Thus RD may be used to explain some of the drivers of global supply chain process integration.

## TRANSACTION COST ANALYSIS (TCA)

Transaction Cost Analysis (TCA) (Williamson 1979, 1985) is a blend of institutional economics, organizational theory, and modern contract law (Dwyer and Oh 1988). TCA assumes bounded rationality and opportunism. The assumption of bounded rationality states that managers have a limited capacity in their decision making and information processing abilities (John and Weitz 1988). Opportunism refers to the fact that exchange partners are assumed to work in their own self interest.

In addition to those assumptions, TCA has three important features: uncertainty, frequency and idiosyncrasy. There are two different kinds of uncertainty: environmental and behavioral. Environmental uncertainty is when circumstances around an exchange cannot be specified ex-ante (John and Weitz 1988; Rindfleisch and Heide 1997). Behavioral uncertainty refers to the difficulty of ascertaining the actual performance or adherence to contractual agreements such as false claims from downstream retailers or resellers (John and Weitz 1988; Rindfleisch and Heide 1997).

Williamson (1985) suggests that firms may rely on hierarchical structures with higher transaction frequencies. There has been a strong debate on the accuracy of this proposition in the literature and some researchers failed to find a positive relationship between hierarchical structures and transaction frequency (Anderson 1985; Maltz 1994; Rindfleisch and Heide 1997). Transaction frequency will not be included in this dissertation as more emphasis will be placed on the importance of the transaction rather than the frequency.

When the parties of a transaction have to incur expenses that are specific and non-marketable, the transaction is said to be idiosyncratic. Other things being equal, idiosyncratic exchange relations that feature personal trust will survive greater stress and display greater adaptability (John and Weitz 1988; Rindfleisch and Heide 1997). Examples of idiosyncratic transactions are the purchase of a specialized component from an external supplier or situating a specialized plant in a unique location with proximity to a downstream processing stage to which it supplies vital input.

## RELATIONAL VIEW

The relational view (RV) of the firm states that inter-organizational relationships can be a source of competitive advantage (Esper et. al. working paper; Dyer and Singh 1998). Inter-organizational relationships support operational exchange and can serve as a key source of learning. By building relationships with global supply chain members, firms can develop a unique set of capabilities. This can occur when multiple firms within the same supply chain invest in relation-specific assets, develop inter-firm knowledge and sharing routines, use effective governance mechanisms, and exploit complementary capabilities (Dyer and Singh

1998; Esper et. al. working paper). The relational view of the firm will be used to build the theory of global supply chain process integration.

## GAPS IN THE LITERATURE

Maintaining a competitive advantage is no longer achieved by low costs and high quality alone; flexibility has become an essential component in this formula (Upton 1995). In the broadest sense, the concept of flexibility is generally referred to as the capacity to adapt (Golden and Powell 2000; De Toni and Tonchia 2001). Stalk, Evans and Shulman (1992) define strategic flexibility as one of their competitive capabilities – "agility." Agile firms may be characterized as those firms that can thrive in a continuously changing environment where organizational structures, processes, or products can respond to changes in a useful time frame (Christopher 2000; Prater, Biehl and Smith 2001). Thus, flexibility is seen as the ability of an organization to react to changes in the environment such as shifting levels of demand or changing risk levels in the market. Integrating processes, as opposed to acquiring ownership through vertical integration, enables firms to coordinate the movement of products and share information (Cagliano, Caniato and Spina 2006; Jasper and Ende 2006; Narasimhan and Das 2001) without getting into vertical integration agreements and thus maintaining a certain level of flexibility (Donk and Vart 2005; Frohlic and Westbrook 2001; Morgan and Monczka 1996; Romano 2003). Process integration, through shared knowledge, information, and coordination of product movement can help other supply chain members become flexible and responsive in a changing environment. It is important to address issues such as supply chain process integration that allow firms to coordinate and interact without losing their overall flexibility in the market. Supply

chain process integration can help firms develop a competitive advantage by achieving a higher level of flexibility in the market, and thus improving process and firm performance.

Supply chain integration has been investigated primarily from the perspective of vertical integration (e.g. Agarwal and Ramaswami 1992; Anderson and Gatignon 1986; Aulakh and Kotabe 1997; Bello and Gilliland 1997; Erramilli and Rao 1993; Hennart 1991; Hill, Hwang and Kim 1990; Huang and Hsu 2003; Kim and Hwang 1992; Klein, Frazier and Roth 1990; Li and Li 2003). Supply chain vertical ownership is defined as the expansion of the scope of activities of a company, whether through forward or backward vertical ownership, to gain more legitimate authority over other members of the supply chain (Anderson and Coughlan 1987; Anderson and Gatignon 1986; John and Weitz 1988).

Studies investigating vertical integration developed models to explain antecedents to supply chain vertical integration in foreign markets, with limited empirical testing of the relevant variables and models (Aulakh and Kotabe 1997; Li and Li 2003; Merino and Salas 2002). Furthermore, studies of global supply chain drivers have been limited to the vertical integration of global supply chains, namely foreign entry modes. Currently there are no studies that model, describe, or explain the drivers of global supply chain process integration. The gaps in the literature are summarized in Table 1.1.

**Table 1.1 Comparison of Current Dissertation with Previous Related Research**

| Focus of Research | Exemplar Studies | Type of Integration | Drivers of Integration | Global Context | Performance Implications | Empirical Testing |
|---|---|---|---|---|---|---|
| Investigating the impact of different factors on the choice of foreign entry mode | Agarwal and Ramaswami (1992); Erramilli and Rao (1993); Huang and Hsu (2003); Kim and Hwang (1992) | Vertical Integration | Yes | Yes | No | No |
| Supply chain integration decisions in new product development | Li and Li (2003) | Vertical Integration | Yes | Yes | Yes | Yes |
| Global Supply Chain Integration | Aulakh and Kotabe (1997) | Vertical Integration | Yes | Yes | Yes | Yes |
| Performance Implications of Process Integration | (Cagliano, Caniato and Spina 2006; Christopher 2000; Lambert and Cooper 2000; Mentzer et. al. 2001; Morgan and Monczka 1996; Romano 2003) | Process Integration | No | No | No | No |
| Drivers of Global Supply Chain Process Integration | Current Dissertation | Supply Chain Processes | Yes | Yes | Yes | Yes |

Table 1.1 classifies the existing literature on supply chain integration, both vertical and process. Several authors have investigated drivers of vertical integration (e.g. Agarwal and Ramaswami 1992; Erramilli and Rao 1993; Huang and Hsu 2003; Kim and Hwang 1992) from a global perspective and their impact on performance (Aulakh and Kotabe 1997; Li and Li 2003). Other researchers have investigated the phenomenon of process integration across firms (e.g. Cagliano, Caniato and Spina 2006; Christopher 2000; Lambert and Cooper 2000; Mentzer et. al. 2001; Morgan and Monczka 1996; Rodrigues, Stank and Lynch 2004; Romano 2003; Rowat; 2004; Stank, Keller and Daugherty 2001; Stock, Greis and Kasarda 1999).

Those studies have helped further our understanding about some of the potential implications of process integration. The literature still lacks studies that provide a comprehensive understanding of the major drivers of supply chain process integration and their impact on logistics and firm performance. Bowersox, Closss and Stank (2000) stressed the importance of focusing on process integration by listing it as one of the ten mega trends that will revolutionize supply chain logistics. This dissertation addresses this gap in the literature by providing a framework that explains the drivers of supply chain process integration from a global perspective. The dissertation also provides empirical data on the implications of global supply chain process integration on supplier flexibility, logistics performance, and overall firm performance.

## CONTRIBUTIONS OF THIS DISSERTATION

This dissertation has several potential theoretical and practical contributions. From a theoretical standpoint, this dissertation utilizes existing theories such as RD, TCA, and RV to explain the major drivers and outcomes of global supply chain process integration. Another theoretical contribution is that in the process of developing and testing this theory, more questions will be generated for future research. This is a critical and important theoretical contribution. Good theories serve as catalysts for further conceptualization and subsequent theory testing (Mentzer and Schumann 1998). The usefulness of a theory is in part dependent on the generation of new research (Seth and Zinkhan 1991).

One of the major contributions is that this dissertation provides a better understanding of global supply chain process integration by defining it, explaining its antecedents, and its

consequences. Addressing global supply chain process integration issues is becoming more popular due to the increased level of globalization that is taking place in a lot of supply chains.

Another contribution of this dissertation is that it provides empirical evidence for the potential impact of global supply chain process integration on supplier flexibility, logistics performance, and firm performance. An important criterion for a good theory is that it should be testable (Hunt 1991). To date, there are no studies that provide empirical results of the impact of global supply chain process integration on flexibility or process performance. There are also no studies that highlight the drivers of supply chain process integration in a global context. This is very important given the growing globalization trend. Managers in the global environment need to understand the factors that may influence their decision to become more integrated in the supply chain from a process standpoint and the potential performance implications for this decision.

## STATEMENT OF PURPOSE

Based on the previous discussion, a better understanding of global supply chain process integration is warranted. This is valuable both to researchers as well as business practitioners. A better understanding of this issue starts with more insight into the drivers in the global environment. The presence of those drivers for certain supply chains indicates a dire need for process integration to improve performance in terms of efficiency, effectiveness, and ultimately financial indicators. This research is specifically designed and structured to answer the following questions:

RESEARCH QUESTIONS

1. What is global supply chain process integration?

2. What are the elements or dimensions of global supply chain process integration
3. What are the main drivers or antecedents of global supply chain process integration?
4. How does global supply chain process integration impact supplier flexibility?
5. How does supplier flexibility impact logistics performance?
6. What is the relationship between logistics performance and the overall firm performance?

## METHODOLOGY

A quantitative approach was used to test the model. A quantitative approach was appropriate in this dissertation since the objective was to examine the influence of several independent variables on a dependent variable (Kerlinger and Lee 2000). Data collection in this dissertation was accomplished using a survey methodology. Key respondents in this dissertation are purchasing, logistics, or supply chain managers working for US based manufacturing companies that source from overseas (e.g. China, Brazil, etc.). Respondents were identified through a mailing list obtained from a third party firm-database provider. All the respondents were called to be pre-qualified to fill out an online survey. All questionnaires were accessible online and some were filled out by hand and faxed back. Structural equation modeling (SEM) was used to analyze the results.

## DISSERTATION ORGANIZATION

This dissertation is divided into five chapters. Chapter 1 introduces and defines concepts related to supply chain management, supply chain integration, supply chain process integration and global supply chain process integration. Chapter 1 also provides a brief overview of the theoretical basis for the research, gaps in the literature, the potential contributions expected from

this research, statement of purpose, and an outline of the organization of this dissertation. Chapter 2 provides the literature review. It presents the information used to build the theory for this dissertation based on a thorough literature review. The chapter also presents the research hypotheses. Chapter 3 provides the research methodology. It discusses the methodology used to test the model and associated hypotheses. Included are discussions of the research design, measurement development and purification, data collection and data analysis procedures. Chapter 4 presents the data analyses and findings. Chapter 5 presents the contributions of the dissertation as well as areas for future research, based on the results from testing the theoretical model.

# CHAPTER 2 – THEORY BUILDING

Chapter 2 illustrates a comprehensive literature review which is further used to develop the theory and build the hypotheses of this research. The literature review presents previous research that has been published around the topic under investigation in an attempt to identify the gaps in the literature and build the theory (Creswell 2003). Consideration of existing theories and consistency with good ones are important criteria for developing good theories (Churchill and Perreault 1982; Shaw and Costanzo 1982). Hunt (1991) defines a theory as systematic laws that are logically tied together. Accordingly, a good theory must integrate previous research as it helps in building a body of knowledge in a systematic and organized manner. Random research that is based on a variety of unsubstantiated ideas is less likely to enhance the body of knowledge as would a layer by layer approach, where each layer of research is based on the previous ones (Spender 1979). This layer-by-layer process extends credibility to new theories and increases their probability of acceptance by others.

## ORGANIZING FRAMEWORK FOR THEORY BUILDING

Global supply chain process integration has been discussed in various research streams such as international business, marketing, logistics, operations management, and strategic management. Each of those literature streams will be drawn upon to help build the theory and formulate the hypotheses.

The first step towards building the theory of global supply chain process integration was to accurately identify and define the major relevant constructs using three theories: resource dependence theory, transaction cost analysis, and relational view of the firm. Subsequently, the

implication of global supply chain process integration on logistics performance was hypothesized. The chapter concluded with a summary of the hypotheses.

## GLOBAL SUPPLY CHAIN ENVIRONMENT

### GLOBAL ENVIRONMENT

Competition is at the core of the success or failure of firms (Porter 1985). To achieve and maintain a competitive advantage, firms develop competitive strategies to establish profitable and sustainable positions against the forces that determine industry competition (Porter 1985). A firm is said to have a sustainable competitive advantage when it is implementing a value creating strategy that is not simultaneously implemented by any current or potential competitors, and when other firms are unable to duplicate the benefits of this strategy (Barney 1991). More often today firms are implementing these strategies through foreign markets (Ghoshal 1987, Roth and Morrison 1992). Firms that strive to be cost leaders in the market are drawing on components or raw materials available at reduced prices from countries such as India, China, or Mexico. Other firms that position themselves as market differentiators are adopting improved manufacturing technologies available elsewhere globally.

Globalization of firms has been rising steadily over the past decade. The United States has experienced a steady increase in exports and imports of manufactured goods and agricultural commodities. Export and import figures obtained from the US Census Bureau (2006) indicate that levels of United States exports and imports have been growing at an average rate of 14% over the past 3 years. This was the case for other trading regions such as Europe, Pacific Rim, and Asia. Several factors account for this trend. Firms are increasingly pursuing strategies to reduce production costs and increase sales volumes through identifying new markets or market

diversification. Firms are developing global competitive advantages by taking advantage of international economies of scale, scope, and learning from different foreign markets (Ghoshal 1987, Roth and Morrison 1992). They are increasingly identifying location specific advantages and exploiting the cost differentials in factors of production such as labor, land, technology and markets, or governmental incentives (Roth and Morrison 1992.) Moreover, the exponential growth in regional economic integration which is promoted by trade and investment agreements, such as the North American Trade Agreement (NAFTA), European Commission (EC), MERCOSUR, and APEC, has facilitated the increase in international trade (Buckley et. al. 2001).

As international trade has become a global phenomenon, countries that are at a disadvantage have created barriers to the spread of globalization to protect their own interests. To combat world globalization, countries formed regional trade agreements and joined global trading blocks. Countries started to group together on a regional or pan-continental basis forming trading blocks to facilitate trade among those countries (Buckley et. al. 2001). This form of integration has helped member countries reap more benefits through constructing barriers to non-member countries and increasing the volume of trade within the trading block. Half of the global trade takes place within countries that are members of a certain trading block trade agreement (Siddiqi 2000, p. 97). This demonstrates the significant impact that regional economic integration, or regional trade agreements, has had in changing the dynamics of global businesses.

Devlin and Davis (1999) summarized different forms of regional economic integration, as shown in Figure 2.1, and explained the rationale behind such partnerships as well as the advantages and disadvantages associated with it. According to Devlin and Davis (1999),

regional economic integration can have different forms, the most basic being a free trade area where tariffs are eliminated progressively on the majority of goods traded among members. The bases of free trade agreements are the rules of origin which are designed to prevent deflection, i.e., the import of goods from a third country into the area by country A which then exports them to country B (Jovanovic 1992, p.9). Another more advanced form of regional economic integration is the comprehensive free trade agreement that may include services such as a customs union. This type of integration involves a common external tariff (CET) to all non member countries. The common market is another form of economic integration, which allows free movement of factors of production.

| | Type 1 | Type 2 | Type 3 | Type 4 | Type 5 |
|---|---|---|---|---|---|
| | Free Trade Area | Customs Union | Common Market | Economic Union | Total Economic Union |
| Removal of tariffs and quotas on Trade among the countries | Yes | Yes | Yes | Yes | Yes |
| Common external tariff (CET) | No | Yes | Yes | Yes | Yes |
| Freedom of movement of factors | No | No | Yes | Yes | Yes |
| Harmonization of economic policies | No | No | No | Yes | Yes |
| Total unification of economic policies | No | No | No | No | Yes |

Source: Jovanovic, Miroslav N. 1992. *International Economic Integration*. London, Routledge.

**Figure 2.1 Different Forms of Trade Agreement**

There are several factors that encourage countries to engage in regional economic integration. Unstable and limited markets make it difficult for firms in certain countries to achieve economies of scale. This could be improved or facilitated through access to regional foreign markets, which can act as a catalyst for external opportunities in other countries (Devlin and Davis 1999, p.275). Another force driving regional integration listed by Dunning and Robson (1987) is the possibility of product and process specialization for firms in member countries. Also, as Devlin and Davis (1999) mention, attracting foreign direct investment is another key motivating factor for regional integration. Larger markets allow for more pronounced economic changes and higher location advantages. As a result, the sub-regional market becomes more attractive to foreign direct investment.

This changing landscape has created new opportunities for firms engaged in a global business environment (Cavinato 1992; Hill 1997; Kotabe and Murray 2004; Mentzer et. al. 2001) and has lead to the globalization of supply chains, where at least one member is located cross border. Dunning (1988) explained the eclectice paradigm of international production stems from three main advantages: ownership, location, and internalization. Ownership advantages stem from privileged possession or access to particular assets, and multinationality. Internalization advantages stem from the perception that the market has failed in some way; either structural or transactional failures. Firms look for locations where these failures have occurred in hopes of exploiting the situation. Location advantage refers to the physical location of production in other countries and what advantages may be associated with that such as cheaper labor costs or access to new markets.

The increasing phenomenon of globalization has made it more difficult for managers to efficiently and effectively manage their supply chains due to the added complexities present in a

global environment (Ta, Choo and Sum 2000; Zeng and Rossetti 2003). Some of those complexities include a higher level of dependence on supply chain members, a higher level of environmental uncertainty, and the need for a higher level of customized assets or resources with certain supply chain members.

In addition to those complexities, some firms started dealing with their supply chain members using a different approach, also known as supply chain orientation. Supply chain orientation is a philosophy that firms embrace to better compete in the market by managing their upstream and downstream flow of products (Mentzer et. al. 2001; Mentzer, Min and Zacharia 2000). The following sections will discuss the aforementioned factors in a global environment that have a major role in changing supply chain management techniques.

## DEPENDENCE

The RD theory is based on the notion that when one party is dependent on the other, that party may not be able to accomplish all necessary tasks or functions without the involvement of the other (Handfield 1993). The RD theory explains why firms in some cases try to restructure their links with other supply chain members either by formal or semi formal links.

Dependence is a function of four different factors: the importance of a resource to the organization (Handfield 1993; Pfeffer and Salancik 1978), the extent to which one firm has discretion over that resource, the availability of alternatives for that resource for the firm (Handfield 1993; Pfeffer and Salancik 1978; Tesfom Lutz, and Ghauri 2004), and the difficulty of replacing the supplier or switching costs (Heide and John 1988). Dependence may make organizations vulnerable to changes imposed by other supply chain members that they are dependent on. An organization's vulnerability is determined by the extent to which the

organization has come to depend on certain types of exchanges from other supply chain members for its operations (Pfeffer and Slancik 1978).

In some cases, companies are becoming more dependent on their global suppliers or customers for their short and long term operations (Handfield 1993). This dependence may be the result of a limited access to unique or low cost resources. Another factor that may influence this dependence is the unique access to specific global markets that the customers may have. According to the previous definitions of dependence, Dependence in this research is defined as:

> ***Dependence*** *is present between a company and one of its suppliers or customers when that company is unable to accomplish its tasks or operations without the involvement of that supplier/customer and where the switching costs are high or when replacing those suppliers or customers is costly or infeasible.*

## UNCERTAINTY

Supply chains face risks regardless of whether they are domestic or global. Yet, the more a supply chain becomes global, the higher the chance of it experiencing uncertainties (Manuj and Mentzer 2006; Milliken 1987). Uncertainty is defined as the inability to predict an event accurately (Manu and Mentzer 2006; Milliken 1987) and in the global context it is caused by several sources of global risk. Risk is present when there is a probability of a potential loss or undesired outcome which will impact the organization or the supply chain with a significant magnitude (Manuj and Mentzer 2006; Mitchell 1995). The following sources of risks have been identified in the literature as potential country risks present in a global environment: political risk, economic instability, and quality (Juttner, Peck and Christopher 2003; Kobrin 1979; Kotabe and Murray 2004; MacCormack, Newman and Rosenfield 1994; Mentzer et. al. 2001; Miller 1992; Rao 2004; Razzaque 1997; Robock 1971).

Political Risks

On the importance of political risks to sourcing and procurement, Siegwart et. al. (1989) states that procurement decisions can no longer be made without taking environmental issues, such as the political and economic environment, into account. Political risk is defined as the risk of adverse consequences arising from political events or host government interference with business activities (Butler and Joaquin 1998; Kobrin 1979). Political risk is present when the following three conditions occur: (1) discontinuities exist in the business environment, (2) these discontinuities are difficult to anticipate, and (3) the discontinuities result from a political change that has the potential of affecting the profits or the goals of a certain organization (Robock 1971). Political risk can be attributed to either state (governmental) related or non-state (societal) related risk (Iankova and Katz 2003; Siegwart et. al. 1989, p. 16, 20).

Political risks, whether state or non-state related, may result in a higher level of supply chain uncertainty. Civil wars, border disputes, or revolutionary movements can all disrupt manufacturing operations in a country where foreign suppliers are based. New governments can take actions that directly impact a foreign organization. Foreign governments can implement more stringent laws for customs which may result in longer lead times in importing products to be sold or parts and components to be used in the manufacturing operations. They can unilaterally revise or breach contracts that can impact the profitability or even the survival of a company or an organization in that foreign country.

Non-state related risks such as labor strikes can disrupt manufacturing operations in the host country, thus delaying production (Iankova and Katz 2003). The costs associated with proprietary technology could be high, especially in industries where core competencies and competitive advantages are based on technology, regardless of the potential cost savings (Fagan 1991). Terrorism and sabotage acts can cripple operations by inflicting damages to property or

personnel. Sometimes the negative consequences can vary from delays in operations for a couple of days to extreme cases where organizations decide to suspend their entire operations in a certain country for security reasons.

Economic Instability

Volatile exchange rates and growing inflation are two major indicators of an unstable economy. Economic instability in a certain country can have effects ranging from simple price fluctuation to the crash of an economy of a country or the whole region such as what happened in the crisis of the Asian markets in 1996 (Ghysels and Seon 2005; Kim 2001). Many suppliers either went out of business or were experiencing extreme financial distress. Disruptions in vendor operations can influence delivery reliability and cause firms to increase their safety stock, which in turn results in higher logistics costs. Late deliveries can result in stockouts, entailing additional costs. Stockouts may also result in short term and long term reactions by customers (Emmelhainz, Emmelhainz and Stock 1991; Verbeke, Farris and Thurik 1998; Sloot, Verhoef and Franses 2005; Zinn and Liu 2001). Recent events in Argentina provide another example of an extreme economic crisis, where an overhauled fixed exchange rate and a large amount of foreign debt were the two main causes of the recent economic crisis (Feldstein 2002).

Quality

Quality is another frequently cited source of global supply chain risks. Quality risks can be manifested in one or more of the following: quality of raw materials, quality of finished products, quality of labor, and perceived quality of products from a specific country of origin. Sourcing of raw materials or products from companies in developing countries can present a risk to the buying firm. Products can be defective or poor in functional qualities and attributes due to

old equipment and manufacturing technology. Poor maintenance of equipment can also add to the problem. Another factor that influences quality is the level of local labor skill. Global production processes may change the nature and level of skills required by local labor (Okada 2004). Manufacturing technologies are constantly changing and so are the required levels of knowledge and skill required by workers to operate these new technologies. Developing countries have high illiteracy rates among their labor workforce, which may in return impact consumers' perception of quality of the products manufactured in those countries. Quality perception can make a big difference. For example, customers may view products assembled in the United States as having superior quality over the same product assembled in a developing country like Mexico (Chao 1998). With heightened customer awareness about global operations and sensitivity about hybrid products, corporations can no longer assume that customers will perceive the same quality for a Sony walkman that was assembled in Malaysia as those previously assembled in Japan (Chao 1998).

## ASSET SPECIFICITY

As firms enter into agreements and exchanges with other supply chain members, they may invest in particular assets. These investments may be specific to a unique context or relationship (Klein, Crawford and Alchian 1978). A high level of asset specificity within a supply chain implies a high level of customization and dedication of resources by a firm to that supply chain. One of the main components of transaction cost analysis is asset specificity.

Asset specificity refers to the amount of physical and intangible investments required to support a business function or an activity such as distribution (Anderson and Gatignon, 1986; Aulakh and Kotabe 1997). Others have defined asset specificity as investments made in business-to-business relationships that are non-recoverable and specific to a particular exchange.

Asset specificity could also take the form of investment in an exchange partner that cannot be redeployed to other supply chain members or partners. The higher the asset specificity, the higher the level of customized resource in an exchange relationship. Customization in assets could be in the form of specialized machinery or specialization in human assets in the form of training and acquiring firm specific knowledge (John and Weitz 1988).

Another attribute that may be important to assets or resources is the level of their fungibility. Fungibility is defined as the ability to reuse certain resources in different situations or for different product segments (Anand and Singh 1997). Non-fungible resources are those whose value is derived within a specific context – their value is not transferable to alternative relationships or firms. The resources may be tangible such as manufacturing equipment or facilities, or intangible such as human resource capabilities or specific technology (Jap 2001). According to the literature discussed above, supply chain asset specificity in this research is defined as:

> ***Asset specificity*** *is the level of resources or assets that are specifically tailored or customized to be used with a supply chain member. These resources are non-fungible and cannot be used or transferred to other supply chain members without a large loss in their value. Such resources or investments may include machinery or equipment, software, or training.*

SUPPLY CHAIN ORIENTATION

External culture, in some cases, determines channel members' expectations of each other. Supply chain orientation is a philosophy that firms adopt to determine those expectations. Mentzer et. al. (2001) differentiate between supply chain management and supply chain orientation. Supply chain management is the systemic and strategic coordination of business functions within an organization and across multiple organizations to improve the long term performance of the supply chain and each individual company within that supply chain (Mentzer

et. al. 2001). Supply chain orientation is not synonymous to supply chain management; however the two terms are related. Supply chain orientation is defined as (Mentzer et. al. 2001, p.11):

> *"**Supply chain orientation** is the recognition by an organization of the systemic and strategic implications of the tactical activities involved in managing the various flows of the supply chain. Thus a company possesses supply chain orientation if its management can see the implications of managing the upstream and downstream flow of products, services, finances, and information across their suppliers and their customers."*

According to this definition, a company needs to see systemic and strategic implications upstream and downstream in order to have a supply chain orientation. Supply chain orientation is a philosophy adopted by managers to compete in the market and supply chain management is this philosophy in action (Esper et. al. working paper; Mentzer et. al. 2001). Supply chain orientation is a multidimensional construct that builds and maintains several behavioral elements such as: trust, commitment, cooperative norms, organizational compatibility, and top management support (Mentzer et. al. 2001; Mentzer, Min and Zacharia 2000; Min, Mentzer and Ladd 2007).

Trust is when a company has confidence in working or relying on other exchange partners who are perceived as reliable and have integrity (Ganesan 1994; Min, Mentzer and Ladd, forthcoming; Moorman, Deshpande and Zaltman 1993; Morgan and Hunt 1994). Trust is composed of both credibility and benevolence (Ganesan 1994). Credibility is the firm's perception that another party will deliver its promises and fulfill its obligations (Anderson and Narus 1990; Dwyer and Oh 1987). Benevolence is present when a firm believes that the other exchange party will not take actions that are harmful to the firm (Anderson and Narus 1990; Min, Mentzer and Ladd 2007).

Commitment in a relationship is present when a firm has the desire to maintain that relationship for a perceived value in it (Dwyer, Schurr and Oh 1987; Min, Mentzer and Ladd 2007; Moorman, Zaltman and Deshpande 1992; Morgan and Hunt 1994). A firm is said to have commitment to other supply chain members when this firm endures its relationship with other members and puts an effort, and resources if necessary, to maintain this relationship (Morgan and Hunt 1994).

Cooperative norms are the firm's perceptions of the joint efforts between the firm and other supply chain members, suppliers or customers, to achieve its goals without experiencing any opportunistic behavior from other firms (Min, Mentzer and Ladd 2007; Siguaw, Simpson and Baker 1998). A customer will experience cooperative norms with a supplier if that supplier is focused on satisfying the customers' needs (Min, Mentzer and Ladd 2007; Siguaw, Simpson and Baker 1998).

In order for a firm to have a supply chain orientation towards another firm, there needs to be a certain level of organizational compatibility between both firms (Cooper, Lambert and Pagh 1997; Min, Mentzer and Ladd 2007). Compatible organizations may have similar corporate cultures or operating techniques and procedures (Bucklin and Sengupta 1993).

Supply chain orientation, as defined earlier, is formulated through the recognition of top management that a focus on a supply chain can have strategic implications on improving its efficiency and effectiveness. Thus, top management support is critical in developing and maintaining relationships with suppliers and customers (Lambert, Stock and Ellram 1998).

## IMPACT ON GLOBAL SUPPLY CHAIN MANAGEMENT

The question now becomes: how do these variables impact global supply chain management? Given the previous discussion on global Dependence, uncertainty, customization,

and supply chain orientation, the next step would be to explain how these factors influence managerial decisions in global supply chains. The next section will explain global supply chain management, with a focus on global process integration followed by an explanation of how the previous factors may influence global supply chain process integration and the impact of global process integration on supplier flexibility, logistics performance, and overall firm performance.

## GLOBAL SUPPLY CHAIN MANAGEMENT

Despite the fact that supply chain management is a concept that dates back to the building of the pyramids, it has caught the attention of researchers and practitioners in the past 25 years (Christopher 2005). The term supply chain management became popular in the early 1980's (Romano 2003) when Oliver and Webber (1982) started using it. It started gaining the attention of practitioners and academics because it was viewed as the next source of competitive advantage (Lambert and Cooper 2000).

A supply chain is defined as "a set of three or more companies directly linked by one or more of the upstream and downstream flows of products, services, finances, and information from a source to a customer," (Mentzer et. al. 2001, p.5). A supply chain may include suppliers/vendors, manufacturers, distributors, and retailers that are interconnected by transportation, information and financial infrastructure. Supply chain members are interconnected by a significant physical flow that includes raw materials, work-in-process inventories, finished products and returned items, information flows, and financial flows. The goal of a supply chain is to maximize customer value and minimize system-wide costs for each participant. To achieve this goal, businesses must now compete as an integral part of a supply chain and no longer as individual firms (Cagliano, Caniato and Spina 2006; Green and Inman 2005). The notion of competing as part of a larger chain has placed a higher importance on

managing the supply chain as a whole as opposed to managing individual functions or firms as isolated entities.

This notion of competing as a supply chain has drawn attention to the best methods and approaches to supply chain management. Supply chain management, as defined by the Council of Supply Chain Management Professionals (2007) and by Mentzer et. al. (2001), stresses the necessity for strategic collaboration and coordination of business functions "within" and "across" organizations or companies. The focus of this research is on the drivers of collaboration and coordination of different supply chain processes in a global context.

## GLOBAL SUPPLY CHAIN PROCESS INTEGRATION

### Supply Chain Integration

The term "integration" is confusing and is used interchangeably in many areas (Nye 1968). Integration has been defined differently in various contexts and research disciplines such as economics, international business, logistics, marketing, and new product development. In order to accurately define the term, various streams of literature are discussed.

In the economics literature, "economic integration" is defined as the elimination of discrimination amongst states. Holzman (1976, p. 59) refers to economic integration as a process of development of deep relationships of the division of labor between national economies. Pelkmans (1984, p. 3) states that economic integration is the elimination of economic frontiers between two or more different nations. Economic integration can also be defined as a process by which the economies of separate states merge forming economic linkages between or among geographical regions in an attempt to promote trade and facilitate the flow of goods and services, labor, capital, and technology (Jovanovic 1992, p. 8; Nye 1968; O'Neill 2004).

Vertical integration is the focus of much research in the field of international business (Agarwal and Ramaswami 1992; Anderson and Gatignon 1986; Aulakh and Kotabe 1997; Bello and Gilliland 1997; Erramilli and Rao 1993; Hennart 1991; Hill, Hwang and Kim 1990; Huang and Hsu 2003; Kim and Hwang 1992; Klein, Frazier and Roth 1990; Li and Li 2003). Vertical integration in this context is defined as the expansion in the scope of activities of a company, whether through forward or backward integration, to gain more legitimate authority over other members of the supply chain. Supply chain vertical integration is not within the scope of this research. The focus is on external or cross-enterprise process integration.

Supply chain integration creates interwoven processes that cannot be easily replicated (Mentzer and Williams 2001). The extent of supply chain integration is reflected by the extent to which activities in one company are synchronized with the activities of its suppliers or customers (Stock, Greis and Kasarda 1999). External process integration is the integration of processes across firm boundaries (Stock, Gries, and Kasarda 1999). External integration ensures that operational interfaces between firms are synchronized to reduce duplication, redundancy, and dwell time (Rodrigues, Stank, and Lynch 2004). External integration may be viewed as the state of collaboration and coordination among supply chain members (Holcomb and Manrodt 2000).

Collaboration is defined as an attitudinal approach across organizations emphasizing continuous relationships (Ellinger, Daugherty and Keller 2000; Kahn and Mentzer 1996). Collaboration is an informal behavior that occurs between interdependent actors, based on resource and information sharing (Ellinger, Daugherty and Keller 2000). Collaboration is based on the cooperation of the organizations on different activities based on an informal structure (Kahn and Mentzer 1996). Collaboration exists between different parties when they work together to achieve a common goal or objective (Kahn and Mentzer 1996; Tjosvold 1988). It

involves resource and information sharing as well as knowledge sharing between firms (Balakrishnan and Koza 1995; Ellinger, Keller and Daugherty 2000; Huber 1991). Collaboration requires joint efforts from both parties in order to be sustainable (Kahn and Mentzer 1996).

In addition to collaboration, coordination is essential for successful supply chain management (Fugate, Sahin and Mentzer 2006). Coordination of supply chain processes across firms provides an efficient and effective flow of products, materials, and information throughout the supply chain (Sahin and Robinson 2002). Examples of some of the techniques or initiatives that are used to ensure a high level of coordination across firms include Vendor Managed Inventory (VMI), Quick Response (QR), Collaborative Planning, Forecasting and Replenishment (CPFR), Efficient Consumer Response (ECR), and postponement (Bowersox, Closs and Stank 1999; Daugherty, Myers and Autry 1999; Frohlic 2002; Fugate, Sahin and Mentzer 2006; McCarthy and Golicic 2002). Integration is defined in this dissertation as:

> ***Supply Chain Integration*** *is the level of collaboration and coordination that exists among different organizations within a supply chain.*

Supply Chain Processes

As defined earlier, supply chain management is the systemic and strategic coordination of the traditional business functions within and across firms (Mentzer et. al. 2001). Integration mechanisms are the key dimensions characterizing supply chain management (Romano 2003). Supply chain management can be achieved through the integration of all the key business processes from end-users to original suppliers (Cagliano, Caniato and Spina 2006). Supply chain management processes include all processes involved in the acquisition and transformation of raw materials to finished goods and their delivery to customers (Srivastava, Shervani and Fahey 1999). According to Lambert and Cooper (2000), there are eight key supply chain business

processes: customer relationship management, customer service management, demand management, customer order fulfillment, manufacturing flow management, procurement, product development and commercialization, and returns. Table 2.1 summarizes each supply chain business process as defined by Lambert and Cooper (2002).

**Table 2.1 Supply Chain Business Process**

| Supply Chain Process | Definition |
|---|---|
| Customer Relationship Management | Identifying customers that are critical for the business mission and identifying the required service levels for those customers. Customer service teams coordinate with customers to further identify and eliminate sources of demand variability. |
| Customer Service Management | Informing customers with real time information on shipping and delivery dates as well as assisting the customer with product applications. |
| Demand Management | Managing the variability of demand, which is customer driven, to reduce unnecessary inventory. Marketing requirements and production plans should be coordinated on an enterprise wide basis. |
| Customer Order Fulfillment | Making sure that customer orders are fulfilled either on a line item or an order basis through an integrated manufacturing, distribution, and transportation plan. |
| Manufacturing Flow Management | Provide a flexible manufacturing environment in order to be responsive to changes in demand and provide mass customization. |
| Procurement | Strategic plans are developed with suppliers to support manufacturing flow management and new product development. Coordination is needed between suppliers and engineering to reduce cycle times. Communication tools such as (EDI) can facilitate information exchange. |
| Product Development and Commercialization | Customers and suppliers must be integrated into the product development processes to ensure a swift and timely product development and commercialization. |
| Returns | Effective process management of returns is necessary for achieving a sustainable competitive advantage by coordinating the inbound of products going from the customers back to the supplier/manufacturer. |

Adapted from: Lambert, Douglas M. and Martha C. Cooper (2000), "Issues in Supply Chain Management," *Industrial Marketing Management*, 29, 65-83.

Additional supply chain processes include managing inbound and outbound logistics (Srivastava, Shervani and Fahey 1999). The focus of this dissertation will be on supply chain processes that interface with the supplier. Other supply chain processes will not be within the scope of this study. The supply chain processes that are relevant in this context include: inbound logistics (Srivastava, Shervani and Fahey 1999), procurement, and returns (Lambert and Cooper 2000).

Definition of Global Supply Chain Process Integration

Frohlic and Westbrook (2001) define supply chain integration in two ways. The first is the forward physical flow of products through suppliers, manufacturers and customers. This includes coordinating product flows that span several firms is an area in which new opportunities for cost service improvement may be found (Ballou, Gilbert, Mkherjee 2000). The second method of integration is through collaboration through information and knowledge sharing. In this sense, supply chain process integration does not require ownership but rather stresses the harmonization of goals (Morgan and Monczka 1996).

The goal of supply chain process integration is to enhance the performance of each individual company and the supply chain as a whole. Supply chain process integration implies that business processes should be streamlined and interconnected both within and outside the company boundaries (Cagliano, Caniato and Spina 2006). Frohlich and Westbrook (2001) indicate that the purpose of supply chain process integration is to create and coordinate manufacturing processes seamlessly across the supply chain in a manner that most competitors cannot replicate. Supply chain process integration is not binary but rather a continuum that

occurs across all processes on both dimensions: collaboration and coordination. Based on a synthesis of these descriptions, supply chain process integration is defined as:

> ***Supply chain process integration*** *is the level of collaboration and coordination that exists within different supply chain processes across organizations within a supply chain.*

> ***Global supply chain process integration (GSCPI)*** *is the level of collaboration and the coordination that takes place across different supply chain processes, where at least one firm is located cross-border.*

One of the objectives of this dissertation, as highlighted in the chapter 1, is to identify the drivers of supply chain process integration. The Resource Dependence theory (RD), the Transaction Cost Analysis (TCA), and the Relational View (RV) of the firm will be used to identify the antecedents and drivers of supply chain process integration. In the next section the model of supply chain process integration is introduced with an explanation of its drivers and outcomes.

## THEORETICAL FRAMEWORK

Figure 2.2 presents the conceptual model developed and tested in this dissertation. As depicted in the figure, this dissertation suggests that global supply chain process integration is driven by global supply chain asset specificity, global supply chain uncertainties, Dependence, and supply chain orientation. Those relationships will be positively moderated by the level of cultural distance. The model also predicts that global supply chain process integration will result in a higher level of supplier flexibility which will lead to a higher level in logistics performance. Finally, the model predicts that an increased level of logistics performance will improve the overall performance of the firm.

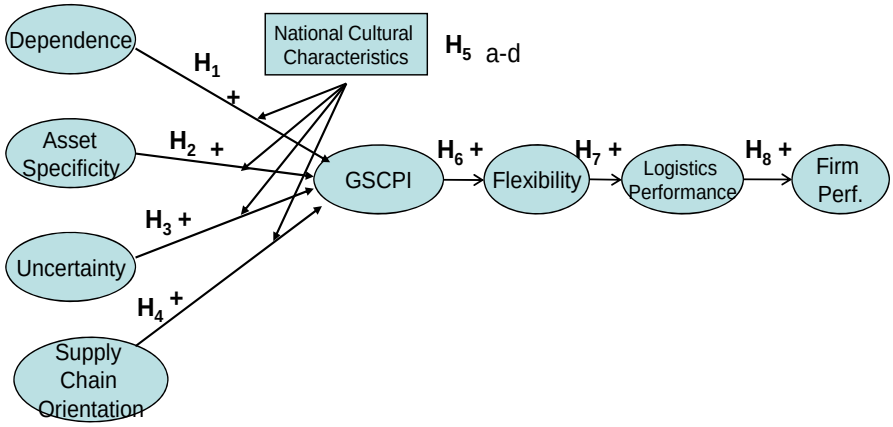


**Figure 2.2 Antecedents and Consequences of Global Supply Chain Process Integration**

The following section of chapter 2 justifies the hypotheses to be tested in this research.

DEPENDENCE AND GSCPI

The resource dependence (RD) theory emerged in the seminal article by Emmerson (1962), which stated that dependence is a function of power. The power of entity "A" over entity "B" is directly proportional to the dependence of "B" over "A" (Emmerson 1962; Handfield 1993; Pfeffer and Salancik 1978). Power is defined as the ability to evoke change in another's behavior (Wilkinson 1973). Power is also defined as the ability of a channel member to control the decision variables in the marketing strategy. There are five bases of social power: reward, coercive, legitimate, referent, and expert (French and Raven 1959). Reward power represents the ability to administer positive valences and to remove or decrease negative

valences. Coercive power stems from the expectation of one party that s/he will be punished by failing to conform to the influence of the other party. Legitimate power stems from internalized values of one party that the other party has the right to influence power. Referent power is a form of identification, a feeling of oneness, or a desire to share an identity with another party. Expert power is accepting another person's knowledge as greater in relation to one's own.

Power plays an important role in supply chains and the various sources of power have different effects over relationships (Maloni and Benton 2000). In this research, power is assumed to be an antecedent to dependence; however, the concept of power itself is not discussed in detail as it is not within the scope of this research.

The RD theory is largely based on the concept of dependence; where one actor does not entirely control all the conditions necessary for an action or a desired outcome (Handfield 1993). The basic premise of the resource dependency theory is that interfirm governance is a strategic response to conditions in an organization's environment – specifically, uncertainty and dependence (Pfeffer and Salancik 1978). The RD theory assumes that the primary objective of managers is to operate in more stable environments (Handfield 1993). Another assumption underlying RD theory is that organizations recognize their social contexts and constraints and that they make the necessary organizational adjustments to accommodate these social realities. (Handfield 1993; Pfeffer 1981). One type of adjustment to dependence is through engaging with other companies in the supply chain. Organizations engage with other groups or companies in exchanges and transactions. The transactions may be characterized as monetary, physical resources, or information. In many instances, the organization is not self sufficient, and thus relies on the environment for support (Pfeffer and Salancik 1978).

The level of dependence is suggested to introduce decision-making uncertainty to the degree that resource supply is not under the direct control of the focal firm (Pfeffer and Salancik 1978). Ultimately, the presence of uncertainty and dependence motivates organizations to consciously manage their relationships with exchange partners.

An organization's vulnerability to external influence is determined by the extent to which the organization has come to depend on certain types of exchanges for its operations. The critical factors that may affect the degree of interdependence among firms are the importance of the resource, the extent to which the interest group has discretion over it, and the availability of other resources (Handfield 1993). The lack of self sufficiency introduces uncertainty in the decision making of a firm (Heide 1994). Firms will try to reduce uncertainty and manage dependence by purposely structuring their exchange relationships as a means of establishing formal or semi-formal links (Ulrich and Barney 1984). The RD theory states that in the face of uncertainty, firms may establish collective structures of inter-organizational actions through a negotiated environment (Cyret and March 1963; Handfield 1993; Heide 1994). This can be done through social coordination of interdependent actors (Cyret and March 1963).

A negotiated environment can be achieved through the social coordination of the interdependent actors of a supply chain (Cyret and March 1963). This coordination may be attained through a higher level of information sharing, product flow coordination and mutual decision making, as opposed to unilateral decision making processes. Coordination among supply chain members increases inter-firm links as well as strengthens the current links among those firms. Inter-firm links are established when problems of uncertainty and dependence are addressed by deliberately increasing the coordination with the relevant set of exchange partners (Heide 1993).

Firms try to manage their dependence by constantly establishing links with other supply chain members (Ulrich and Barney 1984). In some cases this dependence could be managed through formal links such as vertical integration. Vertical integration is sometimes seen as a disadvantage as it makes firms less flexible in a constantly changing and unpredictable environment. Consequently, the alternative choice to those formal links is having close relationships and a higher level of collaboration and coordination among supply chain members. The higher the level of Dependence between firms, the higher the need for collaboration and coordination of activities and processes among those firms (Jaspers and Ende 2006).

**$H_1$**: A higher level of dependence leads to a higher level of global supply chain process integration.

ASSET SPECIFICITY AND GSCPI

TCA can also be used to explain the relationship between the level of supply chain asset specificity and global supply chain process integration. Several authors have studied the effect of channel customization in the form of asset specificity or the amount of non fungible resources deployed in a specific relationship.

Aulakh and Kotabe (1997) indicate that with a high level of asset specificity in a foreign distribution channel, the bargaining power is less and results in a threat of an opportunistic behavior by other members. In order to avoid opportunistic behavior in the case of high level of asset specificity, firms try to monitor their investments by working closely more with other firms.

At a high level of global supply chain asset specificity, firms are inclined to closely monitor their investments through more coordination and communication with their supply chain

members. This could be achieved through a higher level of global supply chain process integration which enables firms to better manage their customized investments in the supply chain without loosing flexibility through a vertical integration strategy.

**$H_2$**: A higher level of asset specificity results in a higher level of global supply chain process integration.

## UNCERTAINTY AND GSCPI

Transaction Cost Analysis (TCA) (Williamson 1979, 1985) is a blend of institutional economics, organizational theory, and modern contract law (Dwyer and Oh 1988). The four key assumptions of TCA are opportunism, asset specificity, uncertainty, and bounded rationality (John and Weitz 1988). Opportunism stipulates that exchange partners tend to work for their own best interest as opposed to the interest of both parties involved in that exchange (Williamson 1979, 1985). It is hard to tell ahead of time which partners may seek to serve their self interests versus others who may not. Asset specificity refers to the amount of investments made in specific relationships and exchange partners that cannot be recovered or redeployed. These investments could be in the form of specialized machinery, training of human assets, or transferring firm specific knowledge (John and Weitz 1988). Another way to account for asset specificity is assessing the degree of fungibility in a firm. Fungibility is the ability to reuse certain resources in different situations or for distinct product segments (Anand and Singh 1997). The third key element of TCA is uncertainty. There are two types of uncertainty: behavioral and environmental. Behavioral uncertainty occurs when downstream resellers find it difficult to ascertain actual performance, adherence to contractual agreements or identify false claims. Environmental uncertainty refers to the circumstances surrounding the exchange which cannot

be predicted *ex ante*. The last element of TCA is bounded rationality which denotes that managers or decision makers have constraints on their cognitive capabilities and limitations on their rationality.

TCA suggests that organizational performance could be improved when the governance structure is in congruence with the dimension of exchange (Robicheaux and Coleman 1994). Within this context, TCA was utilized in various studies in an attempt to explain foreign entry modes for global supply chains (e.g., Anderson and Gatignon 1986; Aulakh and Kotabe 1997; Erramilli and Rao 1993; Hill, Hwang and Kim 1990; Huang and Hsu 2003; Kim and Hwang 1992; Klein, Frazier and Roth 1990; Li and Li 2003; Merino and Salas 2002).

Williamson (1985) explained that there are trade-offs involved when firms decide to become vertically integrated. Such trade-offs could be mitigated, while achieving the objectives of vertical integration, through intermediate supply chain structures (Williamson 1985). Process integration does not require ownership, but rather, stresses collaboration and coordination (Morgan and Monczka 1996). This is an important area for global supply chains that are in need of coordinating their processes and maintaining a certain level of flexibility. TCA can be used to explain some of the drivers of global supply chain process integration.

Both TCA and RD can be used to explain the relationship between global supply chain uncertainty and global supply chain process integration. Uncertainty resulting from different risk sources is present for most supply chains at the strategic, operational, and tactical levels (Manuj and Mentzer 2006, Schmidt and Wilhelm 2000). This uncertainty becomes amplified in a global environment due to all the additional socio, economic and political variances. Managing global uncertainties is one of the primary objectives for firms operating globally (Miller 1992).

According to the resource dependence theory, firms try to reduce uncertainty by purposely structuring their exchange relationships by means of establishing formal or semi-formal links (Heide1994; Pfeffer and Slancik 1978). An example of establishing such a link is through supply chain process integration. By integrating supply chain processes, firms share more information and better coordinate the movement of products. Firms desire to share more information in uncertain environments in order to be better equipped to manage those global uncertainties. Global uncertainty is going to drive firms to become more process integrated in terms of collaboration and coordination across those firms.

Demand uncertainty and lack of downstream information in global and domestic markets can result in undesirable outcomes to the firm such as high levels of unnecessary inventory or stockouts and poor customer service. Lack of information in a highly uncertain demand environment may also result in poor forecasts and in some cases the bullwhip effect. The sharing of downstream sales information at the retailer level and the use of supply chain coordination mechanisms such as VMI may help reduce the impact of the bullwhip effect (Forrester 1958; Lee et. al. 1997; Sahin and Robinson 2002). Both collaboration and coordination are necessary to avoid the potential negative financial impacts of serving a market with a high level of uncertainty.

**$H_3$**: A higher level of uncertainty results in a higher level of global supply chain process integration among firms.

## SUPPLY CHAIN ORIENTATION AND GSCPI

Bowersox, Closs, and Stank (2000) recognized knowledge-based learning as one of the ten mega-trends that will revolutionize supply chain and logistics. They suggested that managers

must understand supply chain dynamics and use information-based tools to develop and implement effective strategies. In the case of global supply chains, it is inter-organizational relationships that support operational exchange and can serve as a key source of learning. Therefore, relationships should be managed in ways that facilitate inter-organizational learning (Inkpen 1998). By building relationships with supply chain members, firms can develop a unique set of capabilities. This can occur when multiple firms within the same supply chain develop inter-firm knowledge sharing routines, use effective governance mechanisms, and exploit complementary capabilities (Dyer and Singh 1998; Esper et. al. working paper). Inter-firm knowledge and stronger supply chain relations with suppliers or customers can provide a competitive advantage specifically in an environment characterized by a high level of uncertainty.

The relational view of the firm states that a firm may develop a competitive advantage through a network of other firms (Esper et. al. working paper; Dyer and Singh 1998). This competitive advantage is achieved when there is sufficient inter-organizational information sharing (Dyer and Singh 1998; Esper et. al. working paper).

Trust has an impact on the level of information and knowledge sharing (Anderson and Narus 1990; Coleman 1990). Trust between supply chain members is critical in the successful implementation of VMI (Waller, Johnson and Davis 1999).Commitment is an essential ingredient to long term relationships and supply chain management implementation (Dwyer, Schurr and Oh 1987). Trust and commitment are essential determinants of supply chain collaboration (Speh 2003).

Cooperative norms are crucial to the efforts of collaboration and coordination of supply chain members (Min, Mentzer and Ladd, forthcoming; Siguaw, Simpson and Baker 1987).

Trust, Commitment and cooperative norms are all essential for integrated relationships among firms (Benton and Maloni 2000). Compatible corporate cultures and top management support are also important issues that are necessary for implementing supply chain management practices such as collaboration and coordination of processes across firms (Bucklin and Sengupta 1993; Cooper, Lamber and Pagh 1997). A strong supply chain orientation by the firm should result in a higher level of collaboration and coordination among supply chain members.

**$H_4$**: A higher level of supply chain orientation results in a higher level of global supply chain process integration.

## NATIONAL CULTURAL INFLUENCES

Of the all the contextual influences Bowman, Farley, and Schmittlein (2000) discuss, the role of culture has arguably received the most attention in international business research (Nakata and Pokay 2004). Culture is a multi-level concept where various levels of cultural phenomena are nested within each other from the macro-level of global culture, through national cultures, organizational cultures, group cultures, and individual's cultural values (Leung et al. 2005). Of these types, national culture is most often examined in international business research and has been defined as patterns of thinking, feeling, and acting rooted in common beliefs and conventions of society (Nakata and Sivakumar, 2001).

From the perspective of a company that sources, scholars demonstrate that culture can play a significant role in shaping buyer search criteria, referral behavior (Money, Gilly, and Graham 1998), perceived service quality (Bolton and Myers 2003), and consumer's perceived value (Overby et al., 2004). A majority of international business behavior studies involve end consumers (e.g., Hofstede, Steenkamp, and Wedel 1999), but there are a handful of recent

studies by Homburg and his colleagues (2002, 2003, 2005) that simultaneously examine business buyer's behavior across the U.S. and Germany.

Findings from two of these studies show that geographic distance between buyers and sellers can negatively influence customers' perceptions of provider benefits (Homburg et al. 2002), and that cultural dimensions of individualism and uncertainty avoidance (Hofstede 1980) demonstrate diverse effects for German versus U.S. buyers' perceived benefits (Homburg et al. 2005). Yet, a close examination of the supported hypotheses for cultural differences based on effect sizes and chi-square difference tests, e.g., .01 for Germans versus .08 for Americans at $p \leq$ .10 (as an exemplar), calls into question the practicality of these differences for understanding buyer behavior. While subtle differences can be intriguing, the concern about whether differences have practical relevance relates to a continuing debate on whether customers' needs around the world are converging (Heuer, Cummings, and Hutabarat 1999; Levitt 1983).

For example, whereas marketing research often responds to cultural differences with suggestions for customizing strategies for individual countries, Farley and Lehmann (1994, p. 11) offer a different view by suggesting that "the myth in international business is that everything is different." They suggest that researchers can mistakenly interpret the absence of "universal" perceptions or behavior as the presence of "complete idiosyncrasy." Farley and Lehmann review cultural studies in four top marketing journals and two international journals and find the majority of authors expect to find differences and commonly base findings on discrepancies in country means rather than differences in response sensitivities that explain significant variance in key outcomes.

Recent studies support the idea that significant commonalities in firm behavior can be found across countries. Bowman, Farley, and Schmittlein (2000) test several factors representing

business buyers' preferences for foreign exchange services across four countries and show that their needs demonstrate greater similarities than differences. Specifically, they find that cultural-specific deviations from main effects occur in only 25 of 140 cases. Also, at least two segmentation studies (i.e., Bolton and Myers 2003; Hofstede, Wedel, and Steenkamp 2002) find horizontal markets where sets of common buyer needs transcend national borders (Kinnear 1999).

Additionally, several distinctions of business markets might mitigate cultural effects (Leung et al. 2005). Research shows instances where the impact of national culture is overshadowed by factors like unique personalities (Early and Gibson 2002), strong leadership (Wetlaufer 1999), organizational culture (Erez-Rein, Erez, Maital 2004), or uniformity of practices (Maznevski and Chudoba 2000). In other cases, culture demonstrates a statistically significant relationship with outcomes, but explains such little variance that other variables take precedence (Brett and Okumura 1998; Clugston, Howell, and Dorman 2000; Gibson 1999; Kirkman and Shapiro 2001; Mitchell et al. 2000; Peterson et al. 1995). Finally, some scholars continue to question the basic assumption that culture has a chronic, dispositional influence in light of recent evidence showing individuals can activate cultural knowledge based on situations – or that people with exposure to multiple cultures (i.e. bi-culturals, multi-culturals) are influenced by culture in significantly different ways (Aaker 2000; Lau-Gesk 2003).

This study concurs with a "middle-ground" perspective offered by Farley and Lehmann (1994) and tested by Bolton and Myers (2003), and suggests that – while culturally-inflected differences in drivers of GSCPI likely exist for business customers across countries – significant commonalities will emerge that demonstrate groups of horizontal segments as opposed to vertical countries (Kinnear 1999). To explore this possibility and control for the effects of

culture, this study utilizes Hofstede's (1980) culture theory which is recognized as the dominant national culture paradigm, due mostly to consistent replication and correspondence with findings in over 30 other studies (Sondergaard, 1994, Sivakumar and Nakata, 2001).

**$H_5$**a: Cultural distance positively moderates the relationship between dependence and GSCPI.

**$H_5$**b: Cultural distance positively moderates the relationship between global uncertainty and GSCPI.

**$H_5$**c: Cultural distance positively moderates the relationship between asset specificity and GSCPI.

**$H_5$**d: Cultural distance positively moderates the relationship between supply chain orientation and GSCPI.

GSCPI AND FLEXIBILITY

As the relational view theory states, inter-firm relationships can be a source of a competitive advantage. Inter-organizational relationships support operational exchange and can serve as a key source of learning. One of the ways where inter-firm learning can be leveraged across supply chain members is through a higher level of collaboration and coordination. A higher level of collaboration will lead to a higher level of knowledge and information sharing. By strengthening relationships with global supply chain members, firms can develop a unique set of capabilities such as a higher level of flexibility.

Tracey (2004) explains that one of the ways to develop a higher level of flexibility, in constantly changing environment, is through process integration of both a firm and its supplier. The use of knowledge and expertise of supply chain members to complement and enhance

internal capabilities may help reduce concept-to-customer cycle time, costs, quality problems, and improve the overall design effort by becoming more flexible (Ragatz et. al. 2002). The New Product Development (NPD) process in a global supply chain is a good illustration of using process integration as a tool to develop a higher level of flexibility for improving process performance.

**$H_6$**: A higher level of global supply chain process integration results in a higher level of supplier flexibility.

## FLEXIBILITY AND LOGISTICS PERFORMANCE

Flexible supply chains are better equipped to respond to changes in the global environment. Several supply chain risk management strategies such as postponement or hedging have flexibility as prerequisite or are severely hampered because of lack of flexibility (Manuj and Mentzer, Forthcoming; Lessard and Lightstone 1986). Maintaining a competitive advantage is no longer achieved by low costs and high quality alone, flexibility has become an essential component in this formula (Upton 1995). Flexibility represents the main driver of competitive advantage and market leadership for several firms and organizations (Fawcett, Calantone and Smith 1996). Flexibility provides firms the capacity to adapt to unforeseen changes or uncertainties in the environment with the minimum effort, cost, and time. This allows firms to become more efficient (less effort and cost to respond to changes) and more effective (less time) than competition.

As defined by Mentzer and Konrad (1991) logistics performance is achieved through a higher level of logistics efficiency and effectiveness. Efficiency is the amount of resources used or utilized to achieve specific objectives while effectiveness is the extent to which those

objectives are achieved (Mentzer and Konrad 1991). Thus an increase in the level of supplier flexibility should provide its customers with an added competitive advantage that could improve both process efficiency and effectiveness. Bobbitt (2004) developed a scale to measure logistics performance and this scale was also adopted by Fugate (2006). Several concerns regarding the face validity and dimensional accuracy (discussed in more details in chapter 3) of that scale led to the development of a new logistics performance scale in this study.

**$H_7$**: Higher levels of supplier flexibility result in higher levels of logistics performance.

## LOGISTICS PERFORMANCE AND FIRM PERFORMANCE

The performance of an organization may be defined as the extent to which goals are achieved (Chow, Heaver, and Henriksson 1994). Firm performance needs to be considered alongside several dimensions. The use of a single measure is sometimes attractive for simplicity and ease (Beamon 1999), but using a single measure to evaluate performance can be misleading and inaccurate (Mentzer and Konrad 1991). Beamon (1996) revealed major issues with using a single measure to evaluate supply chain or firm performance. Those measures lacked inclusiveness, universality, measurability, and consistency (Beamon 1999).

Performance can be measured along two main outcomes: efficiency and effectiveness. Efficiency is defined as the amount of resources used by the organization to achieve its target (Mentzer and Konrad 1991). This could be demonstrated through financial indicators such as the return on assets ratio (ROA) – total assets divided by total sales. A firm can increase its efficiency by increasing its volume of sales for the same amount of total assets or by reducing total assets for the same volume of sales.

Mentzer and Konrad (1991) define effectiveness as the extent of achieving the goals or objectives set forth by an organization. Measuring efficiency without measuring effectiveness is partially successful (Mentzer and Konrad 1991). This can be addressed through the effectiveness of the firm. One of the ways to improve the overall firm efficiency and effectiveness of the firm is through a higher level of logistics performance.

Firms are increasingly creating inimitable distinctive capabilities through their logistics processes to create a competitive advantage (Barney and Muhanna 2004; Makhija 2003; Fawcett, Calantone and Smith 1996; Lynch, Keller and Ozment 2000). Traditionally, logistics activities have been thought of as move and store activities such as warehousing, inventory management, transportation, inbound logistics, outbound logistics, and order processing. But logistics is more than just 'move and store.' Many of the distinctive capabilities firms develop revolve around cycle time compression and order and delivery accuracy (Bowersox, Mentzer and Speh 1995; Daugherty and Pittman 1995; Shore and Venkatachalam 2003; Stank, Davis and Fugate 2005; Zhoa, Droge and Stank 2001).

Logistics' purpose is to make products available to customers on a timely basis (Novack, Rinehart and Wells 1992). Thus, firms focusing on managing the elapsed time between a customer's order placement and receipt of the desired property (LaLonde and Masters 1994) strive to eliminate wasted time, effort, and inventory in developing their logistics capability (Daugherty and Pittman 1995; Larson and Lusch 1990; McGinnis and Kohn 1993). Such time responsiveness of the move/store activities (Carter and Hendrick 1996; McGinnis and Kohn 1990) enables a firm to translate an order into a finished product quickly and accurately, thus, capturing the time-sensitive buyers better than competitors (McGinnis and Kohn 1993). Reducing total order cycle time as well as the variability required for order transmittal, order

processing, order preparation, and transit also allows businesses to respond to demand fluctuations with less distortion of the order cycle process (Daugherty and Pittman 1995; Mcginnis and Kohn 1990). This can improve firm performance by improving customer satisfaction, reducing order processing costs, and reacting quicker to changes in the environment.

**$H_8$**: A higher level logistics performance results in a higher level of firm performance.

## CHAPTER SUMMARY

This chapter provided the theoretical justification from which the supply chain process integration model was developed. The theoretical justification was based on a literature review of resource dependence, transaction cost analysis, and relational views of the firm. The theory was integrated with existing relevant studies to provide antecedent justification for the relationships between the different constructs presented in the model. Six research hypotheses that represent the relationships between the model constructs were presented and are summarized in Table 2.2.

**Table 2.2 Summary of Hypotheses**

| Hypothesis | Description |
|---|---|
| $\mathbf{H_1}$ | A higher level of dependence results in a higher level of global supply chain process integration. |
| $\mathbf{H_2}$ | A higher level of uncertainty results in a higher level of global supply chain process integration among firms. |
| $\mathbf{H_3}$ | A higher level of asset specificity results in a higher level of global supply chain process integration. |
| $\mathbf{H_4}$ | A higher level of supply chain orientation results in a higher level of global supply chain process integration. |
| $\mathbf{H_{5(a-d)}}$ | Cultural distance positively moderates the relationship between the four antecedents (dependence, global uncertainty, asset specificity, and supply chain orientation) and global supply chain process integration. |
| $\mathbf{H_6}$ | A higher level of global supply chain process integration results in a higher level of supplier flexibility. |
| $\mathbf{H_7}$ | A higher level of supplier flexibility results in a higher level of logistics performance. |
| $\mathbf{H_8}$ | A higher level of logistics performance results in a higher level of firm performance. |

# CHAPTER 3 – METHODOLOGY

This chapter provides details of the procedures used for testing the theoretical hypotheses presented in Chapter two. First, the hypotheses are reviewed and the theoretical model is presented as a structural equation model. Next, the research design for the pretest and final test is described, including a discussion of the sampling procedure and the data collection methods that were used. This is followed by a description of the measurement development process, including details on the construct operationalization and scale development. Construct measures were developed using three sources: (1) extant literature, (2) exploratory qualitative inquiry, and (3) several pilot tests. Finally, details on the final collection and analysis of data are presented.

## STRUCTURAL EQUATION MODELING

This section provides the theoretical global supply chain process integration model (GSCPI) introduced in Chapter 2 in the form of a structural equation model. The GSCPI in Figure 3.1 identifies five exogenous (independent) variables and four endogenous (dependent) variables. The exogenous variables are dependence, uncertainty, asset specificity, supply chain orientation, and cultural distance. The endogenous variables are global supply chain process integration, supplier flexibility, logistics performance, and firm performance. The nomological network of all the exogenous and endogenous variables is presented by the relationships among the nine constructs, represented by the directional paths shown in Figure 3.1.

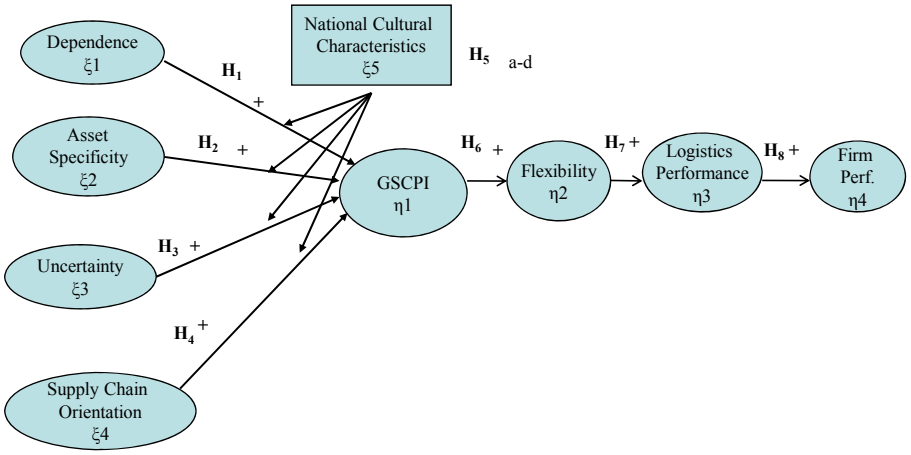


**Figure 3.1 Global Supply Chain Process Integration**

The hypotheses are reviewed below:

$H_1$: A higher level of supplier dependence results in a higher level of global supply chain process integration.

$H_2$: A higher level of asset specificity results in a higher level of global supply chain process integration.

$H_3$: A higher level of uncertainty results in a higher level of global supply chain process integration among firms.

$H_4$: A higher level of supply chain orientation results in a higher level of global supply chain process integration.

$H_5$: Cultural distance positively moderates the relationship between the four antecedents (dependence, global uncertainty, asset specificity, and supply chain orientation) and global supply chain process integration.

H6: A higher level of global supply chain process integration results in a higher level of supplier flexibility.

H7: A higher level of supplier flexibility results in a higher level of logistics performance.

H8: A higher level of logistics performance results in a higher level of firm performance.

## RESEARCH DESIGN

A research design is the plan and structure of an investigation, conceived so as to obtain answers to research questions (Hendrick and Jones 1972). To gather the necessary data to test the hypotheses, non-experimental survey methodology (Kerlinger and Lee 2000) was employed. Survey research can capture a significant and precise amount of information from large populations within sampling error (Babbie 1990; Fowler 2002; Kerlinger and Lee 2000). Accuracy is high, especially when good sampling procedures are followed such as those proposed by Dillman (2000). Surveys have a unique advantage among scientific methods since we can check the validity and the reliability of the data (Kerlinger and Lee 2000).

Survey methodology using online surveys were used as they result in data that is easily quantifiable and suitable for statistical testing for significant results. Mail and internet surveys have about the same response rate but internet surveys are more efficient (Dillman 2000). According to Dillman (2000), web survey methods can offer significant advantages, including greater efficiencies over other survey types, easier access to respondents, shorter time for implementation, and the ability to provide a more dynamic interaction between the respondent and the questionnaire. In addition, surveys reduce the degree of interviewer bias or variability (Boyd and Westfall 1955) and are suitable for collecting a large number of responses in a relatively cost-effective manner, with the possibility of having responses from geographically dispersed respondents.

One of the challenges of internet surveys is gaining the respondents' trust that the study is authentic and not a disguise for a marketing promotion. This was addressed by calling and pre-qualifying the potential respondents and providing them with background information about the research team and the objective of the research. The following section describes the sampling plan that was undertaken, which is followed by a discussion of the data collection methods used for testing the theory.

## DATA COLLECTION

A range of organizations from various industries were sampled in order to achieve a reasonable level of external validity (Cook and Campbell 1979; Shadish, Cook and Campbell 2002) and generalizability. The sample included respondents representing US based firms that operate in various industries and that dealt with suppliers located overseas.

### SAMPLING

As shown in Figure 3.2, the sample for this dissertation was manufacturing firms based in the United States, procuring or sourcing some or all of their products from cross-border suppliers.

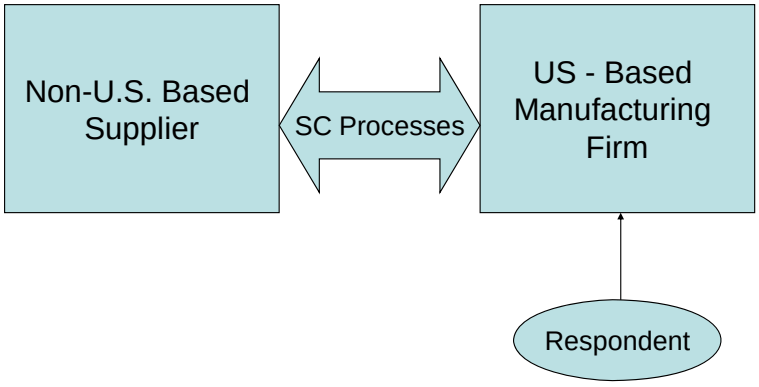


**Figure 3.2 Target Respondents**

This dissertation focuses on the supply chain processes involved between the US based manufacturing firm and one of its non-US based suppliers. Those processes include: procurement, inbound logistics, and returns management. Other supply chain processes will not be within the scope of this research. The target respondents were the organization's mid- and top-level logistics managers, purchasing managers, or supply chain managers. Such individuals are believed to have a higher degree of knowledge of supply chain processes with upstream suppliers and downstream customers and act as key informants for their organizations. John and Reve (1982) found the key informant approach to be a valid way to study business relationships, and recent examples reveal the continued use of this technique in several business-to-business studies (Jap 1999; Selnes and Sallis 2003). Within this approach, key informants were asked to explain the behavior of organizations rather than individuals (Seidler 1974), and based on this necessary expertise were chosen based on their qualifications.

To gain access to informants for this dissertation, samples were drawn from the databases of third-party firms that maintain contact information for business professionals. Two companies in that category that were used in this study included "INFOUSA.com" and "Dun & Bradstreet". Those are companies that provide their customers with a contact list of business managers that may potentially fill out the surveys. Potential respondents were then pre-qualified over the phone with questions designed to ascertain their expertise and job responsibilities when dealing with their suppliers or customers. Respondents that met the qualifications were then asked to participate in the research.

## SURVEY PROCEDURES

The majority of the data for the pre-test and the main test was collected using a web survey (over 95%). Other respondents chose to fill out the survey by hand and fax it to the research team. Respondents were able to access the survey through a hyperlink embedded in an e-mail that was sent to them after the pre-qualification call.

The respondents were approached by an initial pre-qualification phone call to establish suitability for the study. After the initial phone call, a multiple-contact strategy was implemented using several follow-ups with individuals who agreed to take the survey but did not log-in to the website in a few days. Follow-ups included additional phone calls and e-mail reminders. An executive summary of the findings upon request was offered as an incentive for participants. Since the target firms in this sample were all based in the US, translation of the survey to other languages was not required.

## CONSTRUCT MEASUREMENT

The first step in developing measures for non-experimental survey methodology was to operationalize the constructs of interest (Dillman 2000). The construct operationalizations were based on the definitions described in Chapter two. A summary of the theoretical and operational definition of each construct is presented in Table 3.1.

**Table 3.1 Theoretical and Operational Definitions of Constructs**

| Construct | Theoretical Definition | Operational Definition |
|---|---|---|
| Dependence | The inability of a supply chain member to accomplish tasks without the involvement of another firm. | The importance of a resource to a firm in addition to the availability of other alternative resources and the cost of switching to other suppliers. |
| Uncertainty | Inability to predict a supply chain event accurately due to the presence of different risk factors in the global environment. | Random outcomes in the environment due to demand variability, political instability, economic instability, or market competitiveness. |
| Asset specificity | The level of resources or assets, that are non fungible and cannot be deployed to other supply chains without a large loss in value, specifically tailored or customized to be used within a global supply chain member. | The level of physical assets, training, and software that is invested in a supply chain member that cannot be easily transferred to other supply chain members without a considerable loss. |
| Supply Chain Orientation | The recognition by an organization of the systemic and strategic implications of the tactical activities involved in managing the various flows of the supply chain. | The degree to which the focal firm exhibits the following characteristics towards other supply chain members: credibility, benevolence, commitment, and cooperative norms. Also, there must be organizational compatibility between the focal firm and the other supply chain member in addition to top management support. |
| Cultural Distance | The cultural distance between a manufacturing firm and its supplier. | Total score using Kogut and Singh (1988) formula to calculate CD based on the Hofstede's (2001) four dimensions. |
| Global Supply Chain Process Integration | The degree of collaboration and the coordination that takes place across different supply chain processes, where at least one firm is located cross borders. | Information sharing, knowledge sharing, product coordination and flow, and resource sharing across different supply chain processes (supplier related processes) using formal or informal structures. |

| Construct | Theoretical Definition | Operational Definition |
|---|---|---|
| Supplier Flexibility | The ability of a supplier to respond to changes in the environment. | The ability to respond or adapt to changes with the minimum time and resources. |
| Logistics Performance | Efficiency and Effectiveness relative to competition | Efficiency in terms of the ratio of inputs to outputs (relative to competition) and effectiveness in terms of achieving the required objectives (relative to competition) |
| Firm Performance | The extent to which the goals of the firm are achieved. | The firm's performance relative to competition along the dimensions of profitability, timelines, and growth. |

For each of the constructs, multi-item measures will be used to increase reliability, decrease measurement error, allow for greater distinction among respondents, and minimize the specificity associated with each item when multiple items are averaged (Churchill 1979). According to Anderson and Gerbing (1988), each construct should consist of 3-5 items in order to effectively measure the construct and analyze it using structural equation modeling. The following section explains how each construct will be measured.

DEPENDENCE

Dependence was defined earlier in chapter two as the inability of an organization to accomplish its tasks or objectives without the involvement of another organization such as a supplier or a customer. Dependence is a function of the importance of a resource or a market to the organization (Handfield 1993; Pfeffer and Salancik 1978), the extent to which one firm has discretion over that resource or market, the availability of alternatives for that resource or market

for the firm (Handfield 1993; Pfeffer and Salancik 1978; Tesfom Lutz, and Ghauri 2004), and the difficulty of replacing the supplier/customer (Heide and John, 1988). Based on a synthesis of the information above and the discussion presented earlier in chapter two, the domain of Dependence is defined through the following elements:

1. The firm cannot accomplish its tasks without the involvement of the other supply chain member (supplier or customer).
2. Replacing the supplier/customer involves high switching costs.
3. There are no alternatives for that supplier or customer.

UNCERTAINTY

Uncertainty is defined as the inability to predict an event accurately (Manuj and Mentzer 2006; Milliken 1987, Pfeffer and Salancik 1978) and in the global context it is caused by several sources of global risk. Supply chains face uncertainties regardless of whether they are domestic or global. Yet, the more global a supply chain becomes, the higher the chance of it experiencing uncertainties (Manuj and Mentzer 2006; Milliken 1987). Some of the risk sources present in the global environment include political risks (Miller 1992; Rao 2004; Razzaque 1997; Robock 1971), economic instability (Agarwal and Ramaswami 1992; Gatignon and Anderson 1988; Kim and Hwang 1992; MacCormack, Newman and Rosenfield 1994), demand variability (Forrester 1958; Lee et. al. 1997; Sahin and Robinson 2002), and market competitiveness (Cagliano, Caniato and Spina 2006; Christopher 2005; Green and Inman 2005). Global supply chain uncertainty will be measured through managers' perceptions of the different sources of risk (domain) such as political risk, economic instability, demand variability, and market competitiveness.

## ASSET SPECIFICITY

Supply chain asset specificity refers to the level of resources that are tailored to a specific supply chain member (Anand and Singh 1997; Anderson and Gatignon, 1986; Aulakh and Kotabe 1997; John and Weitz 1988). These resources are not easily recoverable if the firm wants to redeploy them with another supply chain member (Klein, Crawford and Alchian 1978). Supply chain asset specificity may take place in the form of physical or non-physical assets. Examples of physical assets include machinery or other equipment. Non-physical assets include software or training of employees (e.g., sales people). Supply chain asset specificity will be measured through managers' perceptions of investments, physical and non-physical, with their suppliers or customers. The domain of supply chain asset specificity includes investments in machinery or equipment, investments in software or other on-tangible assets, or investment in human resources and training.

## SUPPLY CHAIN ORIENTATION

Supply chain orientation is a philosophy adopted by managers to compete in the market and supply chain management is this philosophy in action (Esper et. al. working paper; Mentzer et. al. 2001). Supply chain orientation is a multidimensional construct that builds and maintains several behavioral elements such as trust, commitment, cooperative norms, organizational compatibility, and top management support (Mentzer et. al. 2001; Mentzer, Min and Zacharia 2000; Min, Mentzer and Ladd 2007). Supply chain orientation was measured based on a reflective scale that consists of the following constructs: trust, commitment, cooperative norms, organizational compatibility, and top management support. This construct is shown in Figure 3.3.

The items used to measure supply chain orientation were adapted from the existing literature (e.g. Bucklin and Sengupta 1993; Cannon and Perreault 1999; Jaworski and Kohli 1993; Kumar, Scheer, and Steenkamp 1995; Min, Mentzer and Ladd, forthcoming; Moorman, Zaltman and Deshpande 1992; Morgan and Hunt 1994; Siguaw, Simpson, and Baker 1998), and were pre-tested and refined in accordance with Dillman's (2000) pre-test procedure.

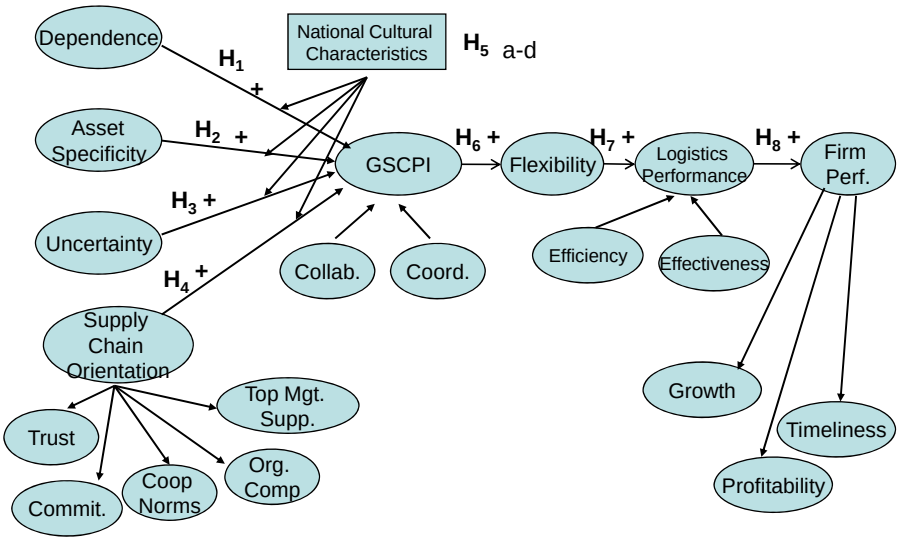


**Figure 3.3 Global Supply Chain Process Integration (Reflective and Formative Scales)**

CULTURAL DISTANCE

To assess cultural effects, this study utilizes Hofstede's empirical work on cultural dimensions (1980, 2001), which has had a predominant influence on the field in comparison to other national culture paradigms (Bearden, Money, and Nevins 2006; Steenkamp 2001). Hofstede's framework identifies four cultural dimensions that can predispose human thinking, feeling, and behavior in predictable ways, i.e. (1) *uncertainty avoidance*: individuals' tolerance for risk, change, and their corresponding desires for control over uncertain, ambiguous situations, (2) *individualism*: how people in a society perceive themselves in relation to others, such as in loose or tightly-knit social networks (3) *masculinity*: individuals' tendencies for assertive versus nurturing behavior, and (4) *power distance*: how people address social hierarchies and inequalities and among people (Hofstede 1980). These dimensions were developed on the basis of over 100,000 survey respondents in 66 countries and are most representative of middle class individuals in multinational corporations from which the sample was drawn.

Out of these four dimensions, recent buyer behavior studies (e.g., Bowman, Farley, and Schmittlein 2000; Homburg et al. 2005) indicate that two factors, uncertainty avoidance and individualism, have the most potential to influence buyers' perceptions of supplier relationships. Other researchers also indicate uncertainty avoidance and individualism as being closely related to perceptions (Cutler, Erdem, and Javalgi 1997; Roth 1995). Country scores for Hofstede's dimensions are obtained from recent research that make data readily accessible for use in cultural effects analysis (Hofstede 2001, p. 499-502). The actual cultural distance (CD) was calculated using the values available from Hofstede's (2001) study and the formula used by Kout and Singh (1988) as follows:

$$CD_{MS} = \Sigma_{i=1 \text{ to } 4}\{(I_{iM}-I_{iS})^2/V_i\}/4$$

Where $I_i$ indicates the $i^{th}$ dimension and M represents the manufacturer's home country (United States in this study), Vi represents the variance of the $i^{th}$ dimension, S represents the country where the supplier is located, and $CD_{MS}$ is the cultural distance between country of manufacturer M and supplier S.

## GLOBAL SUPPLY CHAIN PROCESS INTEGRATION

Global supply chain process integration is the degree of collaboration and coordination that takes place across different supply chain processes, where at least one firm is located in a different country. Collaboration across processes exists between different parties when they work together to achieve a common goal or objective (Kahn and Mentzer 1996; Tjosvold 1988). It involves resource and information sharing as well as knowledge sharing between firms (Balakrishnan and Koza 1995; Ellinger, Keller and Daugherty 2000; Huber 1991). Collaboration is another important component of global supply chain process integration. Examples of some of the techniques or initiatives that are used to ensure a high level of coordination across firms include Vendor Managed Inventory (VMI), Quick Response (QR), Collaborative Planning, Forecasting and Replenishment (CPFR), Efficient Consumer Response (ECR), and postponement (Bowersox, Closs and Stank 1999; Daugherty, Myers and Autry 1999; Frohlic 2002; Fugate, Sahin and Mentzer 2006; McCarthy and Golicic 2002). As shown in Figure 3.2, global supply chain process integration is a formative scale that is composed of the two constructs: collaboration and coordination. In this dissertation, the domain of collaboration and coordination includes all of the supply chain logistics processes such as order processing, inbound logistics, outbound logistics, and returns.

## SUPPLIER FLEXIBILITY

Flexibility represents the main driver of competitive advantage and market leadership for several firms and organizations (Fawcett, Calantone and Smith 1996). The concept of "flexibility" may seem very simple and easily understood. Defining flexibility is a much harder task (Upton 1995). The complexity of defining this concept is due to the fact that it has been defined through many different ways in the literature (Carlsson 1989; De Toni and Tonchia 2005; Upton 1995; Upton 1994; Wernerfelt 1984). Multiple definitions exist because flexibility is a multidimensional and polymorphous term (Golden and Powell 2000).

Stalk, Evans and Shulman (1992) define strategic flexibility along one of the competitive capabilities they discuss, "agility". Agile firms may be characterized as those firms that can thrive in a continuously changing environment where organizational structures, processes, or products can respond to changes in a useful time frame (Prater, Biehl and Smith 2001). From this view, flexibility is seen as the speed with which an organization can move from one business to another. In the new product development literature, Singh and Sushil have defined flexibility as: "the ability of the firm to change or react with little penalty in time, effort, cost, or performance, with respect to changes in the business environment, during the period of product development and introduction to the market," (Singh and Sushil 2004, p. 24). Flexibility is the ability to move from state A to state B with the least costs and minimum time (Slack 1983). Systems are considered to be more flexible if they do achieve that change in state with lower costs and shorter time periods.

The concept of flexibility in this study is defined as the capacity to adapt to unforeseen changes or uncertainties in the environment with the minimum effort, cost, and time. Whether it

is done on a strategic level, operational level, or from an organizational point of view it still deals with swiftly and efficiently dealing with uncertainties or risks that a certain firm may face.

## LOGISTICS PERFORMANCE

Several studies have operationalized logistics performance, as shown in Figure 3.4, as a formative second order construct with efficiency, effectiveness, and differentiation as the first order constructs (Bobbitt 2004; Fugate 2006).

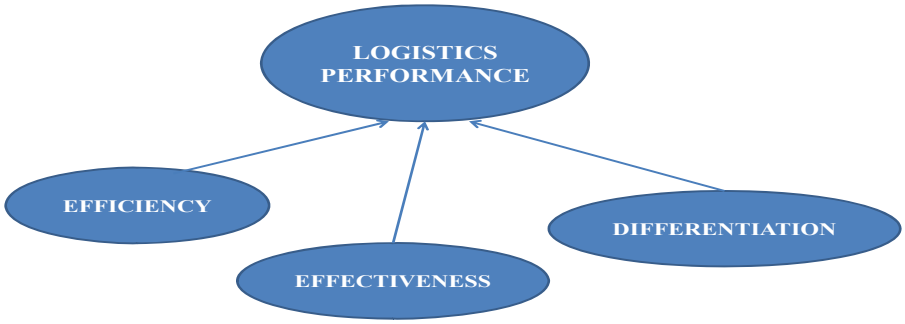


**Figure 3.4 Logistics Performance Scale**
(Source: Bobbitt (2004) and Fugate (2006)

The existing logistics performance scale (composed of efficiency, effectiveness, and differentiation) tested by both Bobbitt (2004) and Fugate (2006) was questionable for two reasons. The first reason was that differentiation by definition is a measure of the customers' perception of how different the firm is relative to its competition (Porter and Millar 1985; Stahl and Bounds 1991; Wernerfelt 1984). This means that no one else besides the customers should be qualified to answer any questions regarding differentiation. This was not the case in those two studies, where managers working for the focal firm were asked to answer questions based on their customers' perceptions, which is not appropriate.

The second issue was the face validity of the effectiveness scale. When the items of this scale were examined carefully, they seemed to be measuring efficiency (how well resources are being utilized) as opposed to effectiveness (whether or not the objectives were met).

Given these concerns about the logistics performance scale, some modifications were made to ensure the validity of the scale. First, differentiation was dropped from the scale since the respondents in this study were supply chain and purchasing managers as opposed to the customers of the firm. Second, efficiency and effectiveness were measured relative to competitors in the industry as opposed to internal benchmarks (Figure 3.5). Third, new items were introduced to measure effectiveness in order to better capture the nature of that construct.

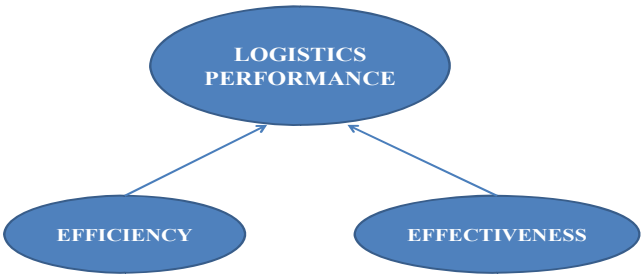


**Figure 3.5 Logistics Performance (Modified Scale)**

FIRM PERFORMANCE

Logistics performance was hypothesized earlier to have a positive impact on firm performance both in terms of efficiency and effectiveness. An improvement in the performance of logistics processes can improve firm performance by improving customer satisfaction, reducing order processing costs, and reacting quicker to changes in the environment (Daugherty and Pittman 1995; Mcginnis and Kohn 1990).

There is a lack of a consensus on a specific firm or organization performance indicator (Tan et. al. 1999). Given this lack of consensus, firm performance is operationalized in this dissertation by senior managers' perceptions of their firm's performance relative to competition along the dimensions of timeliness, profitability, and growth. Managers' perceptions of firm performance have been used in other studies as valid measures of firm performance (e.g. Fugate 2006; Kannan and Tan 2006; Min, Mentzer and Ladd 2007; Tan et. al.1999; Tan et. al. 1998). This was validated by comparing reported performance measures of a subset of firms to actual financial performance of those firms through COMPUSTAT. A significant correlation between

both the self reported and the financial measures did validate the use of perceptual measures as a proxy for actual performance (Kannan and Tan 2006; Tan et. al.1999; Tan et. al. 1998).

MARKER VARIABLE

In order to test for common method bias (Lindell and Whitney 2001; Podsakoff and Organ 1986: Menon, Bharadwaj, and Howell 1996) a marker variable was used. The marker variable is a construct that should not be theoretically related to any of the other constructs (Fugate 2006). "Formalization" will be used as the marker variable. Formalization is used to measure the degree of formalization and rules in the business place (Ferrel and skinner 1988). The scale for this construct is shown in Table 3.2.

**SURVEY PRETEST & MAIN TEST**

A pretest was conducted in order to validate both the adapted measures and the newly developed measures for this dissertation. In addition, the pretest helped identify potential problems with the design of the survey. The process also provided face validity of the measures. The five step process recommended by Dillman (2000, p. 604) was used for the implementation of the pretest survey. The pre-test was administered through a web-based survey, following Dillman (2000). Once the list was obtained from the third party, a random sample was drawn from the database for the pretest (enough to get 100 filled out surveys). This list was used for the pre-qualification calls, in which potential respondents were asked to verify their email address and other information required for pre-qualification purposes.

A first wave of emails was sent to the respondents that qualified as a result of the prequalification calls, along with a message that allowed the respondent to click on a highlighted internet address that transferred them to the web-based survey. The items that were included in the pre-test (and subsequently modified for the main test) are shown in Table 3.2. The message given to the participants explained the importance of the study and requested their participation. This was followed by a second wave to those who have not responded approximately one week after the first wave was sent. Finally, the respondents that indicated a willingness to participate yet have not responded were called to determine the status of their response. Non-response information (4 substantive questions) was collected from those that indicated an unwillingness to participate in the survey.

## Table 3.2 Sample Items

*** Denotes reverse coded items.**

| **Dependence (Dep.)** (Adapted from – Heide 1994) | **Strongly Disagree** | | | **Neutral** | | | **Strongly Agree** |
|---|---|---|---|---|---|---|---|
| 1. If we decide to stop purchasing from this supplier, we cannot easily replace their volume with purchases from other suppliers. | **1** | **2** | **3** | **4** | **5** | **6** | **7** |
| 2. There are many competitive suppliers for the components or products that we get from this supplier.* | **1** | **2** | **3** | **4** | **5** | **6** | **7** |
| 3. We cannot easily switch our production system to components from a new supplier. | **1** | **2** | **3** | **4** | **5** | **6** | **7** |
| 4. Dealing with a new supplier will require a considerable amount of redesign and development effort on our part. | **1** | **2** | **3** | **4** | **5** | **6** | **7** |
| **Uncertainty (U)** (Adapted from – Aulakh and Kotabe 1997) | **Strongly Disagree** | | | **Neutral** | | | **Strongly Agree** |
| 1. The demand for our product is characterized by a high level of uncertainty. | **1** | **2** | **3** | **4** | **5** | **6** | **7** |
| 2. Our supply is characterized by a high level of uncertainty. | **1** | **2** | **3** | **4** | **5** | **6** | **7** |
| 3. Our supplier is located in a country with a high level of political unrest. | **1** | **2** | **3** | **4** | **5** | **6** | **7** |
| 4. Our supplier is located in a country with a high level of economic unrest. | **1** | **2** | **3** | **4** | **5** | **6** | **7** |
| 5. There is a high level of competition in our industry. | **1** | **2** | **3** | **4** | **5** | **6** | **7** |
| **Asset Specificity (AS)** (Adapted from – Aulakh and Kotabe 1997; Erramilli and Rao 1993) | | | | | | | |
| 1. If we decide to replace this supplier, investments made in the following areas are not easily transferable to other suppliers: | **Strongly Disagree** | | | **Neutral** | | | **Strongly Agree** |
| a. Machinery | **1** | **2** | **3** | **4** | **5** | **6** | **7** |
| b. Training | **1** | **2** | **3** | **4** | **5** | **6** | **7** |
| c. Software | **1** | **2** | **3** | **4** | **5** | **6** | **7** |
| d. Facilities | **1** | **2** | **3** | **4** | **5** | **6** | **7** |
| e. Personnel | **1** | **2** | **3** | **4** | **5** | **6** | **7** |
| f. Other areas | **1** | **2** | **3** | **4** | **5** | **6** | **7** |

| **Supply Chain Orientation - Trust(SCO-T)** (Adapted from – Doney and Cannon 1997) | **Strongly Disagree** | | | **Neutral** | | | **Strongly Agree** |
|---|---|---|---|---|---|---|---|
| 1. This supplier keeps promises made to our firm. | **1** | **2** | **3** | **4** | **5** | **6** | **7** |
| 2. This supplier is **not** always honest with us.* | **1** | **2** | **3** | **4** | **5** | **6** | **7** |
| 3. We believe that this supplier keeps our best interest in mind. | **1** | **2** | **3** | **4** | **5** | **6** | **7** |

| **Supply Chain Orientation - Commitment (SCO-COMM)** (Adapted from – Kumar, Scheer and Steenkamp 1995; Min, Mentzer and Ladd, forthcoming) | **Strongly Disagree** | | | **Neutral** | | | **Strongly Agree** |
|---|---|---|---|---|---|---|---|
| 1. We feel it is very important to maintain our relationship with this supplier. | **1** | **2** | **3** | **4** | **5** | **6** | **7** |
| 2. We do not expect our relationship to continue with this supplier for a long time.* | **1** | **2** | **3** | **4** | **5** | **6** | **7** |
| 3. We will do what it takes to preserve our relationship with this supplier. | **1** | **2** | **3** | **4** | **5** | **6** | **7** |

| **Supply Chain Orientation – Organizational Compatibility (SCO-OC)** (Adapted from – Bucklin and Sengupta 1993; Min, Mentzer and Ladd, forthcoming) | **Strongly Disagree** | | | **Neutral** | | | **Strongly Agree** |
|---|---|---|---|---|---|---|---|
| 1. Our goals and objectives are consistent with those of our supplier. | **1** | **2** | **3** | **4** | **5** | **6** | **7** |
| 2. The culture of our firm is similar to that of this supplier. | **1** | **2** | **3** | **4** | **5** | **6** | **7** |
| 3. Our executives have a management style different from this supplier.* | **1** | **2** | **3** | **4** | **5** | **6** | **7** |

| **Supply Chain Orientation – Cooperative Norm (SCO-N)** (Adapted from – Min, Mentzer and Ladd, forthcoming) | **Strongly Disagree** | | | **Neutral** | | | **Strongly Agree** |
|---|---|---|---|---|---|---|---|
| 1. Our business unit is willing to make cooperative changes with this supplier. | **1** | **2** | **3** | **4** | **5** | **6** | **7** |
| 2. We believe our supply chain members must work together to be successful. | **1** | **2** | **3** | **4** | **5** | **6** | **7** |
| 3. We view our supply chain as a value added piece of our business. | **1** | **2** | **3** | **4** | **5** | **6** | **7** |

| **Supply Chain Orientation – Top Management Support (SCO-TMS)** (Adapted from – Min, Mentzer and Ladd, forthcoming) | **Strongly Disagree** | | | **Neutral** | | | **Strongly Agree** |
|---|---|---|---|---|---|---|---|
| 1. Top managers repeatedly tell employees that building, maintaining, and enhancing long-term relationships with our supply chain members are critical to this business unit's success. | **1** | **2** | **3** | **4** | **5** | **6** | **7** |

| | | | | | | | |
|---|---|---|---|---|---|---|---|
| 2. Top managers repeatedly tell employees that sharing valuable strategic/tactical information with our supply chain members is critical to this business unit's success. | **1** | **2** | **3** | **4** | **5** | **6** | **7** |
| 3. Top managers repeatedly tell employees that sharing risk and rewards with our supply chain members is critical to this business unit's success. | **1** | **2** | **3** | **4** | **5** | **6** | **7** |
| **Overall GSCPI – (GSCPI)** | **Strongly Disagree** | | | **Neutral** | | | **Strongly Agree** |
| 1. We have a high level of process integration with this supplier. | **1** | **2** | **3** | **4** | **5** | **6** | **7** |
| 2. We share information and knowledge with this supplier. | **1** | **2** | **3** | **4** | **5** | **6** | **7** |
| 3. We have coordination mechanisms for product movement and flow with this supplier. | **1** | **2** | **3** | **4** | **5** | **6** | **7** |
| **Global Supply Chain Process Integration - Collaboration (GSCPI COLLAB)** (Adapted from Min, Mentzer and Ladd, forthcoming) | **Strongly Disagree** | | | **Neutral** | | | **Strongly Agree** |
| 1. We participate jointly with our supplier in decisions related to: | | | | | | | |
| a. Inbound flow of material | **1** | **2** | **3** | **4** | **5** | **6** | **7** |
| b. Procurement | **1** | **2** | **3** | **4** | **5** | **6** | **7** |
| c. Returns | **1** | **2** | **3** | **4** | **5** | **6** | **7** |
| 2. We share information with our supplier on the following processes: | | | | | | | |
| a. Inbound flow of material | **1** | **2** | **3** | **4** | **5** | **6** | **7** |
| b. Procurement | **1** | **2** | **3** | **4** | **5** | **6** | **7** |
| c. Returns | **1** | **2** | **3** | **4** | **5** | **6** | **7** |
| 3. We share knowledge and specific know–how with our supplier on the following processes: | | | | | | | |
| a. Inbound flow of material | **1** | **2** | **3** | **4** | **5** | **6** | **7** |
| b. Procurement | **1** | **2** | **3** | **4** | **5** | **6** | **7** |
| c. Returns | **1** | **2** | **3** | **4** | **5** | **6** | **7** |
| **Global Supply Chain Process Integration - Coordination (GSCPI-CORD)** (Adapted from Japp 1999; Min, Mentzer and Ladd, forthcoming) | **Strongly Disagree** | | | **Neutral** | | | **Strongly Agree** |
| 1. We have reduced formal organizational structures to more fully integrate operations with our supplier in the following processes: | | | | | | | |
| a. Inbound flow of material | **1** | **2** | **3** | **4** | **5** | **6** | **7** |
| b. Procurement | **1** | **2** | **3** | **4** | **5** | **6** | **7** |
| c. Returns | **1** | **2** | **3** | **4** | **5** | **6** | **7** |

| | | | | | | | |
|---|---|---|---|---|---|---|---|
| 2. We coordinate operations with our supplier in the following areas: | | | | | | | |
| a. Inbound flow of material | **1** | **2** | **3** | **4** | **5** | **6** | **7** |
| b. Procurement | **1** | **2** | **3** | **4** | **5** | **6** | **7** |
| c. Returns | **1** | **2** | **3** | **4** | **5** | **6** | **7** |
| 3. Our firm and this supplier place personnel at each other's facilities to facilitate coordination in the following areas: | | | | | | | |
| a. Inbound flow of material | **1** | **2** | **3** | **4** | **5** | **6** | **7** |
| b. Procurement | **1** | **2** | **3** | **4** | **5** | **6** | **7** |
| c. Returns | **1** | **2** | **3** | **4** | **5** | **6** | **7** |

| **Flexibility – (FLEX)** (Adapted from Swafford, Ghosh and Murthy 2006) | **Strongly Disagree** | | | **Neutral** | | | **Strongly Agree** |
|---|---|---|---|---|---|---|---|
| 1. This supplier can respond quickly to unexpected: | | | | | | | |
| a. Changes in demand | **1** | **2** | **3** | **4** | **5** | **6** | **7** |
| b. Changes in supply | **1** | **2** | **3** | **4** | **5** | **6** | **7** |
| c. Political changes in the supplier's home country | **1** | **2** | **3** | **4** | **5** | **6** | **7** |
| d. Economic changes in the supplier's home country | **1** | **2** | **3** | **4** | **5** | **6** | **7** |
| e. Actions by our competitors | **1** | **2** | **3** | **4** | **5** | **6** | **7** |

| **Logistics Performance – Overall (LPERF-O)** (Adopted from: Fugate 2006) | **Strongly Disagree** | | | **Neutral** | | | **Strongly Agree** |
|---|---|---|---|---|---|---|---|
| i. Our overall logistics performance is well above industry average. | **1** | **2** | **3** | **4** | **5** | **6** | **7** |
| ii. In general, our logistics performance is excellent. | **1** | **2** | **3** | **4** | **5** | **6** | **7** |
| ii. We are outstanding at performing our logistics processes. | **1** | **2** | **3** | **4** | **5** | **6** | **7** |

| **Logistics Performance – Efficiency (LPERF-E)** (Adopted from: Bobbitt 2004; Fugate 2006) | **Poor** | | | **Average** | | | **Excellent** |
|---|---|---|---|---|---|---|---|
| Respond to each of the following based on your firm's performance with respect to company objectives (during the previous fiscal year): | | | | | | | |
| 1. Percent of orders shipped to customers from the primary location designated to serve those customers. | **1** | **2** | **3** | **4** | **5** | **6** | **7** |
| 2. Line item fill rate (percentage order items the picking operation actually found). | **1** | **2** | **3** | **4** | **5** | **6** | **7** |
| 3. Percent of orders shipped on time. | **1** | **2** | **3** | **4** | **5** | **6** | **7** |
| 4. Percent of shipments requiring expediting. | **1** | **2** | **3** | **4** | **5** | **6** | **7** |

| | | | | | | | |
|---|---|---|---|---|---|---|---|
| 5. Average order cycle time. | **1** | **2** | **3** | **4** | **5** | **6** | **7** |

| **Logistics Performance – Effectiveness (LPERF –F)** (New items) | **Strongly Disagree** | | | **Neutral** | | | **Strongly Agree** |
|---|---|---|---|---|---|---|---|
| Respond to each of the following based on your firm's performance with respect to company objectives (during the previous fiscal year): | **1** | **2** | **3** | **4** | **5** | **6** | **7** |
| 1. We met our objectives for: | | | | | | | |
| 1. On time deliveries. | **1** | **2** | **3** | **4** | **5** | **6** | **7** |
| 2. Reduction in number of back-orders/stock outs. | **1** | **2** | **3** | **4** | **5** | **6** | **7** |
| 3. Reduction in shipping errors. | **1** | **2** | **3** | **4** | **5** | **6** | **7** |
| 4. Reduction in customer complaints. | | | | | | | |

| **Marker Variable – Formalization (MR) Adapted from Ferrel and Skinner (1988)** | **Strongly Disagree** | | | **Neutral** | | | **Strongly Agree** |
|---|---|---|---|---|---|---|---|
| 1. Internally in my unit, if a written rule is not specified in a certain situation, we make up informal rules as we go along.* | **1** | **2** | **3** | **4** | **5** | **6** | **7** |
| 2. Contact with my company and its representatives are on a formal pre-planned basis. | **1** | **2** | **3** | **4** | **5** | **6** | **7** |
| 3. When rules and procedures exist in my organization they are usually written agreements. | **1** | **2** | **3** | **4** | **5** | **6** | **7** |
| 4. There are many things in my business unit that are not covered by formal procedures for doing it.* | **1** | **2** | **3** | **4** | **5** | **6** | **7** |

**The following information will help the research team understand differences in various business settings. Please check all that apply.**

**(1)** Which term best describes your firm's industry?

__Automotive __Electronics __Chemicals/plastics

__Medical/pharmaceutical __Industrial products __Appliances

__Apparel/textiles __Consumer packaged goods __Other:_____

**(2)** How would you characterize the rate of change in your industry?

__Very Slow __Slow __Average __Fast __Very Fast

**(3)** What is your business unit's approximate annual sales revenue?

__Less than $1 million

__$1-50 million

__$51-500 million

__$501 million - $1 billion

__Greater than $1 billion

**(4)** How many personnel directly or indirectly report to you?_____

**(5)** What is the name of your department? _____

**(6)** How many years have you been in your department? _____

**(7)** Please provide your job title: _____

Once the surveys were completed, the data was downloaded from the Internet database into AMOS 7. The surveys were examined for respondent errors and missing data analysis was conducted to identify potential problems with the survey instrument. Missing data was examined for each respondent and each variable.

After improvements were made to the survey, as a result of the survey pre-test, the pre-test respondents were removed from the contact list. Then, the remaining potential respondents were used for the final survey. The survey was administered using the same 5-step approach as described previously in the pretest section. The final analysis was performed using structural equation modeling (SEM).

## SCALE PURIFICATION

Construct unidimensionality, reliability, convergent validity, and discriminant validity were assessed following Garver and Mentzer (1999). The measures for each variable were tested for unidimensionality to verify the existence of one latent construct underlying a set of measures (Hattie 1985). Since it provides a more stringent interpretation of unidimensionality than other methods (e.g., exploratory factor analysis, item total correlations, and coefficient alpha) (Gerbing and Anderson 1988), confirmatory factor analysis was used ( in the main test but nor for the pre-test due to the small sample size in the pre-test) to test each construct individually, then for all possible pairs, and finally for the overall measurement model and each construct in the presence of other constructs (Garver and Mentzer 1999; Medsker, Williams, and Holahan 1994). This resulted in a reduction of the number of items used to measure each construct and provided evidence of unidimensionality.

Reliability was also assessed using Cronbach's Coefficient Alpha, with the rule of thumb that an alpha above .70 indicates good correlation between the item and the true scores and a lower alpha level suggests the sample of items is a poor indicator of the construct (Churchill 1979). Furthermore, because coefficient alpha tends to underestimate scale reliability and has several limitations, Garver and Mentzer's (1999, p. 44) formulae for SEM scale reliability measures, construct reliability, and variance extracted, were calculated.

Construct validity was assessed through both convergent validity and discriminant validity. Convergent validity was judged by assessing the overall fit of the measurement model, the magnitude, direction, and statistical significance of the estimated parameters between the latent variables (Garver and Mentzer 1999). For discriminant validity, paired correlation of the constructs was performed. Correlations among the constructs of the measurement model were compared to the theoretical model and the chi-square tests were utilized to test the differences between the two.

# CHAPTER 4- DATA ANALYSIS

This chapter presents a detailed analysis of the research design and measures discussed in chapter 3. As planned a pre-test was performed prior to the launch of the main survey test. The pre-test analysis explored potential measurement and procedural modifications needed for the main test. Measurement analyses of the main test reviewed the overall data set by examining descriptive statistics, missing data, data distribution, evaluation of the scales, and tests for cross-national measurement invariance. This was followed by analyzing the structural model to test the hypotheses. Finally, the chapter concludes with a summary of the findings.

## SURVEY PRE-TEST

The pre-test was administered according to the procedures laid out in chapter three, which involved calling executives and managers from a third-party database (Dun and Bradstreet) and: (a) pre-qualifying their experience as purchasing or supply chain managers in US based manufacturing companies working with a non-U.S. based supplier and (b) requesting their participation in the web survey. Out of the 425 contacts qualified over the phone, 103 resulted in completed online surveys, yielding a response rate of 24 percent. The strategy of contacting respondents via telephone/email and requesting their participation in an Internet-based survey is a relatively new approach vis-à-vis a more traditional direct mail strategy (Dillman 2000). An early-late response test examined potential bias among respondents (Armstrong and Overton 1977). Surveys were classified as early or late based on the number of follow-ups required and the date stamps on survey submissions. An independent t-test indicated no

significant difference between early and late respondents so response bias in the pretest was not considered a concern.

DESCRIPTIVE STATISTICS

Respondents answered 77 substantive questions related to the theoretical framework and 17 questions capturing control variables and/or demographic-type questions. As shown in Table 4.1, approximately half of the 103 respondents in the pre-test sample came from either the automotive (n=15), electronics (n=13), or industrial products (n=24) industries. Other industries in this sample included aerospace, pharmaceuticals, consumer goods, furniture and home improvement, and heavy equipment.

**Table 4.1 Pre-Test Participants by Industry Type**

| | **Frequency** | **( %)** |
|---|---|---|
| Apparel/Textiles | 3 | 2.9 |
| Appliances | 1 | 1.0 |
| Automotive | 15 | 14.6 |
| Consumer Packaged Goods | 6 | 5.8 |
| Electronics | 13 | 12.6 |
| Industrial Products | 24 | 23.3 |
| Medical/Pharmaceutical | 6 | 5.8 |
| Aerospace | 4 | 3.9 |
| Other | 31 | 30.1 |
| Total | 103 | 100.0 |

The majority (95%) of the companies included in the pre-test sample reported annual sales between 1-500 million, with an equal share of companies in the range of 1-50 million and 51-500 million. Average years of experience of the respondents was 13 years with the majority holding job titles as Purchasing Managers, VP of Purchasing, or Supply Chain Managers. Each respondent had an average of 11 people reporting to him/her. One of the important pre-qualification criteria was that those individuals have enough overview of the operations involving their company and one of its global suppliers. Additional demographic information about the location of the global suppliers is shown in Table 4.2.

**Table 4.2 Location of Suppliers in the Study**

| | Number of Suppliers | Percent |
|---|---|---|
| Europe | 18 | 17.5 |
| Asia (China, India, and Japan) | 66 | 64.1 |
| Americas (Canada, Mexico, and South America) | 19 | 18.4 |
| Total | 103 | 100.0 |

## MISSING DATA ANALYSIS

Missing values were examined by case and for each survey item across cases. Complete surveys accounted for 95% of the cases and an additional 3% of the remaining cases contained five missing items or less. 15 cases contained significant missing data and were discarded, reducing the dataset to 103 (from 118). Examining item by item, missing values accounted for less than one percent (0.2%) of responses and non-significant t-tests indicated they were missing at random (MAR). Missing values were replaced using the Expectation Maximization (EM) method in SPSS, which uses an iterative process to estimate the means, covariance matrix and correlation of variables with missing values. Overall, missing values did not present any threats to the analysis in the pre-test.

## DATA DISTRIBUTION

All substantive items were measured on a seven-point scale and the majority represented statements for which respondents could respond on a scale from "strongly disagree" to "strongly agree." Mean values ranged from 2.49 to 6.05. Standard deviations ranged from 1.1 to 2.6 and min/max for all substantive items were 1 to 7 (see Table 4.3). These were considered acceptable levels of range and deviation.

Normality statistics (also Table 4.3) showed only two items from the commitment scale, CM1 and CM2, raised concerns for kurtosis (5.5 and 2.6 kurtosis statistics, respectively). Cases with extreme outliers for CM1 and CM2 were identified and examined for their influence. Pulling out these extremes (9 cases) modified statistics for CM1 and CM2 to acceptable levels of kurtosis. Potential outliers for the overall data set were assessed using the Mahalanobis $D^2$

measure, which estimates the distance in multidimensional space of each observation from the mean center of the observations (the centroid). No observations were flagged as outliers.

## Table 4.3 Pretest Items (Means, SD, and Kurtosis)

| | Minimum | Maximum | Mean | Std. Deviation | Kurtosis | |
|---|---|---|---|---|---|---|
| | Statistic | Statistic | Statistic | Statistic | Statistic | Std. Error |
| SD1 | 1 | 7 | 3.91 | 2.192 | -1.464 | .472 |
| SD2 | 1 | 7 | 3.92 | 2.003 | -1.262 | .472 |
| SD3 | 1 | 7 | 3.17 | 2.176 | -1.260 | .472 |
| SD4 | 1 | 7 | 3.56 | 2.181 | -1.616 | .472 |
| U1 | 1 | 7 | 4.11 | 1.608 | -1.004 | .472 |
| U2 | 1 | 6 | 3.42 | 1.340 | -.949 | .472 |
| U3 | 1 | 7 | 2.95 | 1.817 | -.958 | .472 |
| U4 | 1 | 7 | 3.06 | 1.685 | -.864 | .472 |
| U5 | 1 | 7 | 5.58 | 1.678 | .439 | .472 |
| AS1 | 1 | 7 | 3.79 | 2.136 | -1.379 | .472 |
| AS2 | 1 | 7 | 3.73 | 1.832 | -.847 | .472 |
| AS3 | 1 | 7 | 3.12 | 1.800 | -.588 | .472 |
| AS4 | 1 | 7 | 3.22 | 1.841 | -.489 | .472 |
| AS5 | 1 | 7 | 3.52 | 1.999 | -.965 | .472 |
| AS6 | 1 | 7 | 3.82 | 1.613 | -.014 | .472 |
| T1 | 1 | 7 | 5.20 | 1.757 | -.179 | .472 |
| T2 | 1 | 7 | 5.18 | 1.924 | -.661 | .472 |
| T3 | 1 | 7 | 4.58 | 1.918 | -1.178 | .472 |
| CM1 | 1 | 7 | 6.05 | 1.309 | 5.516 | .472 |
| CM2 | 1 | 7 | 5.74 | 1.553 | 2.589 | .472 |
| CM3 | 1 | 7 | 4.85 | 1.972 | -.813 | .472 |
| CL1i | 1 | 7 | 5.02 | 1.645 | -.084 | .472 |
| CL1p | 1 | 7 | 4.66 | 1.861 | -.754 | .472 |
| CL1r | 1 | 7 | 4.68 | 1.733 | -.241 | .472 |
| CL3i | 1 | 7 | 4.98 | 1.726 | .115 | .472 |
| CL3p | 1 | 7 | 4.85 | 1.801 | -.591 | .472 |
| CL3r | 1 | 7 | 4.69 | 1.639 | .240 | .472 |
| CL4i | 1 | 7 | 4.70 | 1.674 | -.487 | .472 |

| | Minimum | Maximum | Mean | Std. Deviation | Kurtosis | |
|---|---|---|---|---|---|---|
| | Statistic | Statistic | Statistic | Statistic | Statistic | Std. Error |
| CL4p | 1 | 7 | 4.70 | 1.725 | -.264 | .472 |
| CL4r | 1 | 7 | 4.50 | 1.726 | -.220 | .472 |
| CR1i | 1 | 7 | 4.12 | 1.510 | -.311 | .472 |
| CR1p | 1 | 7 | 4.00 | 1.435 | .133 | .472 |
| CR1r | 1 | 7 | 3.92 | 1.326 | .575 | .472 |
| CMP1 | 1 | 7 | 4.68 | 1.652 | -.161 | .472 |
| CMP2 | 1 | 7 | 3.43 | 1.763 | -1.021 | .472 |
| CMP3 | 1 | 6 | 3.09 | 1.502 | -.784 | .472 |
| NRM1 | 2 | 7 | 5.31 | 1.229 | 1.284 | .472 |
| NRM2 | 2 | 7 | 6.04 | 1.236 | 2.733 | .472 |
| NRM3 | 1 | 7 | 5.96 | 1.371 | 2.777 | .472 |
| TMS1 | 1 | 7 | 4.72 | 1.700 | -.740 | .472 |
| TMS2 | 1 | 7 | 3.97 | 1.735 | -1.070 | .472 |
| TMS3 | 1 | 7 | 3.87 | 1.696 | -.860 | .472 |
| CR2i | 1 | 7 | 5.39 | 1.443 | 1.931 | .472 |
| CR2p | 1 | 7 | 4.91 | 1.535 | .171 | .472 |
| CR2r | 1 | 7 | 4.78 | 1.533 | .368 | .472 |
| LE1 | 1 | 7 | 5.58 | 1.512 | 1.985 | .472 |
| LE2 | 3 | 7 | 5.60 | 1.097 | -.674 | .472 |
| LE3 | 2 | 7 | 5.46 | 1.297 | -.152 | .472 |
| LE4 | 1 | 6 | 3.78 | 1.455 | -.640 | .472 |
| LE5 | 1 | 7 | 4.44 | 1.655 | -.306 | .472 |
| FP1 | 3 | 7 | 5.02 | .990 | -.468 | .472 |
| FP2 | 3 | 7 | 5.03 | .985 | -.713 | .472 |
| FP3 | 1 | 7 | 4.64 | 1.170 | .496 | .472 |
| FP4 | 2 | 7 | 4.55 | 1.178 | -.192 | .472 |
| FP5 | 2 | 7 | 4.63 | 1.120 | -.207 | .472 |
| FP6 | 3 | 7 | 5.16 | 1.219 | -1.016 | .472 |
| FP7 | 2 | 7 | 5.06 | 1.290 | -.690 | .472 |
| FP8 | 2 | 7 | 4.88 | 1.316 | -.631 | .472 |
| LP1 | 1 | 7 | 4.53 | 1.356 | -.011 | .472 |

| | Minimum | Maximum | Mean | Std. Deviation | Kurtosis | |
|---|---|---|---|---|---|---|
| | Statistic | Statistic | Statistic | Statistic | Statistic | Std. Error |
| LP2 | 1 | 7 | 4.51 | 1.481 | -.334 | .472 |
| LP3 | 1 | 7 | 4.20 | 1.504 | -.873 | .472 |
| LF1 | 2 | 7 | 5.67 | 1.484 | .415 | .472 |
| LF2 | 2 | 7 | 5.27 | 1.457 | -.399 | .472 |
| LF3 | 3 | 7 | 5.71 | 1.143 | -.779 | .472 |
| LF4 | 2 | 7 | 5.45 | 1.398 | -.061 | .472 |
| CR3i | 1 | 7 | 2.46 | 2.132 | -.577 | .472 |
| CR3p | 1 | 7 | 2.57 | 2.212 | -.783 | .472 |
| CR3r | 1 | 7 | 2.49 | 2.109 | -.503 | .472 |
| Coll1 | 1 | 7 | 4.7864 | 1.48841 | -.007 | .472 |
| Coll2 | 1 | 7 | 4.8414 | 1.53311 | .331 | .472 |
| Coll3 | 1 | 7 | 4.6311 | 1.56271 | -.145 | .472 |
| Coor1 | 1 | 7 | 4.0129 | 1.36954 | .174 | .472 |
| Coor2 | 1 | 7 | 5.0259 | 1.29663 | 1.495 | .472 |
| Coor3 | 1 | 7 | 2.5049 | 2.09308 | -.899 | .472 |
| FL1 | 1 | 7 | 4.11 | 1.743 | -.976 | .472 |
| FL2 | 1 | 7 | 3.84 | 1.626 | -.872 | .472 |
| FL3 | 1 | 7 | 3.91 | 1.329 | .179 | .472 |
| FL4 | 1 | 7 | 4.07 | 1.338 | .392 | .472 |
| FL5 | 1 | 7 | 3.89 | 1.501 | -.333 | .472 |

EVALUATION OF MEASURES

The small sample size (less than 4 * number of items) precluded use of confirmatory factor analysis, thus principal component factor analyses assisted the evaluation of scale unidimensionality and Cronbach's coefficient alpha assessed scale reliability (Selnes and Sallis 2003). A common rule of thumb guided the assessment, which indicates that a coefficient should be above .70 for satisfactory correlation (Churchill 1979). Out of 15 scales measured, 13 displayed alpha coefficients of .70 or higher. There were two scales that showed poor reliability: uncertainty and commitment. Scales containing more than three items were examined for potential improvement by assessing item-total correlation, communalities, Cronbach's alpha if-item-deleted, and the inter-item correlation matrix. Most of the scales (with the exception of uncertainty and commitment) showed strong reliability, as shown in Table 4.4.

Preliminary evidence for discriminant validity also relied on principle components analysis and correlation matrices. Items that seemed to be cross-loading on other items/constructs included: two items from "Dependence" (SD2 and SD4), one item from "Uncertainty" (U5). Collaboration and coordination items all loaded on each question as opposed to loading on each process (inbound, procurement, and returns). This was probably due to the fact that the respondents seemed to have the same answer for the three processes. The collaboration and coordination scales were consequently modified in the main survey, where each question asked about the operations between the focal firm and the supplier as opposed to asking about each of the three different supply chain processes.

In summary, the pre-test offered provisional validation for both the newly developed measures and literature-based scales. The pre-test also helped identify problematic items that had to be replaced or re-worded to improve the data collection procedures for the main test.

**Table 4.4 Pre-Test Scale Purification**

| Variable | Alpha | Items to Replaced or Re-worded |
|---|---|---|
| Dependence | 0.71 | SD2, SD4 |
| Uncertainty | 0.486 | U1,U2, and U5 |
| Asset Specificity | 0.91 | Good Items |
| Trust | 0.81 | T2 |
| Commitment | 0.67 | CM1 and CM2 |
| Coop Norms | 0.82 | Good items |
| Compatibility | 0.76 | Good items |
| Top Management Support | 0.83 | Good items |
| Collaboration | 0.94 | Items for collaboration and coordination loaded on each question as opposed to each process as originally expected – this lead to the conclusion that respondents did not differentiate between the three supply chain processes (procurement, inbound logistics, and return) |
| Coordination | 0.88 | |
| Flexibility | 0.83 | FL1 and FL2 |
| Efficiency | 0.75 | LE1 and LE3 to be re-worded – scale needs to capture performance relative to competition |
| Effectiveness | 0.9 | More items to be added – relative to competition |
| Firm Performance | 0.84 | All items to be kept |

**SURVEY MAIN TEST**

After refining, re-wording, and replacing some of the measurement items as suggested by the pre-test and theory, the following instrument (Table 4.5) was administered in the main test.

**Table 4.5 Main Survey Items**

| |
|---|
| **Dependence** |
| **(SD1)** If we decide to stop purchasing from this supplier, we cannot easily replace their volume with purchases from other suppliers.<br>**(SD2)** The products we buy from this supplier are difficult to get from other suppliers.<br>**(SD3)** We cannot easily switch our production system to components from a new supplier.<br>**(SD4)** Switching from this supplier will impact our operations negatively. |
| **Uncertainty** |
| **(U1)** Our supplier is located in a country with a high level of political unrest.<br>**(U2)** Our supplier is located in a country with a high level of economic unrest.<br>**(U3)** Overall, the business environment in the supplier's country is unpredictable.<br>**(U4)** Our supplier is located in a country with a high level of competitive turmoil.<br>**(U5)** We face a level of uncertainty when dealing with this supplier. |
| **Asset Specificity** |
| If we decide to replace this supplier, investments made in the following areas are not easily transferable to other suppliers:<br>**(AS1)** Machinery<br>**(AS2)** Training<br>**(AS3)** Software<br>**(AS4)** Facilities<br>**(AS5)** Personnel |
| **Trust** |
| **(T1)** This supplier is trustworthy.<br>**(T2)** We believe that this supplier keeps our best interest in mind.<br>**(T3)** This supplier is genuinely concerned that our business succeeds. |
| **Commitment** |
| **(COM1)** We expect our relationship to continue with this supplier for a long time.<br>**(COM2)** We will do what it takes to preserve our relationship with this supplier.<br>**(COM3)** The continuity of our relationship with this supplier is very important to us. |
| **Organizational Compatibility** |
| **(CMP1)** The culture of our firm is similar to that of this supplier.<br>**(CMP2)** Our executives have a management style similar to this supplier.<br>**(CMP3)** Our firm has a compatible corporate culture to that of our supplier. |

| |
|---|
| **Cooperative Norms** |
| **(NRM1)** We believe our supply chain members must work together to be successful.<br>**(NRM2)** We view our supply chain as a value added piece of our business.<br>**(NRM3)** We believe we can improve our performance by adapting to any necessary changes with our supplier. |
| **Top Management Support** |
| **(TMS1)** Top managers repeatedly encourage employees to maintain our relationship with this supplier.<br>**(TMS2)** Top managers repeatedly tell employees that sharing valuable strategic/tactical information with our supplier is important to improve our performance.<br>**(TMS3)** Top management supports a stronger working relationship with our supplier. |
| **Overall Integration** |
| **(OPI1)** We have a high level of process integration with this supplier.<br>**(OPI2)** We share information and knowledge with this supplier.<br>**(OPI3)** We have coordination mechanisms for product movement and flow with this supplier. |
| **Collaboration** |
| **(COL1)** We participate jointly with our supplier in operational decisions.<br>**(COL2)** We share information with our supplier on operational decisions.<br>**(COL3)** We share knowledge and specific know–how with our supplier on operational decisions.<br>**(COL4)** We work closely with our supplier on issues related to operational decisions. |
| **Coordination** |
| **(COR1)** We have reduced formal organizational structures to more fully integrate operations with our supplier.<br>**(COR2)** We coordinate operations with our supplier.<br>**(COR3)** Our firm and this supplier have systems or processes in place to facilitate the movement and flow of products.<br>**(COR4)** We use one or more mechanisms to coordinate operations with our supplier. |
| **Flexibility** |
| This supplier can respond quickly to unexpected:<br>**(FLEX1)** Changes in the environment.<br>**(FLEX2)** Political changes in the supplier's home country<br>**(FLEX3)** Economic changes in the supplier's home country<br>**(FLEX4)** Actions by our competitors |
| **Overall Logistics Performance –Overall** |
| **(LPO1)** Our overall logistics performance is well above industry average.<br>**(LPO2)** In general, our logistics performance is excellent.<br>**(LPO3)** We are outstanding at performing our logistics processes.<br>**(LPO4)** We have a high level of customer satisfaction. |
| **Logistics Efficiency** |
| Please respond to each of the following based on your firm's performance with respect to competition during the previous fiscal year:<br>**(LE1)** Cost of expediting shipments<br>**(LE2)** Transportation costs<br>**(LE3)** Warehousing costs<br>**(LE4)** Inventory costs<br>**(LE5)** Order processing costs<br>**(LE6)** Overall logistics costs |
| **Logistics Effectiveness** |
| Please respond to each of the following based on your firm's performance with respect to competition during the |

| |
|---|
| previous fiscal year:<br>**(LF1)** On time deliveries<br>**(LF2)** Number of back-orders/stock outs<br>**(LF3)** Line item fill rate<br>**(LF4)** Time between order receipt and delivery<br>**(LF5)** Shipping errors<br>**(LF6)** Customer complaints<br>**(LF7)** Damage free goods |
| **Firm Performance** |
| **(FP1)** Our business unit's return on assets (ROA) relative to our competitors.<br>**(FP2)** Our business unit's return on investment (ROI) relative to our competitors.<br>**(FP3)** Our business unit's return on sales (ROS) relative to our competitors.<br>**(FP4)** Our business unit's sales growth relative to our competitors.<br>**(FP5)** Our business unit's market share growth relative to our competitors<br>**(FP6)** Our business unit's customer order-to-delivery cycle time specifications relative to our competitors.<br>**(FP7)** Our business unit's customer order-to-delivery cycle time consistency relative to our competitors.<br>**(FP8)** Our business unit does a better job providing our customers real time information about their orders than our major competitors. |
| **Marker** |
| **(MV1)** Contact with my company and its representatives are on a formal pre-planned basis<br>**(MV2)** When rules and procedures exist in my organization they are usually written agreements<br>**(MV3)** Most things in my business unit are covered by formal procedures for doing it |

Building on the pre-test, a larger scale data collection effort resulted in 855 unique visitors to the survey website out of 1,452 qualified respondents, i.e. 63% of qualified respondents accessed the survey. 320 completed the entire survey and submitted it (37% of the 855 who accessed the site), representing a 22% response rate out of the 1,452 qualified respondents. The remaining potential respondents dropped off quickly or within the first few pages. Surveys were directed at respondents who worked for a US based manufacturing company and had enough knowledge regarding their operations with one of their non-US based suppliers.

Potential response bias was evaluated by capturing non-respondent's verbal answers to five items and testing for differences against survey data responses (Mentzer and Flint 1997). Specifically, 110 non-respondents who had previously indicated they were qualified – but not

interested or capable to take the survey due to time constraints were contacted by phone and asked to respond to five questions (four items from the collaboration scale and their job title). No significant differences ($p \leq .05$) were found between items on surveys and verbal responses. Job titles were not significantly different either. An early-late response test was also conducted to investigate potential bias between early and late respondents (Armstrong and Overton 1977). Surveys were classified as early or late based on the number of follow-ups required and date stamps on web survey submissions. An independent samples t-test indicated no significant differences ($p < .05$). Based on these two results and an acceptable response rate for managerial survey research (22%), potential bias in the responses were not considered a significant concern.

Respondents answered 65 substantive questions related to the theoretical framework, 3 questions representing a marker variable designed to test for common method variance, and 15 questions capturing control variables. The average relationship age between the manufacturers and the suppliers was 6 years. The annual sales of the respondents range is shown in Table 4.6. Less than 1% of the respondents reported annual sales of less than $1 million while 11% had sales of over $500 million.

**Table 4.6 Annual Sales of Participating Companies**

| | Frequency | Percent |
|---|---|---|
| Less than $1 million | 2 | .6 |
| $1-50 million | 165 | 51.6 |
| $51-500 million | 117 | 36.6 |
| $501 million - $1 billion | 16 | 5.0 |
| Greater than $1 billion | 20 | 6.2 |
| Total | 320 | 100.0 |

Sixty percent of respondents held job levels of director or higher in their firm, with the remaining reporting middle-level manager positions (e.g., Purchasing Manager, Materials Manager, etc.). Firms in this sample came from the following industries: apparel/textiles, appliances, automotive, chemicals/plastics, consumer packaged goods, electronics, industrial products, medical/pharmaceutical, and aerospace (See Table 4.7). Sixty five firms in the sample were publicly traded, which allowed further analysis and validation of self reported performance measures.

**Table 4.7 Breakdown of Participating Firms by Industry**

| | Frequency | Percent |
|---|---|---|
| Apparel/Textiles | 15 | 5% |
| Appliances | 41 | 13% |
| Automotive | 39 | 12% |
| Chemicals/Plastics | 32 | 10% |
| Consumer Packaged Goods | 26 | 8% |
| Electronics | 60 | 19% |
| Industrial Products | 53 | 17% |
| Medical/Pharmaceutical | 26 | 8% |
| Aerospace | 28 | 9% |
| Total | 320 | 100.0 |

Table 4.8 lists the location of each non-US based supplier and the frequency of that country in the survey. This was important to capture in order to calculate the cultural distance and test for any moderating effects on antecedent–>GSCPI relationships. The sample included a diverse range of countries that allowed the categorization of suppliers as either having a high or low cultural distance with respect to the US based manufacturing firms.

**Table 4.8 Location of Suppliers**

| Country of Supplier | # | % | Country of Supplier | # | % | Country of Supplier | # | % |
|---|---|---|---|---|---|---|---|---|
| Australia | 1 | 0.3 | Bolivia | 1 | 0.3 | Venezuela | 2 | 0.6 |
| Austria | 1 | 0.3 | India | 11 | 3.4 | Poland | 1 | 0.3 |
| Portugal | 1 | 0.3 | Indonesia | 1 | 0.3 | Russia | 1 | 0.3 |
| Brazil | 6 | 1.9 | Ireland | 1 | 0.3 | S. Korea | 6 | 1.9 |
| Canada | 41 | 12.8 | Israel | 2 | 0.6 | Spain | 4 | 1.3 |
| China | 102 | 31.9 | Italy | 10 | 3.1 | Sweden | 4 | 1.3 |
| Denmark | 2 | 0.6 | Japan | 23 | 7.2 | Switzerland | 5 | 1.6 |
| Ecuador | 1 | 0.3 | Malaysia | 3 | 0.9 | Taiwan | 15 | 4.7 |
| Finland | 2 | 0.6 | Mexico | 22 | 6.9 | Thailand | 3 | 0.9 |
| France | 7 | 2.2 | Netherlands | 2 | 0.6 | Greece | 1 | 0.3 |
| Germany | 25 | 7.8 | Kazakhstan | 1 | 0.3 | UK | 12 | 3.8 |

Some scholars capture respondents' degree of confidence in their answers as an additional check on data reliability (Ulaga and Eggert 2006). This technique was used here mainly in the pre-qualification process where the respondents were asked about their level of knowledge about their relationship with one of their non US-based suppliers. Any respondent who indicated not having a high level of knowledge was excluded from the sample (did not qualify to take the survey).

## MISSING DATA ANALYSIS

To augment the integrity of the data, the survey allowed respondents the freedom to skip questions by filling out a survey by hand and faxing it (as opposed to completing it online). This design technique helps minimize the problem of "forcing" respondents into answers, but an increased amount of missing data is the consequence. After checking for errors, analysis of missing data was undertaken for each respondent and item to assess the level of missing data and look for patterns that might indicate systematic bias (e.g., sensitive information, etc.).

Out of the 320 cases analyzed, 305 (95 %) contained fully completed questions and 15 contained some missing responses (mainly from faxed in surveys). Patterns of missing values were evaluated using separate variances t-tests, which revealed no significant mean differences across items with complete versus missing data and suggesting that values are missing at random (MAR).

The expectation maximization (EM) method was used to estimate and replace missing values. This method uses a two-step, iterative process to determine expected values of parameters and then calculates maximum likelihood estimates. The EM method has been shown to be superior to alternative remedies such as listwise, pairwise, and mean imputation estimation

techniques (Raaijmakers 1999). A comparison of the means and standard deviations for items in the original data set and items in the data set containing imputed values showed no significant deviations.

## DATA DISTRIBUTION

Most items were worded as statements and based on a seven-point scale anchored by "strongly disagree" to "strongly agree." Means ranged from 2.28 to 5.68, standard deviations ranged from 1.13 to 2.18, and min/max for all items achieved the full range of 1 to 7. These were considered acceptable levels of range and deviation.

Similar to the pretest, in the normality tests no items were found to have kurtosis issues or skeweness. Outliers were assessed using the Mahalanobis $D^2$ measure, which estimates the distance in multidimensional space of each observation from the mean center of observations. 12 cases were flagged with differences.

Each case was examined for missing data, coding errors, and strange patterns, but none were found. Subsequently, tests were run on the entire data set with and without outliers to determine their influence. Descriptive statistics, exploratory factor analyses, correlations, reliability statistics, and analysis of variance tests showed only very small differences in some variables. Thus, outliers were retained for further analysis.

## EVALUATION OF MEASURES

To assess construct unidimensionality, validity, and reliability, the psychometric properties of the constructs were evaluated using statistical tests and modeling techniques found

in SPSS 15 and AMOS 7. First-generation statistical techniques, e.g., principal component factor analyses, Cronbach's alpha coefficient, analyses of correlation matrices, etc. were employed initially – as well as more robust approaches available within the confirmatory factor analysis (CFA) component of structural equation modeling (SEM). Standards for first-generation statistical techniques are well established, but criteria for assessing goodness of model fit in SEM is somewhat controversial (Shook, Ketchen, Hult, and Kacmar 2004). In particular, no single metric has gained universal acceptance and researchers suggest using multiple indices to assess results (Breckler 1990). To clarify measurement criteria in this study, the following list of metrics and their associated heuristics served as guidelines for assessing model fit.

- The chi-Square ($\chi$2) goodness of fit reports an absolute measure of fit indicating the degree to which the estimated model corresponds with the pattern of variances and covariances in the observed data. Also, the $\chi^2$ *difference* test is commonly used as a measure of incremental fit for comparing nested models, e.g., testing for measurement invariance across groups. In both cases, a significant finding indicates lack of fit. However, both of these tests are sensitive to sample size, i.e. the larger the sample size, the more likely negligible and unimportant departures will be detected (Cochran 1952; Gulliksen and Tukey 1958). While it is commonly reported, scholars have described the chi-square as a "poor" measure of model fit especially as sample size increases (Bollen 1989; Fornell 1983) and frequently discounted the chi-square relative to other fit indices (e.g., CFI, RMSEA, etc.) (Steenkamp and Baumgartner 1998; Mullen 1995). Thus, since this study's sample size qualifies as a large study, the reported $\chi^2$ and $\chi^2$ difference statistics are interpreted carefully in light of other available indices.

- The chi-square ratio (CMIN/df) is the chi-square fit index divided by degrees of freedom and is less dependent on sample size. Ratios in the range of two to five have been called adequate (Hair et al. 1998), but others suggest that two to three or less is a more conservative threshold (Kline 1998).

- The Bentler comparison-fit index (CFI) is a well accepted incremental fit statistic which compares the existing model fit with a model assuming the latent variables are uncorrelated. In practice, CFI should be equal to or greater than .90 to accept the model (.95 or higher for close fit), indicating that 90% of the covariation in the data can be reproduced by the model (Baumgartner and Homburg 1996).

- The root mean square error of approximation (RMSEA) measures absolute fit by comparing the average difference per degree of freedom expected to occur in the population. Statistical methodologists indicate that RMSEA values of about .06 or less indicate close fit (Hu and Bentler 1999), but .05 or less is a more traditional standard in business research. Values of about 0.05 to 0.08 indicate a reasonable error of approximation and values near 0.1 or greater are deemed unacceptable (Baumgartner and Homburg 1996; Browne and Cudeck 1993).

Evaluation of measures began by grouping items into *a priori* conceptualized construct scales and examining their capacity to demonstrate unidimensionality, convergent and discriminant validity, and reliability.

***Unidimensionality***. To achieve unidimensionality, within-factor items should possess one and only one underlying construct in common (Hair et al. 1998). Initial tests for unidimensionality utilized principal component factor analyses to examine whether scale items loaded on a single or multiple factors. Results showed each scale loading on a single respective

factor and variance-explained ranging from 76 to 87 percent. A more robust interpretation of unidimensionality can be obtained using CFA by assessing the overall goodness of model fit and examining convergent and discriminant validity. Scales that possess both convergent and discriminant validity are deemed unidimensional (Anderson and Gerbing 1988; Gerbing and Anderson 1988).

To assess overall measurement fit within CFA, the measurement model was run in AMOS 7. Initial runs of the CFA model (prior to any refinement) showed fit statistics that were moderately acceptable and needed improvement ($\chi 2$=4006, df=1862, $\chi 2$/df=2.18, CFI=0.86, and RMSEA=0.061).

## MEASUREMENT MODEL REFINEMENT

Further analysis revealed areas for improvement. Specifically, by examining modification indices, standardized residuals, item $\lambda$ weights for each construct, and overall fit statistics, several problematic items were flagged (Anderson and Gerbing 1988). A key concern within SEM is judging when to make model refinements. Any re-specifications based on sample-dependent results implicitly change a model's substantive meaning in some way. And extensive modification reduces the likelihood that the model will replicate for future samples. Thus, refinements were considered with caution based on whether each modification made sense theoretically and aligned with the research goals at hand. After examining each item based on the criteria outlined above, some scales had one or two items deleted. One of the findings from the scale refinement is that the new items introduced for the logistics effectiveness scale loaded on two dimensions. This was first flagged when looking at the modification indices where those two sets of items seemed to load on two separate dimensions as opposed to one construct. When

examined carefully, those dimensions seemed to be measuring delivery performance and customer satisfaction performance from a logistics standpoint. When run as two constructs, both dimensions had good reliability coefficients (0.88 and 0.86 respectively) and the average variance extracted for each one of them was greater than the squared correlation between either of them and any other construct. Reliability and validity assessments are discussed in more details in the following sections. A breakdown of those dimensions with each item is shown in Table 4.9. Logistics effectiveness was consequently modeled as a second order reflective construct with two first order constructs: delivery performance and customer satisfaction performance. The new construct is shown in Figure 4.1.

**Table 4.9 Logistics Effectiveness Scale**

| Scale | Dimensions | Items<br><br>Rate your firm's performance relative to competition on: |
|---|---|---|
| Logistics Effectiveness | Delivery Performance | **(LF1)** On-Time Deliveries. |
| | | **(LF2)** Line item fill rates. |
| | | **(LF3)** Time between order receipt and order delivery. |
| | Customer Satisfaction Performance | **(LF4)** Shipping errors. |
| | | **(LF5)** Customer complaints. |
| | | **(LF6)** Damage free goods. |

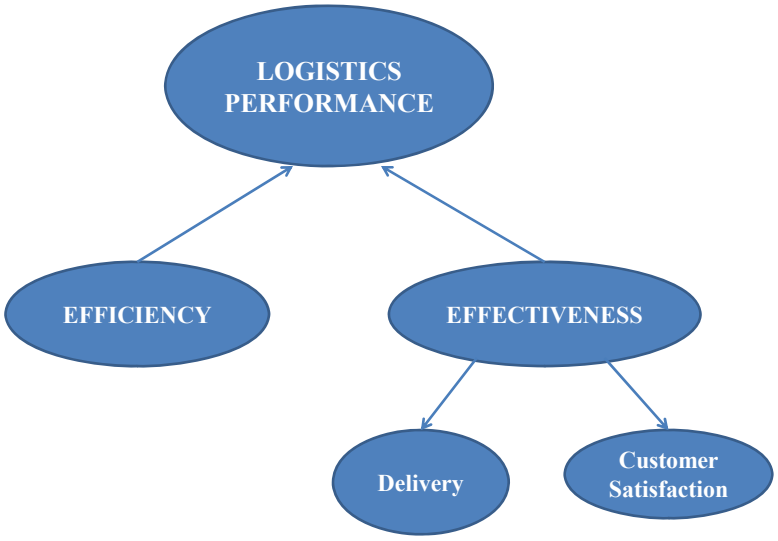


**Figure 4.1 Logistics Performance**

All of the final refined scales are shown in Table 4.10. The final refined measurement model had very good fit statistics ($\chi 2$ = 1811.39, df = 1276, $\chi 2$/df = 1.42, CFI=0.96, RMSEA = 0.036).

## Table 4.10 Refined Scales

| Scale | Scale Reliability (α) | Items | Mean | SD |
|---|---|---|---|---|
| **Dependence** | 0.81 | **(D1)** If we decide to stop purchasing from this supplier, we cannot easily replace their volume with purchases from other suppliers. | 3.94 | 2.18 |
| | | **(D2)** We cannot easily switch our production system to components from a new supplier. | 3.79 | 2.12 |
| | | **(D3)** Switching from this supplier will impact our operations negatively. | 4.04 | 1.98 |
| **Uncertainty** | 0.82 | **(U1)** Our supplier is located in a country with a high level of economic or political unrest. | 2.95 | 1.63 |
| | | **(U2)** Overall, the business environment in the supplier's country is unpredictable. | 3.12 | 1.65 |
| | | **(U3)** Our supplier is located in a country with a high level of competitive turmoil. | 3.50 | 1.69 |
| **Asset Specificity** | 0.91 | If we decide to replace this supplier, investments made in the following areas are not easily transferable to other suppliers: | | |
| | | **(AS1)** Machinery | 3.56 | 2.01 |
| | | **(AS2)** Software | 3.07 | 1.76 |
| | | **(AS3**) Facilities | 3.09 | 1.73 |
| | | **(AS4)** Personnel | 3.27 | 1.88 |
| **SCO**-Trust | 0.93 | **(T1)** This supplier is trustworthy. | 5.28 | 1.60 |
| | | **(T2)** We believe that this supplier keeps our best interest in mind. | 4.87 | 1.65 |
| | | **(T3)** This supplier is genuinely concerned that our business succeeds. | 4.94 | 1.68 |
| **SCO**-Commitment | $R^1$=0.76 | **(COM1)** We expect our relationship to continue with this supplier for a long time. | 4.96 | 1.48 |
| | | **(COM2)** We will do what it takes to preserve our relationship with this supplier. | 5.23 | 1.47 |
| **SCO**-Coop Norms | $R^1$=0.81 | **(NRM1)** We believe our supply chain members must work together to be successful. | 5.68 | 1.77 |
| | | **(NRM2)** We view our supply chain as a value added piece of our business. | 5.67 | 1.78 |
| **SCO**-Org. Comp. | 0.91 | **(CMP1)** The culture of our firm is similar to that of this supplier. | 3.68 | 1.68 |
| | | **(CMP2)** Our executives have a management style similar to this supplier. | 3.50 | 1.62 |
| | | **(CMP3)** Our firm has a compatible corporate culture to that of our supplier. | 3.67 | 1.64 |
| **SCO**-Top Mgt Sup. | 0.85 | **(TMS1)** Top managers repeatedly encourage employees to maintain our relationship with this supplier. | 4.54 | 1.52 |
| | | **(TMS2)** Top managers repeatedly tell employees that sharing valuable strategic/tactical information with our supplier is important to improve our performance. | 3.97 | 1.67 |
| | | **(TMS2)** Top management supports a stronger working relationship with our supplier. | 4.72 | 1.486 |
| **Collaboration** | 0.93 | **(COL1)** We participate jointly with our supplier in operational decisions. | 3.16 | 1.76 |
| | | **(COL2)** We share information with our supplier on operational decisions. | 3.49 | 1.81 |
| | | **(COL3)** We share knowledge and specific know–how with our supplier on operational decisions. | 3.63 | 1.89 |
| | | **(COL4)** We work closely with our supplier on issues related to operational decisions. | 3.54 | 1.86 |
| | | | | |
| | | | | |

| Scale | Scale Reliability (α) | Items | Mean | SD |
|---|---|---|---|---|
| **Coordination** | $R^1$=0.75 | **(COR1)** Our firm and this supplier have systems or processes in place to facilitate the movement and flow of products. | 3.73 | 1.79 |
| | | **(COR2)** Our firm and this supplier have systems or processes in place to facilitate the movement and flow of products. | 4.22 | 1.76 |
| **Flexibility** | 0.88 | **(FLEX1)** This supplier can respond quickly to unexpected changes in the environment. | 3.72 | 1.44 |
| | | **(FLEX2)** This supplier can respond quickly to unexpected political changes in the supplier's home country | 3.78 | 1.31 |
| | | **(FLEX3)**This supplier can respond quickly to unexpected economic changes in the supplier's home country | 3.91 | 1.38 |
| **Logistics Efficiency** | 0.91 | Please respond to each of the following based on your firm's performance with respect to competition during the previous fiscal year (Much Worse-Much Better): | | |
| | | **(LE1)** Cost of expediting shipments. | 4.45 | 1.27 |
| | | **(LE2)** Transportation costs. | 4.47 | 1.21 |
| | | **(LE3)** Warehousing costs. | 4.56 | 1.29 |
| | | **(LE4)** Inventory costs. | 4.54 | 1.30 |
| | | **(LE5)** Order processing costs. | 4.66 | 1.19 |
| | | **(LE6)** Overall logistics costs. | 4.60 | 1.22 |
| **Logistics Effectiveness – Delivery** | 0.88 | **(LF1)** On-Time Deliveries. | 3.69 | 2.04 |
| | | **(LF2)** Line item fill rates. | 4.95 | 1.34 |
| | | **(LF3)** Time between order receipt and order delivery. | 4.98 | 1.35 |
| **Logistics Effectiveness-Customer Satisfaction** | 0.86 | **(LF4)** Shipping errors. | 4.63 | 1.41 |
| | | **(LF5)** Customer complaints. | 4.58 | 1.50 |
| | | **(LF6)** Damage free goods. | 4.81 | 1.44 |
| **Firm Performance - Profitability** | 0.94 | **(FP1)** Our business unit's return on assets (ROA) relative to our competitors. | 4.74 | 1.20 |
| | | **(FP2)** Our business unit's return on investment (ROI) relative to our competitors. | 4.66 | 1.13 |
| | | **(FP3)** Our business unit's return on sales (ROS) relative to our competitors. | 4.72 | 1.25 |
| **Firm Performance – Growth** | $R^1$= 0.83 | **(FP4)** Our business unit's sales growth relative to our competitors. | 4.76 | 1.27 |
| | | **(FP5)** Our business unit's market share growth relative to our competitors. | 4.70 | 1.29 |
| **Firm Performance - Timeliness** | 0.89 | **(FP6)** Our business unit's customer order-to-delivery cycle time specifications relative to our competitors. | 4.84 | 1.25 |
| | | **(FP7)** Our business unit's customer order-to-delivery cycle time consistency relative to our competitors. | 4.85 | 1.24 |
| | | **(FP8)** Our business unit does a better job providing our customers real time information about their orders than our major competitors. | 4.81 | 1.36 |
| **Overall Process Integration** | $R^1$=0.88 | **(OPI1)** We share information and knowledge with this supplier. | 4.68 | 1.59 |
| | | **(OPI2)** We have coordination mechanisms for product movement and flow with this supplier. | 4.57 | 1.65 |
| **Overall Logistics Performance** | 0.93 | **(LPO1)** Our overall logistics performance is well above industry average. | 4.37 | 1.30 |
| | | **(LPO2)** In general, our logistics performance is excellent. | 4.45 | 1.42 |
| | | **(LPO3)** We are outstanding at performing our logistics processes. | 4.37 | 1.37 |
| **Marker Variable** | 0.87 | **(MV1)** Contact with my company and its representatives are on a formal pre-planned basis. | 2.82 | 1.76 |
| | | **(MV2)** When rules and procedures exist in my organization they are usually written agreements. | 3.88 | 2.01 |
| | | **(MV3)** Most things in my business unit are covered by formal procedures for doing it. | 3.69 | 2.04 |

## CONVERGENT VALIDITY

Convergent validity is demonstrated when items have substantial loadings on the constructs they are intended to measure. Rules of thumb include: (1) item loadings greater than or equal to .70 that are (2) statistically significant and (3) have the correct sign (Hulland, Shou, and Lam 1996). All parameter estimates met the latter two criteria. All item loadings were significant (<0.001).

## DISCRIMINANT VALIDITY

In addition to items converging on their respective constructs, analyses should confirm that items designed to measure different constructs are in fact measuring different constructs. In particular, though certain pairs of constructs are likely to be highly correlated, items from one factor should not converge too closely with items from a different scale. Discriminant validity was assessed several ways. First, a series of nested models were specified that constrained the covariance between clusters of constructs to one (Anderson and Gerbing 1988). Constrained models were compared to baseline models that allowed parameters to correlate freely. If model comparisons show an insignificant $\chi^2$ difference test, this suggests that a single factor can explain the observed data as well as a model with distinct theoretical constructs. Analyses revealed all differences between constrained and unconstrained models to be significant ($p \leq .05$), indicating that distinct theoretical constructs posed a better fit.

Next, the average variance extracted (AVE) was computed for each construct ($\Sigma\lambda^2 / [\Sigma\lambda^2 + \Sigma(1-\lambda_j^2)]$) compared to the shared variance between all possible pairs of constructs (Fornell and Larcker 1981). Based on this conservative test, discriminant validity is supported when AVE (the

total amount of variance in the indicators accounted for by the construct) exceeds shared variance with other constructs. All comparisons met the stated criteria where AVE was greater than shared variance (see Table 4.11).

## Table 4.11 Average Variance Extracted (AVE)

| | SD | AS | U | T | COM | NRM | CMP | TMS | COL | COR | FLEX | Log Efficiency | Log Effect - Delivery | Log Effect-Cust Sat. | Profitability | Growth | Timeliness |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| **SD** | **0.5958** | | | | | | | | | | | | | | | | |
| **AS** | 0.1722 | **0.7352** | | | | | | | | | | | | | | | |
| **U** | 0.0000 | 0.0317 | **0.6157** | | | | | | | | | | | | | | |
| **T** | 0.0384 | 0.0007 | 0.0361 | **0.8501** | | | | | | | | | | | | | |
| **COM** | 0.1764 | 0.0219 | 0.0052 | 0.1043 | **0.8047** | | | | | | | | | | | | |
| **NRM** | 0.0000 | 0.0174 | 0.0012 | 0.4610 | 0.1340 | **0.8594** | | | | | | | | | | | |
| **CMP** | 0.0306 | 0.0256 | 0.0036 | 0.1354 | 0.1129 | 0.0001 | **0.7922** | | | | | | | | | | |
| **TMS** | 0.0445 | 0.0001 | 0.0006 | 0.1772 | 0.3125 | 0.2927 | 0.0324 | **0.6888** | | | | | | | | | |
| **COL** | 0.0912 | 0.0346 | 0.0007 | 0.0006 | 0.0190 | 0.0000 | 0.0369 | 0.0475 | **0.7921** | | | | | | | | |
| **COR** | 0.0600 | 0.0102 | 0.0001 | 0.0246 | 0.0441 | 0.0094 | 0.0299 | 0.1183 | 0.5550 | **0.7516** | | | | | | | |
| **FLEX** | 0.0225 | 0.0108 | 0.0506 | 0.1384 | 0.1102 | 0.0001 | 0.1310 | 0.0292 | 0.0475 | 0.0762 | **0.7362** | | | | | | |
| **Log Efficiency** | 0.0042 | 0.0035 | 0.0177 | 0.0557 | 0.0237 | 0.0144 | 0.0428 | 0.0240 | 0.0433 | 0.1056 | 0.0762 | **0.6290** | | | | | |
| **Log Effect-Delivery** | 0.0035 | 0.0019 | 0.0404 | 0.0955 | 0.0172 | 0.0156 | 0.0121 | 0.0079 | 0.0174 | 0.0350 | 0.0493 | 0.2343 | **0.6949** | | | | |
| **Log Effect-Cust Sat.** | 0.0096 | 0.0004 | 0.0144 | 0.0437 | 0.0119 | 0.0004 | 0.0196 | 0.0021 | 0.0076 | 0.0164 | 0.0253 | 0.1354 | 0.6037 | **0.6492** | | | |
| **Profitability** | 0.0050 | 0.0018 | 0.0231 | 0.0858 | 0.0686 | 0.0635 | 0.0007 | 0.0497 | 0.0050 | 0.0202 | 0.0361 | 0.2460 | 0.1697 | 0.1310 | **0.8453** | | |
| **Growth** | 0.0085 | 0.0003 | 0.0062 | 0.0635 | 0.0365 | 0.0471 | 0.0014 | 0.0595 | 0.0059 | 0.0231 | 0.0135 | 0.1936 | 0.1122 | 0.1296 | 0.5314 | **0.8352** | |
| **Timeliness** | 0.0015 | 0.0023 | 0.0149 | 0.1030 | 0.0416 | 0.0180 | 0.0117 | 0.0475 | 0.0320 | 0.0894 | 0.0324 | 0.2450 | 0.2052 | 0.1170 | 0.3697 | 0.5670 | **0.7465** |

Diagonal = Average Variance Extracted (AVE)
Lower Matrix = $R^2$

RELIABILITY

The reliability of a construct refers to the internal consistency of its scale. Reliability was assessed in several ways. A common rule of thumb is that a Cronbach's alpha result of .70 or higher indicates good correlation between the items and the true scores (Churchill 1979). Table 4.7 demonstrates that all constructs had good reliability alpha (the smallest was 0.81).

Another measure of construct reliability computed by $(\Sigma\lambda)^2 / [(\Sigma\lambda)^2 + \Sigma(1-\lambda_j^2)]$ was also utilized because Cronbach's alpha tends to underestimate reliability (Anderson and Gerbing 1988) and has several limitations (Garver and Mentzer 1999). All constructs exceeded the .70 threshold for good reliability. Finally, if constructs are reliable, the AVE should exceed .50. This third criterion for construct reliability was also met as demonstrated in Table 4.10.

COMMON METHOD VARIANCE

The potential influence of common method bias, also called common method variance (CMV) (Campbell and Fiske 1959), continues to be an issue in survey research. If present, CMV can inflate/deflate correlations between constructs and generate doubts about findings. Research exploring this problem is somewhat equivocal; some evidence suggests it is a pervasive issue that causes deleterious effects (Cote and Buckley 1987; Podsakoff et al. 2003). Other studies show the presence of CMV is far less frequent than some researchers suggest and, in many cases, find that (even when present) CMV does not meaningfully impact findings (Crampton and Wagner 1994; Malhotra et al. 2006).

To address it here, several initial steps were taken in the research design to minimize the potential for CMV, such as qualifying respondents' relevant knowledge prior to requesting their participation, ensuring respondents of their anonymity in the initial call and on the survey, and

distancing the order of independent and dependent variables on the survey. However, because this study uses a key-informant approach to capture independent and dependent variables, a marker variable representing a theoretically un-related construct was also incorporated into the survey to assess whether the survey method itself influenced respondents' answers (Lindell and Whitney 2001).

Podsakoff et al. (2003) credit Lindell and Whitney (2001) for introducing the marker variable technique as a way to diagnose CMV effects. A marker variable represents a theoretically un-related construct placed within the survey. The marker variable in this study was labeled MV and was adapted from Ferrel and Skinner (1988) and is called "Formailzation." This construct measures the level of formal rules and procedures within an organization. Three reflective items (labeled as MV1, MV2, and MV3) were used to measure this construct (shown in Table 4.9). The construct's coefficient alpha was 0.87 and AVE was 0.74 and exceeded shared variance with all other constructs. The marker variable was subsequently incorporated into the refined measurement model and allowed to covary with all substantive constructs. None of the correlations with the substantive constructs were significant at the 0.05 level. This supported the notion that CMV was not a concern in this study.

## SUMMARY OF MEASUREMENT EVALUATION

Overall, the most important results in assessing measurement was finding that after the refinement of the measurement model in the main survey, the constructs seemed to be unidimensional and reliable, exhibiting both convergent and discriminant validity. Fit statistics were very good and none of the substantial constructs correlated with the marker variable.

## CROSS-NATIONAL MEASUREMENT INVARIANCE

Before testing hypotheses and comparing groups in a multi-country study, analyses must show that measures for the constructs are cross-nationally invariant (Hui and Triandis 1985; Mullen 1995; Singh 1995; Steenkamp and Baumgartner 1998). Without demonstrating invariance, researchers have no basis for claiming that scales have captured commensurable interpretations of the constructs across countries. For example, Horn (1991, p. 119) states, "without evidence of measurement invariance, the conclusions of a [international] study must be weak." Conducting measurement invariance analyses helps explain whether similarities/differences across countries are due to true similarities/differences in the underlying latent constructs or stem from systematic biases.

Scholars agree that multi-group confirmatory factor analysis offers the most powerful approach for testing cross-national measurement invariance (Jöreskog 1971; Myers et al. 2000), thus, this approach was adopted for this study. When using CFA, cross-national data demonstrates increasing levels of measurement invariance when incremental model constraints (i.e., constraining parameters such as item loadings to be equivalent across country groups) reveal insignificant differences from less constrained models. Chi-square difference tests and change in fit-indices serve as standards for assessing whether constrained models are significantly different (Steenkamp and Baumgartner 1998).

Varying research goals guide the degree of invariance needed to test hypotheses. If the research goal involves just exploring the basic structure of the constructs cross-nationally, configural invariance is the only requirement, i.e., constructs demonstrate the same pattern of salient and non-salient item loadings across groups. However, if the research goal involves quantitatively comparing the latent means of constructs across countries and their structural

relationships, metric and scalar invariance are also required. Metric invariance and scalar invariance indicate that item loadings and manifest means, respectively, are equivalent across country groups. Establishing increasing levels of invariance beyond metric and scalar, such as factor covariance invariance, factor variance invariance, and error variance invariance offer opportunities for additional comparisons, but in practice, extensive levels of invariance are infrequent in cross-national data sets. To examine measurement invariance in this study, the two theoretical sub-models (high cultural distance and low cultural distance) were each tested using a series of nested models. Consistent with scholars' recommendations, nested models placed increasing levels of parameter constraints on each theoretical sub-model, i.e. constraining loadings to be equivalent across country groups, constraining loadings and manifest means to be equivalent across country groups, etc. (Mullen 1995; Steenkamp and Baumgartner 1998). Results in Table 4.9 demonstrate that configural, metric, and scalar invariance are justifiably achieved across the two groups representing countries with high and low cultural distance with respect to the United States. Insignificant chi-square difference tests at $p \leq .05$ and extremely small change in fit indices support configural and metric invariance. Scalar invariance is justifiably supported through extremely small change in fit indices.

Insignificant chi-square difference tests are the standard way to determine invariance across nested models, but experts suggest that change in fit indices should take precedence over the chi-square difference test in the case of large sample sizes. For example, Steenkamp and Baumgartner (1998, p. 84, 88) suggest that "one should not rely exclusively on the chi-square difference test as it suffers from the same well known problems as the chi-square test for evaluating overall model fit" and instead "endorse the recommendations of Anderson and Gerbing (1988) to base model comparison on multiple fit indices." Mullen (1995, p. 586)

concurs with this advice and recommends that, especially in cases of large sample sizes, use of multiple fit indices should be utilized for assessing invariance. Both insignificant chi-square differences and negligible changes in fit indices (as shown in Table 4.12) support the argument that there is measurement invariance across country groups (high and low cultural distance).

**Table 4.12 Test for Measurement Invariance**

| | χ2 | Δχ2 | Df | Δdf | X2/df | Δχ2/df | P-Value | CFI | ΔCFI | RMSEA | ΔRMSEA |
|---|---|---|---|---|---|---|---|---|---|---|---|
| **Unconstrained** | 982.73 | 18.63 | 664 | 19 | 1.48 | 0.01 | | 0.953 | 0 | 0.039 | 0.001 |
| **Measurement Weights (λ)** | 1001.36 | | 683 | | 1.47 | | 0.481 | 0.953 | | 0.038 | |

## HYPOTHESIS TESTING

With the measurement model purified and construct reliability and validity tested, the hypotheses depicted in Figure 4.2 were then tested. The structural model in Figure 4.2 is similar to the one introduced earlier in chapter 3 (Figure 3.3) with only one exception, the logistics effectiveness construct is modeled as second order construct with two dimensions: delivery and customer satisfaction. The standardized regression weights ($H_1$-$H_7$) and fit statistics for the structural model are shown in Table 4.12.

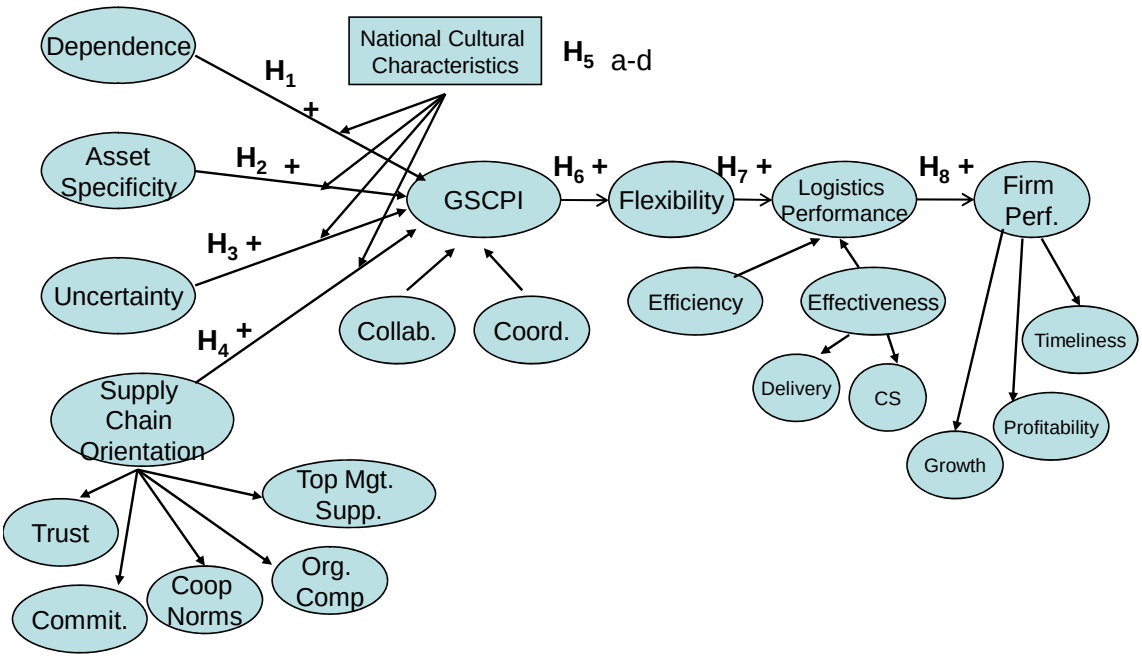


**Figure 4.2 CSCPI Theoretical Framework**

**Table 4.12 Structural Model Statistics**

| Hypothesized Relationship | | | Estimates | P< |
|---|---|---|---|---|
| Dependence | (+) → | GSCPI | 0.109 | Not Significant |
| Asset Specificity | (+) → | GSCPI | 0.20 | Not Significant |
| Uncertainty | (+) → | GSCPI | -0.374 | 0.05 (significant but in the wrong direction) |
| Supply Chain Orientation | (+) → | GSCPI | 0.729 | 0.05 |
| Cultural Distance | Moderator | D-GSCPI<br>AS-GSCPI<br>U-GSCPI<br>SCO-GSCPI | No Moderation Effects | |
| GSCPI | (+) → | Flexibility | 0.524 | 0.01 |
| Flexibility | (+) → | Logistics Performance | 0.01 | Not Significant |
| Logistics Perfromance | (+) → | Firm Performance | 0.742 | 0.001 |
| Model Fit | | | | |
| $\chi 2 = 1895.91$ | | df = 1228 | | |
| $\chi 2/df = 1.54$ | | CFI = 0.94 | RMSEA = 0.041 | |

Summary of Hypothesis Testing

The relationship between dependence and GSCPI turned out to be not significant (standardized regression weight = 0.109, p=0.424). The relationship between asset specificity and GSCPI also turned out to be not significant (standardized regression weight = 0.20, p=0.15), contrary to what was hypothesized earlier. Hypothesis 3 stated that the level of environmental uncertainty positively impacts the levels of GSCPI. Despite the fact that the path from uncertainty to GSCPI was statistically significant, this hypothesis was not supported because the direction of the relationship was negative instead of positive as originally hypothesized (standardized regression weight = -0.374, $p<0.05$). Hypothesis 4 was supported (standardized regression weight = 0.729, $p<0.05$), indicating that supply chain orientation was a strong driver of GSCPI.

## MODERATING EFFECTS OF CULTURAL DISTANCE

Testing the moderating effect of a variable in SEM is similar to testing for group differences. Identical models are used for the groups tested. When testing for moderating effects, parameters take on different values for the different groups as dictated by the theory (Arbuckle and Wothke 1999). To accomplish the test of cultural distance as a moderator required a three step process. First, the scores for the cultural distance (CD) for each country where suppliers were located were calculated using Kogut and Singh (1988)'s cultural distance model. Next, the data were dichotomized by grouping the CD scores into two groups: High CD and Low CD. Finally the parameters of interest (paths from Dependence, Asset Specificity,

Uncertainty, and SCO to GSCPI) were labeled in order to constrain the estimates of their values and the fit statistics of the two models were compared (constrained versus unconstrained). The first model was the moderated model (paths were free to vary). In the second model, the no-moderation model, each path was constrained once (Path 1 High = Path 1 Low, Path 2 High = Path 2 Low, etc.). Therefore, the no moderation model constrained the path weights to be the same regardless of the level of CD, while the moderation model allowed for differences in the CD to change the path weights. The two models were then compared to check for differences in fit (statistical and practical). The nested model comparison showed no significant difference between the moderated model and the no moderation model. The results are shown in Table 4.14. The results in Table 4.14 indicate that cultural distance was not a significant moderator for all of the hypothesized antecedents of GSCPI (dependence, asset specificity, uncertainty, and supply chain orientation). The Chi-square change was minimal and statistically not significant ($p>0.05$). Additionally, when all of the antecedents were tested together in one run to check for moderation across all of them (overall moderation), there was no significant moderation through different levels of cultural distance.

**Table 4.14 Tests for CD Moderation**

| Model | DF | CMIN | P |
|---|---|---|---|
| Dependence | 1 | .777 | .378 |
| Asset Specificity | 1 | 1.064 | .302 |
| Uncertainty | 1 | .422 | .516 |
| SCO | 1 | .025 | .874 |
| Overall Moderation | 4 | 3.678 | .451 |

Cultural Distance did not have any moderating effects on any of the paths from dependence, asset specificity, uncertainty, and supply chain orientation to GSCPI. Hypothesis 6 posited that a higher level of GSCPI will lead to a higher level of supplier flexibility. This was strongly supported (standardized regression weight = 0.524, $p<0.01$). Hypothesis 7 predicted that supplier flexibility will improve logistics performance, but this hypothesis was not supported and the path was not significant (standardized regression weight 0.01, $p=0.887$). The last hypothesis relating logistics performance to firm performance was supported (standardized regression weight = 0.742, $p<0.001$).

It was not surprising to find hypotheses $5_{a\text{-}d}$ (moderating effects on cultural distance) not significant since the literature on this issue has been controversial with several recent studies not finding any significant impact from cultural distance (Bowman, Farley, and Schmittlein 2000).

An interesting finding was that the relationship between uncertainty and GSCPI was negative instead of positive as initially hypothesized, indicating that firms tend to have lower levels of GSCPI with their suppliers when the levels of environmental uncertainty are high. Another surprising finding was the fact that the path from flexibility to logistics performance was not supported. More post-hoc analyses were conducted to investigate any additional findings or explanations.

## POST HOC ANALYSIS

In order to examine the effects of flexibility on logistics performance, an alternative model was proposed that examined the impact of flexibility on logistics

efficiency and logistics effectiveness separately (not as one formative construct). The items from the initial "logistics performance" construct (adapted from Fugate (2006) and Bobbitt (2004)) were modified in the main test because of concerns regarding face validity. This raised doubts to whether logistics efficiency and logistics effectiveness were first order constructs for a higher second order latent construct "logistics performance" or whether they were two separate constructs. The alternative structural model shown in Figure 4.3 was run in Amos 7.

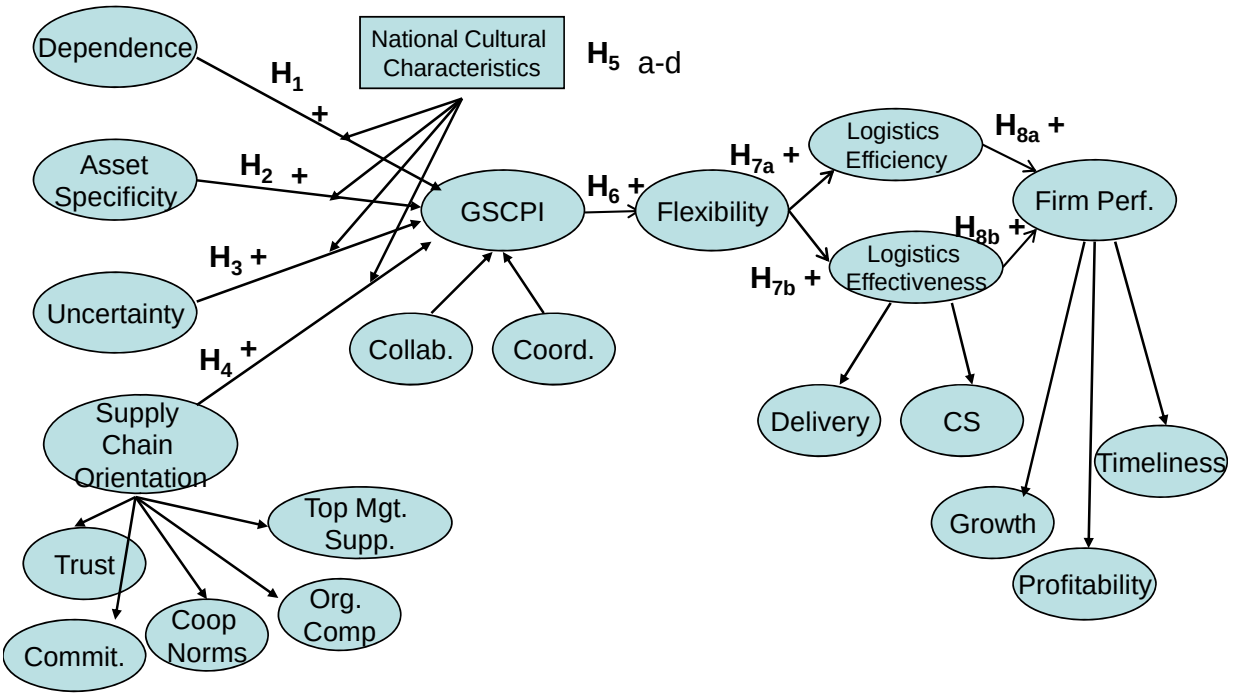


**Figure 4.3 Alternative Theoretical Framework**

**Table 4.15 Structural Model Statistics (Alternative Models)**

| Hypothesized Relationship | | | Estimates | P< |
|---|---|---|---|---|
| **($H_1$)** Dependence | (+) | GSCPI | 0.116 | Not Significant |
| **($H_2$)** Asset Specificity | (+) → | GSCPI | 0.198 | Not Significant |
| **($H_3$)** Uncertainty | (+) | GSCPI | -0.388 | 0.05 (significant but in the wrong direction) |
| **($H_4$)** Supply Chain Orientation | (+) → | GSCPI | 0.72 | 0.05 |
| **($H_5$ a-d)** Cultural Distance | Moderator | D-GSCPI | No Moderation Effects | |
| | | AS-GSCPI | | |
| | | U-GSCPI | | |
| | | SCO-GSCPI | | |
| **($H_6$)** GSCPI | (+) → | Flexibility | 0.527 | 0.01 |
| **($H_{7a}$)** Flexibility | (+) → | Logistics Efficiency | 0.227 | 0.001 |
| **($H_{7b}$)** Flexibility | (+) → | Logistics Effectiveness | 0.445 | 0.001 |
| **($H_{8a}$)** Logistics Efficiency | (+) → | Firm Performance | 0.378 | 0.001 |
| **($H_{8b}$)** Logistics Effectiveness | (+) → | Firm Performance | 0.742 | 0.001 |
| Model Fit | | | | |
| $\chi 2 = 2008.6$ | df = 1240 | | | |
| $\chi 2/df = 1.62$ | CFI = 0.94 | | RMSEA = 0.04 | |

As shown in Table 4.15, there were no differences between the fit statistics of the first structural model and the alternative model. The paths from dependence to GSCPI and asset specificity to GSCPI were still not significant. The path from uncertainty to GSCPI was statistically significant but did not support hypothesis 3 because the direction of the relationship turned out to be negative. The path from SCO to GSCPI was significant and supported hypothesis 4. In addition, the path from GSCPI to flexibility was significant. Cultural distance did not moderate any of the paths from dependence, asset specificity, uncertainty, or supply chain orientation to GSCPI. The results of the moderation test were identical to Table 4.14.

The most intriguing result from the alternative model was that flexibility of the supplier improves logistics efficiency (standardized regression weight = 0.227, $p<0.001$) and logistics effectiveness (standardized regression weight = 0.445, $p<0.001$) and that improvements to logistics efficiency and logistics effectiveness lead to better firm performance (standardized regression weights = 0.378 and 0.742 respectively, $p<0.001$). This supports the alternative explanation that logistics efficiency and logistics performance are two separate constructs and not first order constructs for a higher second order latent variable (logistics performance).

## ASSESSING SELF-REPORTED PERFORMANCE MEASURES

Several previous studies demonstrate that self-reported performance assessment is consistent with external secondary data (Kannan and Tan 2006; Tan et al. 1999; Venkatraman and Ramanujam 1986) and objective internal performance (Dess and Robinson 1984; Pearce, Robbins, and Robinson 1987; Slater and Narver

1994). A total of 65 respondents voluntarily provided their firm names, which were also available in the Compustat database. Three objective indicators (return on investment, return on assets, return on sales, and sales growth) obtained via Compustat (and then computed) for those 65 companies were compared with the Likert-scale measures. This resulted in a positive, significant correlation of .72 for return on investment, .69 for return on assets, and .66 for return on sales, each significant at $p < .01$.

## RIVAL MODELS

It has been suggested that researchers test rival models and not just the proposed model (Bollen and Long 1992; Rust, Lee and Valente 1995). According to the procedure presented by Morgan and Hunt (1994), a rival model is a model in which the antecedents affect the outcomes directly (e.g., uncertainty directly to firm performance or GSCPI directly to firm performance).

The overall suitability of a rival model is judged by comparing its overall fit versus the proposed model relative to degrees of freedom, the number of significant structural paths it contains, and the rival model's comparative ability to explain variance in the dependent variables (Rust, Lee and Valente 1995). Given this criteria, model (2) discussed above, which removes a few insignificant drivers, appears to present the best option. All path weights remain significant and fit improves slightly.

Several rival models were attempted with paths directly from GSCPI to logistics efficiency, logistics effectiveness, and firm performance. None of those paths was significant and the overall model fit in all three cases was worse than the

initial model fit. This provided even stronger support for the theoretical model proposed in Figure 4.2.

## CHAPTER SUMMARY

This chapter analyzed the survey data for this dissertation and committed significant attention to two areas: (1) evaluating the data and quality of measurement and (2) testing the proposed models according to the hypotheses presented in chapter two as well as conducting post hoc analyses. The overriding intent was to subject the data to a very high standard of rigor and assess the results. A summary of the results of the hypotheses testing (based on the alternative model in Figure 4.3) is outlined in Table 4.16. Chapter five illustrates what these results mean for the research objectives and the extant body of knowledge.

**Table 4.16 Summary of Hypotheses**

| # | Hypothesis | Results |
|---|---|---|
| $H_1$ | A higher level of supplier dependence results in a higher level of GSCPI. | Not Supported |
| $H_2$ | A higher level of asset specificity results in a higher level of GSCPI. | Not Supported |
| $H_3$ | A higher level of environmental uncertainty results in a lower level of GSCPI. | Not Supported |
| $H_4$ | A higher level of supply chain orientation results in a higher level of GSCPI. | Supported* |
| $H_{5(a-d)}$ | Cultural distance positively moderates the relationship between GSCPI and all four antecedents (dependence, asset specificity, uncertainty, and supply chain orientation) | Not Supported |
| $H_6$ | A higher level of GSCPI results in a higher level of supplier flexibility. | Supported** |
| $H_{7a}$ | A higher level of supplier flexibility results in a higher level of logistics efficiency. | Supported*** |
| $H_{7b}$ | A higher level of supplier flexibility results in a higher level of logistics effectiveness. | Supported*** |
| $H_{8a}$ | A higher level of logistics efficiency results in a higher level of firm performance. | Supported*** |
| $H_{8b}$ | A higher level of logistics effectiveness results in a higher level of firm performance. | Supported*** |

*Supported at the 0.05 level
*Supported at the 0.01 level
*Supported at the 0.001 level

# CHAPTER 5 - CONCLUSIONS AND IMPLICATIONS

## CHAPTER OVERVIEW

Global competition compels firms around the world to re-think their approach to a market increasingly characterized by a network of competing global supply-chains. Global markets move at a rapid pace (MacMillan et al. 2003). Sharp discontinuities in the macro-environment and industry factors occur frequently and trigger shortfalls in firm performance along with devaluation of their strategic resources (Barnett and McKendrick 2004). This turbulent landscape leads global supply chain managers to continuously assess their supply chain strategies and search for areas of improvement.

Towards this end, key areas for firms to build knowledge competence include supplier knowledge, competitive knowledge, and customer knowledge (Yeniyurt, Cavusgil, and Hult 2005). In support of calls to address gaps in knowledge about global supply chain management, the purpose of this dissertation was to test a theory of supply chain process integration in a global business context and advance strategic thinking in one key problem area: improving performance (both process and firm) by integrating supply chain processes with global suppliers.

This dissertation set out to understand the phenomenon of global supply chain process integration in more depth. There are numerous studies in the areas of strategic management, international business, and supply chain management that have focused on issues related to vertical integration in supply chains. This research is distinct from previous research in several ways:

1. This research is focused on process integration issues in supply chains as opposed to vertical integration.

2. Given the importance of flexible supply chains in a rapidly changing environment, flexibility was investigated as an outcome of global supply chain process integration, and its potential impact on process and firm performance.

3. All suppliers in the study were located cross border (relative to the manufacturer), which is a growing trend for many manufacturing firms. This also enabled the investigation of the potential impact of cultural distance as a result of this global supply chain design.

The first chapter highlighted the difficulty of competing in a global environment and the need to continuously search for new ways to better manage a global supply chain. Research objectives as well as potential contribution, and both theoretical and managerial implications, were highlighted towards the end of chapter 1. Chapter two presented hypotheses based on an extensive review of theory and literature and depicted them in a theoretical framework. Chapter three discussed the methodology used to test the theory including measures and different steps for evaluating those measures. Chapter four provided detailed analyses of a pre-test, a main survey test and post hoc analyses of the hypotheses. This chapter concludes this dissertation by discussing how the findings address the research objectives, expanding on the contributions to research and practice, pointing out limitations, and reflecting on future research opportunities.

## DISCUSSION OF THE FINDINGS

### HYPOTHESIS 1

Hypothesis 1 stated that the dependence of a manufacturing firm on one of its suppliers should positively increase the level of global supply chain process integration between both firms. This hypothesis was proposed based on the literature grounded in resource dependence (RD) theory. The basic premise of RD theory is that inter-firm governance is a strategic response to conditions in an organization's environment – specifically, uncertainty and dependence (Pfeffer and Salancik 1978). RD theory is largely based on the concept of dependence; where one actor does not entirely control all the conditions necessary for an action or a desired outcome (Handfield 1993). According to RD theory, firms try to manage their dependence by constantly establishing links with other supply chain members (Ulrich and Barney 1984).

Findings in this study did not support this hypothesis, which was intriguing as well as counter intuitive. One possible explanation is that global supply chain process integration could be driven by "interdependence" as opposed to "dependence." The difference between dependence and interdependence is that in the case of dependence, one of the firms is dependent on the other firm (firm "A" is dependent on firm "B"). On the other hand, interdependence means that both firms are dependent on each other (firm "A" is dependent on firm "B" and firm B" is dependent on firm "A").

Several studies have discussed the importance of inter-dependence in supply chain relationships and structures (Kumar, Scheer and Steenkamp1995). In addition

to the level of interdependence, another factor that should be addressed is the level of asymmetry of the interdependence (Anderson and Weitz 1989; Kumar, Scheer and Steenkamp1995). Levels of inter-dependence asymmetry can have an impact on the relationship strength and thus impede or facilitate a higher level of process integration. Further research is warranted in this area to explore the impact of interdependence on global supply chain process integration.

HYPOTHESIS 2

Hypothesis 2 stated that a higher level of asset specificity leads to a higher level of supply chain process integration. The rationale behind this hypothesis was built using transaction cost analysis (TCA) theory. TCA theory states that in the case of investments that are uniquely tailored to a specific supply chain member, firms would be more inclined to safe guard those investments and protect them from any opportunistic behavior by engaging their operations closer with that supply chain member. Several studies have found support for this hypothesis in the case of vertically integrated relationships (e.g. Agarwal and Ramaswami 1992; Anderson and Gatignon 1986; Aulakh and Kotabe 1997; Erramilli and Rao 1993; Hill, Hwang and Kim 1990; Huang and Hsu 2003; Kim and Hwang 1992; Klein, Frazier and Roth 1990; Li and Li 2003). Despite the fact that this was supported in the context of vertically integrated relationships, this relationship was not supported in this study. Several factors may have led to the lack of support in the context of process integration.

A high level of asset specificity means that a firm has invested a large number or amount of assets with one of its supply chain members, and that those assets

cannot be easily transferred to a different supply chain member without a considerable loss (Anand and Singh 1997; Jap 2001). This should result in a higher level of dependence between that firm and its supply chain member (supplier in the context of this dissertation). Testing this relationship, the results confirmed that there is a strong positive relationship between asset specificity and dependence where a higher level of asset specificity leads to a higher level of dependence (standardized regression weight = 0.445, significant at $p<0.001$). Given the preceding discussion on dependence, it may not be sufficient to have dependence only from one side of the dyad but there has to be interdependence. This interdependence may not necessarily be asymmetric but there has to be a minimum level of dependence between both parties. Thus asset specificity may not be a contributing factor to global supply chain process integration if it's only from one side of the dyad. Further research is warranted in this area to investigate whether high levels of dyadic asset specificity lead to higher levels of global supply chain process integration.

HYPOTHESIS 3

The third hypothesis states that a high level of environmental uncertainty leads to a higher level of global supply chain process integration. Building on RD and TCA theories, one should expect that with increasing levels of uncertainly, firms would be inclined to closely collaborate with their suppliers and coordinate the movement and flow of products in order to reduce this level of uncertainty. According to RD theory, firms try to reduce uncertainty by purposely structuring their exchange relationships by means of establishing formal or semi-formal links

(Heide1994; Pfeffer and Slancik 1978). Thus uncertainty should lead to a higher level of collaboration and coordination between manufacturing firms and their global suppliers. The path from uncertainty to GSCPI was statistically significant ($p<0.05$) but the standardized regression weight was negative (-0.338) as opposed to positive as initially hypothesized. This means that there is a significant negative relationship between the level of environmental uncertainty and global supply chain process integration. Manufacturers in this study were found to have lower levels of collaboration and coordination with their global suppliers when the level of uncertainty was high.

This finding can be explained by the fact that supply chain managers could sometimes use risk avoidance strategies when there is a high level of uncertainty. Risk avoidance is one of many strategies that managers employ to manage risk in their global environment (Juttner, Peck and Christopher 2003; Manuj and Mentzer, Forthcoming; Miller 1992). Risk avoidance strategies are typically undertaken when the risk associated with dealing with a specific global supplier is considered unacceptable. In such circumstances, supply chain managers are aware of the potential risks involved and choose to avoid them (Manuj and Mentzer, Forthcoming) by having lower levels of process integration. Other studies that investigated global supply chain vertical integration also found support that environmental uncertainty leads to lower levels of vertical integration in the case of foreign entry mode. This supports the findings in this study that managers would be more inclined to avoid additional risks and have lower levels of process integration when the level of

uncertainty is high. Future research is warranted to further investigate this relationship.

HYPOTHESIS 4

Hypothesis 4 states that a higher level of supply chain orientation leads to a higher level of global supply chain process integration. This hypothesis was supported (standardized regression weight = 0.72, $p<0.05$). Supply chain orientation is a multidimensional construct that builds and maintains several behavioral elements such as trust, commitment, cooperative norms, organizational compatibility, and top management support (Mentzer et. al. 2001; Mentzer, Min and Zacharia 2000; Min, Mentzer and Ladd 2007). Those behavioral elements drive a firm's decision to integrate its global supply chain processes with its suppliers. This also supports the argument that the internal culture of the organization is important in maintaining and strengthening relationships with external suppliers (Lambert, Stock and Ellram 1998).

HYPOTHESIS 5

Hypothesis 5 posited that cultural distance between the manufacturing firms and their global suppliers moderates hypotheses 1-4. Recent research on the importance of the impact of national culture on business relationships and managerial decisions is equivocal. Some find significant cultural inflections on the way business managers deal with their suppliers still persist (Homburg et al. 2005). Others show that cultural effects fade or fail to show up (Blocker 2007; Bolton and Myers 2003; Bowman et al. 2000; Cheung 2005). Based on a balanced view (Farley and Lehmann

1994), $H_{5a-d}$ predicted that the cultural distance moderates the level of global supply chain process integration between manufacturing firms and their global suppliers. This was not the case. Thus, results strengthen the idea that cultural distance (in business contexts) is being overshadowed by other factors (Heuer, Cummings, and Hutabarat 1999; Levitt 1983). Some of those factors include the nature or orientation of a firm's strategy. Supply chain orientation in this study was found to have a strong impact on the level of global supply chain process integration. This study adds to the ongoing debate on cultural distance and national cultural characteristics and their impact on business decisions.

HYPOTHESIS 6

Hypothesis 6 posited that global supply chain process integration improves the responsiveness and flexibility of the global suppliers. This was supported (standardized regression weight = 0.527, $p<0.01$). One of the central themes emerging in the strategic management resource based view is that inter-firm knowledge sharing and collaboration is a major source of competitive advantage (Connor and Prahalad 1996). When collaboration was coupled with coordination, suppliers in this study were found to be more responsive and more flexible in meeting the demands of their customers (US based manufacturers).

HYPOTHESIS 7

Hypothesis 7 predicted that a higher level of flexibility and responsiveness provided by the global supplier improves logistics performance. Logistics

performance is defined through the efficiency and effectiveness of logistics activities (Mentzer and Konrad 1991). Efficiency is how well a firm utilizes its resources to achieve its objectives while effectiveness is the degree in which those objectives were met (Mentzer and Konrad 1991). In addition to efficiency and effectiveness, other researchers have argued that differentiation is another dimension of logistics performance (Langley and Holcomb 1992).

Differentiation is defined as the degree to which the customers see the firm as being different from its competition. The approach of comparing performance to competitors has long been rooted in strategic management research (Porter and Millar 1985; Stahl and Bounds 1991; Wernerfelt 1984). This dissertation did not include differentiation as one of the dimensions of logistics performance since the respondents were managers working for manufacturing firms, and not their customers. Another change made to the logistics performance construct that was tested by Bobbitt (2004) and Fugate (2006) was changing the items for the effectiveness scale. Upon careful examination, the original items had face validity issues because they seemed to be measuring efficiency as opposed to effectiveness. After running the pre-test analysis, the effectiveness scale emerged with two dimensions: delivery performance and customer satisfaction. The logistics performance scale that was tested in this study is shown in Figure 5.1. Logistics performance was modeled as a second order formative construct with two first order constructs: efficiency and effectiveness. Effectiveness had two reflective dimensions: delivery performance and customer satisfaction.

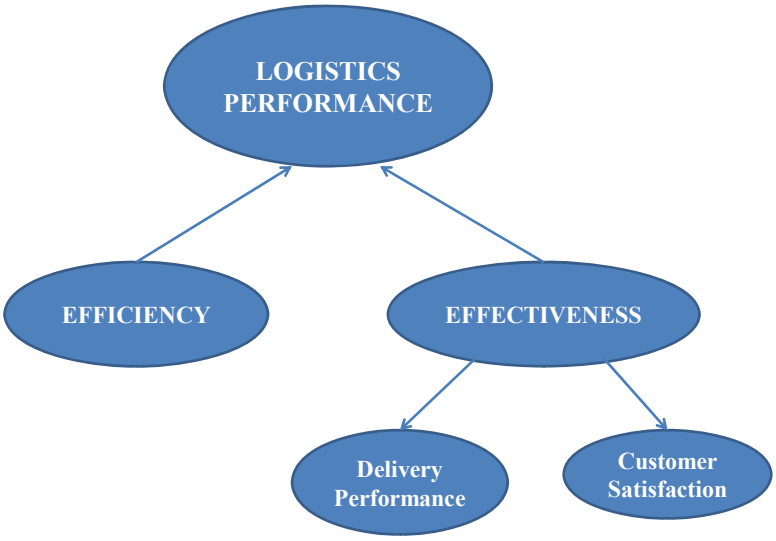


**Figure 5.1 Logistics Performance Scale**

After running the structural model in AMOS with logistics performance modeled as shown in Figure 5.1, hypothesis 7 was not supported. The path from flexibility to logistics performance turned out to be not significant (standardized regression weight = 0.01, p = 0.887). This result was contrary to what was expected based on the literature review that supports the argument that a higher level of flexibility should improve logistics effectiveness and logistics efficiency. In the *post hoc* analysis, logistics performance was modeled as two separate constructs (logistics efficiency and logistics effectiveness – see Figure 5.2) as opposed to one formative latent construct with two first order constructs. This was done in an attempt to understand whether flexibility was impacting just one of those constructs (effectiveness or efficiency). The results were intriguing and demonstrated that there

was a strongly significant relationship between flexibility and logistics efficiency (standardized regression weight = 0.227, $p<0.001$) and between flexibility and logistics effectiveness (standardized regression weight = 0.445, $p<0.001$).

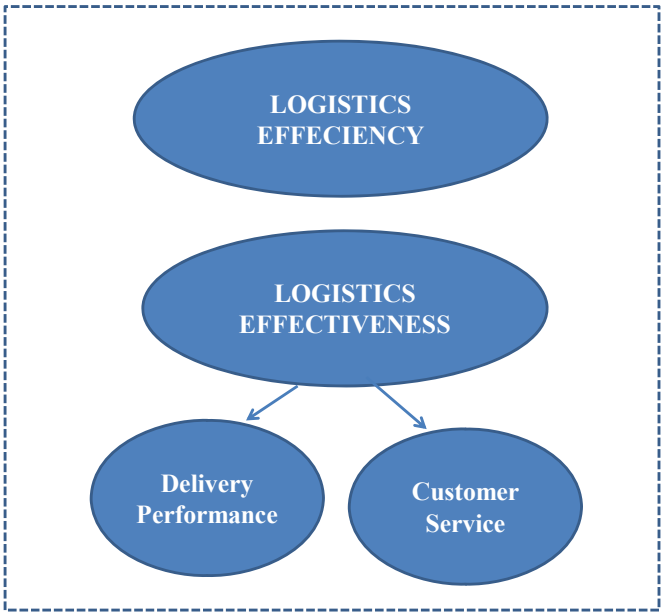


**Figure 5.2 Logistics Performance- Post-Hoc**

The results were intriguing for two reasons. First, logistics performance turned out to be two separate constructs, logistics efficiency and effectiveness, as opposed to one formative construct as previously modeled in other studies (e.g. Bobbitt 2004; Fugate 2006). Second, some researchers argue that supply chain managers always have to choose between efficiency or effectiveness (Griffis 2004) or that supply chains should be designed and structured to be either responsive or efficient (Fisher 1997). The results from this study contradict those arguments and support the idea that firms can achieve their process performance both in terms of efficiency and effectiveness simultaneously. One of the ways that this could be achieved is through integrating their supply chain processes with their global suppliers to attain a higher level of flexibility or responsiveness that, in turn, would improve both efficiency and effectiveness of the manufacturing firm.

HYPOTHESIS 8

Hypothesis 8 posited that a higher level of logistics performance improves overall firm performance. After applying all of the changes to the logistics performance construct and running the structural model in AMOS, the results supported this hypothesis. Both logistics efficiency and logistics effectiveness were found to have a positive significant impact on firm performance (both significant at $p<0.001$). Since firm performance was measured using self reported measures, an additional step was taken in order to validate the results. A sample of publicly traded firms in this study was used to further validate the self reported measures. This was done by comparing the correlation between the self reported measures and the actual

performance measures (calculated using figures from COMPUSTAT database). The results supported the credibility of the self reported performance measures since there was a positive, significant correlation of .72 for return on investment, .69 for return on assets, and .66 for return on sales, each significant at $p < .01$.

## CONTRIBUTION

In filling existing gaps in the current literature, a research project has to contribute to the current literature and support or question existing theories. The research should make an important contribution to at least one stakeholder such as researchers and teachers, practitioners, or public policy makers (AMA task force 1988; Varadarajan 2003). The findings from this research expand on the literature in the areas of supply chain management, logistics, and international business. This has important theoretical and managerial implications, which are discussed in details in the following section.

## THEORETICAL IMPLICATIONS

### Defining and Measuring Global Supply Chain Process Integration

One of the theoretical contributions of this study is defining and measuring the phenomenon of global supply chain process integration as a formative second order construct formed by collaboration and coordination across global supply chain processes. This was done by a comprehensive synthesis of the literature in the areas of supply chain management (Lambert and Cooper 2000; Melnyk, Stank and Closs 2000; Mentzer et. al. 2001; Mentzer, Min and Zacharia 2000; Srivastava, Shervani

and Fahey 1999; Stank, Keller and Daugherty 2001), international business (Agarwal and Ramaswami 1992; Aulakh and Kotabe 1997; Erramilli and Rao 1993; Huang and Hsu 2003; Kim and Hwang 1992), and operations management (Cagliano, Caniato and Spina 2006; Christopher 2000; Morgan and Monczka 1996; Rodrigues, Stank and Lynch 2004; Romano 2003; Rowat; 2004; Stock, Greis and Kasarda 1999).

After defining supply chain process integration as a second order formative construct composed of collaboration and coordination (see Figure 5.3), the appropriate scale items were used to measure the construct using existing items from the literature and new items introduced in this study. The decision to model this construct as a formative scale was based on theoretical criteria that define formative versus reflective constructs (Jarvis, MacKenzie and Podsakoff 2003). A summary of the criteria used to model the construct is highlighted in Table 5.1. The results from the data analysis supported the hypothesized second order formative construct of global supply chain process integration. Additionally, the items used for both collaboration and coordination met all scale validity (convergent and discriminant) and reliability criteria. This could be useful for other researchers who may want to measure or test the level or degree of global supply chain process integration in future studies.

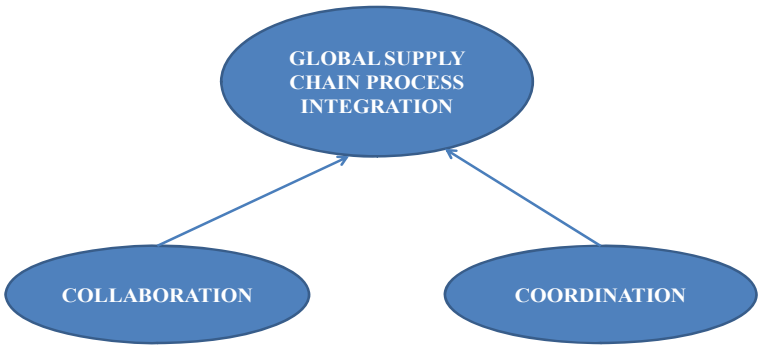


**Figure 5.3 Global Supply Chain Process Integration**

**Table 5.1 Criteria for Formative vs. Reflective Scales***

| Criteria | Reflective | Formative |
|---|---|---|
| Causality | Direction of causality is from construct to indicators or first-order dimensions | Direction of causality is from indicators or first-order dimensions to construct |
| Nature of Indicators | Indicators or first-order dimensions are manifestations of the construct | Indicators or first-order dimensions are defining characteristics of the construct |
| Are Indicators Interchangeable? | Indicators or first-order dimensions should be interchangeable, have same or similar content, and share a common theme. | Indicators or first-order dimensions may, but do not necessarily need to be interchangeable, have same or similar content, or share a common theme. |
| Dropping Indicators | Dropping an indicator or first-order dimension should not alter the conceptual domain of the construct | Dropping an indicator or first-order dimension should alter the conceptual domain of the construct |
| Covariance of Indicators | Indicators or first-order dimensions are expected to covary with each other | Indicators or first-order dimensions may covary positively, negatively, or be neutral with each other |
| Nomological Net | Nomological net for the indicators or first-order dimensions should not differ | Nomological net for the indicators or first-order dimensions may differ |

*Adapted from Jarvis, Mackenzie and Podsakoff (2003)

Understanding the Antecedents of Global Supply Chain Process Integration

Another objective of this study was to determine the antecedents of global supply chain process integration. This helps researchers understand what drives inter-firm process integration in a global supply chain context. Four antecedents were investigated in this study: dependence, asset specificity, uncertainty, and supply chain orientation. Dependence and asset specificity were found not to be significant drivers

of global supply chain process integration. One possible explanation is that dependence or idiosyncratic investments that just form one end of the dyad is not sufficient to drive that integration, but perhaps it should be the case for both ends of the dyad.

On the other hand, the level of environmental uncertainty had a significant negative impact on the level of process integration for global supply chains. When levels of environmental uncertainty were high, global process integration was low. This was similar to other cases in foreign entry mode and global vertical integration literature (e.g. Agarwal and Ramaswami 1992; Aulakh and Kotabe 1997; Erramilli and Rao 1993; Huang and Hsu 2003; Kim and Hwang 1992).

Supply chain orientation had the only hypothesized significant impact on the level of global supply chain process integration. This supports previous research on supply chain orientation describing how this philosophy could be a driving force for firms to collaborate and coordinate with other supply chain members (Min. Mentzer and Ladd 2007). Another contribution to the supply chain concept is by further validating it as a second order reflective construct with five first order dimensions (trust, commitment, cooperative norms, organizational compatibility, and top management support) as previously found by Min, Mentzer and Ladd (2007).

Impact of Cultural Distance

The results from this study indicate that cultural distance did not play a significant role in strengthening or weakening the drivers of global supply chain process integration. This adds to the current dialogue among international business scholars regarding effects of cultural distance on global business managers' behavior.

The findings of this study support the argument that given the current rising trends in globalization, cultural distance factors are being over shadowed by other factors such as corporate philosophy or firm's orientation (supply chain orientation in the context of this study). Further global contexts could be examined in order to evaluate the impact of national cultural differences.

Understanding the Relationship between SCO and Firm Performance

This study makes a significant contribution in the area of supply chain orientation, by building on a previous study that was conducted by Min, Mentzer and Ladd (2007). That study investigated how supply chain orientation may lead to firm performance through supply chain management. Figure 5.5 shows part of the theoretical model that was examined and tested in that study. One of the findings in that study was that the direct path from supply chain orientation to firm performance was significant while the path from supply chain management to firm performance was not significant (possibly because it was overshadowed by the path between SCO and firm performance).


**Figure 5.5 SCO and Firm Performance**
(Adapted from Min, Mentzer and Ladd 2007)

This gap was addressed in this study by identifying the mediators between supply chain orientation and firm performance. The path from supply chain orientation to firm performance was mediated by global supply chain process integration, flexibility, and logistics efficiency and logistics effectiveness. This is shown in Figure 5.6

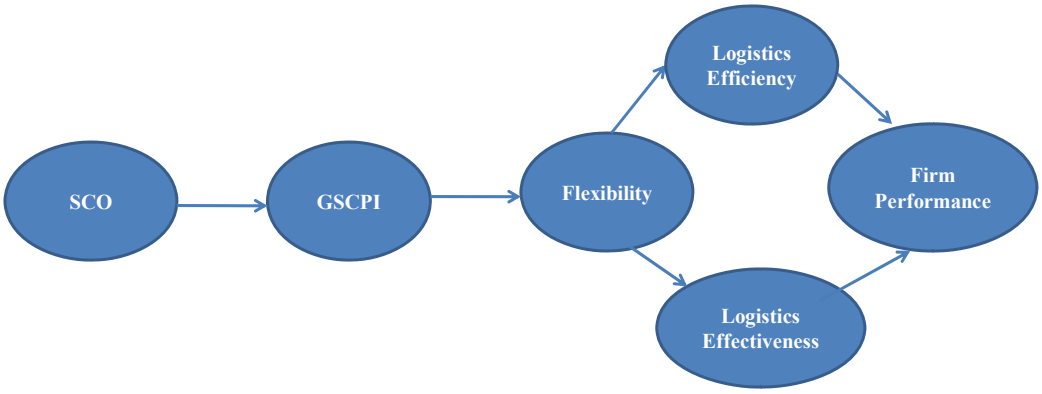


**Figure 5.6 Mediation between SCO and Firm Performance**

Measuring Logistics Performance

Finally, this study makes an important contribution by measuring and testing the logistics performance construct that was previously used in the literature by Bobbitt (2004) and Fugate (2006). Contrary to how the construct was modeled in the previous two studies, this study finds that the two defining constructs of logistics performance are two distinct constructs. Previous studies (Bobbitt 2004; Fugate (2006) have modeled logistics performance as a second order formative construct with efficiency and effectiveness as its first order constructs. This was not the case in this dissertation. Logistics efficiency and logistics effectiveness turned out to be two

separate constructs, not two dimensions of a higher second order construct. This difference in findings between this dissertation and previous studies could be attributed to the changes that were made to the items measuring efficiency and effectiveness because of face validity concerns.

## MANAGERIAL IMPLICATIONS

### Defining and Measuring GSCPI

Previous research studies have discussed various issues regarding process integration. This study makes an impact by defining and measuring the elements of global supply chain process integration between firms. Strategists and supply chain managers can use this to assess their current levels of process integration with their global suppliers. Understanding how to measure and assess levels of global supply chain process integration could be a very valuable tool in a growing and expanding global environment. This scale provides supply chain managers with better decision making tools to evaluate their current status with their global suppliers in terms of the levels of process integration and deciding whether any adjustments are necessary.

### Supply Chain Orientation and Firm Performance

Another valuable insight from this dissertation is identifying the link between supply chain orientation and firm performance. A previous study conducted by Min, Mentzer and Ladd (2007) found a relationship between supply chain orientation and firm performance but could not establish the mediating constructs in that relationship. This dissertation provides insights on the path that a firm may follow when adopting a

supply chain orientation strategy or philosophy. Supply chain orientation was found to improve firm performance through a couple of mediating factors.

Supply chain orientation drives firms to integrate their supply chain processes with their global suppliers, which in turn makes the suppliers more responsive. This responsiveness improves the firm's logistics efficiency and logistics effectiveness and both of those improve overall firm performance. Understanding this chain of events provides supply chain managers with the information and expected outcomes from adopting a supply chain orientation strategy with their suppliers. This allows managers to understand the trade-offs involved when trying to gauge the appropriate level of process integration to be undertaken with a specific supplier. Some of the trade-offs of intense global supply chain process integration may include: the risk of losing propriety information, compromising trade secrets, losing control, losing revenue, or losing competitive edge. Understanding the pros and cons of increasing or decreasing the levels of process integration with global suppliers allows managers to make better decisions when managing their global supply chains.

GSCPI and Supplier Flexibility

Another important finding in this study is the impact of global supply chain process integration on improving supplier responsiveness and flexibility. In an environment where demand is changing rapidly, industry characteristics are evolving quickly, and companies are facing new challenges every day, flexibility is a very valuable tool. Flexibility allows firms to make changes or adjustments with the minimum amount of time and resources involved (Carlsson 1989; De Toni and Tonchia 2005; Upton 1995; Upton 1994; Wernerfelt 1984). This dissertation

provides an explanation of how managers can attain a higher level of flexibility from their overseas suppliers in a dynamic environment. This study provides empirical support that manufacturing firms can experience a higher level of responsiveness and flexibility from their suppliers by integrating their supply chain processes. Thus manufacturing firms that really value flexibility and responsiveness in their operations can adjust their process integration levels to attain the required level of flexibility.

Supplier Flexibility and Downstream Performance

Another important finding in this study stems from the established link between upstream performance and downstream performance. This study provides support that by improving performance from the supply side through increasing or enhancing supplier flexibility, manufacturing firms can improve their downstream process performance by improving logistics efficiency and logistics effectiveness (delivery performance and customer satisfaction). This provides further support to the value of having flexible or responsive suppliers in a dynamic and constantly changing global environment.

Logistics Performance and Firm Performance

Firms are increasingly creating inimitable distinctive capabilities through their logistics processes to create a competitive advantage (Barney and Muhanna 2004; Makhija 2003; Fawcett, Calantone and Smith 1996; Lynch, Keller and Ozment 2000). This study provides empirical support that improving logistics performance has a positive impact in improving overall firm performance. Many of the distinctive

capabilities firms develop revolve around cycle time compression and order and delivery accuracy (Bowersox, Mentzer and Speh 1995; Daugherty and Pittman 1995; Shore and Venkatachalam 2003; Stank, Davis and Fugate 2005; Zhoa, Droge and Stank 2001). By enhancing logistics performance through improvements to logistics efficiency and logistics effectiveness, firms can improve their overall performance in the market and thus their profitability, growth, and customer satisfaction.

## LIMITATIONS AND FUTURE RESEARCH OPPORTUNITIES

All research methods suffer from inescapable flaws (McGrath 1981), many of which can only be addressed in future research that gathers additional data and/or uses alternate methods. Key limitations in this study involve the weaknesses associated with cross-sectional surveys (e.g., Lindell and Whitney 2001; Podsakoff et al. 2003), using a single-informant per firm to collect perceptual data (Van Bruggen et al. 2002), and constraints on the depth of information a survey can capture relative to the phenomena being investigated. Limitations of the research design are discussed in the following section, followed by discussion of potentially fruitful avenues for further research.

### RESEARCH DESIGN LIMITATIONS

One major drawback of using a cross-sectional survey is that investigation of global supply chain process integration is limited to a point-in-time assessment. Longitudinal research designs can capture changing phenomena without relying on

static assessments and future research on this topic could benefit significantly from this approach. For example, future studies might incorporate a small panel of managers who agree to report on their perceptions of antecedents and consequences of global supply chain process integration over time.

Whereas a single cross-section survey limits this study's ability to capture long term effects and changes, the intent of this dissertation was to focus on managers' perceptions of what drives global supply chain process integration and what are the consequences of this phenomenon – not to track how particular aspects of this phenomenon evolved over time in US based manufacturing companies. With the stated goal, a cross-sectional design was considered an appropriate method.

It has been demonstrated that obtaining data from multiple informants versus single informants improves the quality of the response data and thus the validity of the findings in organizational research (Wilson and Lilien 1991). Although attempts were made to gather multiple-informants per respondent firm by asking respondents to pass along survey information to other qualified managers in their organization, this strategy did not yield acceptable results. Thus, the correspondence of this study's self-reported, single-informant perceptions to the "true shared perceptions" held by each respondent's organizational buying center is bounded by potential informant bias. The difficulty of obtaining multiple informant data is high (Tanner 1999), thus future research might address this issue by focusing on a few firms with multiple informants in each firm.

Additionally, perceptual versus actual behavioral data are used to test the hypotheses. Informants report perceptions of their experiences working with

providers. To mitigate potential bias in the accuracy of the responses, informants were qualified over the phone based on their expertise. Respondents also were asked about the level of their confidence in their answers. Still, perceptual data are dependent upon respondents' ability and willingness to mentally retrieve and accurately report on their mental evaluations (Nisbett and Wilson 1977). Future research would benefit from obtaining company data that track coordination mechanisms set in place, collaboration efforts that are documented, or other relevant data.

As it relates to the constraints on depth and breadth that can be obtained through surveys, this study was unable to capture additional information that may relate to the phenomena under investigation. For example, it would have been interesting to see how the respondents would have answered the survey when asked about three different types of non-US based suppliers: highly strategic suppliers, moderately strategic suppliers, and non-strategic suppliers.

Another limitation in this research is studying the phenomenon of global supply chain process integration from one firm's perspective as opposed to a dyadic approach. Focusing on just one side of the dyad may induce some bias in the research and could miss important details regarding the phenomenon that could only be captured by studying the entire dyad. An important step to understand and consequently improve supply chain management is by understanding the exchanges that take place between two firms (Achrol, Reve and Stern 1983). A dyadic approach takes two party exchange relationships as its fundamental subject matter to be explained (Achrol, Reve and Stern 1983). By looking at both sides of the dyad,

manufacturers and their suppliers or the manufacturers and their customers, valuable insights may be gained.

Beyond the limited scope addressed above, most constructs were measured with three-item questions that attempted to tap each construct's domain, but invariably overlook possible sub-dimensions (e.g., sub-dimensions of collaboration or coordination) and stop well short of the rich description obtained only through qualitative inquiry. For example, constructs like trust and commitment address emotions through the lens of a very cognitive, utilitarian survey instrument whereas other methods can provide greater depth of each concept.

Finally, although the sample employed in this survey spans suppliers located in 33 different countries, findings cannot be directly extrapolated beyond US based manufacturing companies.

Although this list of limitations impose significant boundaries on the results, the weight of evidence – considering methodological rigor of the tests applied and in light of existing research – justifiably presents a host of contributions for research.

## SUGGESTIONS FOR FUTURE RESEARCH

Beyond addressing limitations in the research design, future research might concentrate on extensions to this study or avenues related to theoretical issues and other interesting research questions.

A future step in providing a more rigorous discipline in the field of supply chain management is through triangulation. Triangulation is the use of different research approaches methods and techniques in the same study in order to overcome

the potential bias and sterility of a single approach (Hussey and Hussey 1997). There are different ways of triangulation such as data, investigator, methodological, or theory triangulation (Fetterm 1998; Wallendorf and Belk 1989). Data triangulation is when data are collected at different times and/or from different sources. Investigator triangulation is achieved when different investigators collect data independently. Methodological triangulation is when both qualitative and quantitative methods are employed. The last method of triangulation is theory triangulation through borrowing theories from another discipline to explain a phenomenon. Use of methodological triangulation in supply chain research will allow the discipline to approach the level of rigor sought in other areas of business research and help researchers to more fully understand the phenomena being studied (Mentzer and Flint 1997).

Extending this Research

Direct extensions of this research might incorporate different contexts such as other focal firms, for example: retailers, suppliers or manufacturing firms in Latin America, Europe, or Asia. Each new context will likely pose contingencies for the theory proposed in this study and can help shape knowledge of how it should evolve. Attempting to repeat the study after an appropriate amount of time and with a smaller sample of the original respondents might be possible. This would allow for comparison of changes to the global supply chain process integration framework over time. Also, a number of new insights might be obtained from additional analysis of the existing data set by using alternate statistical methods, such as clustering procedures or by examining potential mediator and moderator relationships that were not hypothesized in this study.

Logistics Performance Definition & Measurement

A mix of similar and disparate results was obtained through analyzing this study's data with first order and second-order models as well as reflectively-specified (according to design) and formatively-specified measures (in *post hoc* analysis). Logistics performance was defined and tested by other researchers (Bobbitt 2004; Fugate 2006) as a formative construct at the second-order level. This study found that the two dimensions of logistics performance were not a first order construct for a higher second order formative construct, rather they are separate constructs. Future research to further support this finding could be valuable to the research and practice of measuring logistics performance.

Dependence versus Interdependence

One of the surprising findings of this dissertation is that the level of dependence of a manufacturing firm on its supplier did not play a role in the level of process integration between the firm and its suppliers. The literature supports the argument that dependence should play a role in the level of global supply chain process integration (Handfield 1993; Pfeffer and Salancik 1978). The lack of support of this hypothesis in this study could be due to the fact that what was measured was dependence rather than interdependence. Since global supply chain process integration is a phenomenon that requires both firms (manufacturer and supplier) to be engaged in the collaboration and coordination of the supplier chain processes, interdependence may be the relevant driver here and not just the level of dependence from one side of the dyad. Future research should be directed towards investigating the role of interdependence on global supply chain process integration. Research

should also be directed to investigate the role of symmetry/asymmetry of interdependence in driving GSCPI.

Uncertainty and GSCPI

A high level of environmental uncertainty was hypothesized to increase GSCPI. This hypothesis was based on RD theory that states that firms try to reduce uncertainty by purposely strengthening their exchange relationships by means of establishing semi-formal links (Heide1994; Pfeffer and Slancik 1978). The results do not support this hypothesis and indicate that there is a negative relationship between the level of environmental uncertainty and GSCPI. The findings are similar to other studies that were done in the context of global supply chain vertical integration (e.g. Aulakh and Kotabe 1997; Hill, Hwang and Kim 1990; Kim and Hwang 1992). Those studies found that companies tend to use risk avoidance strategies (Juttner, Peck and Christopher 2003; Manuj and Mentzer, Forthcoming; Miller 1992) with their global suppliers/customers when faced with high levels of environmental uncertainties.

The relationship between environmental uncertainty and GSCPI needs further investigation. Future research could provide a better understanding of the managerial decision making processes in the face of environmental uncertainty in global supply chains. This could help managers and researchers understand the relationship between uncertainty and GSCPI in different contexts. Future research should also investigate whether there is a positive relationship between uncertainty and GSCPI to a certain level of uncertainty, then the relationship becomes negative when managers perceive the risk as too high and decide to use risk avoidance strategies.

Qualitative Research Design

Considering the early stages of GSCPI research and types of questions involved, some of these issues are probably best suited for qualitative inquiry. For example, global supply chain process integration could be further investigated to explore additional dimensions of that phenomenon or more domains of the current dimensions: collaboration and coordination. Gaining in depth information about those aspects could be achieved by conducting qualitative research design to understand the nature, evolving aspects and mechanisms of collaboration and coordination. A better understanding of both dimensions requires rich description afforded by various qualitative traditions. Qualitative research methodology could also shed light on other issues related to global supply chain process integration such as the risks involved, barriers to integration, and the cost of integration.

Dyadic Research

As discussed in the limitations section, one of the areas where global supply chain management can be investigated thoroughly is by conducting dyadic, or if possible triadic, research. The ideal case would be to study the entire network or all participants in the supply chain to get a more detailed picture on the phenomenon under investigation. Despite the fact that dyadic research is hard to carry out and implement, it is the best approach to capture behavioral aspects like trust, dependence, and supply chain orientation. Studying one side of the dyad may not give the full picture. Studying the entire network leads to better understanding of the inter-organizational relations in global supply chains and the first step to do so would

be by understanding the exchanges that take place between pairs of social actors or "dyads" (Achrol, Reve and Stern 1983).

Pie-Sharing Issues

Conducting dyadic or triadic research could provide valuable insights on many fronts. One of them is by investigating pie-sharing issues. Several researchers have highlighted the importance of understanding pie-sharing and rewards among dyads in business-to-business contexts (Jap 1999; Jap 2001). Investigating global supply chains in the form of dyadic research design could help researchers and supply chain managers understand the benefits of integrating supply chain processes to each party in the dyad. This could help managers understand the expected benefits of integrating their processes with suppliers or customers and thus make a better informed decision when evaluating the trade-offs.

## CONCLUDING REMARKS

Attempts to succinctly summarize the aims, outcomes, strengths, weaknesses, and contributions of a dissertation study are fairly unrealistic. But at the admission of oversimplification, this study attempts to push the boundaries of global supply chain process integration by exploring the phenomenon, defining it, identifying its antecedents and consequences. This study explores how firms integrate their supply chain processes in a global context by investigating the following points:

(1) Defining global supply chain process integration

(2) Identifying the drivers of global supply chain process integration

(3) Identifying the consequences of global supply chain process integration

Specifically, results from this study suggest:

(1) Global supply chain process integration is defined as a formative construct through collaboration and coordination of global supply chain processes.

(2) Supply chain orientation positively increases the levels of global supply chain process integration while the level of uncertainty has a significant negative impact on it.

(3) Global supply chain process integration improves the responsiveness or flexibility for the overseas suppliers.

(4) Improvements in supplier flexibility improve logistics efficiency and logistics effectiveness

(5) Logistics performance is defined through two separate constructs (Efficiency and Effectiveness), not as a second order formative construct.

(6) Finally, improving logistics efficiency and logistics effectiveness can improve firm performance.

Overall, this study presents a number of findings across a wide scope of areas related to global supply chain management in a business-to-business context. Results offer exciting avenues for managers to pursue and other avenues to further investigate in order to better manage their global supply chains.

# LIST OF REFERENCES

## REFERENCES


Agarwal, Sanjeev and Sridhar Ramaswami (1992), "Choice of foreign market entry mode: Impact of ownership, location and internationalization factors," *Journal of International Business Studies*, 23 (1): 1-27.

Anand, Jaideep and Harbeer Singh (1997), "Asset Redeployment, Acquisitions and Corporate strategy in Declining Industries," *Strategic Management Journal*, 18(Special Issue): 99-118.

Anderson, Erin (1985), "The Salesperson as Outside Agent or Employee: A Transaction Cost Analysis," *Marketing Science*, 4 (3): 234-254.

Anderson, Erin and Anne T. Coughlan (1987), "International Market Entry and Expansion via Independent or Integrated Channels of Distribution," *Journal of Marketing*, 51 (1): 71-82

Anderson, Erin and Hubert Gatignon (1986), "Modes of foreign entry: A transaction cost analysis and propositions," *Journal of International Business Studies*, 17 (Fall): 1-26.

Anderson, James C. and David W. Gerbing (1988), "Some Methods for Re-Specifying Measurement Models to Obtain Unidimensional Construct Measurement," *Journal of Marketing Research*, 19 (November), 453-60.

Anderson, James C. and James A. Narus (1990), "A Model of Distributor Firm Manufacturing Firm Working Partnerships," *Journal of Marketing*, 54 (1): 42-58.

Armstrong, Scott and Terry Overton (1977), "Estimating Nonresponse Bias in Mail Surveys," *Journal of Marketing Research*, 14 (3): 396-402.

Aulakh, Preet and Masaaki Kotabe (1997), "Antecedents and performance implications of channel integration in foreign markets," *Journal of International Business Studies*, 28 (1): 145-175.

Babbie, Earl R. (1990), *Survey Research Methods* (2nd ed.). Belmont, CA: Wadsworth.

Ballou, Ronald, Stephen Gilbert and Ashok Mkherjee (2000), "New Managerial Challenges from Supply Chain Opportunities," *Industrial Marketing Management*, 29, 7-18.

Barney, Jay and Waleed Muhanna (2004), "Capabilities, Business Processes, and Competitive Advantage: Choosing the Dependent Variable in Empirical Tests of the Resource-Based View," *Strategic Management Journal*, 25 (1): 23-37.

Barney, Jay (1991), "Firm Resources and Sustained Competitive Advantage', *Journal of Management*, 17 (1): 99-120.

Baumgartner, Hans and Christian Homburg (1996), "Applications of Structural Equation Modeling in Marketing and Consumer Research: A Review," *International Journal of Research in Marketing*, 13: 139-161.

Beamon, Benita (1998), "Measuring Supply Chain Performance," International *Journal of Operations and Production Management*, 55, 281-294.

Beamon, Benita M. (1998), "Supply Chain Design and Analysis: Models and Methods," *International Journal of Production and Economics*, 55: 281-294.

Bello, D. C. and David Gilliland. (1997), "The Effect of Output Controls, Process Controls, and Flexibility on Export Channel Performance," *Journal of Marketing*, 61 (1): 22-38.

Benvenuti, Stefano C. and Giandemetrio Marangoni (1999), "Infrastructure and Performance of the Italian Economic System," *Economic System Research*, 11 (4): 439-455.

Bobbittt, Michelle (2004), "An Examination of the Logistics Leverage Process: Implications for Marketing Strategy and Competitive Advantage," Marketing and Logistics. Knoxville, The University of Tennessee.

Bollen, Kenneth (1989), *Structural equations with latent variables*. New York: John Wiley.

Bollen, Kenneth and Scott Long (1992), "Tests for Structural Equation Models: Introduction," *Sociological Methods and Research*, 21 (November), 123-31.

Breckler, Steven (1990), "Applications of Covariance Structure Modeling in Psychology: Cause for Conern", *Psychological Bulletin*, 107 (2): 260-273.

Browne, Michael and Robert Cudeck. (1993), "Alternative Ways of Assessing Model Fit," In *Testing Structural Equation Models*, ed. K. A. Bollen and J. S. Long. Newbury Park, Calif.: Sage Publications.

Bowersox, Donald J., Dave J. Closs and Theodore P. Stank (2000), "The Ten Mega-Trends that will Revolutionize Supply Chain Logistics," *Journal of Business Logistics*, 21 (2):1-15.

Bowersox, Donald J., John T. Mentzer, and Thomas W. Speh (1995), "Logistics Leverage," *Journal of Business Strategies*, 12 (2): 36-49.

Buckley, Peter, Jeremy Clegg, Nicolas Forsans and Kevin Reilly (2001) 'Increasing the size of the "country": Regional economic integration and foreign direct investment in a globalised world economy', *Management International Review*, 41 (3): 251-73.

Bucklin, Louis P. and Sanjit Sengupta. 1993, "Organizing Successful Co-Marketing Alliances," *Journal of Marketing,* 57 (April): 32-46.

Butler, Kirt C. and Domingo C. Joaquin (1998), "A Note on Political Risk and the Required Return on Direct Investment," *Journal of International Business Studies*, 29 (3): 599-607.

Boyd, Harper W. Jr., and Robert Westfall (1955), "Interviewers as a Source of Error in Surveys," *Journal of Marketing*, 2: 311-324.

Cagliano, Raffaella, Fredrico Caniato and Gianluca Spina (2006), "The Linkage between Supply Chain Integration and Manufacturing Improvement Programs," *International Journal of Production and Operations Management*, 26 (3), 282-299.

Campbell, Donald and Donald Fiske (1959), "Convergent and Discriminant Validation by the Multitrait-Multimethod Matrix," *Psychological Bulletin*, 56, 81-105.

Cavinato, Joseph (1992), "A total cost/value Model for supply chain competitiveness', *Journal of Business Logistics*, 13 (2): 285-301.

Chao, Paul (1998), "Impact of Country-of-Origin Dimensions on Product Quality and Design Quality Perceptions," *Journal of Business Research*, 42 (1): 1-6.

Chow, Garland, Trevor D. Heaver and Lennart E. Henriksson (1994), "Logistics Performance," *International Journal of Physical Distribution & Logistics Management*, 24 (1): 17-28.

Christopher, Martin (2005), Logistics and Supply Chain Management, FT Press: New York (3rd Edition).

Christopher, Martin (2000), "The Agile Supply Chain," *Industrial Marketing Management*, 29: 37-44.

Churchill, Gilbert A, Jr., and William D. Perreault, Jr. (1982), "JMR Editorial Policies and Philosophy," *Journal of Marketing Research*, 19: 283-287.

Churchill, Gilbert A. (1979), "A Paradigm for Developing Better Measures of Marketing Constructs," *Journal of Marketing Research*, 16, (February): 64-73.

Closs, David J. and Diane A. Mollenkopf (2004), "A Global Supply Chain Framework," *Industrial Marketing Management*, 33: 37-44.

Cochran, W.G. (1952). The test of goodness of fit. *Annals of Mathematical Statistics*, 23, 315–345.

Cook, Thomas D. and Donald T. Campbell (1979), *Quasi-Experimentation: Design and Analysis for Field Settings*, Boston: Houghton Mifflin Company.

Cote, J. A., and R. Buckley (1987), "Estimating Trait, Method, and Error Variance: Generalizing across 70 Construct Validation Studies." *Journal of Marketing Research*, 24, 315-318.

Council of Supply Chain Management Professionals (2008), www.cscmp.org

Crampton, Suzanne and John Wagner (1994), "Percept-Percept Inflation in Micro-Organizational Research: An Investigation of Prevalence and Effect," *Journal of Applied Psychology*, 79, 67-77.

Creswell, John W. (2003), Research Design: Qualitative, Quantitative, and Mixed Methods Approaches – Sage Publications: Thousand Oaks, California.

Croxton, Keeley L., Sebastian Garcia-Dastague and Douglas M. Lambert (2001), "The Supply Chain Management Processes," *International Journal of Logistics Management*, 12 (2): 13-36.

Cyret, Richard and James March (1963), *A Behavioral Theory of the Firm*, Prentice-Hall: Englewood Cliffs, NJ.

Daugherty, Patricia J., Mathew B. Myers and Chad W. Autry (1999), "Automatic Replenishment Programs: An Empirical Examination," *Journal of Business Logistics*, 20 (2): 20-26.

Daugherty, Patricia J. and Paul H. Pittman (1995), "Utilization of Time-Based Strategies," *International Journal of Operations and Production Management*, 15 (2), 54-61.

Day, George (1994), "The Capabilities of Market-Driven Organizations," *Journal of Marketing*, 58 (4): 37-52.

Day, George and Prakash Nedungadi (1994), "Managerial Representations of Competitive Advantage," *Journal of Marketing*, 58 (2): 31-44.

De Toni, A. and Tonchia S. (2001), "Definitions and Linkages between Operational and Strategic Flexibilities," *Omega*, 33(6): 525-540.

Devlin, R. and Ricardo Ffrench-Davis (1999), "Towards an Evaluation of Regional Integration in Latin America in the 1990s," *The World Economy*, 22 (2): 261-88.

Dillman, Don A. (2000), "Chapter Four: Constructing the Questionnaires," *in Mail and Internet Surveys: The Total Design Method*, New York: John Wiley & Sons, 79 148.

Doh, Jonathan P. and Ravi Ramamurti (2003), "Reassessing Risk in Developing Country Infrastructure," *Long Range Planning*, 36: 337-353.

Doney, Patricia M. and Joseph P. Cannon (1997), "An Examination of the Nature of Trust in Buyer-Seller Relationships," *Journal of Marketing*, 61 (April): 35-51.

Donk, Dirk Pieter van and Taco van der Vaart (2005), "A Case of Shared Resources, Uncertainty and Supply Chain Integration in the Process Industry," *International Journal of Production Economics*, 96: 97-108.

Droge, Cornelia, Jayanth Jayaram and Shawnee K. Vickery (2000), "The Ability to Minimize the Timing of New Product Development and Introduction: An examination of Antecedent Factors in the North American Automobile Supplier Industry," *Journal of Product and Innovation Management*, 17 (1): 24-40.

Dunning, John H. and Peter Robson (1987), "Multinational Corporate Integration and Regional Economic Integration," *Journal of Common Market Studies*, 26 (2): 103-125.

Dwyer, F. Robert and Sejo Oh (1988), "A Transaction Cost Perspective on Vertical Contractual Structure and Inter-channel Competitive Strategies," *Journal of Marketing*, 52 (2): 21-34.

Dwyer, F. Robert, Paul H. Schurr, and Sejo Oh. (1987), "Developing Buyer-Seller Relationships," *Journal of Marketing,* 51 (April): 11-27.

Dyer, Jeffrey and Harbir Singh (1998), "The Relational View: Cooperative Strategy and Sources of Interorganizational Competitive Advantage," *Academy of Management Review,* 23 (4): 660-679.

Ellinger, Alexander, Patricia Daugherty, and Scott Keller, (2000) "The Relationship Between Marketing/Logistics Interdepartmental Integration and Performance in U.S. Manufacturing Firms: An Empirical Study", *Journal of Business Logistics*, 65 (4): 82-105.

Emmelhainz, Larry W., Margaret A. Emmelhainz and James R. Stock (1991), "Logistics Implications of Retail Stockouts," *Journal of Business Logistics*, 12 (2): 129.

Emmerson, Richard M. (1962), "Power-Dependence Relations," *American Sociological Review*, 27: 31-44.

Erramilli, Krishna and CP Rao (1993), "Service firms' international entry-mode choice: A modified transaction-cost analysis approach," *Journal of Marketing*, 57 (3): 19-38.

Esper, Terry L., Theodore P. Stank, John T. Mentzer, Daniel J. Flint and Mathew B. Myers, "A Strategic Framework for Supply Chain Orientation," Working Paper.

Etgar, M. (1978), "The effects of forward vertical integration on service performance of a distributive industry," *The Journal of Industrial Economics*, 26 (30): 249-55.

Fagan, Michael (1991), "A Guide to Global Sourcing," *Journal of Business Strategy*, 12 (2): 21-25.

Fawcett, Stanley E., Roger Calantone, and Sheldon R. Smith (1996), "An Investigation of the Impact of Flexibility on Global Reach and Firm Performance," *Journal of Business Logistics*, 17 (2): 167-196.

Feldstein, Martin (2002), "Argentina's Fall: Lessons from the Latest Financial Crisis," *Foreign Affairs*, 81 (2): 8-14.

Flint, Daniel J. and John T. Mentzer (1999), "Evaluating Contributions to Logistics Knowledge," Proceedings, (Council of Logistics Management, Oak Brook, IL), 1-12.

Fornell, Claes (1983), "Issues in the Application of Covariance Structure Analysis: A Comment." *Journal of Consumer Research*, 9 (March), 443-448.

Forrester, J. W. (1958), "Industrial Dynamics," *Harvard Business Review*, July-August, 37-66.

Fowler, Floyd J. (2002), *Survey Research Methods* (3rd ed.). Thousand Oaks, CA: Sage.

French, J.R.P., Jr. and B. H. Raven (1959), "The Bases of Social Power," In D. Cartright (Ed.), *Studies in Social Power*, 150-167, Ann Arbor, MI: Institute of Social Research.

Frohlich, Markham T. and Roy Westbrook (2001), "Arcs of Integration: An International Study of Supply Chain Strategies," *Journal of Operations Management*, 19, 185-200.

Fugate, Brian S., Funda Sahin and John T. Mentzer (2006), "Supply Chain Management Coordination Mechanisms," *Journal of Business Logistics*, 27 (2): 129-161.

Fugate, Brian S. (2006), "The Role of Logistics in the Marketing Orientation Process" Marketing and Logistics. Knoxville, The University of Tennessee.

Ganesan, Shanakar (1994), "Determinants of Long-Term Orientation in Buyer-Seller Relationships," *Journal of Marketing*, 58 (2): 1-19.

Garver, Michael S. and John T. Mentzer (2000), "Salesperson Logistics Expertise: A Proposed Contingency Framework," *Journal of Business Logistics*, 21 (2): 113-132.

Gerbing, David. W. and James. C. Anderson (1988), "An Updated Paradigm for Scale Development Incorporating Unidimensionality and Its Assessment," *Journal of Marketing Research,* 25 (2): 186-192.

Ghoshal, Sumantra (1987), "Global Strategy: An Organizing Framework," Strategic *Management Journal*, 8 (5): 425-40.

Ghysels, Eric and Junghoon Seon (2005), "The Asian financial crisis: The Role of Derivative Securities Trading and Foreign Investors in Korea," *Journal of International Money & Finance*, 24 (4).

Golden, Wiliam and Philip Powell (2000), "Towards a Definition of Flexibility: In Search of the Holy Grail?" *Omega*, 28: 373-384.

Grant, Robert M. (1996), "Toward a Knowledge Based Theory of the Firm," *Strategic Management Journal*, 17 (Special Issue): 109-122.

Green, Kenneth. W. and R. Anthony Inman (2005), "Using a Just-in-Time Selling Strategy to Strengthen Supply Chain Linkages," *International Journal of Production Research*, 43 (16): 3437-3453.

Griffin, Abbie (2002), "Product Development Cycle Time for Business-to-Business Products," *Industrial Marketing Management*, 31 (4): 291-304.

Griffis, Stanley E., Martha Cooper, Thomas J. Goldsby and David J. Closs (2004), "Performance Measurement: Measure Selection Based Upon firm Goals and Information Reporting Needs," *Journal of Business Logistics*, 25 (2): 95-118.

Griffis, Stanley E., Goldsby, Thomas J., and Martha Cooper (2003), "Web-Based and Mail Surveys: A Comparison of Response, Data and Cost," *Journal of Business Logistics*, 24 (2): 237-259.

Gulliksen, H. & Tukey, J.W. (1958). "Reliability for the Law of Comparative Judgment," *Psychometrika*, 23, 95–110.

Hair, Joseph F., Rolph E. Anderson, Ronald L. Tatham, and William C. Black (1998), *Multivariate Data Analysis* (5th ed.). Upper Saddle River, NJ: Prentice Hall.

Handfield, Robert B. (1993), "A Resource Dependence Perspective of Just-in-Time Purchasing," *Journal of Operations Management*, 11 (3): 289-311.

Hattie, John (1985), "Methodology Review: Assessing Unidimensionality of Tests and Items," *Applied Psychological Measurement,* 9, 139-164.

Heath, Chip and Nancy Staudenmayer (2000), "Coordination Neglect: How Lay Theories of Organizing Complicate Coordination in Organizations," *Research in Organizational Behavior*, 22 (1): 153-191.

Heide, Jan B. (1994), "Interorganizational Governance in Marketing Channels," *Journal of Marketing*, 58 (January): 71-85.

Heide, Jan. and John George (1988), "The Role of Dependence Balancing in Safeguarding Transaction-Specific Assets in Conventional Channels," *Journal of Marketing*, 52 (1): 20-5.

Hendrick, Thomas E. and Craig R. Carter (1996), "Purchasing's Involvement in Time-Based Strategies," *International Journal of Purchasing & Materials Management*, 32 (3): 2-10.

Hendrick, C. and E.E. Jones, "Formal Aspects of Theory and Hypothesis Testing," *The Nature of Theory and Research in Social Psychology*, (New York: Academic Press, 1972).

Hennart, Jean-Francois. (1991), "The transaction costs theory of joint ventures: An empirical study of Japanese subsidiaries in the United States," Management Science, 37 (4): 483-497.

Hill, Charles W. (1997), *International Business: Competing in the Global Marketplace,* Chicago, Richard D. Irwin.

Hill, Charles W., Huang P. and Kim W. C. (1990), "An Eclectic Theory of the Choice of the International Entry Mode," *Strategic Management Journal*, 11 (2): 117-28.

Hofstede, Geert (1983), "The Cultural Relativity of Organizational Practices and Theories," *Journal of International Business Studies*, 14 (Fall), 81-89.

Holcomb, Mary and Karl Manrodt, (2000), "The Shippers' Perspective: Transportation and Logistics Trends and Issues", *Transportation Journal*, 40 (1):15-26.

Holzman, Franklyn (1976), *International Trade Under Communism*, New York: Basic Books.

Horn, John L. (1991). "Comments on 'Issues in Factorial Invariance,'" In Linda M. Collins and John L. Horn (Eds.), Best Methods for the Analysis of Change (pp. 114-125). Washington, D.C: American Psychological Association.

Hu, L. and P. M. Bentler (1999). "Cutoff criteria for fit indexes in covariance structure analysis: Conventional criteria versus new alternatives," *Structural Equation Modeling*, 6 (1): 1-55.

Huang, Li-Te and Chien-Lung Hsu (2003) 'Factors on channel integration decisions of Taiwanese manufacturers in the export market', *Journal of American Academy of Business*, 2 (2): 312-21.

Huber, George P. (1991), "Organizational Learning: The Contribution Processes and the Literatures," *Organization Science*, 2 (1): 88-115.

Hunt, Shelby D. (1991), Modern Marketing Thought, Cincinnati, Ohio: South-Western Publishing Co.

Iankova, Elena and Jan Katz (2003), "Strategies for Political Risk Mediation by International Firms in Transition Economies: The Case of Bulgaria," *Journal of World Business*, 38: 182-203.

Inkpen, Andrew (1998), "Learning, Knowledge Acquisition and Strategic Alliances," *European Management Journal*, 16 (2): 223-229.

Jacobides, Michael G. (2005), "Industry Change Through Vertical Disintegration: How and Why Markets Emerged in Mortgage Banking," *Academy of Management Journal*, 48 (3): 465-498.

Jacobs, G.D., and N. Greaves (2003), "Transport in Developing and Emerging Nations," *Transport Reviews*, 23 (2) 133-138.

Jap, Sandy (2001), "Pie-Sharing in Complex Contexts," *Journal of Marketing Research*, 38 (1): 86-99.

Jap, Sandy (1999), "Pie-Expansion Efforts: Collaboration Processes in Buyer Supplier Relationships," *Journal of Marketing Research*, 36 (4): 461-475.

Jasper, Ferdinand and Jan van den Ende (2006), "The Organizational Form of Vertical Relationships: Dimensions of Integration," *Industrial Marketing Management*, 35: 819-828.

Jaworski, Bernard (1988), "Toward a theory of marketing control: Environmental context, control types, and consequences," *Journal of Marketing*, 52 (3): 23-39.

Jaworski, B. J., Stathakopoulos, V. and H. Krishnan, S. (1993), "Control combinations in marketing: Conceptual framework and empirical evidence," *Journal of Marketing*, 57(1): 57-69.

John, George and Torger Reve (1982), "The Reliability and Validity of Key Informant Data from Dyadic Relationships in Marketing Channels," *Journal of Marketing Research*, 19 (4), 517-24.

John, G. and Weitz, B.A. (1988) 'Forward integration into distribution: Empirical test of transaction cost analysis," *Journal of Law, Economics and Organization*, 4: 337-55.

Jöreskog, Karl G. (1971), "Simultaneous Factor Analysis in Several Populations," *Psychometrika*, 36 (December), 409-426.

Jovanovic, M. N. 1992. *International Economic Integration*, London, Routledge.

Jüttner, Uta (2005), "Supply Chain Risk Management," *International Journal of Logistics Management*, 16 (1), 120-41.

Jüttner, Uta, Helen Peck, and Martin Christopher (2003), "Supply Chain Risk Management: Outlining an Agenda for Future Research," *International Journal of Logistics: Research & Applications*, 6 (4), 197-210.

Kahn, Kenneth B. and John T. Mentzer (1996), "Logistics and Interdepartmental Integration," *International Journal of Physical Distribution and Logistics Management*, 26 (8): 6-14.

Kannan, Vijay R. and Keah-Choon Tan (2006), "The Impact of Supplier Selection and Buyer-Supplier Engagement on Relationship and Firm Performance," *International Journal of Physical Distribution and Logistics Management*, 36 (10): 755-775.

Kerlinger, Fred N. and Howard B. Lee (2000), *Foundations of Behavioral Research*. United States: Thomson Learning.

Kim, Suk H. (2001), "The Asian Financial Crisis of 1997: The Case of Korea," *Multinational Business Review*, Vol. 9, No. 1, pp. 50-58.

Kim, W. C. and Hwang, P. (1992) "Global strategy and multinationals' entry mode choice," *Journal of International Business Studies*, 23 (1): 29-53.

King, Barry E. and Richard J. Penlesky (1992), "Impediments to Timely Delivery of New Products at an Industrial Products Firm," *International Journal of Operations and Production Management*, Vol. 12, No. 10, pp56-65.

Klein, S., Frazier, G. L. and Roth V. J. (1990), "A transaction cost analysis model of channel integration in international markets," *Journal of Marketing Research*, 27 (May): 196-208.

Klein, Benjamin, Robert G. Crawford and Armen A. Alchian (1987), "Vertical Integration, Appropriable Rent, and the Competitive Contracting Process," *Journal of Law &Economics*, 21 (2): 297-326.

Kline, Rex B. (1998). *Principles and Practice of Structural Equation Modeling*. New York: Guilford Press.

Kobrin, S. J. (1979), "Political Risk: A Review and Reconsideration," *Journal of International Business Studies*, 10 (1): 67-80.

Kogut, Bruce and Harbir Singh (1988), "The Effect of National Culture on the Choice of Entry Mode," *Journal of International Business Studies,* 19 (3): 411-432.

Kogut, Bruce and Udo Zander (1996), "What Firms Do? Coordination, Identity, and Learning," *Organization Science*, 7 (5): 502-518.

Kotabe, Masaaki, and Murray J. Y. (2004) 'Global Sourcing Strategy and Sustainable Competitive Advantage', *Industrial Marketing Management*, 33 (1): 7-14.

LaLonde, Bernard J and James M. Masters (1994), "Logistics: Perspectives for the 1990's," *International Journal of Logistics Management*, 1 (1): 1-6.

Lambert, Douglas M. and Martha C. Cooper (2000), "Issues in Supply Chain Management," *Industrial Marketing Management*, 29: 65-83.

Lambert, Douglas M., James R. Stock, and Lisa M. Ellram (1998), *Fundamentals of Logistics Management*, Boston, MA: Irwin/McGraw-Hill, Chapter 14.

Larson, Paul D. and Robert F. Lusch (1990), "Quick Response Retail Technology: integration and Performance Measurement," *International Review of Retail, Distribution, and Consumer Research*, 1 (1): 17-35.

Lee, Hau L., V. Padmanabhan, and Seungjin Whang (1997), "The Bullwhip Effect in Supply Chains," *Sloan Management Review*, 38 (3): 112.

Li, T. and Li, Z. G. (2003), "Channel integration decisions in new product global competition: A conceptual framework and empirical investigation," *Advances in International Marketing*, 14: 49-75.

Lindell, Michael K. and David J. Whitney (2001), "Accounting for Common Method Variance in Cross-Sectional Research Designs," *Journal of Applied Psychology*, 86 (1), 114-121.

Lynch, Daniel F., Scott B. Keller, and John Ozment (2000), "The Effects of Logistics Capabilities and Strategy on Firm Performance," *Journal of Business Logistics*, 21 (2), 47-69.

MacCormack, D.A., Newman III, L. J. and Rosenfield. D.B. (1994), "The New Dynamics of Global Manufacturing Site Location," *Sloan Management Review*, (Summer): 69-80.

Malhotra, Naresh K., Sung S. Kim, Ashutosh Patil (2006) "Common Method Variance in IS Research: A Comparison of Alternative Approaches and a Reanalysis of Past Research," *Management Science*, 52 (12): 1865-1883.

Maloni, Michael and W. C. Benton (2000), "Power Influences in the Supply Chain," *Journal of Business Logistics*, 21 (1): 49-73.

Maltz, Arnold M, (1994), "The Relative Importance of Cost and Quality in the Outsourcing of Warehousing," *Journal of Business Logistics*, 15 (2): 45-62.

Manuj, Ila and John T. Mentzer (2006), "Global Supply Chain Risk Management," *Journal of Business Logistics*.

Matsuno, Ken John T. Mentzer and Aysegul Ozsomer (2002), "The Effects of Entrepreneurial Proclivity and Market Orientation on Business Performance," *Journal of Marketing*, 66 (3): 18-32.

McCarthy, Teresa M and Susan L. Golicic (2002), "Implementing Collaborative Forecasting to Improve Supply Chain Performance," International Journal of Physical Distribution & Logistics Management, 32 (6): 431-454.

McGinnis, Michael A. and Jonathan W. Kohn (1990), "A Factor Analytic Study of Logistics Strategy," *Journal of Business Logistics*, 11 (2), 41-63.

Medsker, Gina J., Larry J. Williams, and Patricia J Holahan (1994), "A Review of Current Practices for Evaluating Causal Models in Organizational Behavior and Human Resources Management Research," *Journal of Management*, 20 (2): 439-464.

Melnyk, Steven, Theodore P. Stank and David J. Closs (2000), "Supply Chain Management at Michigan State University: The Journey and the Lessons Learned," *Production and Inventory Management Journal*, 41 (3):13-18.

Merino, F. and Salas, V. (2002), "Causes and Consequences of exports' channel integration," *Spanish Economic Review*, 4: 239-259.

Mentzer, John T. and Daniel J. Flint (1997), "Validity in Logistics Research," *Journal of Business Logistics*, 18 (1): 199-216.

Mentzer, John, T. William DeWitt, James S. Keebler, Soonhong Min, Nancy W. Nix, Carlo D. Smith and Zach G. Zacharia (2001), "Defining Supply Chain Management," *Journal of Business Logistics*, 22 (2), 1-25.

Mentzer, J. T., DeWitt, W., Garver, M. S., Keebler, J. S., Soonhoong, M., Nix, N. W., Smith, C. D., and Zacharia, Z. G. (2001) *Supply Chain Management*, Sage Publications: New Delhi.

Mentzer, John T., Soonhong Min, and Zach G. Zacharia (2000), "The Nature of Interfirm Partnering in Supply Chain Management," *Journal of Retailing*, 76 (4): 549-579.

Mentzer, John T. and Konrad, B. P. (1991), "An Efficiency/Effectiveness Approach to Logistics Performance Analysis," *Journal of Business Logistics*, 12(1): 33-61.

Mentzer, John T. and David W. Schumann (1998), "Marketing Scholarship," working paper.

Miller, Kent D. (1992), "A Framework for Integrated Risk Management in International Business," *Journal of International Business Studies*, 23 (2), 311-31.

Milliken, Frances J. (1987), "Three Types of Perceived Uncertainty About the Environment: State, Effect, and Response Uncertainty," *Academy of Management Review*, 12 (1): 133-43.

Min, Soonhong, John T. Mentzer and Robert T. Ladd (2007), "A Market Orientation in Supply Chain Management," Journal of Academy of Marketing Science.

Min, Soonhong and John T. Mentzer (2004), "Developing and Measuring Supply Chain Management Concepts," Journal of Business Logistics, 25 (1): 63-99.

Mitchell, V.W. (1995), "Organizational Risk Perception and Reduction: A Literature Review," *British Journal of Management*, 6: 115-33.

Moorman, Christine, Rohit Deshpande, and Gerald Zaltman. 1993. "Factors Affecting Trust in Market Research Relationships." *Journal of Marketing* 57 (January): 81-101.

Morgan, Robert and Shelby Hunt. 1994. "The Commitment--Trust Theory of Relationship Marketing." *Journal of Marketing* 58 (Summer): 20-38.

Morgan, James P. and Robert M. Monczka (1996), "Supplier Integration: A New Level of Supply Chain Management," *Purchasing*, 120 (1): 110-113.

Mullen, Michael R, (1995), "Diagnosing Measurement Equivalence In Cross-National Research," *Journal of International Business Studies*, 26, (3): 573.

Myers, Matthew B., Roger J. Calantone, Thomas J. Page Jr., and Charles R. Taylor (2000), "An Application of Multiple-Group Causal Models in Assessing Cross-Cultural Measurement Equivalence," *Journal of International Marketing*, 8 (4), 108-121.

Narasimhan, Ram and Ajay Das (2001), "The Impact of Purchasing Integration and Practices on Manufacturing Performance," *Journal of Operations Management*, 19, 593-609.

Novack, Robert A., Lloyd M. Rinehart and Michael V. Wells (1992), "Rethinking Concept Foundations in Logistics Management," *Journal of Business Logistics*, 13 (2) 233-267.

Nye, Joseph S (1968), "Comparative Regional Integration: Concept and Measurement," *International Organization*, 22 (4): 855-880.

Oliver, R. K. and M. D. Webber (1982), *Outlook*, Booz, Allen & Hamilton Inc: New York.

O'Neill, Tim. 2004. Globalization: Fads, fictions and facts. *Business Economics*, 39 (1): 16-27.

Pelkmans, J. 1984. *Market Integration in the European Community*. The Hague: Martinus Nijhoff.

Persson, Goran and Lars-Olof Backman (1993), "Logistics in Eastern Europe: Some Facts, Experiences, and Challenges," *The Logistics and Transportation Review*, 29 (4):319-328.

Pfeffer, J. (1981), *Power in Organizations*, Pitman: Marshfield, MA.

Pfeffer, J. and Salancik, G. R. (1978), "*The External Control of Organizations: A Resource Dependence Perspective*," Harper & Row: New York.

Podsakoff, Philip M., Scott B. MacKenzie, Jeong-Yeon Lee, and Nathan P. Podsakoff (2003), "Common Method Biases in Behavioral Research: A Critical Review of the Literature and Recommended Remedies," *Journal of Applied Psychology*, 88 (5): 879-903.

Porter, Michael E. (1985) *Competitive Advantage*. The Free Press: New York.

Prater, Edmund, Markus Biehl and Michael A. Smith (2001), "International Supply Chain Agility," *International Journal of Operations and Production Management*, 21 (5/6): 823-839.

Rao, M. T. (2004) 'Key Issues for Global IT Sourcing: Country and Individual Factors," *Information Systems Management*, 21 (3): 16-21.

Razzaque, M. A. (1997) 'Challenges to Logistics Development: The Case of a Third World Country-Bangladesh', *International Journal of Physical Distribution & Logistics Management*, 27 (1): 18-38.

Rindfleisch, Aric and Jan B. Heide (1997), "Transaction Cost Analysis" Past, Present, and Future Applications," *Journal of Marketing*, 61 (4): 30-54.

Robock, S. H. (1971), "Political Risk: Identification and Assessment," *Columbia Journal of World Business*, 6 (4): 6-20.

Rodrigues, Stank, and Lynch, (2004), "Linking Strategy, Structure, Process and Performance in Integrated Logistics", *Journal of Business Logistics*, 25 (1).

Romano, Pietro (2003) Coordination and Integration Mechanisms to Manage Logistics Processes Across Supply Networks," *Journal of Purchasing and Supply Chain Management*, 9, 119-134.

Rosenthal, Stephan (1992), *Effective Product Design and Development*. Homewood, Illinois: Business One Irwin.

Roth, K. and Morrison, A. J. (1992) 'Implementing global strategy: Characteristics of global subsidiary mandates', *Journal of International Business Studies*, 23 (4): 715-35.

Rowat, Christine (2004), "How Resilient is Your Supply Chain?" Logistics and Transport Focus, 6 (4): 16-18.

Ruekert, Robert W. and Orville C. Walker Jr. (1987), "Marketing's Interaction with Other Functional Units: A Conceptual Framework and Empirical Evidence," Journal *of Marketing*, 51 (1): 1-19.

Rust, Roland T., Chol Lee, and Ernest Valente Jr. (1995), "Comparing Covariance Structure Models: A General Methodology," *International Journal of Research in Marketing*, 12 (November): 279-91.

Sahin, Funda and Powell E. Robinson (2002), "Flow Coordination and Information Sharing in Supply Chains: Review, Implications, and Direction for Future Research," *Decision Sciences*, 33 (4): 505-536.

Schmidt, G. and Wilbert E. Wilhelm (2000), "Strategic, Tactical and Operational Decisions in Multi-National Logistics Networks: A Review and Discussion of Modeling Issues," *International Journal of Production Research*, 38 (7): 1501-23.

Seidler, John (1974), "On Using Informants: A Technique for Collecting Quantitative Data and Controlling for Measurement Error in Organization Analysis," *American Sociological Review*, 39: 816-31.

Selnes, Fred and James Sallis (2003), "Promoting Relationship Learning," *Journal of Marketing*, 67 (3): 80-95.

Seth, Anju and George Zinkhan (1991), "Strategy and the Research Process: A Comment," *Strategic Management Journal*, 12: 75-82.

Shadish, William R., Thomas D. Cook, and Donald T. Campbell (2002), *Experimental and Quasi-Experimental Designs for Generalized Causal Inference*. Boston, MA: Houghton Mifflin.

Shaw, M.E., and P.R. Costanzo, "Social Psychology and Social Theory," in Theories of Social Psychology, New York: McGraw-Hill, 1982.

Shook, Christopher L., David J. Ketchen, Jr., G. Tomas M. Hult, and K. Michele Karmar (2004), "An Assessment of the Use of Structural Equation Modeling in Strategic Management Research," Strategic Management Journal, 25: 397-404.

Shore, Barry and A.R. Venkatachalam (2003), "Evaluating the Information Sharing Capabilities of Supply Chain Partners: A Fuzzy Logic Model," *International Journal of Physical Distribution & Logistics Management*, 33 (9): 804-824.

Siddiqi, S. (2000) 'Customizing core competencies: The regional challenge', *International Journal of Trade and Commerce*, 10 (1): 91-103.

Siegwart, Hans, Ivo G. Caytas, and Julian I Mahari (1989), *Global Political Risk*. Basle: Helbing and Lichtenhahn.

Siguaw, Judy A., Penny M. Simpson, and Thomas L. Baker (1998), "Effects of Supplier Market orientation on Distributor Market orientation and the Channel Relationship: The Distributor Perspective," *Journal of Marketing* 62 (July): 99-111.

Singh, Jagdip (1995), "Measurement Issues In Cross-National Research," *Journal of International Business Studies*, 26, (3): 597.

Sloot, Laurens M., Peter C. Verhoef and Philip Hans Franses, (2005), "The Impact Equity and Hedonic Level of Products on Consumer Stock-Out Reactions," *Journal of Retailing*, 81 (1): 15-34.

Smith, Carlo. D. (2000), Assessing the Value of Improved Forecating Management. Marketing and Logistics. Knoxville, The University of Tennessee.

Spender, J. C., et. al. (1979), "Theory Building and Theory Testing in Strategic Management," *Strategic Management*, Dan E. Schendel and Charles W. Hoffer, eds. (Boston, MA: Little, Brown and Company).

Srivastava, Rajendra, Tasadduq Shervani and Liam Fahey (1999), "Marketing, Business Processes, and Shareholder Value: An Organizational Embedded View of Marketing Activities and the Discipline of Marketing," *Journal of Marketing*, 63 (4):168-179.

Stalk, G., Evans, P. and Shulman, L. (1992), "Competing on Capabilities: The New Rules of Corporate Strategy," *Harvard Business Review.* (March-April): 57-69.

Stank, Theodore P., Elizabeth Davis and Brian Fugate (2005), "A Strategic Framework for Supply Chain Oriented Logistics," *Journal of Business Logistics*, 26 (2): 27-45.

Stank**,** Theodore P., Scott B. Keller and Patricia J. Daugherty (2001), "Supply Chain Collaboration and Logistical Service Performance," *Journal of Business Logistics*, 22 (1): 29-48

Steenkamp, Jan-Benedict E.M. (1989), *Product Quality: An Investigation into the Concept and How it is Perceived by Consumers*. Assen/Maastricht, The Netherlands: Van Gorcum.

Stock, Gregory N., Noel P. Greis and John D. Kasarda (1999), "Logistics Strategy and Structure: A Conceptual Framework," *International Journal of Physical Distribution and Logistics Management*, 29 (4): 224-239.

Ta, Huu-Phuong, Hwee-Ling Choo, and Chee-Chuong Sum (2000), "Transportation Concerns for Foreign Firms in China," *International Journal of Physical Distribution & Logistics Management*, 30 (1): 35-54.

Tan, Keah-Chooh, Vijay R. Kannan, Robert B. Handfiled and Soumen Ghosh (1999), "Supply Chain Management: An Empirical Study of its Impact on Performance," *International Journal of Operations and Production Management*, 19 (10): 1034-1052.

Tesfom, G., Lutz, C. and Ghauri, P. (2004), "Comparing Export marketing channels: developed versus developing countries," *International Marketing Review*, 21 (4/5): 409-22.

Tjosvold, Dean (1988), "Cooperative and Competitive Interdependence," Group and Organization Studies, 13 (3): 274-289.

Tracey, Michael (2004), "A Holistic Approach to New Product Development: New Insights," *Journal of Supply Chain Management*, 40 (4): 37-55.

Ulaga, Wolfgang and Andreas Eggert (2005), "Relationship Value in Business Markets: The Construct Its Dimensions," *Journal of Business-to-Business Marketing*, 12 (1): 73-99.

Ulrich, David and Jay B. Barney (1984), "Perspectives in Organizations: Resource Dependence, Efficiency and Population," *Academy of Management Review*, 9 (3): 471-481.

Upton, D. M. (1995), "What Really Makes Factories Flexible?" *Harvard Business Review*, 73 (4): 74-84.

Vallespir, B. and Kleinhans, S. (2001), "Positioning a company in enterprise collaborations: vertical integration and make-or-buy decisions," *Production Planning & Control*, 12 (5): 478-87.

Verbeke, Willem, Paul Farris, and Roy Thurik (1998), "Consumer Response to the Preferred Brand Out-of-Stock Situation," *European Journal of Marketing,* 32 (1): 1008-1028.

Waller, Matt, Eric Johnson and Tom Davis (1999), "Vendor-Management Inventory in the Retail Supply Chain," *Journal of Business Logistics*, 20 (1): 183-203.

Wernerfelt, Birger (1984), "A Resource-Based View of the Firm," *Strategic Management Journal*, 5 (2): 171-180.

Williamson, Oliver E. (1985), "Assessing Contract," *Journal of Law, Economics & Organization*, 1 (1): 177-209.

Williamson, Oliver E. (1979), "Transaction Cost Economics: The Governance of Contractual Relations," *Journal of Law & Economics*, 22 (2): 233-261.

Wilkinson, Ian F. (1974), "Power and Influence Structures in Distribution Channels," *European Journal of Marketing*, 7 (2): 119-129.

Zeng, Amy Z., and Christian Rossetti, (2003) "Developing a Framework for Evaluating the Logistics Costs in Global Sourcing Processes: An Implementation and Insights," *International Journal of Physical Distribution and Logistics Management*, 33 (9/10): 785-803.

Zhao, Meng, Cornelia Dröge, and Theodore P. Stank (2001), "The Effects of Logistics Capabilities on Firm Performance: Customer-Focused Versus Information-Focuses Capabilities," *Journal of Business Logistics*, 22 (2): 91-107.

Zinn, Walter and Peter C. Liu (2001), "Consumer Response to Retail Stockouts," *Journal of Business Logistics*, 22 (1): 49-71.

## Vita

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