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Risk and Visibility in Global Supply Chains: An Empirical Study

Hung V. Nguyen

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RISK AND VISIBILITY IN GLOBAL SUPPLY CHAINS: AN EMPIRICAL STUDY

BY

HUNG VU NGUYEN

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ACCEPTANCE

This dissertation was prepared under the direction of the *Hung Vu Nguyen's* Dissertation Committee. It has been approved and accepted by all members of that committee, and it has been accepted in partial fulfillment of the requirements for the degree of Doctoral of Philosophy in Business Administration in the J. Mack Robinson College of Business of Georgia State University.

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ABSTRACT

RISK AND VISIBILITY IN GLOBAL SUPPLY CHAINS: AN EMPIRICAL STUDY

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NOVEMBER 2011

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Working with international suppliers in global supply chains, manufacturing firms now are faced with substantial supplier risks which could be triggered by disruptions in either their suppliers or the supplier's market. Reactive actions to the risks, however, have usually been shown to be inefficient and sometimes ineffective. In this dissertation, therefore, I develop a theoretical framework linking some key relationship-specific capabilities to supplier risk. My contention is that the capabilities, when developed, can help proactively mitigate the risk. Thus, the model in this study is grounded in the resource-based and the relational views.

In this study, the survey method has been employed to collect data from 66 manufacturing firms in the United State who are sourcing from international suppliers. Procedural and statistical methods have been employed to guard against typical empirical issues including non-response bias, common method bias, and problems in validity and reliability of measurement instruments.

Structural equation modeling with partial least squares was employed to test the model with bootstrapping to estimate t-values for the paths. The analysis results showed support for the model.

A conclusion from the study is that visibility is the critical relationship-specific capability that needs to develop for buying firms to mitigate supplier risk proactively. This is because it may not be substitutable by other mechanisms like goodwill trust, and other capabilities, including absorptive capacity and IT integration, will only operate via visibility to influence risk performance. Moreover, visibility is a significant capability that helps mitigate risk regardless of the relationship duration between the buyer and the supplier and of the market conditions under which the supplier is working.

This study thus adds to the risk literature with discussions of supplier risks. Nuances have also been added to the resource-based and relational views by developing the theoretical relationships among the identified capabilities and by examining the contextual conditions under which the relationships are working to mitigate supplier risk. Managers from both sides of a dyadic relationship may benefit from the study by utilizing the tools and the study results to monitor and mitigate supplier risk.

CHAPTER I. INTRODUCTION

1.1. Research Background

Risks in supply chains or networks have recently increased in significance and have become a topic of interest for scholarly research as well as for company practice. Indeed, severe and costly disruptions have been documented at different companies in various industries including Boeing and General Motors (Blackhurst et al 2005), Dell, Toyota, and Ericsson (Chopra & Sodhi 2004), Sony and Nike (Hendricks & Singhal 2005a), Apple (Zsidisin, Melnyk, & Ragatz 2005), and Bosch (Wagner & Bode 2006), to name a few.

The consequence of such disruptions can be economically devastating. For example, in the recent case of the Boeing 787 project for the Dreamliner, a glitch in a small supplier for Boeing was pointed out as the culprit for approximately ten billion dollars of loss to the airplane manufacturer (Gates 2008; Greising & Johnsson 2007; Wallace 2008). While one-time disruptions of this kind may be costly, these disruptions may trigger adverse repercussions even for a longer term that will deteriorate company performance in terms of the persistent declines in sales growth and stock returns (Hendricks & Singhal 2005a, 2003, 2005b). Costly to reverse and lingering, such negative effects for a company have shown to take months to several years to address, if they can ever be remedied (Hendricks & Singhal 2003; Knight & Pretty 1996). Simply put, the damages to a buying firm from supply failures may be severely disruptive and sticky, and they may be troubling to the company beyond the simple proportion of an operational mishap.

In working with suppliers, especially foreign ones, therefore, manufacturing firms now are faced with substantial supplier disruption risks. Such risks increase because manufacturers tend to

depend on suppliers more and more. Considering more than 50% of manufacturers' budget is allocated to procuring input from suppliers (Joshi 2009; Wagner & Bode 2006), a typical manufacturer today is more in "the assembling business than in the business of producing the components required to create the end product" (Joshi 2009, p. 133). Adding to such risk, the failure rates of suppliers worldwide have reportedly swung up by 30% in the recent years due to the current economic crisis. (McKinsey & Company Operations Extranet 2010). As the economic downturn continues, the supplier risks for buying firms will not diminish but likely keep increasing.

From the managerial point of view, the practical research question is what can a buying firm do to mitigate the supplier risk? It has been recently noted that managers in buying firms have not had an adequate answer to the question (Byrne 2007; Knemeyer, Zinn, & Eroglu 2009). Firms have been very reactive rather than proactive to the risks. Such corrective actions to the damages, however, have usually been ineffective and wasteful (Hendricks & Singhal 2005a, 2003, 2005b). A more precise and important question for the managers then is what can a buying firm do proactively? In another words, how can a buying firm act before a disruption occurs to prevent or at least mitigate the potential for substantial damages?

However, such a question remains open. The academic view on the supplier risk is still limited as the research on supplier risk has usually been descriptive and prescriptive in nature. On the other hand, there is a burgeoning stream of modeling research which addresses only one or several types of disruptions in supply chains separately and usually in experimental environments (see Snyder et al. 2010 for a review). Additionally, scant behavioral research in the field has mostly focused on the outcomes of the risk (e.g.Lee & Padmanabhan 1997; Lee, Padmanabhan, &

Seungjin 2004; Zsidisin & Ellram 2003). Thus there seems to be a gap in behavioral studies on supplier risks with regards to disruptions.

1.2. Research Questions

Motivated by the gap in the research stream, the objective of this study is to identify the key factors that can help mitigate supplier risk proactively. To achieve this, the current study endeavors to answer several key research questions.

The first question that needs to be answered is what is supplier risk? This question can be broken down into several more specific questions. In particular, I would like to understand what is the nature of supplier risk? It is important to understand the nature of the risk before one can mitigate it proactively. In a similar vein, it is important to understand how supplier risk is created. Understanding the process of risk creation is important in order to identify the potential factors that can mitigate the risk.

The second question is how and why should managers mitigate the supplier risk in a proactive way? In particular, what factors can managers control to mitigate the supplier risk? And what theoretical views can one draw on to explain factors that help mitigate the supplier risk?

Through the investigation process, three information-based capabilities can be identified as the factors that can mitigate supplier risk proactively. My next research questions thus would be what is the nature of the information-based capabilities, which include visibility, absorptive capacity, and information technology (IT) integration? And how could they be facilitated each other in influencing supplier risk?

The last question that this dissertation endeavors to answer is how can the links among the capabilities and to supplier risk change? In another word, I would like to understand what would be the moderators to the relationships? Related to this question, I would seek to identify potential control variables that should be included in the model to rule out potential spurious relationships.

1.3. Contributions of the Study

This thesis work purports to make several important contributions to inter-firm literature. First, I add to the literature on supplier risk by creating a clear conceptualization of supplier risk and by identifying the key antecedents to the risk. In particular, the concept of supplier risk here is subjective in nature. This is important because if one is to mitigate the risk proactively, one needs to evaluate the risk before its management. Moreover, I identify some key information-based capabilities that can be linked to supplier risk. Such capabilities are actionable factors that managers can control for and thus can develop to mitigate supplier risk. The overall theoretical framework developed for this paper is presented in Figure 1-1.

Second, I add to the resource-based and relational view literature by linking relationship-specific capabilities to perceived supplier risk. As widely posited and tested in various literatures, capabilities and resources qualified for some certain conditions could result in a firm's competitive advantage (Barney 1991). In this work, three relationship-specific capabilities have been identified. Consideration of the relationship-specific capabilities is important because the valuable resources may not and should not be limited to the ones within a firm. Instead, the resources or capabilities can reside in inter-organizational settings in various forms including dyadic and network types (Dyer & Singh 1998).
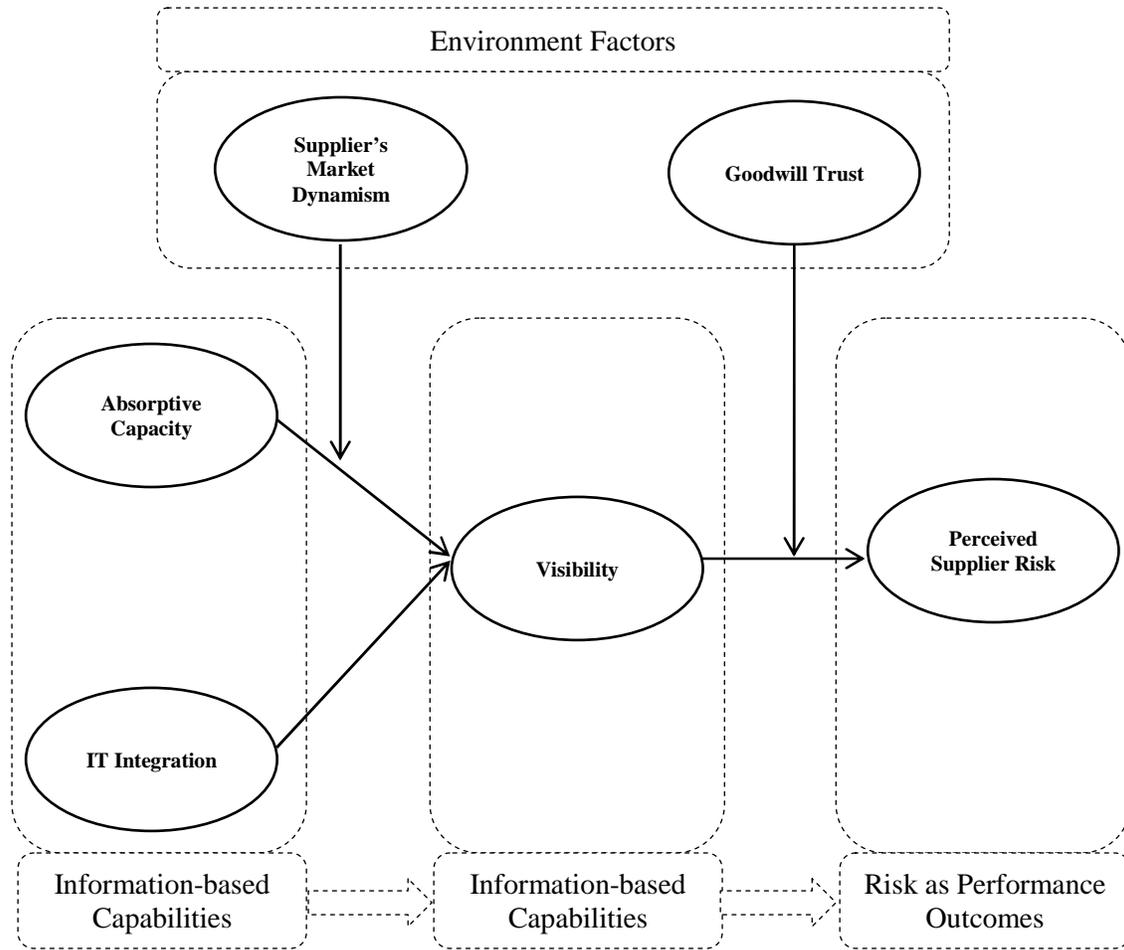
Figure 1-1. A Framework for Supplier Risk

Third, I provide a more nuanced picture for the resource-based and relational views by

identifying the configuration of capabilities under which they would influence supplier risk. In

particular, absorptive capacity and IT integration will operate via visibility to mitigate supplier

risk. The configuration of the capabilities here is important because despite the importance of the

capabilities like absorptive capacity and IT integration, the primary source for risk mitigation is

visibility. Such distinction between the capabilities could help explain why firms who are

inefficient in leveraging their absorptive capacity and IT integration could not improve risk

performance. Thus it demonstrates different ways that capabilities could contribute to performance, with an emphasis on visibility.

Fourth, I provide a better picture for the pathways that lead to supplier risk by examining several moderators. The moderators identified here include supplier's market dynamism and buyer's goodwill trust. Thus I can also contribute to the literature on market dynamism and inter-firm trust and the contextual effects they may have on other capability-performance relationships.

Finally, from a managerial perspective, this paper makes practical contributions by developing and testing the measurement instruments for supplier risk and visibility. Managers in the buying firm can utilize the reliable and valid instruments developed in this paper to monitor and mitigate supplier risk.

1.4. Scope and Boundary Conditions of the Study

The model in this dissertation is shaped by its scope and boundary conditions. In particular, this study aims to examine one key link in the global supply chains, namely the link between manufacturing firms and their key international suppliers. Even though important, the investigation into other links in the chain such as the ones between first-tier and higher-tier suppliers is not taken in this study.

Moreover, for practical purposes, I only examine the model from the manufacturing firm perspective. Dyadic data is always desirable but very difficult to obtain, especially for the relationships between a buying firm and its foreign partner.

It also should be noted that, in an empirical study of this kind, there is always a possibility of missing independent variables in a model. After thoroughly reviewing the literature, I attempt to

reach a balance between parsimony and breadth of antecedents. Thus the model in this dissertation includes the representative independent and control variables. High scores of explained variance for the dependent variables in the model can provide an evidence of less potential for missing important independent variables.

Finally, this study employs a survey technique and psychometric multi-item data analysis which is cross-sectional in nature. This technique is appropriate given the fact that the purpose of this study is to examine perception of buying firm managers. Other techniques such as experiment, quasi-experiment, and/or secondary data design, however, can be used in future research to triangulate and validate results from this study.

1.5. Organization of the Study

The rest of the dissertation is organized as follows. In Chapter II, I provide a review of the key concepts in the model. Theoretical frameworks for the model are also presented in this chapter. Chapter III presents a development of the model hypotheses. Relationships in the main model will be discussed first. Next I discuss the potential moderating effects on the main model relationships. Chapter IV will follow with discussions on methodology and hypothesis analyses. In this chapter, I present the sampling design, data collection process, and instrument development. The chapter concludes with the measurement and structural model analysis results. Chapter V concludes this dissertation with a discussion of the hypothesis testing results and implications from the study. I conclude chapter V with a discussion of limitations and respective recommendations for the directions for further research related to this topic.

CHAPTER II. LITERATURE REVIEW AND THEORETICAL FRAMEWORKS

This chapter provides a literature review for the key concepts in the model. I will start with the dependent variable, supplier risk. Next, other concepts including visibility, absorptive capacity, and IT integration will be discussed. The chapter concludes with examination of the moderation variables: supplier's market dynamism and goodwill trust.

2.1. Supplier Risk

In this study, perceived supplier disruption risk (hereafter perceived supplier risk) refers to the buyer's expectation of probable disruption on the supplier's side that causes loss to the buyer due to unavailability of a sourced item. The failure of having the item may be due to disruptions which are attributed to either the supplier internals or to the business environment of the supplier. Note that because a buying firm may buy different items from one supplier, we limit the level of analysis at the firm level to one particular regularly-purchased critical item. To better delineate the concept, in the following sections I will elaborate on the general concept of organizational risk and clarify our focus on the subjective rather than the objective risk. Next I identify the key components of perceived risk and the possible triggers of supplier risk. I conclude the section by reviewing literature on supplier risk with suggestions for potential antecedents of the risk.

2.1.1. Definition of Risk

The task of defining organizational risks has been deceptively simple in the literature. Different scholars have adopted different definitions of risks (Khan & Burnes 2007; Yates & Stone 1992b). Conceptually these definitions have fallen into two categories: (1) variation in distribution of outcomes or performance; and (2) potential losses or general threats or hazards.

The first approach to risk definition could be traced back to classical decision theory (e.g. Arrow 1965; Pratt 1964). Under this perspective, risk is "most commonly conceived as reflecting variation in the distribution of possible outcomes, their likelihoods, and their subjective values" (March & Shapira 1987, p. 1404) or variability (Jemison 1987). A riskier choice involves having a higher variance in outcomes while keeping the expected outcome constant. Under this perspective, therefore, the attitude toward risk could be classified as risk-taking, risk-neutral, or risk-averse based on the choice among options of the same return but with different outcome variances. This conceptualization of risk has been adopted most widely in finance where risk is considered volatility in outcomes and sometimes in other literature such as international business (cf. Miller 1992).

However, the problem with this conceptualization is that, in practice, managers do not usually view risks in this way. In a seminal article, March and Shapira reported survey results with American, Canadian, and Israeli managers and found several interesting discrepancies between the managerial perspective and the classical theoretical definition of risk (March & Shapira 1987). Two most notable points have been made. First, managers did not treat variance with positive outcomes as risk. They only focus on the negative outcomes. This observation matches with earlier criticisms on risk as total variation (e.g. Markowitz 1952) and has led to models based on semi-variance (e.g. Coombs 1983; Fishburn 1977), which is often termed downside risk (Das & Teng 2001). Second and more interesting, risk was not processed by managers by explicit consideration of statistical probability outcomes. Instead, while uncertainty is considered an important component of risk, managers also focus on the potential harm and damage from subjective perspective. For them, the risk represents "amount to lose (or expected to be lost) than in terms of moments of the outcome distribution" (March & Shapira 1987, p. 1407). This

observation was also supported by a recent grounded theory research where supply risk was viewed not only by potential disruptive events to the supply but also their negative impacts on a buyer (Zsidisin 2003). These survey results have impacted the later conceptualization of risk, especially in scientific disciplines other than finance and insurance (Khan & Burnes 2007; Peck 2006).

Possibly cultivated on the above results, later researchers in various disciplines have adopted similar conceptualizations of risk which could often be traced back to Yates and Stone (1992b). Under this stream of studies, risk refers to the "possibility of loss" or potential losses (Yates & Stone 1992b, p. 4). This definition of risk is in line with research in various disciplines including political science (e.g. Kobrin 1979), consumer behavior (e.g. Dowling 1986; Dowling & Staelin 1994), purchasing firm behavior (e.g. Mitchell 1995; Zsidisin, Ragatz, & Melnyk 2005), and supply chain/networks (e.g. Ellis, Henry, & Shockley 2010; Hallikas et al 2004; Zsidisin & Ellram 2003).

In short, definitions of risk may be context-dependent (Spekman & Davis 2004). For the purpose of this study, I refer to risk as expectation of potential loss. This definition is based on the following reasoning. First, as we will examine risks from purchasing managers' perspective, adopting this definition, which stemmed from the manager's perspective, is justifiable. Second, the definition has been usually adopted in organizational buying and supply chain literature which is also our context of study (e.g. Ellis, Henry, & Shockley 2010; Zsidisin 2003). Defining risk as possibility of loss rather than the variation as in the classical decision theory, therefore, is well justified.

2.1.2. Objective versus Subjective Risk

While risk could be viewed as possibility of loss, the debate over the nature of risk about whether risk is objective or subjective has not been resolved (Khan & Burnes 2007). On one hand, risk could be viewed as objectively calculated based on full knowledge of different outcomes and their probabilities (Das & Teng 2001). On the other hand, risk could be viewed from the decision maker's perspective and considered subjective in nature (Dowling 1986; Mitchell 1995). To many social scientists, risk cannot be objective because a decision maker may only consider several outcomes rather than the whole distribution of outcomes (March & Shapira 1987). He is boundedly rational (Williamson 1991). Moreover, even with full knowledge of potential losses, interpretation of the likelihood of outcomes occurring and the degree of losses due to the outcomes is still inherently subjective (Ellis, Henry, & Shockley 2010; Yates & Stone 1992b). What outcome is considered positive by some can be considered negative by others (Yates & Stone 1992b). As some scholars noted, the debate over the nature of risk may represent the tension between measuring risk ex ante or ex post (Jemison 1987) or could be boiled down to a question of to what extent does the past determine the future (Khan & Burnes 2007).

Because I will examine risk from the manager's perspective, I take the latter view and consider risk as subjective (i.e. perceived risk). Additionally, we usually deal with risk perception rather than objective risk when it comes to the decision maker's behaviors (Ellis, Henry, & Shockley 2010; Spekman & Davis 2004). Executives also usually base their decisions on a feel of overall risk (Shapira 1995) or managers describe projects in terms of overall riskiness (Yates & Stone 1992a). Thus studying perceived risk, rather than objective one, is important in organizational behavioral science and relevant in this particular context.

2.1.3. Key Components of Perceived Risk

There are two components of perceived risk that have been commonly accepted in literature, namely uncertainty and adverse consequence (Dowling 1986; Yates & Stone 1992b; Zsidisin, Melnyk, & Ragatz 2005). The first component of perceived risk, uncertainty, has been represented in some form of likelihood function. Such likelihood can be estimated, subjectively assigned, or obtained from statistical models. However, all come to the same result since the differences are not in the concept of future likelihood of events but the ways that future is assigned various probabilistic weights. In this study, I take the view that perception of uncertainty of future states is expressed as a degree from one extreme where there is no basis to establish knowledge about probabilities and outcome to the other extreme with complete knowledge (Mitchell 1995; Zsidisin 2003). The second component, the adverse consequence, represents the magnitude of losses to an organization. There may be different types of losses incurred by an organization including financial, performance, psychological, physical, social, and time losses (Dowling 1986; Mitchell 1995).

The question of how these two components will work together to become the overall risk has not been answered unanimously. A group of scholars often use the multiplicity of the two components because the absence of either one may eliminate risk (cf. Dowling 1986). For others, however, the two components are formative (e.g. Ellis, Henry, & Shockley 2010; March & Shapira 1987). This is because some theorists note the difficulty in equating the risk of high probability and low magnitude loss with the one of low probability and high magnitude (Ellis, Henry, & Shockley 2010). Thus, they suggest that the likelihood of outcomes and their values enter into calculations of risk independently rather than as their products (March & Shapira 1987). Still, others consider the two components to be independent and postulate that they would

be considered in two successive stages of assessment (Yates & Stone 1992a), where the likelihood of an event occurring may be evaluated first before an assessment of the impact of the event occurring is made. In fact, a recent survey by Zsidisin with supply chain managers seems to support this third view because the managers in the survey seemed to consider supply risk first as the possibility of an incident associated with inbound supply and then as its outcomes resulting in losses to the buyer (cf. Zsidisin 2003).

Concurring with the third view, definition of perceived supplier risk in this study focuses more on the possibility of unavailability of sourced item than its resulting losses. Thus the concept of perceived risk here may bear a close relationship with the concepts of fear (Mitchell 1995), lack of confidence (Christopher & Lee 2004), and the feeling of uncertainty, discomfort, and/or anxiety (Dowling & Staelin 1994) over the availability of sourced item. Our definition here also matches with definition of risk in various literatures including international business (e.g. Mascarenhas 1982; Werner, Brouthers, & Brouthers 1996), consumer behavior (e.g. Dowling & Staelin 1994), and especially in supply chain management, the context of this study (e.g. Chopra & Sodhi 2004; Harland, Brenchley, & Walker 2003; Tang 2006a).

2.1.4. Triggers of Perceived Supplier Risks

The supply chain literature has provided different taxonomies/typologies of risks in supply chain/network (e.g. Chopra & Sodhi 2004; Hallikas, Virolainen, & Tuominen 2002; Spekman & Davis 2004). In general, risks in supply chain could be classified into demand risks and supply risks if we take a manufacturer as the dividing position in a supply chain. This study focuses on the supply side, and more specifically in the relationship between a buying firm and one of its suppliers (i.e. supplier risk), rather than on the demand side.

Within the supply side, however, there may be different types of risk. For the purpose of this paper, I adopt a recent classification of supply risks by Spekman and Davis (2004) which is based on the triggers of risk. Under this classification, risks include (1) business disruption risk, where disruptions are from the events such as failures by the suppliers and/or in logistic operations; (2) exogenous disruption risk, where disruptions are from events such as natural disasters and political changes that impact supplier performance in providing inputs to the buying firm; (3) opportunism risk, where risk comes from opportunistic behaviors by the suppliers; (4) system security risk, where the risk arises from activities which cause problems in system security; and (5) social corporate risk, where risk is rooted in the actions by suppliers that taint the social responsibility image or reputation of the buying firm. This dissertation develops a theoretical framework with regards to the first two types of risk triggers. However, note that for a purchasing firm, major disruptions to its supplier will only matter when they influence the supply to the firm. In another words, the exogenous disruptions to the supplier could only become a risk to the buyer when they cascade the effects via the supplier onto the buyer (Wagner & Bode 2006). We, therefore, can combine the two risk triggers for a common supplier risk.

Various internal and external types of disruptions have been recorded in literature (e.g. Chopra & Sodhi 2004; Hallikas, Virolainen, & Tuominen 2002; Zsidisin & Ellram 2003). Table 2-1 provides a summary for different types of supplier risks identified in literature. In particular, for example, risks due to business disruption events may come from the failures of suppliers and/or in logistic performance that may cause a supplier delays or breakdowns in providing goods and services to the buying firm. Any problems in flows of goods/materials, information, and money between a buying firm and its suppliers could result in these risks (Spekman & Davis 2004). Different supplier failures have been identified in the literature, including inability of suppliers to

deal with volumes and mixed requirement changes resulting in a stock-out from suppliers; inability of suppliers to meet with technological development in the market; quality-related risks from failures of suppliers to maintain capital equipment or damages that occur in transit or lack of supplier training in quality principles and techniques; price increase risk when suppliers increase good price due to the increase in price of supply inputs or currency fluctuations; logistic risks from problems in shipping, transportation, or delivery performance leading to delays or breakdown in focal firm operation; and failures of suppliers due to their financial instability or insolvency or as they are vertically integrated by a direct competitor of a focal firm (Hallikas, Virolainen, & Tuominen 2002; Kleindorfer & Saad 2005; Spekman & Davis 2004; Wagner & Bode 2008, 2006; Zsidisin 2003; Zsidisin & Ellram 2003).

A more recently noticeable category of risk triggers is major exogenous disruptions. Different major triggers have been recorded in the literature, including natural catastrophic disasters such as volcanoes, tsunamis, earthquakes, and fires. They may also include major political and social events such as labor disputes, war, terrorism, and political changes (e.g. Chopra & Sodhi 2004; Kleindorfer & Saad 2005; Knemeyer, Zinn, & Eroglu 2009; Kobrin 1979; Tang 2006a, 2006b; Wagner & Bode 2008, 2006; Zsidisin, Melnyk, & Ragatz 2005; Zsidisin, Ragatz, & Melnyk 2005). These major disruption events are exogenous events which may occur to a supplier. For a buying firm, the critical issue is if such events can cascade their effects on the firm via impacting its suppliers.

Table 2-1. Triggers of Supplier Risk

Categories	Risk Sources/Triggers	Articles/Authors
Risks due to Business Disruption Events	**Volumes and mixed requirement change risks** that lead to possible stock-out from suppliers.	(Zsidisin & Ellram 2003) (Kleindorfer & Saad 2005) (Zsidisin 2003) (Spekman & Davis 2004)
	Technological change risk that is due to the inability of suppliers to meet with technological development to provide the needed item.	(Zsidisin & Ellram 2003) (Wagner & Bode 2006) (Wagner & Bode 2008) (Kleindorfer & Saad 2005) (Zsidisin 2003) (Spekman & Davis 2004)
	Quality-related risks include failure of suppliers to maintain capital equipment, damage that occurs in transit, and lack of supplier training in quality principles and techniques.	(Zsidisin & Ellram 2003) (Wagner & Bode 2006) (Wagner & Bode 2008) (Kleindorfer & Saad 2005) (Zsidisin 2003) (Spekman & Davis 2004)
	Price increase risk because of market changes such as increase in price paid for supplier inputs and currency fluctuations.	(Zsidisin & Ellram 2003) (Wagner & Bode 2006) (Wagner & Bode 2008) (Hallikas, Virolainen, & Tuominen 2002) (Kleindorfer & Saad 2005) (Chopra & Sodhi 2004) (Zsidisin 2003) (Spekman & Davis 2004)
	Logistics risk due to problems in shipping, transportation, or distribution methods and lead time, delivery performance.	(Zsidisin & Ellram 2003) (Hallikas, Virolainen, & Tuominen 2002) (Kleindorfer & Saad 2005) (Zsidisin 2003) (Spekman & Davis 2004)
	Other supplier business risks: various events that affect the continuity of the supplier and result in the temporary or permanent perturbation or termination of the buyer–supplier relationship. Example: financial instability of suppliers and when a supplier is vertically integrated by a direct competitor of the customer firm.	(Wagner & Bode 2006) (Wagner & Bode 2008) (Kleindorfer & Saad 2005) (Zsidisin 2003) (Spekman & Davis 2004)
Risk due to Exogenous Disruption Events	**Natural disruption risks:** difficult to predict but when occur will have immediate and significant impacts on performance such as natural disasters and other catastrophic events.	(Zsidisin, Melnyk, & Ragatz 2005) (Zsidisin, Ragatz, & Melnyk 2005) (Wagner & Bode 2006) (Wagner & Bode 2008) (Kleindorfer & Saad 2005) (Tang 2006b) (Knemeyer, Zinn, & Eroglu 2009) (Chopra & Sodhi 2004)
	Political risks from political events such as government acts or constraints put on firms.	(Kobrin 1979) (Kleindorfer & Saad 2005)

2.2. Gap in Supplier Risk Literature

Literature on supplier risk in supply chains has been strong on descriptive and prescriptive accounts. For example, a substantial number of articles described or prescribed risk management process (see for example Giunipero & Eltantawy 2004; Hallikas et al 2004; Khan & Burnes 2007; Knemeyer, Zinn, & Eroglu 2009; Manuj & Mentzer 2008). The common format for all the articles is to start with descriptions of risk in supply chains and then recommended different strategies for mitigating the risk. On the other hand, there have been an increasing number of modeling papers on disruption risk in supply chain (see Snyder et al 2010 for a review). Though useful, such papers usually address only one or several types of disruptions, and some of these have been conducted in an experimental setting. Thus there is a gap in behavioral studies on supplier risks and risks in supply chain with regards to disruptions.

Within this research stream, there is scant empirical evidence from behavioral studies on the outcomes of risk rather than on why and how the perception of risk is developed (Ellis, Henry, & Shockley 2010). Some examples include Zsidisin and Ellram (2003),who found that perceived supplier risks could result in purchasing firms engaging in different types of risk mitigation strategies. When a purchasing firm perceives high risk from its supplier, it invests more in behavior-based strategies including implementing supplier certification and quality management programs, developing target costing with suppliers, and launching different supplier development programs (Zsidisin & Ellram 2003). It has also been found that lack of confidence in the supply chain could result in excessive buffering activities by all players, resulting in inefficiency along the chain (Lee & Padmanabhan 1997; Lee, Padmanabhan, & Seungjin 2004; Lee, Padmanabhan, & Wang 1997). And finally, perceived supplier risk has been found to associate with higher search activities for alternative suppliers (Ellis, Henry, & Shockley 2010).

In fact, Ellis et al. (2010) could be the only exception that provided some initial evidence on several factors that lead to perceived supplier risks with regards to disruptions. The explained variance for this model, however, is relatively low (nearly 12 percent for the uncertainty component of risk) and two factors that were found to be related to the uncertainty component of risk are technological uncertainty and market thinness. These factors are environmental or structural factors that a firm may not be able to control. So far, no actionable factors that a buyer can develop and control have been identified to mitigate the risk proactively.

To fill in the gap, in this dissertation I examine some key information-based capability factors that explain the development of perceived supplier risks at the organizational level. The logic here is that if we are to mitigate supplier risk proactively, we need to identify some key actionable factors that help mitigate the risk. Such key factors should be information-related because risk is about uncertainty. Moreover, if disruption risk could be considered an indicator of performance (i.e. reverse of high performance), capabilities can be linked to risk under the resource-based or relational views (Barney 1991; Dyer & Singh 1998), which I'll discuss in more detail in the next section.

2.3. Theoretical Framework for Supplier Risk

In order to examine our model under the resource-based view (RBV) and relational view, one assumption needs to be made: disruption risk is a reverse indicator of performance. In another words, high risk of disruptions should mean the likelihood of high performance will be low. This assumption can be justified given the recent empirical evidence. In particular, in a series of empirical studies, Henricks and Singhal examined several hundreds of supply chain disruptions reported in the Wall Street Journal and Down Jones News Service (Hendricks & Singhal 2005a,

2003, 2005b). They found that the companies experiencing minor to major disruptions in supply chain faced with significant declines in sales growth, stock return, and shareholder wealth. Moreover, such effects tended to linger for a long time, at least two years after the disruptions. These findings are also consistent with previous findings that the impact of a disruption on shareholder wealth was a sharp decrease of almost eight percent, and a recovery time, if possible, was at least 50 trading days (Knight & Pretty 1996). Thus, as an indicator of performance, risk could be examined under the RBV and relational view to identify its link to some key resources/capabilities.

This dissertation establishes itself in the tradition of RBV and the relational view. In particular, I view sources of competitive advantage as the resources and/or capabilities that a firm possesses. Different from the traditional neo-classical economic view, the assumption behind my thesis rests on the RBV contention that firm resources may be heterogeneous and immobile (Barney 1991; Wernerfelt 1984). Therefore resource and capability differentials between firms lead to different levels of risk exposure. As the RBV postulates, I argue that sustainability of risk performance of a company (as a source of competitive advantage) is driven by its resources and capabilities that meet some key conditions including: valuable, rare, inimitable, and non-substitutable (Barney 1991). Thus three supply network capabilities examined in this study, absorptive capacity, IT integration, and visibility, determine and sustain competitive advantage for a firm to the extent that they can meet the above conditions. This view parallels the central theoretical lens in the marketing and inter-firm literature under which researchers examined the links between market-based assets and capabilities (e.g. Day 1994; Hunt & Morgan 1995; Srivastava, Fahey, & Christensen 2001; Srivastava, Shervani, & Fahey 1998) and supply chain

capabilities (e.g. R. Klein & Rai 2009; Wu et al 2006) in terms of marketing, financial, and relationship-specific performance.

More importantly, I propose that the sources for competitive advantages not only lie in the resources and capabilities developed within a firm but also in those that are embedded in a dyadic or network relationship of the firm (Dyer & Singh 1998). Extended from the original RBV which recognized firm-specific barriers to imitation and advocated for firms to control the critical resources (Barney 1991; Wernerfelt 1984), I see the resources and capabilities as being enabled by value-adding initiatives facilitated by inter-firm routines under the relational view (Dyer & Singh 1998). Thus the dyadic and network capabilities, including absorptive capacity, IT integration, and visibility, are relationship-specific capabilities, which are enabled and natured in a trading-partner relationship that can result in high performance in terms of low supplier risk for a buying firm. This view parallels the theoretical perspective in various recent inter-firm studies (cf. R. Klein & Rai 2009).

The relational view is particularly applicable here because the concept of supplier risk in this study is examined within a relationship between a buyer and a seller. Moreover, as discussed in the previous sections, the key element of our concept of supplier risk is uncertainty, which is information-related. Thus the natural logic is to identify the information-based capabilities that can be linked to supplier risk, three of which are of particular interest and have recently been stressed in inter-firm literature: visibility, absorptive capacity, and IT integration. In the next sections, I discuss each of the capabilities in more detail.

2.4. Visibility

Visibility is an important relationship-specific information-based capability. Even though this concept has been a popular buzzword the term remains elusive, especially in supply chain literature (Barratt & Oke 2007). Recently, researchers have been calling for a better understanding of the concept (e.g. Wang & Wei 2007) and an untangling of its workings in practice (e.g. Straub et al 2002; Wang & Wei 2007). In particular, this concept has usually been used interchangeably with other popular notions such as information sharing (Barratt & Oke 2007; Swaminathan & Tayur 2003) and transparency (Lamming, Caldwell, & Harrison 2004; Lamming et al 2001). The visibility concept in this dissertation is built on an emerging concept of transparency (Lamming, Caldwell, & Harrison 2004; Lamming et al 2001) that goes beyond but takes information sharing as a baseline prerequisite. Thus in the following sections, I introduce the concept of visibility, its attributes and information content, and a review of literature related to the concept for its potential antecedents and outcomes.

2.4.1. Visibility Definition and Attributes

In our discussion, a buyer's visibility into its supplier (hereafter visibility) refers to the extent to which a focal buying firm is able to access timely, accurate, and relevant information about its supplier's operational and strategic issues. We maintain that visibility is a key relationship-specific capability of the organization and is distinct from information sharing because of the following attributes.

First, extant literature in inter-organizational studies has stressed the importance of sharing information among partners to resolve conflict and enhance performance (e.g. Frazier et al 2009; R. Klein & Rai 2009; Wu et al 2006). Information sharing here has usually been understood as

"the degree to which each party in a channel relationship discloses information to facilitate the other party's activities" (Heide & Miner 1992, p. 275). The visibility concept in this dissertation benefits from this stream of literature and requires information exchange as a baseline prerequisite. This is because for a firm to have access to the partner's information, the information needs to be shared and obtained from its external sources.

It should be noted that the concept of visibility here does not focus on the mechanistic flows of information sharing but the outcome of such flows, which is the access that the firm have to its partner's information. Thus I will not consider the flow characteristics in a more mechanistic view, such as bi-directional versus unidirectional, formal versus informal, direct influence versus indirect influence, and frequency of contacts among inter-firm members (Mohr, Fisher, & Nevin 1999; Mohr & Nevin 1990). Instead, the concept of visibility here only stresses the degree of access that a firm has over its partner's information. This is because even though important and sometimes inevitable, the flows of information from a trading partner may not be the only determinant of the access to the partner's information (Frazier et al 2009; Frishammar & Sven Åke 2005).

The second attribute of visibility is transparency, an emerging concept that underlines and sometimes supplants visibility. Transparency in supply relationships has appeared in several works by Lamming and his co-authors (Lamming, Caldwell, & Harrison 2004; Lamming et al 2001). Under this perspective, transparency is defined as "the creation, nurture, and delivery of value, for the benefit, and thus continued existence, of both parties" (Lamming et al 2001, p. 7). The critical point that makes the transparency an attribute of visibility is the requirement for information efficacy. This is because transparency here does not assume perfect access to information and knowledge. In fact, perfect clarity may never exist, and too much information

may limit transparency (Lamming, Caldwell, & Harrison 2004). Empirical evidence has already showed that too much information may lead to the problem of information overload (e.g. Gosain, Malhotra, & El Sawy 2004). Transparency therefore requires that the partners exchange only the relevant information which, and more importantly, is needed for mutual benefits. The mutual benefits here are considered within the realm of partners' abilities to create, nurture, and deliver values for their customers rather than solely focusing on cost.

For the above reasons, in this study I argue that for partners to obtain benefits from information and knowledge, visibility requires information to be both potentially accessible and content-wise efficacious. In particular, the concept of visibility in this dissertation focuses on three regularly-examined efficacious elements: accuracy, relevance, and timeliness (e.g. Hult et al 2006; Kim, Cavusgil, & Calantone 2006; Mohr & Sohi 1995), which have seemed to be relatively easily discerned by business managers.

2.4.2. Information Content of Visibility

Extant literature has examined different types of information shared among trading partners. Some authors even attempt to categorize distinctive types of information that would be shared among the partners at different degrees (e.g. Hultman & Axelsson 2007; Wareham et al 2005), thus possibly resulting in different types of visibility. To date, however, the distinction of such categories lacks empirical support. For example, Hultman and Axelsson (2007) built on the works of Lamming et al. (2004; 2005; 2001) and some case studies to propose a typology of transparency including cost transparency, supply transparency, organizational transparency, and technological transparency. This typology, however, may not be generalizable because (1) it is not theory-based and is built on case studies of only two Swedish manufacturing firms, and (2)

the main focus of the typology is on "descriptions of transparency enabled by information technology" (Hultman & Axelsson 2007, p. 627) even though the authors claimed that it could be applicable to transparency in general. It should be noted that while important, IT is not the only channel for communication. In fact, non-IT communication channels, including face-to-face, has been shown to be more effective in exchanging complex and hard-to-codify knowledge (e.g. Bresman, Birkinshaw, & Nobel 2010). Thus this typology needs to be exposed to further empirical testing to confirm its usefulness

Similarly, even though built on extant theories, the framework by Wareham et al. (2005), which proposed two types of information shared, including strategic and operational, has not been tested empirically. As noted by the authors, operational information includes data that can be related to specific process or transaction pertinent to the planning and execution of operations (Wareham et al 2005). For example, operational data pertains to the process of deploying input resources to produce products and services including production, capacity, and inventory schedules and plan (e.g. R. Klein & Rai 2009; Noordewier, John, & Nevin 1990). Strategic information, on the other hand, is usually characterized by a longer term perspective and could span cognition about the external environment, scarce and valuable resources, and other capabilities (Wareham et al 2005). Example includes information such as cost structure and margins (e.g. R. Klein & Rai 2009; Lamming et al 2001), firm competitive positioning, and planned actions in the market (e.g. R. Klein & Rai 2009). However, the authors also acknowledged that even though two types of information can be used in managerial decision making in different manners, "the difference between the two is often a function of aggregation where operational data can be combined to form strategic data" (Wareham et al 2005, p. 207). The distinction between the two thus may not be discernable by practicing managers. Moreover,

this framework was exposed to only one case study by the authors and therefore has not yet been proved for their generalizability.

Thus in this study, I examine both types of information, strategic and operational, as they are theory-based concepts. The distinction between the two and thus the resulting difference between two possible types of visibility, however, will be subjected to empirical evidence.

In short, visibility in this dissertation includes two key attributes: the access of information regarding a trading partner and the efficacy of the information obtained. I examine both operational and strategic types of information when measuring visibility. The next section discusses a theoretical framework for examining the outcome and antecedents of visibility.

2.4.3. Theoretical Framework for Visibility

Information sharing and visibility have been studied under different theories in vertical inter-firm studies, including the channel literature (e.g. James C. Anderson & Narus 1990; Bello, Chelariu, & Zhang 2003; Frazier et al 2009; Griffith, Myers, & Harvey 2006; Heide & Miner 1992; McEvily & Marcus 2005; Noordewier, John, & Nevin 1990) and supply chain studies (e.g. Gustin, Daugherty, & Stank 1995; Kim, Cavusgil, & Calantone 2006; R. Klein & Rai 2009; Lee & Padmanabhan 1997; Lee, Padmanabhan, & Seungjin 2004; Lee, Padmanabhan, & Wang 1997; Lee, So, & Tang 2000; Sahin & Robinson 2002, 2005; Wareham et al 2005; Wu et al 2006; Zhou & Benton Jr 2007). Under these streams of research, the presence of information sharing or exchange is considered to facilitate better relationships, enhance cooperation (James C. Anderson & Narus 1990), improve joint-problem solving (McEvily & Marcus 2005), eliminate the agency problems (Griffith, Myers, & Harvey 2006), and as a result, enhance competitive

advantages such as superior purchasing performance (Noordewier, John, & Nevin 1990) and economic performance (Bello, Chelariu, & Zhang 2003; Bello & Gilliland 1997).

In addition to the above conflict resolving view of information sharing, the supply chain literature also recognizes the importance of information sharing in enhancing operations and working of the chain or network structure. In this stream of studies, information is considered to be instrumental to reducing variability, integrating the structure, and enhancing efficiency. With those goals in mind scholars stressed the importance of making information available to all parties in a supply network (Wareham et al 2005). The information could be the demand information that downstream parties share with upstream partners (Lee & Padmanabhan 1997; Lee, Padmanabhan, & Seungjin 2004; Lee, Padmanabhan, & Wang 1997; Lee, So, & Tang 2000) or supply information including inventory and cost structure that suppliers share with downstream parties (Sahin & Robinson 2002, 2005). Sharing upstream and downstream information provides multiple benefits for the relationship including mitigating bullwhip effect in supply chain (Lee & Padmanabhan 1997; Lee, Padmanabhan, & Seungjin 2004; Lee, Padmanabhan, & Wang 1997; Lee, So, & Tang 2000), facilitating success of logistic system integration (Gustin, Daugherty, & Stank 1995), reducing total costs for better supply chain performance (Sahin & Robinson 2002, 2005), and enhancing market and operational performance for the whole chain (Wareham et al 2005).

Table 2-2 provides a summary of the representative articles examining information sharing and visibility. It should be noted that no articles up to present examined visibility for a firm into its partner. Moreover, most empirical studies to date have been dealing with the concept of information sharing. Only recent theoretical advances have discussed the concept of transparency and visibility (Lamming, Caldwell, & Harrison 2004; Lamming et al 2005; Lamming et al 2001)

but empirical evidence has not shed much light on the concept. Thus this study adds to the inter-firm literature by examining the relationship-specific concept of visibility in its links to supplier risk and other capabilities. Two streams of research with their theoretical perspectives are particularly applicable to visibility here. In particular, one line of research has focused on the consequences of visibility. In the second, antecedents to visibility can be explored.

On the outcome side, sharing information among partners has long been recognized as an important part of prominent theories for dyadic relationships. The marks of cooperative information exchange and sharing can be seen in theories that include dependence theory (Pfeffer & Salancik 1978), agency theories (Bergen, Dutta, & Walker Jr 1992; Eisenhardt 1989), the resource-based view (Barney 1991; Wernerfelt 1984), and the relational view (Dyer & Singh 1998). Considering the link between visibility and risk, the final two theoretical views, which have been widely applied more recently, can be drawn on.

In particular, under the resource-based view, possession of information from a trading partner can help a firm gain competitive advantage because such information is valuable and can help the firm reconfigure its operation for the best performance (Barney 1991; Wu et al 2006). Such information is usually sensitive and proprietary and thus the possession of it is difficult to imitate. Gaining access to a supplier's information therefore may help a buying firm obtain competitive advantage by lowering risk from the supplier. More importantly, such capability (i.e. visibility) may only be developed within a relationship. Such relationship-specific capability thus can result in the relational rents (Dyer & Singh 1998) which are accrued only to the partners in a relationship, beyond the ones that any single firm could obtain alone (Dyer & Nobeoka 2000). Thus reduction in supplier risk is the relational rent that I examine in this dissertation.

Table 2-2. Representative Articles Examined Information Sharing and Visibility

Level of Analysis	Terms/ Aliases of Construct	Efficacy of Information Examined	Content of Information Examined	Definition and Dimensions	Antecedents/ Outcomes	Representative Authors, Year
Information Sharing at Chain/ Network Level	Information availability	No	Operational	The degree to which information is available or exchanged within a distribution system.	Lead to Success of logistic system integration	(Gustin, Daugherty, & Stank 1995)
	Information Sharing	No	Operational	Information shared among upstream to downstream. The focus is on sharing demand information to upstream partners.	Lead to Lower bullwhip effects	(Lee & Padmanabhan 1997; Lee, Padmanabhan, & Seungjin 2004; Lee, Padmanabhan, & Wang 1997; Lee, So, & Tang 2000)
	Information Sharing	N/A	Operational	The timing and specific data shared ranged from only sharing the immediate replenishment order to sharing all POS, inventory, and cost data along the supply chain.	Lead to Higher Supply Chain Performance (reduce costs)	(Sahin & Robinson 2002, 2005)
	Information Sharing	No	Operational Strategic	The availability of information shared within network including two separate types: - Strategic information is typically characterized by a longer temporal perspective and is not related to specific process operations. - Operational Information Sharing includes data that can be related to the planning or execution of a specific process or transaction.	Lead to - Market Performance - Operational Performance (respectively)	(Wareham et al 2005)
Information Sharing at Focal Firm Level	Information to supplier	N/A	Operational	Information provided to supplier.	Lead to Higher Purchasing performance	(Noordewier, John, & Nevin 1990)
	Monitoring of supplier	No	Operational		Leads to Higher Purchasing performance	(Noordewier, John, & Nevin 1990)

Level of Analysis	Terms/ Aliases of Construct	Efficacy of Information Examined	Content of Information Examined	Definition and Dimensions	Antecedents/ Outcomes	Representative Authors, Year
Information Sharing at Focal Firm Level (continued)	Information Sharing	No	Operational Strategic	The degree to which each party discloses information that may facilitate the other party's activities (Heide & Miner 1992, p. 275).	Leads to Better joint-problem solving and acquisition of competitive capabilities.	(McEvily & Marcus 2005) (Heide & Miner 1992)
	Sharing of information	N/A	N/A	The sharing of generalized information about the firm, its product, and its customers	Anteceded by Commitment Lead to Problem Solution	(Griffith, Myers, & Harvey 2006)
	Strategic information flow	No	Strategic	The flow of information from: buyer to supplier supplier to buyer	Anteceded by Focal firm's Trust, Dependence, IT customization Lead to Higher Buyer and Supplier Relationship-specific Performance	(R. Klein & Rai 2009)
	Distributor Sharing of Strategic Information	No	Strategic	Strategic information is processed and retained data within a distributor organization that have implications for firms' long-range decision making including external and internal information.	Sharing of strategic internal information is anteceded by Distributor trust, Dependence Asymmetry favoring distributor, Specific investment by distributor and by supplier. Sharing of strategic external information is anteceded by Dependence Asymmetry favoring distributor, Specific investment by distributor and by supplier.	(Frazier et al 2009)

Level of Analysis	Terms/ Aliases of Construct	Efficacy of Information Examined	Content of Information Examined	Definition and Dimensions	Antecedents/ Outcomes	Representative Authors, Year
Visibility at Channel/ Chain/ Network Level	Information Exchange	Yes	N/A	Formal and informal sharing of meaningful and timely information between firms. Information Exchange is a dimension of Relationalism (MacNeil 1980) and therefore measured at the expectation/norms level.	Anteceded by Manufacturer's dependence and other dyadic antecedents, Leads to Channel Performance	(James C. Anderson & Narus 1990; Bello, Chelariu, & Zhang 2003; Heide & John 1992)
	Information Exchange	No	IT system	Information exchange refers to the ability of a firm to share knowledge with its supply chain partners in an effective and efficient manner. The focus here, however, is on information system as a whole.	Lead to Marketing and Financial Performance	(Wu et al 2006) adapted from (Amit & Schoemaker 1993; Bharadwaj 2000; Collis 1994)
	Transparency	Yes	Operational Strategic	The creation, nurture, and delivery of value, for the benefit, and thus continued existence, of both parties. Transparency is achieved through two-way exchange of sensitive data for specific purposes of improvements in the dyad itself. Customers usually ask suppliers for information about process factors, largely represented by costs (as proxies for process times, physical space allocation, management superstructure, communications requirements, etc.)	Anteceded by Interdependence rather than trust, Leads to higher performance (competitive advantage or created values)	(Lamming, Caldwell, & Harrison 2004; Lamming et al 2005; Lamming et al 2001)
	Information exchange	Yes	IT system	The sharing of knowledge with channel partners to serve downstream customers effectively and efficiently. Such knowledge would include any changes in the business environment, such as market and customer preferences. Dimensions of information exchange include timeliness, accuracy, efficacy, completeness, and credibility of information.	Anteceded by IT System Integration and Advancement Lead to Responsiveness, Coordination, and Market Performance	(Kim, Cavusgil, & Calantone 2006)
	Supply chain visibility	Yes	Operational	The extent to which actors within a supply chain have access to or share information which they consider as key or useful to their operations and which they consider will be of mutual benefit. The information needs to be accurate, trusted, timely, current, useful, and in-a-readily-usable format.	Anteceded by Information Sharing Leads to Enhanced Performance	(Barratt & Oke 2007)

Level of Analysis	Terms/ Aliases of Construct	Efficacy of Information Examined	Content of Information Examined	Definition and Dimensions	Antecedents/ Outcomes	Representative Authors, Year
Visibility at Channel/ Chain/ Network Level (continued)	Information Visibility	Yes	Operational	The degree to which supply chain partners have on-hand information related to both demand and supply for planning and control management. Two dimensions are measured: reliability and timeliness of information.	Anteceded by Relational Governance and Virtual (IT) Integration Leads to Supply Chain Offering Flexibility	(Wang & Wei 2007)
	Information Sharing	Yes	Operational	Higher order constructs of information content (manufacturing and customer), info sharing tech support, and quality of info sharing.	Lead to Effectiveness of Supply Chain Practices (JIT)	(Zhou & Benton Jr 2007)

* N/A: not available or not applicable

On the antecedent side of visibility, a second stream of research examined different factors that could lead to information sharing and visibility. Contrary to the perspective of neoclassical economics, this stream of research started with the assumption that information is imperfect and access to information is limited and costly in the real world (Stiglitz 2000). Thus many of the classical economic results require adjustments (Stiglitz 2000). In particular, when the simplifying assumption of perfect information is removed, the economic treatment and analysis of information becomes formidable. Such a challenge starts from non-tradable nature of information that in turn makes it hard to be priced in the market. Unlike other goods, information presents many characteristics of public goods as non-exclusive and non-rivalrous. That means it is usually difficult to exclude others from benefits of the information and it is not depletable with use (Stiglitz 2000). Under these conditions marginal cost of information approaches to zero with which free riding problem arises. Moreover information sharing is irreversible because when information is shared, it could not be taken back (Lamming, Caldwell, & Harrison 2004; Lamming et al 2005). These complications present big challenges in analyzing appropriation of returns to investment in information and knowledge (Stiglitz 2000) and the motivation for one to share information with others. Thus this stream of research has pointed to the challenges in transferring knowledge and information and thus the cost side of gaining visibility.

Under this stream of research, two sides of antecedents to information sharing have been theorized. On the softer side, social and human factors have been evoked. As information sharing involved a sender and a receiver in its process, such factors include the characteristics of the sender and the receiver as well as their relationship environment. For example, such factors include the sender's capability to interpret and transfer the information or knowledge, the receiver's capability to interpret and absorb the information, and the relationship sentiment over

their relationship (Szulanski 1996; von Hippel 1994). On the harder side, however, more mechanistic or vehicular factors are involved. Research under this stream, for example, usually evoked factors related to channels for transferring information (e.g. Mohr & Nevin 1990) and IT systems or environment for information exchange (e.g. Tippins & Sohi 2003; Wu et al 2006). Because visibility involves access to the information to be shared from a partner, to represent the two sides I examine absorptive capacity and IT integration as the antecedents to visibility in this dissertation. I turn to the discussions on each concept next.

2.5. Absorptive Capacity

On the softer side of antecedents to visibility, absorptive capacity in this dissertation can be defined as the ability of a firm to value and assimilate the external knowledge and information related to its trading partner. In this case, it is the ability of the buying firm to absorb knowledge and information regarding its supplier. The following sections will be discussions on the concept definition and its components.

2.5.1. Absorptive Capacity as a Relationship-Specific Construct

Most studies related to absorptive capacity have cited and defined it with regard to the original definition by Cohen and Levinthal (cf. Zahra & George 2002). Under this stream of research, the concept of absorptive capacity can be defined as a firm's ability "to recognize the value of new, external knowledge, assimilate it, and apply it to commercial ends" (W. M. Cohen & Levinthal 1990, p. 128). This definition, however, may contain in itself at least two components which are distinctive (cf. Zahra & George 2002). The first component includes the ability to value and to assimilate external knowledge (W. M. Cohen & Levinthal 1990; Lane & Lubatkin 1998). This component, however, does not guarantee the ability to exploit the knowledge acquired for

innovative products and services (Zahra & George 2002). The second one captures this latter aspect and is a function of the abilities to transform and exploit (Zahra & George 2002) or simply apply the new knowledge to commercial end (W. M. Cohen & Levinthal 1990). These two components are distinctive but may correlate with each other because the former can be seen as an antecedent to the latter (Zahra & George 2002).

The concept of absorptive capacity in this dissertation focuses on the first component of recognizing the value and assimilating external knowledge and information. Focusing on this component is appropriate because we do not examine innovation outcomes in this study which has usually been associated with the second component of absorptive capacity (e.g. George et al 2001). Moreover, while absorptive capacity has been widely studied and linked to various performance outcomes, the studies have usually reflected a firm's capacity to apply received knowledge to the commercial ends (i.e. the second component) with disproportionately less attention paid to the capacity to value and assimilate the knowledge (i.e. the first component) (Zahra & George 2002).

It should also be noted that the construct of absorptive capacity in this dissertation is a relationship-specific one. I argue that a firm may work with different trading partners under different environments or at least at different stages of a relationship. Thus it may have better absorptive capacity toward one partner than the others. Conceptualizing absorptive capacity as specific to a relationship or trading partner will be more accurate. The definition of absorptive capacity in this dissertation thus bears similarity with the concept of relative rather than the absolute absorptive capacity (Rebolledo, Halley, & Nagati 2009).

2.5.2. Dimensions of Absorptive Capacity

While researchers seem to agree on the definition of absorptive capacity, different dimensions of the capacity have been proposed and operationalized. For example, in innovation studies, research and development (R&D) spending has usually been used as a proxy for absorptive capacity (e.g. W. M. Cohen & Levinthal 1990; George et al 2001). The argument is that firms spend on R&D are usually better able to use externally available information and technical change within an industry is often closed linked to a firm's R&D activities (W. M. Cohen & Levinthal 1990). Other authors invoked the same absorptive capacity definition by Cohen and Levinthal but operationalized the construct differently depending on their research context. For example, in an alliance study, Lane and Lubatkin proposed that absorptive capacity of a student firm will depend on the relevance of the new knowledge, the similarity of student firm's and teacher firm's structures, and shared research communities (Lane & Lubatkin 1998). In a joint-venture study, Lyles and Salk, on the other hand, focused on the flexibility of international joint venture structure when studied the absorptive capacity the ventures (Lyles & Salk 2007).

To be consistent with the original concept of absorptive capacity, I focus on two dimensions of absorptive capacity which built on the original conceptualization by Cohen and Levinthal (1990). First, a key dimension of absorptive capacity is prior knowledge. The knowledge may include both the basic skills and most recent knowledge of scientific or technological development (W. M. Cohen & Levinthal 1990). The more diverse the prior knowledge a firm has, the more likely that the new knowledge will be relevant to it. Past experience may also define the locus of a firm' knowledge search, and therefore influences the development of future knowledge acquisition capabilities (Zahra & George 2002). Therefore, when the prior knowledge is valuable, firms will rely on this knowledge to conduct business operations (Petersen, Pedersen,

& Lyles 2008). Second, a firm's absorptive capacity will also depend on its individual members' absorptive capacity (W. M. Cohen & Levinthal 1990). Investment in the development of individual employee's absorptive capacity, therefore, will determine the organizational capacity. Above of all, it is this investment in employee training that could help each individual employee to better acquire and assimilate new knowledge (Phan et al 2006; Zahra & George 2002).

These two dimensions may not be so distinctive because prior knowledge of an organization may also be a function of the prior knowledge of its employees. Thus both of the dimensions could be examined when measuring absorptive capacity. The dimensions examined here also match with the concept of potential absorptive capacity by Zahra and George as they could represent both the abilities to acquire and to assimilate new knowledge from external sources (cf. Zahra & George 2002).

The importance of absorptive capacity as a capability has been noted in various fields of management including strategic management, technology management, international business, and organizational economics (George et al 2001; Zahra & George 2002), explaining organizational phenomena at multiple levels of analysis and invoking different theories including the organizational learning, industrial economics, resource-based view, and dynamic capabilities (see Zahra & George 2002 for a review). The contention under this stream of research is that firms with high absorptive capacity can reduce the cost of valuing and assimilating external knowledge for achieving better performance. Thus we have reasons to believe that a buyer firm with high absorptive capacity can reduce the cost of valuing and assimilating information and knowledge from its supplier, thus enhancing visibility into the supplier.

2.6. IT Integration

On the mechanistic side of antecedents to visibility, I examine the construct of IT integration. This construct as an important relationship-specific capability has been well studied in literature. The next section thus briefly discusses the concept.

Information technology (IT) has long been touted as an important potential resource that could help provide firms with higher performance and competitive advantage (e.g. Jean, Sinkovics, & Cavusgil 2010; Swafford, Ghosh, & Murthy 2008). Various IT based constructs have been studied, including external IT integration or virtual integration (e.g. Grover & Saeed 2007; Wang & Wei 2007), internal IT integration (e.g. Swafford, Ghosh, & Murthy 2008; Ward & Zhou 2006), IT alignment and advancement (e.g. Wu et al 2006), and electronic integration (Jean, Sinkovics, & Cavusgil 2010). In this dissertation, I focus on IT integration, which could be defined as the extent of compatibility of IT systems that enable partners' common operations and collaboration. The IT systems may contain both the hardware and the software systems of the two trading partners. In this study, the partners are a buyer and its supplier for a particular item sourced. Thus our definition matches with the concepts of external IT integration, virtual integration, between-firm IT integration, or electronic integration (Grover & Saeed 2007; Jean, Sinkovics, & Cavusgil 2010; Ward & Zhou 2006)[1].

The inter-firm literature has shed light on the importance of IT integration to multiple performance results. For example, IT integration has been proven to help firms successfully apply the practices of postponement (Hoek 1998) and just-in-time strategies (Ward & Zhou 2006); enhance supply chain capabilities, including the ability to coordinate and exchange

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[1] The concept of IT integration here is at an aggregate rather than a more granular level as might be conceptualized by others (e.g. Rai, Patnayakuni, & Seth 2006)

information of high quality (Kim, Cavusgil, & Calantone 2006; Wu et al 2006); flexibility (Swafford, Ghosh, & Murthy 2008; Wang & Wei 2007); result in shorter customer lead time (Ward & Zhou 2006); and facilitate the cooperativeness and monitoring activities among partners (Jean, Sinkovics, & Cavusgil 2010).

The theoretical reasoning for all the above links is that IT integration is an important resource that may help reduce the cost of transferring information among the partners involved (Hoek 1998) and therefore facilitate the partners in reconfiguring their operations for better performance. Thus we have reasons to believe that for a buying firm, IT integration with its supplier can help it gain better visibility into the supplier.

2.7. Potential Moderators: Supplier's Market Dynamism and Goodwill Trust

A model would be more robust when we examine the moderators or contextual influences on the model relationships. As a buyer working with its supplier will usually have to evaluate not only the internal environment of the relationship but also the external one, we have reasons to believe that the environment may affect the relationships between variables in our model. Drawn on extant literature, in this dissertation I examine two moderators as the environmental context for the relationships in the model: supplier's market dynamism and goodwill trust. Both have well been discussed in the inter-firm literature. In the next section, therefore, I briefly discuss supplier's market dynamism first. Next will be a discussion of goodwill trust of a buyer on its supplier.

2.7.1. Supplier's Market Dynamism

The external environment where the supplier is working may directly influence the ability of the supplier to make sense of its environment and thus its respective strategies and behaviors. Indirectly, the environment can influence the ability of the buyer to make sense of the information and knowledge about its supplier. In this dissertation, I examine supplier's market dynamism which I refer to here as the degree of unanticipated changes in the supplier's external environment (cf. Bello & Gilliland 1997). High degree of supplier's market dynamism lowers the ability of the firm partners to predict future contingencies in the external environment surrounding it (Bello & Gilliland 1997). Our definition matches with the concepts of external uncertainty-volatility (S. Klein, Frazier, & Roth 1990) and the environment unpredictability (Rindfleisch & Heide 1997). For example, Klein et al. distinguished volatility dimension of external uncertainty with diversity and refers volatility to "the extent at which the environment changes rapidly and allows a firm to be caught by surprise" (S. Klein, Frazier, & Roth 1990, p. 200). Other authors also stressed the changes with unpredictability nature of the construct (e.g. Rindfleisch & Heide 1997).

Market dynamism is one of the key constructs in transaction cost analysis perspective (cf. Williamson 1993; Williamson 1991). Under this view, market dynamism has been attributed to giving rise to the adaptation problems (see Rindfleisch & Heide 1997 for more details) because under such volatile environment, firms are unable to predict future, making it difficult for them to plan and write contingent contracts (Bello & Gilliland 1997). Volatile environment therefore could lead to higher transaction costs, resulting in firms to favor internal integration (S. Klein, Frazier, & Roth 1990) and prevent exporting firms to flexibly adapt to changes (Bello & Gilliland 1997). Thus we have reasons to believe that supplier's market dynamism may influence

the paths to visibility because information is imperfect and obtaining it will entail transaction costs (Lamming, Caldwell, & Harrison 2004; Lamming et al 2001; Stiglitz 2000).

2.7.2. Goodwill Trust

Trust could be an important relational construct that represents not only the motivations for exchange parties but also the relational environment governing their relationship (McEvily, Perrone, & Zaheer 2003). In this dissertation, I focus on buyer's goodwill trust, which could be defined as the buying firm's beliefs and expectations that its supplier will exhibit intentions and actions that are in good faith (cf. Das & Teng 2001).

The notion of trust here is examined from the trustor's perspective (i.e. buyer) toward the intentions and behaviors of the trustee (i.e. supplier). It is important to note that I only focus on trust at the attitudinal level. In fact, trust has been studied in literature at different levels including belief or expectation (e.g. Lui & Ngo 2004; Morgan & Hunt 1994; Nooteboom, Berger, & Noorderhaven 1997), intentional level (e.g. Ganesan 1994; Mayer, Davis, & Schoorman 1995; McEvily, Perrone, & Zaheer 2003), and behavioral level (e.g. Moorman, Zaltman, & Deshpande 1992; Robson, Katsikeas, & Bello 2008). However, while trust at the belief and intention levels may not be separable, they are distinguishable from the behavioral level. This is because, on the one hand, as Moorman et al. put it "if one believes that a partner is trustworthy without being willing to rely on that partner, trust is limited" (Moorman, Zaltman, & Deshpande 1992, p. 315). Morgan and Hunt, therefore, acknowledge that "willingness to rely should be viewed as an outcome…of trust" but proposed that willingness is unnecessary or redundant in the definition of trust because "one could not label a trading partner as 'trustworthy' if one were not willing to take actions that otherwise would entail risk" (Morgan & Hunt 1994, p.

23). On the other hand, intentional trust may lead to behavioral trust but cannot be inferred from the trust behaviors alone. Actions of trust could depend on other reasons than trust intention such as the trustor's dependence on the trustee (Lui & Ngo 2004; Nooteboom, Berger, & Noorderhaven 1997). Thus belief and intentional trust should be considered together as attitudinal and separate from behavioral trust.

Inter-firm literature has touted trust as an important organizing principle (cf. McEvily, Perrone, & Zaheer 2003) . The organizing principle here can be understood as the logic by which information is gathered, disseminated, and interpreted within and between organizations and behaviors and routines are selected to coordinate actions (McEvily, Perrone, & Zaheer 2003; Zander & Kogut 1995). McEvily et al. (2003) integrated works on inter-firm trust and proposed that like other organizational principles such as clan, market, and hierarchy (Ouchi 1979), trust could represent the way of solving problems related to interdependence and uncertainty. This is because trust could influence organizing through two causal pathways: structuring and mobilizing. For example, trust can shape the stable and enduring interaction patterns within and between organizations. Trust can also mobilize resources or motivate actors to contribute, combine, and coordinate resources for collective purposes.

Thus, trust has been found to lead to different positive organizational outcomes including, for example, less conflict, more satisfaction, and higher commitment to the relationship with trading partners (James C. Anderson & Narus 1990; Mohr & Spekman 1994; Morgan & Hunt 1994), lower probability of loss when dealing with a partner (Nooteboom, Berger, & Noorderhaven 1997), lower likelihood to switch trading partner (Saparito, Chen, & Sapienza 2004), higher performance in an alliance or trading relationships (Katsikeas, Skarmeas, & Bello 2009; Robson, Katsikeas, & Bello 2008). As a moderator, goodwill trust has also been found as a substitute for

contractual control to enhance performance satisfaction in architect-contractor partnership (Lui & Ngo 2004). For the above reasons, it may be logical to suspect that goodwill trust may be able to substitute visibility as an important organizing principle to mitigate supplier risk.

In summary, this chapter provided a literature review for the constructs in our model. For the main model, perceived supplier risk has been discussed as the dependent variable that needs to be explained. Three information-based capabilities including visibility, absorptive capacity, and IT integration then were discussed. Two potential moderators also included in the model are supplier's market dynamism and goodwill trust. The resource-based view and relational view have been discussed as the overall framework bonding all the links together. Next chapter will discuss each pathway in the model in more details to formulate hypotheses.

CHAPTER III. MODEL AND HYPOTHESES

The conceptual and operational model in this dissertation takes the resource-based view and relational view as the overarching theoretical lens. In particular, in this model, I provide the links between information-based capabilities including absorptive capacity, IT integration, and visibility to performance as perceived supplier risk. My overall perspective is that a buying firm who develops the relationship-specific capabilities can mitigate supplier risk better.

Moreover, adding to the nuance of the theoretical view, I posit the pathways via visibility which absorptive capacity and IT integration will operate to influence perceived supplier risk. I also examine contextual effects on the relationships in the model with two potential moderators: supplier's market dynamism and goodwill trust. Thus this chapter will start with the main model relationships. Next I discuss and hypothesize the contextual effects on the main model. This chapter is concluded with some discussion on control variables for the model.

3.1. Main Model

3.1.1. Visibility and Perceive Supplier Risks

As discussed earlier, previous literature has linked some structural or environmental factors to perceived supplier risk (e.g. Ellis, Henry, & Shockley 2010). I add to the resource-based and relational view literature by positing that visibility could be the key information-based capability that helps reduce perceived supplier risk. In particular, I posit that visibility is the key to reduce the uncertainty element of the supplier risk. This is because two mechanisms may operate here.

First, a buyer with a high degree of supplier visibility will have accurate, updated, and relevant information and knowledge of both the supplier's operational and strategic issues. Thus it has the

ability to predict and then act proactively against potentially disruptions from its supplier. Access to both types of information is critical for reducing supplier risk. For example, operational information may concern the deployment of input resources such as inventory and production plan. Having an updated and accurate access to the information could help the buying firm optimize input resources by streamlining buffers and resource allocation (R. Klein & Rai 2009) to guard against the possibility of supply disruption from the supplier. Similarly, the strategic information from its supplier involves issues such as the financial status, margin and cost structures, and competitive positioning of the supplier. Such accurate information, when accessed in a timely manner, can help the buying firm reconfigure its resources and coordinate operational activities to match with potential strategic changes (R. Klein & Rai 2009). Thus the buying firm can lower the possibility of being caught up with surprising changes from the supplier and its market environment. Therefore, having access to the operational and strategic information, the buying firm would be able to know what is happening, and more importantly, what may happen. The degree of uncertainty over the item supply from its supplier thus will decrease as a buyer has higher visibility into its supplier.

The above line of argument could be supported by some anecdotal empirical evidence in literature. For example, Lee et al. (1997; 2004) found that shared internal data from its partner could help a firm in a supply chain better able to forecast inventory levels. Sharing operational information, therefore, may help reduce potential operational problems in supply chain (Wareham et al 2005). On the other hand, sharing strategic information could enhance supply chain flexibilities (Wang & Wei 2007) because as relevant information is acquired in a timely manner, firms in the chain could adapt to changes in the environment and changes from other partners.

Second, high supplier visibility may provide good bases for control ability or at least the illusion of control (Das & Teng 2001). This is because having visibility into operational and strategic information of the supplier could facilitate a buying firm to monitor supplier outputs and to understand the processes, resources, and capabilities of the supplier. Such process knowledge and output measurability are necessary for implementing output and behavior controls (Ouchi 1979). In its turn, the ability to control output and behaviors will reduce the uncertainty over the item supply because it would be perceived easy now to apply safeguarding tactics (Stump & Heide 1996) and it creates the sense of confidence (Christopher & Lee 2004). Thus high visibility into its supplier will reduce uncertainty over item supply by providing good bases for control.

This line of argument has been supported by some empirical evidence. For example, Mohr et al. (1996) found that collaborative communication between channel members are positively associated with the uses of control by manufacturers over their dealers. McEvily and Marcus (2005) found that information sharing between exchange partners enhances their abilities to jointly control problems which may arise. Corroborating the above arguments and evidence, I formally hypothesize that:

H1: For a buying firm, Visibility into its supplier will reduce Perceived Supplier Risk.

In its turn, visibility can be realized by two other information-based capabilities: absorptive capacity and IT integration. Absorptive capacity represents the softer side of antecedents to visibility. IT integration, on the other hand, represents the mechanistic side. I discuss each one next.

3.1.2. Absorptive Capacity and Visibility

A buying firm with higher potential absorptive capacity is more able than others to value and assimilate external knowledge (cf. W. M. Cohen & Levinthal 1990; Lane & Lubatkin 1998). I, therefore, posit that buyer's potential absorptive capacity may give rise to the buyer's supplier visibility into its supplier. This is because absorptive capacity lowers the cost of valuing and assimilating supplier's information and knowledge. In particular, each dimension of absorptive capacity as discussed could enhance the supplier visibility as follow.

First, one premise of absorptive capacity is that the firm has prior related knowledge to value and assimilate new knowledge (W. M. Cohen & Levinthal 1990). As learning is cumulative, the learning efficiency is greatest when the object to learn is related to what is already known (Petersen, Pedersen, & Lyles 2008). Learning is usually much more difficult in novel domains (W. M. Cohen & Levinthal 1990). A buyer firm with substantial prior related knowledge about the supplier and the supplier's business environment, therefore, are more able to absorb relevant and updated knowledge from the supplier whether it is operational or strategic. Thus a buying firm with prior related knowledge over its supplier will have higher visibility into the supplier. Empirically, Petersen et al. (2008) found that the degree that a firm could rely on prior knowledge when doing business in a foreign market is negatively associated with the knowledge gap between what the firm has and what is needed for accomplishing foreign business venture in the market.

Second, absorptive capacity may depend on the prior investment in individual absorptive capacities (W. M. Cohen & Levinthal 1990). Such investment effort could be measured by investment in training the firm's employees (Phan et al 2006). As the employees are equipped

with better abilities to learn new knowledge via training, they could overcome the barriers to knowledge transfer (Simonin & Özsomer 2009). Investment in training employees, therefore, may facilitate a buying firm to acquire knowledge regarding the supplier's business issues such as the supplier's resources, capabilities, and its strategic position. Such updated knowledge may also help the buyer's employees interpret new operational information from the supplier in a more accurate, relevant, and timely manner. Thus the updated operational and strategic knowledge transferred from a supplier can be absorbed easily if a buying firm invested adequately in its employees.

Empirically, it has been found that capacity to learn and investment in training are positively related to knowledge acquisition by an affiliate firm from its foreign parent (Lyles & Salk 2007). Investment in training employees was also found to facilitate knowledge acquisition by a firm's employees from their joint-venture partner (Phan et al 2006). Corroborating the above arguments and evidence, therefore, I formally hypothesize that:

H2: For a buying firm, Absorptive Capacity will increase Visibility into its supplier.

3.1.3. IT Integration and Visibility

On the mechanistic side, IT integration with a supplier can also enhance buyer's visibility into the supplier. This is because information technology could be utilized to lower costs in external search, monitoring, and distribution of information (Hoek 1998). Thus IT integration lowers the cost of transferring information and reduces the needed time for sharing information from the supplier. In particular, when trading partners integrate with each other electronically, their IT systems are aligned (Wu et al 2006), providing them with common supporting operations to exchange the standardized and institutionalized information faster and more efficiently (Wang &

Wei 2007). Thus IT integration will smooth out the flow of active information within and across firms (Wu et al 2006) and therefore could encourage partners to share information which may have not been available (Wang & Wei 2007). In its turn, sharing information faster and more efficiently provides firm partners with necessary condition to be efficient in gathering accurate, relevant, and updated information (Kim, Cavusgil, & Calantone 2006). Therefore, IT integration could make the flow of goods transparent (Hoek 1998) and enhance visibility into its supplier.

Empirically, it has been found that interfirm system integration could lead to better quality of information exchanged (Kim, Cavusgil, & Calantone 2006). IT alignment was also found to facilitate supply chain to increase the amount of information exchange (Wu et al 2006). More recently, it has been found in the international inter-firm setting that electronic integration helps customer monitor the supplier output and behaviors (Jean, Sinkovics, & Cavusgil 2010).

For the above theoretical reasons and empirical evidence, I posit that IT integration could increase supplier visibility. Formally, I hypothesize that:

H3: For a buying firm, IT Integration with its supplier will increase Visibility into its supplier.

It should be noted that the above arguments and empirical evidence related to IT integration may only be applicable to explicit and codified information (Nonaka 1994) that would be shared from the supplier to its buyer. While important, the application of IT in integrating partner operations requires the information to be structured, codified (R. Klein & Rai 2009), standardized, and institutionalized to be transferred in a cost-effective manner (Wang & Wei 2007). In fact, all the empirical studies regarding IT integration reported above operationalized information exchange or monitoring only in terms of the structured and codified information (cf. Jean, Sinkovics, & Cavusgil 2010; Kim, Cavusgil, & Calantone 2006; Wu et al 2006). For this reason, the effect of

IT integration on visibility may be limited compared to the influence of absorptive capacity. In general, IT integration only influences visibility by providing a good channel for transferring standardized and codified information.

3.1.4. Mediation Role of Visibility

Literature employing the resource-based or relational views usually does not clarify which capabilities or resources may be more important than the others. However, such distinction is important because some capabilities may only operate via the others in influencing performance (Zahra & George 2002). Thus the former capabilities only provide the necessary, not the sufficient, conditions for gaining higher performance. The latter capabilities will play the key role in achieving competitive advantage. Identifying and testing the configuration of capabilities and resources under which some capabilities will operate via the others in influencing performance therefore are important to explain why some firms even with high capabilities/resources may not obtain higher competitive advantage. The theoretical and practical focus thus would be on the mediation capabilities which would help explain better differential performances among firms.

In this dissertation, absorptive capacity and IT integration are positioned as the information-based capabilities that may influence perceived supplier risk but only indirectly and via visibility. Thus I emphasize the role of visibility as the key capability that would help mitigate supplier risk proactively. This is because absorptive capacity and IT integration only provide the necessary conditions for the buyer to receive knowledge and for supplier to transfer information via reducing the costs of absorbing and transferring the knowledge or information, respectively. It is the visibility, which is the outcome of such information receiving and transferring, that will

determine the perceived supplier risk. This argument parallels the logic for the distinction

between potential absorptive capacity and realized absorptive capacity in influencing innovation

outcomes (cf. Zahra & George 2002). Similarly, IT alignment is posited to only influence supply

chain capabilities which in turn will impact the chain performances (Wu et al 2006). Thus to test

this line of argument empirically, I formally hypothesize:

H4a. For a buying firm, Visibility into its supplier will mediate the relationship between its

Absorptive Capacity and Perceived Supplier Risk.

H4b. For a buying firm, Visibility into its supplier will mediate the relationship between the

firms' IT Integration and Perceived Supplier Risk.

3.2. Moderation

In this dissertation, I explored the moderation role of two environmental factors: supplier's

market dynamism and goodwill trust. In particular, I suspect that supplier's market dynamism

will moderate the relationship between absorptive capacity and visibility. Goodwill trust, on the

other hand, may moderate the relationship between visibility and perceived supplier risk. I

discuss each one next.

3.2.1. Supplier's Market Dynamism as Moderator

A volatile environment results in higher transaction costs (S. Klein, Frazier, & Roth 1990).

Given the fact that information exchange and obtaining visibility entail costs, the environment

dynamism may influence the pathways that lead to visibility. I posit that supplier's market

dynamism may weaken the relationship between absorptive capacity and visibility. This is

because such dynamic environment may dampen the cost-saving effects of absorptive capacity

for valuing and assimilating supplier's knowledge and information. This line of argument could be explored from both sides of trading partners.

From the supplier side, when a supplier is working under a highly dynamic environment, its ability to make sense of the environment is reduced. This is because such volatile environment makes it harder for the firm to predict future (S. Klein, Frazier, & Roth 1990) and anticipate all the relevant future contingencies (Bello & Gilliland 1997). The supplier, therefore, will face with difficulties in making long-range plans and decisions (Bello & Gilliland 1997). It may be better for the firm then to create structures for sequential and adaptive decision making (S. Klein, Frazier, & Roth 1990). The adaptive nature for strategic decisions from the supplier then makes it harder for the supplier to integrate information and knowledge before transferring to the buyer in an accurate and timely manner.

From the buyer side, compared to a less dynamic environment, high dynamism in the supplier's external environment will make the previous knowledge by the buyer less relevant and related. Moreover, training for the buyer's employees is also more likely to be obsolete and irrelevant. Highly dynamic environment thus usually disrupts the routinization necessary for shared understandings between distant trading partners (Bello & Gilliland 1997). Thus under such circumstance, it is difficult for buyer firm to develop routines to capture the external information from its supplier (Anand & Ward 2004).

We can expect, therefore, that the supplier's market dynamism will hamper the effect of its buyer's absorptive capacity to realize its visibility into the supplier. Formally I hypothesize that:

H5. For a buying firm, the Supplier's Market Dynamism will negatively moderate the relationship between Absorptive Capacity and Visibility such that when Supplier's Market

Dynamism is high, the positive relationship between Absorptive Capacity and Visibility will be weaker, compared to when Supplier's Market Dynamism is low.

Note that, however, I do not posit the moderating effect of supplier's market dynamism on the relationship between IT integration and visibility. This is because the effect of IT integration on visibility is realized via reducing the cost of transferring information and knowledge. The supplier's market condition, while it may influence the cost of integrating and absorbing information, may not have a significant effect on this kind of transferring cost. The market condition therefore may not moderate the relationship between IT integration and visibility.

3.2.2. Goodwill Trust as Moderator

Goodwill trust is the second moderator that may have an effect on our model relationships. In this dissertation, I posit that goodwill trust may substitute for visibility and thus reduce the effect of visibility on perceived supplier risk. This happens because of the following mechanisms.

First, a firm who trusts its partner may have less fear of being exploited (Geyskens et al 1996; Gilliland & Bello 2002). A buying firm trusting its supplier thus may be free of concerns over opportunistic intention and behaviors by the partner (Katsikeas, Skarmeas, & Bello 2009). Even when disruptions may occur then, the trusting buyer may believe its supplier will act on its behalf to reduce the potential damaging effect of such disruptions on the buyer. Therefore, when trust is high, visibility may not be necessary for a buyer in forecasting and predicting what may happen to prevent potential risks from its supplier. Empirically, Morgan and Hunt (1994) found that attitudinal trust of retailer on its supplier enhances the perception that the retailer is able to predict the consequences of decisions to be made and the confidence in those decisions when

working with its supplier. Thus buyer's goodwill trust may substitute visibility in enhancing its perceived ability to forecast and then to act against disruptions.

Second, trust and formal control may act as the substitute to each other in mitigating supplier risk. This is because trust could be considered as the informal control while contract as the formal one which covers potential contingencies (R. Klein & Rai 2009). Firms with high trusting beliefs on their partners usually reduce or eliminate the necessity for covering all contingencies (R. Klein & Rai 2009). Goodwill trust, therefore, usually reduce the need to install contractual safeguarding mechanisms against opportunism (Lui & Ngo 2004). In the same vein, I posit that a trusting firm may have the sense of better control ability over its supplier because safeguarding mechanisms are not necessary. Thus high trust may make visibility less necessary in this regard. Goodwill trust, therefore, may substitute for visibility in providing control ability or a sense of it to mitigate supplier risk. Empirically, in the contractor partnership setting, Lui and Ngo (2004) found that goodwill trust actually could substitute for contractual control to influence cooperative outcomes.

Corroborating the above lines of arguments and empirical evidence, we have reasons to believe that goodwill trust can substitute visibility for mitigating supplier risk. Formally, I hypothesize that:

H6. For a buying firm, Goodwill Trust will negatively moderate the relationship between Visibility and Perceived Supplier Risk such that when Goodwill Trust is high, the negative relationship between Visibility and Perceived Supplier Risk will be weaker, compared to when Goodwill Trust is low.

A summary of the hypotheses for the model in this dissertation can be found in Figure 3-1. To control for potential spurious effects I also include control variables for both perceived supplier risk and visibility when testing the model which I will discuss next.

3.3. Control Variables

Benefiting from previous theoretical arguments and empirical studies, I include several control variables in the model. In particular, for visibility as the dependent variable, I include supplier's market dynamism as a control variable. This is because the supplier's market dynamism may increase the transaction costs in general (S. Klein, Frazier, & Roth 1990) and the buyer's cost of accessing information regarding the supplier in particular. Thus high supplier's market dynamism may reduce the buyer's visibility into its supplier.

For perceived supplier risk as the dependent variable, I control for supplier's market dynamism, buyer's goodwill trust, relationship duration, and supplier's substitutability. First, supplier's market dynamism may increase perceived supplier risk because it makes the potential of disruptions from the market more likely. These possible disruptions in turn may affect the supplier and thus highlights the possibility of disruptions from the supplier. Empirically, Ellis et al. found that technological uncertainty increases the probability of disruptions from a supplier (Ellis, Henry, & Shockley 2010).

Second, the mere fact that a buying firm has been working with its supplier for a long time may already mean that the relationship is worth continuing and that the supplier may be reliable in providing the needed item to the buyer. Thus relationship duration may reduce the perceived supplier risk.
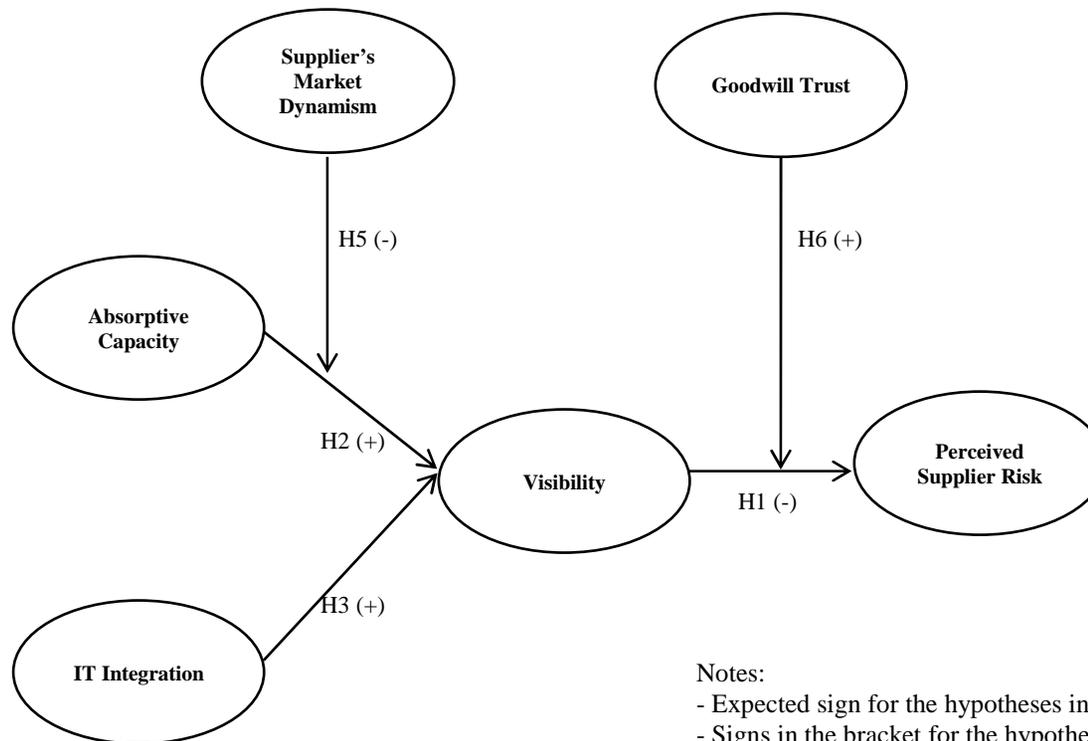
Notes:
- Expected sign for the hypotheses in the brackets.
- Signs in the bracket for the hypotheses about moderating effects are for the interaction term.
- Hypotheses 4a and b are for meditational effect and not presented here.
- Control variables are not presented here.

Third, buyer's goodwill trust may help reduce perceived supplier risk. This is because trust in a partner may act as the informal control over the partner and enhance the perception of ability to predict the partner's intention and behaviors. Empirically, a firm's trust on a partner has been found to lower probability of loss when dealing with the partner (Nooteboom, Berger, & Noorderhaven 1997). Trust was also found to enhance the perceived ability of a firm to predict the consequences of its decisions to be made and the confidence in those decisions when working with its partner (Morgan & Hunt 1994).

Finally, supplier's substitutability is included to as a control variable for perceived supplier risk. In the previous study, Ellis et al. (2010) found that the number of alternative suppliers for a particular item to the buyer reduces the probability of disruptions from the supplier. Thus I include this variable as a control variable to be consistent with previous findings for the comparison purpose.

In short, this chapter elaborated on the relationships in the model. In the first section, I discussed and formally hypothesized the relationships among absorptive capacity, IT integration, and visibility in their paths to supplier risk. In the later section, I posited the potential moderating effects of supplier's market dynamism and goodwill trust on the relationships in the main model. Control variables were included in the model to prevent the potential of interpreting spurious effects. In the next chapter, I discuss the methodology and model analysis and the results for the hypotheses formalized in this chapter.

CHAPTER IV. INSTRUMENT DEVELOPMENT AND MODEL TESTING

To test the structural model, reliable and valid instruments must be developed. The instrument measures include (1) Absorptive Capacity; (2) IT Integration; (3) Supplier's Market Dynamism; (4) Goodwill Trust; (5) Visibility; and (6) Perceived Supplier Risk. All the instruments except Visibility are adapted from previous articles in the field. Since there have been no validated measures used in the literature for the construct of visibility in this dissertation, the measure for the construct is newly developed in this study. The development of all the instruments followed three steps: (1) item generation; (2) expert review; and (3) a large-scale survey analysis.

4.1. Item generation

The objective of this step is to generate the needed items for the construct by extensively reviewing the literature. The measurement items should cover the domain of the construct measured (Churchill Jr 1979; Moore & Benbasat 1991). To generate measurement items for each construct in the study, prior research was extensively reviewed and an initial list of potential items was compiled. The objective here was to generate as many different items as possible to measure the constructs based on their definitions. Except for the construct of Supplier's Market Dynamism, which has been measured in extant literature by seven-point semantic scale, other constructs are measured with seven-point Likert scale with one as Strongly Disagree and seven as Strongly Agree. Items for the constructs were generated as reflective because the constructs are theorized to lead to the relevant items (Jarvis et al 2003). The construct items were generated as follows.

4.1.1. Absorptive Capacity

Measurement items for the construct of absorptive capacity were generated based on the conceptualization of the construct (W. M. Cohen & Levinthal 1990; Zahra & George 2002). The items are adapted from the item pool in previous articles (Petersen, Pedersen, & Lyles 2008; Phan et al 2006). It should be noted that these items tap into domain of the capacity to value and assimilate knowledge from a supplier which is related to the potential rather than the realized absorptive capacity (Zahra & George 2002).

4.1.2. IT Integration

Measurement items for IT integration were generated based on its original conceptualization of the construct (Powell 1992; Wu et al 2006). Items for the construct are adapted from the items in Wu et al. (2006) which tap into the alignment of computer systems of two partners in a channel which comprises the potential for the partners' IT integration. The items were adapted for this dissertation to take the buyer's view in the relationship with its supplier.

4.1.3. Supplier's Market Dynamism

Measurement items for the construct of supplier's market dynamism were generated based on item pool from articles with similar concepts such as external uncertainty (S. Klein, Frazier, & Roth 1990), market dynamism (McGinnis & Kohn 1993), and market volatility (Bello & Gilliland 1997). The items were adapted to tap into the dynamism degree of the market surrounding the supplier.

4.1.4. Goodwill Trust

Measurement items for the construct of goodwill trust were generated and adapted based on its conceptualization as benevolence (Katsikeas, Skarmeas, & Bello 2009; R. Klein & Rai 2009) or goodwill trust (Das & Bing-Sheng 1998; Das & Teng 2001). The items for the construct were adapted from item pool in previous articles (Katsikeas, Skarmeas, & Bello 2009; R. Klein & Rai 2009) to tap into the concept of trust from a buyer on its supplier.

4.1.5. Visibility

Measurement items for the construct of visibility were newly generated for this study because there have been no validated items in previous articles that fully capture the construct domain. As noted in previous section, extant articles instead have operationalized the construct of information sharing (e.g. Heide & Miner 1992; McEvily & Marcus 2005; Noordewier, John, & Nevin 1990) or information flows (e.g. R. Klein & Rai 2009) or measured the quality of logistic information (e.g. Hult et al 2006; Zhou & Benton Jr 2007). Thus in this dissertation, new items were generated to tap into both operational and strategic domain of information exchanged and three elements of information efficacy including accuracy, relevance, and timeliness.

4.1.6. Perceived Supplier Risk

Measurement items for the construct of perceived supplier risk were generated based on its definition and conceptualization which tap into the domain of the supplier risk due to disruptions on the supplier's side. Items for the construct were adapted from the item pool in previous articles (Ellis, Henry, & Shockley 2010; Wagner & Bode 2008, 2006; Zsidisin & Ellram 2003).

In summary, for the six constructs, 50 items have been generated (see Appendix A). The items then were subjected to an extensive review from academic and industrial experts before large-scale surveys for a quantitative analysis.

4.2. Expert Review

After measurement items were created through rigorous and extensive review of literature, the common pool of items together with their definitions were provided to academic and industrial experts to pre-assess the content or face validity of the measures (Churchill Jr 1979). Experts provided feedbacks and suggestions for wording and relevance of the items used for each construct through an iterative process. The objective here was to ensure the content validity of the constructs and to use as few items as possible so that they still cover adequately the domain of the constructs with minimum redundancy. Still, new items were added when necessary. All the measurement items were followed through this process even though most of them have been used and adapted from validly and reliably established scales in extant literature.

The final questionnaire can be found in Appendix A. In the beginning of the survey questionnaire, respondents are directed to think about one of the key international suppliers and a key item that they are sourcing from the supplier. Respondents are told to note down the key item before they could continue the survey. For all the questions in the survey, respondents are reminded of the key supplier and the key item that they are referring to in the beginning. Questions are arranged in the questionnaire so that independent variables will be measured before the dependent variables and easy and less sensitive questions will be asked first. The questionnaire concludes with some questions about demographics and any further comments from the respondents.

4.3. Quantitative Analysis of Measurement

4.3.1. Sampling Design

Respondents should have knowledge and experience in working with an international supplier and their firms' operation and performance. Thus the target respondents are senior buyers or managers (e.g. CEOs, presidents, vice presidents, directors, or managers) for manufacturing firms in the U.S. whose job responsibilities are in the area of purchasing, procurement, and supply chain management. To achieve a greater generalizability, 11 different SIC codes are covered as in Table 4-1.

Table 4-1. SIC Code for Survey

SIC	Industries
200	Food & kindred products
250	Furniture and fixtures
270	Printing and publishing
280	Chemicals and allied products
300	Rubber & misc. plastic products
340	Fabricated metal products
350	Machinery, except electrical
360	Electric/electronic equipment
370	Transportation equipment
380	Instruments & related products
390	Misc. manufacturing industries

A list of 5,000 addresses was obtained from the database of Institute for Supply Management (ISM), a prestigious association of professionals in the area of supply chain management from different industries across the U.S. Under its new policy, however, ISM only provided the post mailing list. No emails or phone numbers were provided for direct contacts.

4.3.2. Data Collection

To increase the potential participation rate, 5,000 post mails were sent to the respondents inviting them to participate in the survey with either option: (1) taking the survey using paper-based questionnaire or (2) taking the survey online. Respondents are promised to have a summary of the result reports on procurement risk as a token of appreciation for their time and cooperation. In fact, we prefer the survey to be administered online because the Internet not only increases the richness of information but also enhances the reach of information (Laudon & Laudon 2009). The purpose of using Web survey is to reach as many respondents as possible and to retrieve as much information as possible in short time (Crawford et al 2002). The survey is sponsored by Center for International Business Education and Research (CIBER) at Georgia State University.

The whole process of data collection was carried out for six months from February 2011 to August 2011. In total, 121 agreed to take the survey online and thus provided their email addresses. Only nine agreed to take the survey off-line (i.e. using paper-based questionnaire). The effective sampling frame thus is 130. Among the 5,000 sent out, about 213 post mails were returned with no existing addresses or the respondents had moved. Nine responded to refuse to participate because they already retired or their firms do not source from outside the U.S.

Given the fact that respondents are managers at high level and working with international suppliers, they are usually very busy and working around the clock. To improve the completion rate, two rounds of emails were sent to invite respondents to complete the survey. In the first round, 121 respondents were sent emails with reminders two or three times a week to participate online. The nine respondents who prefer taking the survey off-line were sent the paper-based questionnaires with pre-posted return envelops. About seven respondents after reading the

invitation emails responded that they are no longer in the procurement position or not sourcing

outside the U.S. After four months, the second round of survey was launched. In the second

round, all the respondents who haven't responded or haven't completed the survey in the first

round were sent a reminder by post mails. As in the first round, in the second round, respondents

who prefer taking the survey online were sent reminders two or three times a week.

In total, we have 90 respondents who started the survey among which 64 completed online and

two completed off-line. 24 respondents started the survey but did not complete it. The effective

response rate is thus 69 percent while the effective completion rate is 50 percent. Some sample

characteristics are provided in Table 4-2.

Table 4-2. Sample Characteristics

	N	Minimum	Maximum	Mean	Std.
Relationship Duration (Years)	66	0.25	40	9.72	8.28
Firm Size (Number of employees)	66	9.00	400000	20844.77	57156.33
Percentage of firm's total procurement budget allocated for the key supplier	65	0.00	60	9.26	11.09
Total firm's sales last year (USD millions)	61	0.00	100000	6849.63	15842.77

Several sample characteristics should be noted. For example, all respondents are holding the

position of high-level managers related to procurement and/or supply chain including, for

example, vice president of supply chain management, senior buyer, purchasing director, global

strategic sourcing director, purchasing director, etc. Moreover, on average, respondents have

been working with the key supplier almost ten years and about nine percent of the buyer's total

procurement budget has been allocated to its key supplier last year. It should be noted that the

key international suppliers that our respondent firms are sourcing from come from different

regions worldwide including Europe (e.g. EU, France, Germany, Belgium, Ukraine), Asia (e.g.

China, India, Hong Kong, Taiwan, Malaysia), non-U.S. America (e.g. Mexico, Canada, Chile,

Brazil), and Australia and New Zealand. The buying firm size ranges from 9 to 400,000 employees with the average of 20,845 employees worldwide.

After further examining the firm size distribution, however, two firms were found to be of extraordinarily big in size with 200,000 and 400,000 employees, outside the three standard deviation of the sample mean of the firm size. Including the two firms in the sample may distort the analysis result. Thus we can exclude the two big firms and do the analyses on the final sample of 64. To test for robustness, however, the model with the sample of 66 is tested later to compare the results. Analysis results in the following sections are reported for the sample of 64.

4.3.3. Non-Response Bias

ISM did not provide emails, phone numbers, or any other firm's characteristics of the sampling frame. Thus we could not contact its client firms personally to assess nonresponse bias. Nevertheless, tests indicate that nonresponse bias is not likely an issue with our data. To do these, the sample was divided into two batches by the median of the response point of time. Then I compare means of firm characteristics between the early and late batches of the survey responses (Armstrong & Overton 1977). As a result, I detected no differences across these batches regarding the buyer-supplier relationship duration, firm size, percentage of firm's total procurement budget allocated for the key supplier, and firm's sales last year even at the 0.1 conservative significance level (see Table 4-3). Thus it could be inferred that nonresponse bias is unlikely to be a significant issue in this study.

Table 4-3. Non-Response Bias Test

Compared Variables	Early Response			Late Response			ANOVA	
	Mean	N	Std.	Mean	N	Std.	F	Sig.
Relationship Duration (Years)	8.73	31	8.41	11.81	31	7.935	2.21	0.14
Firm Size (Employees)	9564.88	32	15699.37	14677.47	32	27568.365	0.83	0.37
Percentage of firm's total procurement budget allocated for the key supplier	7.23	32	7.10	11.63	31	14.097	2.47	0.12
Total firm's sales last year (USD millions)	4247.78	29	7366.24	6366.97	29	12822.091	0.60	0.44

4.3.4. Measurement Validity and Reliability

Before testing the structural model, steps are taken to check (1) reliability; (2) discriminant

validity; and (3) convergent validity of the measures. The typical approach to assess reliabilities

is to use Cronbach's α with threshold of 0.7 (Nunnally & Bernstein 1994). However, Cronbach's

α is based on the restricted assumption of equal importance of all indicators. Following Hair et

al. (1998), the composite reliability (CR) and average variance extracted (AVE) of multiple

indicators of construct are also used to assess reliability of a construct. AVE is greater than 0.5

and CR is greater than 0.7 imply that the variance by trait is more than by error components

(Hair et al 1998). Items were deleted if it reduces the reliability of the construct and when it is

theoretically sound to do so. Results for Cronbach's α, CR, and AVE for the finalized items are

reported in Table 4-6.

To test the discriminant validity of the constructs, I run exploratory factor analysis for the

construct items. The analysis result showed that all the items load cleanly on their components.

On overall, their loadings on the supposed components are larger than the loadings on other

components provide evidence for discriminant validity. Cross-loading items were deleted if it is

theoretically sound to do so. The final factor analysis result is provided on Table 4-4. It should also be noted that the items for strategic and operational visibility load on one common factor, providing evidence that there may not be separate constructs of operational and strategic visibility as some might theorize, at least in our data sample of U.S. manufacturing firms.

To further test for discriminant validity, I also compare inter-construct correlations with the square root of average variance extracted (AVE) which indicates the percentage of overall variance in the indicators captured by the latent construct (Hair et al 1998). Those comparisons support discriminant validities for the measurement items in this study with square root of the AVE for each construct measure exceeding correlations between the construct and other constructs as we could see in Table 4-5.

Finally, convergent validity is an assessment of the consistency in measurements across different operationalization. Following Fornell and Larcker (1981), I use AVE greater than 0.5 as the threshold to confirm the convergent validity. Loadings of the items on the construct which is equal or greater than 0.7 and significant also provide evidence for convergence validity of the construct measures (Hair et al 1998). Items with low loadings were deleted if it is theoretically sound to do so. Final results for item loadings are provided on Table 4-6, providing evidence for convergent validity of the construct items. The final item inter-correlations are provided in the Appendix B.

4.3.5. Common Method Bias

For a single-informant and cross-sectional study like this one, common method bias could be a problem. To guard against such bias, steps have been taken ex ante and ex post (Podsakoff et al 2003).

Table 4-4. Exploratory Factor Analysis Result

Measurement Items (after purification)	Component					
	1	2	3	4	5	6
We commit resources to acquire new knowledge from our key supplier.	0.05	0.20	**0.80**	0.11	-0.23	0.04
We commit resources to understand our key supplier's processes.	-0.04	0.35	**0.67**	-0.18	-0.38	0.12
We invest in training our employees to make better use of knowledge of our key supplier.	0.22	0.17	**0.81**	-0.16	0.01	0.04
My firm's IT system is compatible with our key supplier's IT system.	**0.90**	0.07	-0.02	-0.09	-0.10	0.04
My firm's IT system is aligned with our key supplier's.	**0.91**	0.14	0.11	-0.05	-0.05	0.14
My firm and our key supplier have invested in our IT systems to make them interoperable.	**0.91**	0.08	0.05	0.02	0.05	0.11
Both my firm and our key supplier work together to integrate our IT systems.	**0.92**	0.02	0.08	0.05	0.02	0.07
IT advances for supply chain communication system are well aligned between my firm and our key supplier in order to achieve the best supply chain performance.	**0.82**	0.15	0.07	-0.05	-0.09	0.07
Supplier Environment -Stable:Volatile	0.06	-0.13	0.02	**0.92**	0.16	-0.06
Supplier Environment -Certain:Uncertain	-0.07	-0.11	-0.06	**0.92**	0.09	-0.15
Supplier Environment -Predictable:Unpredictable	-0.08	0.11	-0.10	**0.79**	0.20	-0.02
We believe that our operational information about our key supplier is accurate.	0.16	**0.51**	-0.09	-0.17	-0.08	0.62
Overall, information regarding our key supplier's operations is available to us in a timely manner.	0.06	**0.62**	0.24	-0.01	-0.24	0.53
The operational information we have about our key supplier is useful to improve our performance.	0.28	**0.68**	0.28	-0.09	0.03	0.09
We have a good understanding of the resource and capabilities of our key supplier.	0.10	**0.76**	0.15	-0.02	-0.32	0.18
We believe that the strategic information we have about our key supplier is accurate.	0.11	**0.81**	0.14	-0.01	-0.19	0.21
The strategic information we have about our key supplier is relevant to our business.	0.03	**0.89**	0.14	-0.03	-0.14	0.18
If our firm required assistance, our key supplier would do its best to provide it.	-0.02	0.09	-0.09	-0.15	-0.20	**0.86**
Our key supplier is interested in our firm's well-being, not just its own.	0.18	0.20	0.22	-0.07	-0.04	**0.85**
In times of difficulty (e.g. shortages), our key supplier has "gone out on a limb" for us.	0.16	0.23	0.08	0.02	-0.12	**0.83**
Our key supplier does not have strong controls for unexpected events.	-0.12	-0.17	-0.22	0.17	**0.60**	-0.30
Our key supplier is not capable of providing the key item with consistent quality.	-0.02	-0.24	-0.05	0.12	**0.86**	-0.10
Our key supplier has the technological capability to ensure stability in the supply of the key item (reverse).	-0.03	-0.18	-0.21	0.35	**0.73**	-0.13

Extraction Method: Principal Component Analysis.
Rotation Method: Varimax with Kaiser Normalization.

Table 4-5. Inter-Construct Correlations

	Mean	Std.	Absorptive Capacity	IT Integration	Supplier's Market Dynamism	Goodwill Trust	Visibility	Perceived Supplier Risk	Relation-ship Duration	Supplier's Substi-tutability
Absorptive Capacity	4.76	1.44	**0.841**							
IT Integration	2.64	1.58	0.199	**0.901**						
Supplier's Market Dynamism	3.42	1.42	-0.215	-0.091	**0.899**					
Goodwill Trust	5.2	1.44	0.256	0.239	-0.204	**0.898**				
Visibility	5.12	1.08	0.529	0.299	-0.190	0.564	**0.818**			
Perceived Supplier Risk	3.01	1.11	-0.499	-0.168	0.427	-0.402	-0.521	**0.840**		
Relationship Duration	9.63	8.28	0.231	0.107	-0.210	0.163	0.206	-0.417	**1.000**	
Supplier's Substitutability	4.34	1.61	0.187	0.140	-0.203	-0.050	0.114	-0.123	0.148	**1.000**

* Number in diagonal is square root of average variance extracted (AVE)

Table 4-6. Measurement Items – Reliability and Validity

Construct Items	Loading	Cronbach's Alpha (α)	Composite Reliability (CR)	Average Variance Explained (AVE)
Theoretical Explanatory Variables				
Absorptive Capacity: With regards to the key supplier, how would you agree with the following statements? (Likert Scale 1-7)		0.796	0.879	0.708
- We commit resources to acquire new knowledge from our key supplier.	0.858			
- We commit resources to understand our key supplier's processes.	0.894			
- We invest in training our employees to make better use of knowledge of our key supplier.	0.766			
IT Integration: With regards to the key supplier, how would you agree with the following statements? (Likert Scale 1-7)		0.943	0.956	0.813
- My firm's IT system is compatible with our key supplier's IT system.	0.897			
- My firm's IT system is aligned with our key supplier's.	0.939			
- My firm and our key supplier have invested in our IT systems to make them interoperable.	0.900			
- Both my firm and our key supplier work together to integrate our IT systems.	0.902			
- IT advances for supply chain communication system are well aligned between my firm and our key supplier in order to achieve the best supply chain performance.	0.868			
Visibility: Please answer the following questions with regard to the key supplier and the key item. (Likert Scale 1-7)		0.899	0.923	0.669
- We believe that our operational information about our key supplier is accurate.	0.711			
- Overall, information regarding our key supplier's operations is available to us in a timely manner.	0.857			
- The operational information we have about our key supplier is useful to improve our performance.	0.716			
- We have a good understanding of the resource and capabilities of our key supplier.	0.841			

Construct Items (continued from previous page)	Loading	Cronbach's Alpha (α)	Composite Reliability (CR)	Average Variance Explained (AVE)
- We believe that the strategic information we have about our key supplier is accurate.	0.863			
- The strategic information we have about our key supplier is relevant to our business.	0.899			
Perceived Supplier Risk: With regard to the key supplier and the key item, to what extent would you agree with the following statement? (Likert Scale 1-7)		0.776	0.858	0.605
- Our key supplier is not capable of providing the key item with consistent quality.	0.854			
- Our key supplier has the technological capability to ensure stability in the supply of the key item (reverse).	0.880			
- Our key supplier does not have strong controls for unexpected events.	0.783			
Control Variables				
Market Dynamism: How would you describe the business environment in the key supplier's territory with regard to the key item? (7-point Semantic Scale)		0.790	0.878	0.706
Stable – Volatile	0.942			
Certain – Uncertain	0.941			
Predictable – Unpredictable	0.809			
Goodwill Trust: Your perception of the key supplier? (Likert Scale 1-7)		0.881	0.926	0.807
If our firm required assistance, our key supplier would do its best to provide it.	0.883			
Our key supplier is interested in our firm's well-being, not just its own.	0.905			
In times of difficulty (e.g. shortages), our key supplier has "gone out on a limb" for us.	0.907			
Relationship Duration: How long has your firm been buying from this key supplier? (in years)	N/A*	N/A	N/A	1
Supplier's Substitutability: How substitutable is the key supplier of the key item to your firm?	N/A*	N/A	N/A	1

N = 64

* Single item

In particular, ex ante methods to guard against common method bias include using different types of measures across constructs and different scale types for key construct measures; improving wordings of items to ensure their clear meanings and protect respondent anonymity; and making distinction between independent and dependent variables by measuring them in different sections (Podsakoff et al 2003). In fact, in addition to Likert scales, semantic scale was used for Supplier's Market Dynamism. Moreover, for control variables, we use ratio scale to measure relationship duration. Some of the data for buying firm's size were triangulated with data from their websites. All the above methods were used to prevent potential common method bias to the study before the surveys were launched.

Ex post, a partial correlation procedure was employed by including a marker variable (Lindell & Whitney 2001). A marker variable is theoretically unrelated to one or more of the other variables in the study (Griffith & Lusch 2007; Lindell & Whitney 2001). In this study, buying firm's market dynamism is included as the marker variable. Theoretically, this construct should have nothing to do with the constructs related to the firm's supplier. Thus we should expect no significant correlations between this construct and other variables in the main model.

Table 4-7. Common Method Bias Test

	Main Model Variables	Absorptive Capacity	IT Integration	Perceived Supplier Risk	Visibility
Buying Firm's Market Dynamism	Pearson Correlation	-0.078	-0.158	0.175	-0.056
	Sig. (2-tailed)	0.540	0.213	0.167	0.663
	N	64	64	64	64

As expected, I found no significant correlation even at the conservative 0.1 level between buying firm's market dynamism and any of the variables in our main model (see Table 4-7). This result further provides evidence that common method bias is not likely a problem in this study.

4.4. Structural Model Analysis

After testing and purifying the measurement items, I employ structural equation modeling (SEM), which allows for modeling multiple interdependent relationships, to test the model (J. C. Anderson & Gerbing 1988). Instead of using the covariance-based SEM, however, I use partial least squares (PLS), a component-based SEM, because this research is in a more exploratory phase as theories in the field are still primitive. Thus, a data set that is not the result of long-term measurement development processes and includes a mix of both primary and secondary data like one in this study may perform acceptably in PLS, while it may produce unacceptable results in the covariance-based SEM (David Gefen, Rigdon, & Straub 2011). Moreover, PLS has no distributional assumptions and does not require proportionality constraints on the observed variables (David Gefen, Rigdon, & Straub 2011). Additionally, the component-based SEM maximizes the explained variance of the endogenous variables (Chin 1998; D. Gefen, Straub, & Boudreau 2000), which allows us to understand how much variance is explained for the dependent constructs of Visibility and Perceived Supplier Risk.

As part of the PLS procedure, the bootstrapping technique is used to generate t-value estimates. The bootstrapping represents a nonparametric approach for estimating the precision of PLS path estimate (Chin 1998). Under this approach, M samples are created by sampling with replacement from the original dataset of N (i.e. 64 in this study). Paths then are estimated for each sample. A distribution of the estimates from M samples is created for the path's t-value calculation.

To test the model with PLS, I use SmartPLS 2.0 (Ringle, Wende, & Will 2005). In this study, M bootstrapping of 200, 500, and 1,000 have been used. The results are similar. The follow results

are reported for M of 500. All the tests for the main model, mediation, and moderation can be done with the SmartPLS 2.0.

4.4.1. Main Model Test

Results for the main model could be found in Table 4-8. All the hypotheses for the main model are supported. In particular, hypothesis 1 posited that visibility would reduce the perceived supplier risk. I found that the path from visibility to perceived supplier risk is negative (-.358) and significant at 0.01 level (t-value = 2.702). Thus hypothesis 1 is strongly supported.

Hypothesis 2 posited that absorptive capacity will enhance visibility. I found that the path from absorptive capacity to visibility is positive (.475) and significant at 0.01 level (t-value = 4.601). Thus hypothesis 2 is strongly supported.

Hypothesis 3 posited that IT integration will enhance visibility. I found that the path from IT integration to visibility is positive (.198) but only significant at 0.05 level (t-value = 2.298). Thus hypothesis 3 is supported.

As noted, I include several other variables in the model to control for spurious effects. In particular, for visibility as the dependent variable, I found that supplier's market dynamism is negatively associated with visibility (-.070) but the relationship is not significant (t-value =.553).

For the perceived supplier risk as the dependent variable, I found that supplier's market dynamism and relationship duration are associated with perceived supplier risk with the path estimates of .285 and -.269 as expected, respectively. The paths are significant at 0.05 and 0.01 levels, respectively (t-value = 2.474 and 3.377 respectively). However, the path from goodwill trust to perceived supplier risk, even though negative as one might expect (-.097), is not

significant (t-value = .827). Supplier's substitutability is also not significantly related to
perceived supplier risk either (0.011; t-value = .109).

Table 4-8. PLS Results for Control Variable Only, Theoretical Only, and Full Models

Independent Variables	Control Variable Only Model		Theoretical Variable Only Model		Full Model	
	Visibility	*Perceived Supplier Risk*	*Visibility*	*Perceived Supplier Risk*	*Visibility*	*Perceived Supplier Risk*
<u>Theoretical Variables</u>						
Absorptive Capacity			**0.490****		**0.475****	
t-value			5.664		4.601	
IT Integration			**0.201***		**0.198***	
t-value			2.487		2.298	
Visibility				**-0.552****		**-0.358****
t-value				5.453		2.702
<u>Control Variables</u>						
Supplier's Market Dynamism	***-0.242***	***0.296****			***-0.070***	***0.285****
t-value	1.316	2.568			0.553	2.474
Relationship Duration		***-0.300****				***-0.269****
t-value		3.258				3.377
Supplier's Substitutability		***-0.033***				***0.011***
t-value		0.300				0.109
Goodwill Trust		***-0.297****				***-0.097***
t-value		2.745				0.827
R-square	**6%**	**38%**	**32%**	**27%**	**32%**	**46%**

* significant at 0.05 level
** significant at 0.01 level
N = 64; Bootstrapping = 500

In terms of R^2, 32 percent of variance in visibility has been explained by absorptive capacity, IT
integration, and supplier's market dynamism and the model explained 46 percent of variance for
perceived supplier risk. Such relatively high R^2s are in the moderate to substantial ranges for
social science studies (Chin 1998; J. C. Cohen, Jacob; Cohen, Patricia; West, Stephen G; Aiken,

Leona S; 2003), providing evidence for the model good fit. Moreover, compared to the control-variable-only and theoretical-variable-only models, the full model provided higher explained variance for the dependent variable (38%, 27%, and 46%, respectively), providing further evidence for a good fit of the full model (see Table 4-8).

4.4.2. Mediation Test

To provide support for the hypothesized mediation effects, I employ the logic of mediation testing proposed by Baron and Kenny (1986). In particular, three conditions are required for mediation: (1) the independent variable is significantly related to the mediator variable; (2) the mediator variable is significantly related to the dependent variable; and (3) the relationship between the independent variable and the dependent variable is reduced when both the independent variable and mediator are considered. In our model, the independent variables are absorptive capacity and IT integration. The mediator is visibility. And the dependent variable is perceived supplier risk. It should be noted that I keep all the control variables in our mediation tests. The test results are provided in Table 4-9.

In particular, the test results seemed to meet and satisfy these three conditions as we compared a direct effect model where only absorptive capacity is linked to perceived supplier risk with the model where the mediator visibility is also included. The relationships between absorptive capacity and perceived supplier risk turned from significant (-.338; t-value = 3.495) into non-significant (-.224; t-value = 1.764) when the mediator is considered, thereby satisfying Baron and Kenny's condition three. Absorptive capacity is significantly linked to visibility (i.e. condition one) and visibility is significantly associated with perceived supplier risk (i.e.

condition two) (see Table 4-9). Visibility then could be considered the full mediator between absorptive capacity and perceived supplier risk. Hypothesis H4a thus supported.

Table 4-9. Mediation Test Results

Independent Variables	Perceived Supplier Risk as Dependent Variable		
	Without-Mediator Model	*With-Mediator Model*	*Full-Mediation Model*
Main Model Variables			
Absorptive Capacity	**-0.338****	**-0.246**	
t-value	3.495	1.764	
IT Integration	**-0.008**	**0.019**	
t-value	0.087	0.468	
Visibility		**-0.242***	**-0.358****
t-value		1.972	2.702
Control Variables			
Supplier's Market Dynamism	*0.260**	*0.264***	*0.285**
t-value	2.444	2.631	2.474
Relationship Duration	*-0.250***	*-0.243***	*-0.269***
t-value	2.669	2.84	3.377
Supplier's Substitutability	*0.020*	*0.034*	*0.011*
t-value	0.215	0.38	0.109
Goodwill Trust	*-0.218*	*-0.109*	*-0.097*
t-value	1.894	0.868	0.827

* significant at 0.05 level

** significant at 0.01 level

N = 64; Bootstrapping = 500

However, the relationship between IT integration and perceived supplier risk is not significant whether we include visibility or not (-0.008; t-value = .087 and .019; t-value = .468, respectively). Thus IT integration may have no effect on perceived supplier risk directly or indirectly. Instead, IT integration only influences visibility (see Table 4-9). Hypothesis H4b therefore is not supported.

To further validate our data analysis here for mediation effects, I employed Sobel's tests on the indirect effects (Shrout & Bolger 2002; Sobel 1982). In particular, the standard errors of indirect effects will be calculated based on the following formula:

$$s_{ab} = \sqrt{a^2 s_b^2 + b^2 s_a^2}$$

where s_{ab} is standard error of an indirect effect, a and b are direct effects of independent variable on the mediator and of the mediator on dependent variable, respectively, with their respective standard errors of s_a and s_b. The 95% confidence intervals for the indirect effects then can be calculated based on the formula: confidence bounds = ab $\pm$ s_{ab} $z_{.975}$. A confidence interval that does not cover zero provides supports for the significance of the indirect effect (i.e. meditational effect) (Shrout & Bolger 2002).

Test results provided on table 4-10 further supported our mediation effect analyses. In particular, the indirect effect of absorptive capacity on perceived supplier risk via visibility is significantly different from zero, supporting for H4a. The indirect effect of IT integration on perceived supplier risk via visibility, however, is not significantly from zero. H4b, thus, is not supported.

Table 4-10. Sobel's Tests on Indirect Effects

	Path Estimate	Standard Error	95% confidence interval	
			Lower Bound	*Upper Bound*
Absorptive Capacity -> Visibility (a)	0.475	0.105	0.270	0.680
Visibility -> Perceived Supplier Risk (b)	-0.358	0.124	-0.601	-0.114
Absorptive Capacity's Indirect Effect (a*b)	**-0.170**	**0.070**	**-0.307**	**-0.033**
IT Integration -> Visibility (c)	0.198	0.083	0.036	0.360
Visibility -> Perceived Supplier Risk (d)	-0.358	0.124	-0.601	-0.114
IT integration's Indirect Effect (c*d)	**-0.071**	**0.039**	**-0.146**	**0.005**

N = 64; Bootstrapping = 500

4.4.3. Moderation Test

To do the moderation tests, items were standardized to remove nonessential collinearity between the interaction terms and the independent variables (J. C. Cohen, Jacob; Cohen, Patricia; West, Stephen G; Aiken, Leona S; 2003) and to ensure the interaction constructs have items of the same scale unit. The standardized items then are multiplied to create items for the moderation constructs. Results for the moderation tests are provided on Table 4-11, 4-12, and 4-13. The results provide supports for Hypothesis 5 but not for Hypothesis 6.

Table 4-11. Supplier's Market Dynamism as Moderator for Absorptive Capacity on Visibility

Independent Variables	Paths to Visibility	
	Model 1	*Model 2*
Absorptive Capacity	**0.475****	**0.426****
t-value	4.601	4.269
IT Integration	**0.198***	**0.203***
t-value	2.298	2.554
Supplier's Market Dynamism	**-0.070**	**-0.166**
t-value	0.553	1.552
Absorptive Capacity X Supplier's Market Dynamism		**-0.319***
t-value		2.487
R-square	**32%**	**42%**

* significant at 0.05 level
** significant at 0.01 level
N = 64; Bootstrapping = 500

In particular, hypothesis 5 posited that supplier's market dynamism will moderate the relationship between absorptive capacity and visibility such that the higher the market dynamism, the weaker the positive relationship between absorptive capacity and visibility. Thus we should expect the path estimate for the interaction term is significant and with the opposite sign to the path estimate for the independent variable. I tested this by adding the interaction term

between absorptive capacity and supplier's market dynamism (see Table 4-11). I found that before adding the interaction term, the effect of absorptive capacity is positive and significant (Model 1). After adding the interaction term, the effect of absorptive capacity is still positive and significant (Model 2). As expected, the interaction term effect on visibility is negative and significant at 0.05 level (Model 2) (-.319; t-value = 2.487). R^2 for visibility increases from 32 percent to 42 percent after adding the interaction term, about 10 percent more variance explained. Thus, hypothesis 5 is supported.

To further aid in interpretation of moderation, simple equations for the interaction effects are plotted for three values of the moderator: the mean, one standard deviation below the mean, and one standard deviation above the mean. If the lines are parallel, there are no interactions since the value of dependent variable corresponds to the value of the independent variable at a constant rate (i.e. equal slopes) across all values of the moderator. In contrast, if the lines are not parallel, there is an interaction (J. C. Cohen, Jacob; Cohen, Patricia; West, Stephen G; Aiken, Leona S; 2003). The simple plots for the moderation effects of supplier's market dynamism on the relationship between absorptive capacity and visibility are showed in Figure 4-1.

The plots seemed to show that there is moderation effect of supplier's market dynamism because the slope turns from very steep to less steep and almost parallel to the horizontal axis when supplier's market dynamism takes the values from low to high. The slopes at the mean and one standard deviation below the mean values of supplier market's dynamism look steep and not parallel to the horizontal axis. Thus, this provides further supports for hypothesis 5.
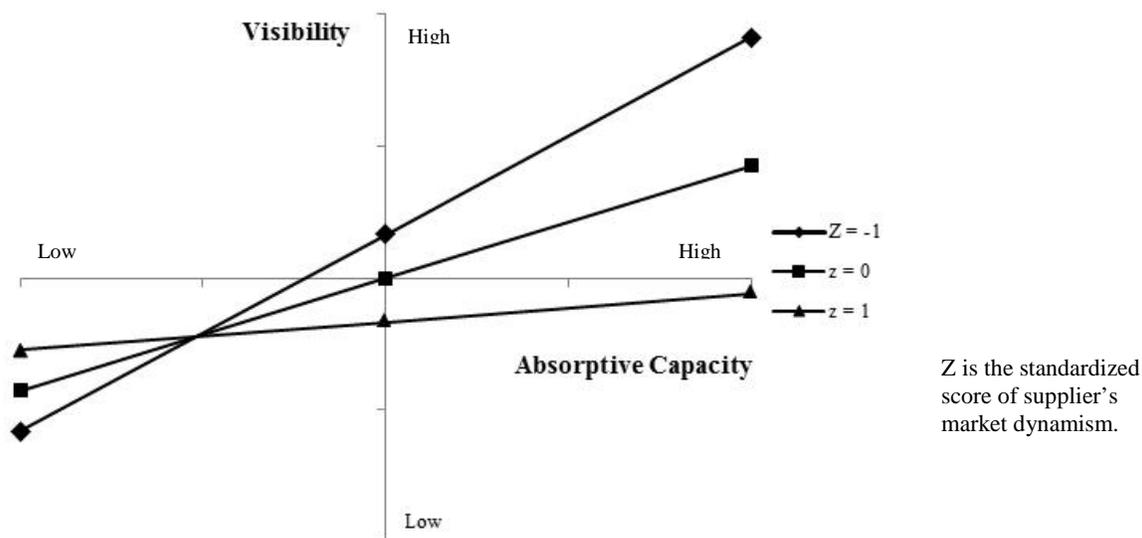
Figure 4-2. Simple Slopes for Visibility on Absorptive Capacity at Different Values of Supplier's Market Dynamism

To test for our suspicion that supplier's market dynamism, while moderating the relationship between absorptive capacity and visibility, will not affect the one between IT integration and visibility, a similar model where the interaction term between IT integration and supplier's market dynamism is added (see Table 4-12). As expected, the path from the interaction term of IT integration and supplier's market dynamism to visibility, even though also negative (-.214), is not significant (t-value = 1.469). It provides support for our argument that supplier's market dynamism may not moderate the relationship between IT integration and visibility.

Simple equations plotted for this moderation equations can be found in Figure 4-2. The lines do not seem to parallel but the slopes look pretty flat and are not clearly different from each other. Thus there may be no moderation effect here or the effect is not significant (Table 4-12).

Table 4-12. Supplier's Market Dynamism as Moderator for IT Integration on Visibility

Independent Variables	Paths to Visibility	
	Model 1	*Model 2*
Absorptive Capacity	0.475**	0.483**
t-value	4.601	4.562
IT Integration	0.198*	0.166
t-value	2.298	1.715
Supplier's Market Dynamism	-0.070	-0.096
t-value	0.553	0.781
IT Integration X Supplier's Market Dynamism		-0.214
t-value		1.469
R-square	**32%**	**37%**

* significant at 0.05 level

** significant at 0.01 level
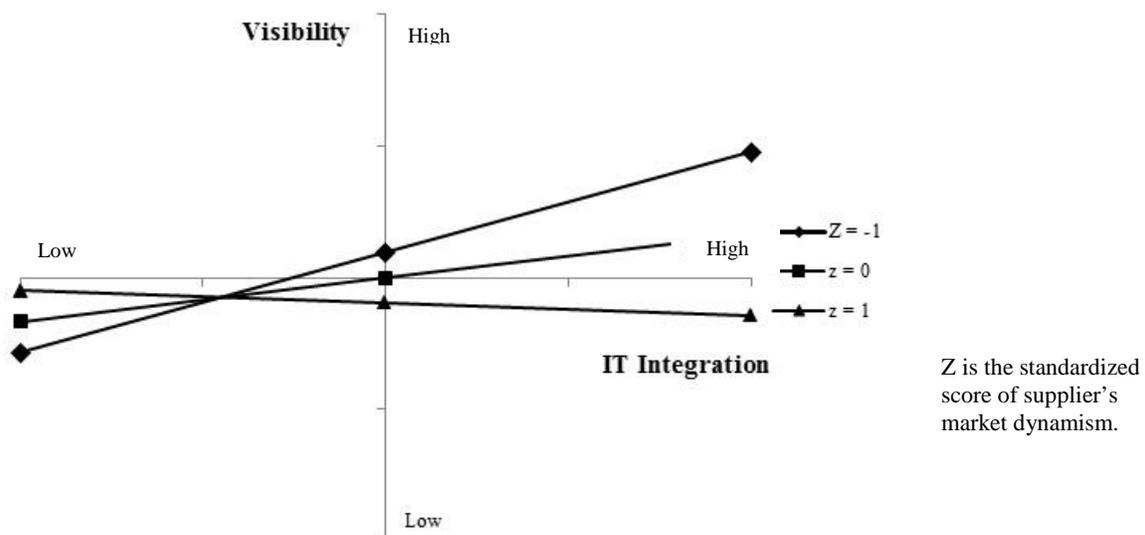
N = 64; Bootstrapping = 500

Figure 4-2. Simple Slopes for Visibility on IT Integration at Different Values of Supplier's Market Dynamism

Hypothesis 6 posited that goodwill trust will moderate the relationship between visibility and perceived supplier risk such that the higher the goodwill trust, the weaker the negative relationship between visibility and perceived supplier risk. Thus we should expect the interaction term's path is significant and with the opposite sign to the path from visibility to perceived supplier risk. The test result is provided in Table 4-13.

Table 4-13. Goodwill Trust as Moderator for Visibility on Perceived Supplier Risk

Independent Variables	Paths to Perceived Supplier Risk	
	Model 1	*Model 2*
Visibility	**-0.358****	**-0.239**
t-value	2.702	1.909
Goodwill Trust	**-0.097**	**-0.090**
t-value	0.827	0.686
Visibility x Goodwill Trust		**0.222**
t-value		0.778
Supplier's Market Dynamism	**0.285***	**0.365****
t-value	2.474	3.397
Relationship Duration	**-0.269****	**-0.259****
t-value	3.377	3.124
Supplier's Substitutability	**0.011**	**0.017**
t-value	0.109	0.171
R-square	**46%**	**49%**

* significant at 0.05 level
** significant at 0.01 level
N = 64; Bootstrapping = 500

As we could see from the Table 4-13, the path from visibility to perceived supplier risk is negative and significant before adding the interaction term (Model 1) and is still negative but only almost significant after we added the term (Model 2). The interaction term between visibility and goodwill trust is positively associated with perceived supplier risk as expected (.222) but not significant (t-value = .778). R^2 only increases from 46 percent to 49 percent after

adding the interaction term (3 percent more variance explained for perceived supplier risk). Thus hypothesis 6 is not supported.

In the same vein, simple equations are plotted for the moderation effect of goodwill trust on the relationship between visibility and perceived supplier risk (Figure 4-3). Even though the lines seem to cross (i.e. different slopes), the slope differences are not so clear and in fact not significant (Table 4-13). Thus the analysis results do not support hypothesis 6.
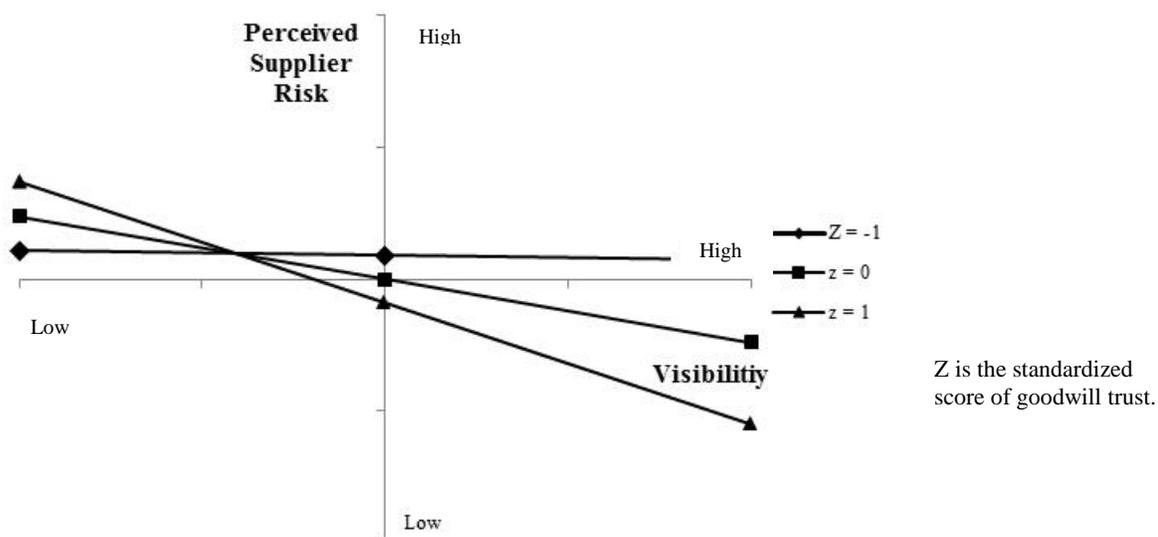
Figure 4-3. Simple Slopes for Perceived Supplier Risk on Visibility at Different Values of Goodwill Trust

4.4.4. Robustness Test

As mentioned earlier, our data sample includes two firms of extraordinary big size which may influence the analysis result. Thus I excluded the two firms when doing the analyses above. To test if data from the two firms may change the above analysis result, the two firms are included

back for testing and comparing results. Analysis results showed that including the two big firms actually did not change our results significantly (see tables on the Appendix C). Results for the main model are almost the same with all the significant paths as expected, compared to the results for the sample without the two firms.

Compared to the analysis of the sample of 64, there is only a minor difference for the results of testing the main model. That is the path from visibility to perceived supplier risk is still significant, but only at the .05 level (instead of the 0.01 level as in the sample of 64 firms). Thus, these results provide evidence that our model test results may be robust to different firm size.

In short, this chapter provides details for item generation process, survey, and model testing. A summary of the model testing results and hypotheses can be found in Figure 4-4 and in Table 4-14. In general, analysis results provided supports for our model. In the next chapter, I'll discuss the analysis results, theoretical and practical implications for this study, limitations, and directions for further research.

Table 4-14. Summary of Hypothesis Testing

Hypotheses	*Relationships*	*Supported*
H1	For a buying firm, Visibility into its supplier will reduce Perceived Supplier Risk.	Yes
H2	For a buying firm, Absorptive Capacity will increase Visibility into its supplier.	Yes
H3	For a buying firm, IT Integration with its supplier will increase Visibility into its supplier.	Yes
H4a	For a buying firm, Visibility into its supplier will mediate the relationship between its Absorptive Capacity and Perceived Supplier Risk.	Yes
H4b	For a buying firm, Visibility into its supplier will mediate the relationship between the firms' IT Integration and Perceived Supplier Risk.	No
H5	For a buying firm, the Supplier's Market Dynamism will negatively moderate the positive relationship between Absorptive Capacity and Visibility such that when Supplier's Market Dynamism is high the relationship between Absorptive Capacity and Visibility will be weaker, compared to when Supplier's Market Dynamism is low.	Yes
H6	For a buying firm, Goodwill Trust will negatively moderate the negative relationship between Visibility and Perceived Supplier Risk such that when Goodwill Trust is high the relationship between Visibility and Perceived Supplier Risk will be weaker, compared to when Goodwill Trust is low.	No
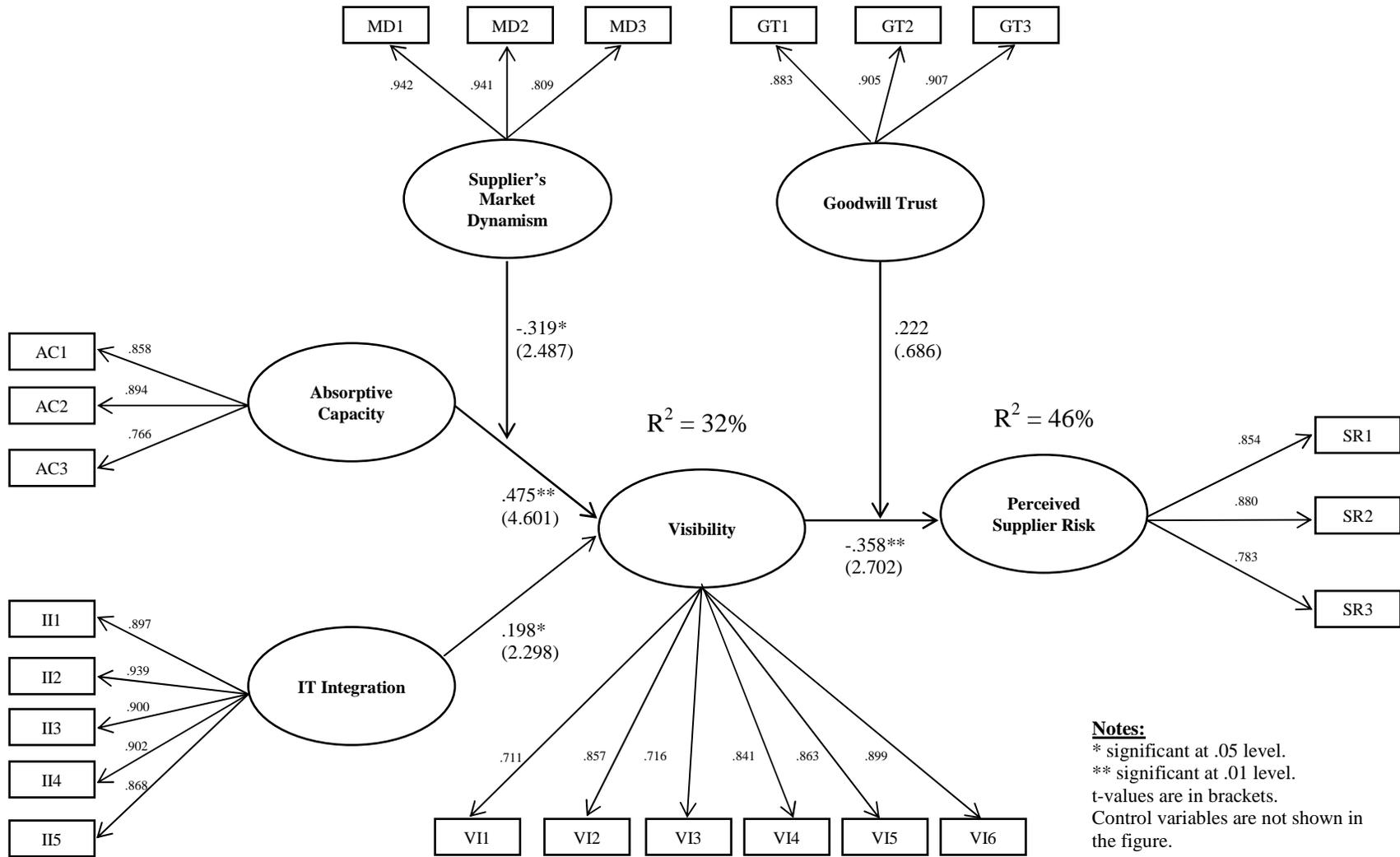
Figure 4-4. Model Testing ResultsFigure 3-3. Model and Hypotheses

CHAPTER V. DISCUSSIONS, IMPLICATIONS, AND DIRECTIONS FOR FUTURE RESEARCH

This dissertation started with two key observations that (1) firms in the supply chain have been becoming more connected than ever and (2) disruptions have occurred more and more frequently in the global supply chains. As a result, firms in the supply chain may suffer from the potential ripple effects of disruptions. For a manufacturing firm, the disruption risks from its suppliers, especially the international ones, thus become prominent and need urgent attention. Dealing with the risks reactively (i.e. after they have occurred) is usually costly and sometimes ineffective.

Thus, in this dissertation, I developed a model that links the key capability factors to help mitigate perceived supplier risk. The model delineated the configuration of information-based capabilities in mitigating supplier risk with the emphasis on visibility. Using data from U.S. manufacturing firms who partner with international suppliers, all the hypotheses in the model have been tested with adequate degree of rigor. In the following sections, hypothesis testing results for the model will be discussed. Next, I discuss the theoretical and practical implications from the paper results. Finally, limitations of the paper will be discussed with the respective recommendations for future research.

5.1. Model Result Discussions

In this section, I will discuss the results of the hypothesis testing, what arguments they supported, and how they are different or similar to previous results in extant literature. Hypotheses for the main model will be discussed first. Moderation hypotheses will be discussed next with some explanations offered for the non-significant finding of goodwill trust as moderator.

Almost all the hypotheses in the main model are supported. In particular, hypothesis 1 which posited that visibility will help reduce perceived supplier risk is strongly supported. This provides evidence for the arguments that visibility into its supplier (1) will help enhance the forecasting ability of the buying firm for possible disruptions from the supplier and thus (2) may enhance the control ability or at least the sense of control for the buying firm over its international supplier. The uncertainty component of perceived risk therefore will be reduced. This result is consistent with the fragmented evidence from previous articles. For example, it is consistent with the findings by Lee et al (1997; 2004) that internal data shared from its partner could help a firm in a supply chain better able to forecast inventory levels and thus lower the bullwhip effect risk in supply chains.

It is important to note that hypothesis 1 is supported even after other variables have been controlled for. In particular, four other variables have been included as the covariates including supplier's market dynamism, supplier substitutability, goodwill trust, and relationship duration. Thus, compared to a previous model (i.e. Ellis, Henry, & Shockley 2010), my model provides much higher explained variance for the construct of perceived supplier risk. While the model in Ellis et al. (2010) explained nearly 12 percent for the variance of supplier risk, the one in this study explained almost 46 percent. This is because the model in this dissertation extended the previous model in Ellis et al. (2010) by adding some key important variables including visibility, supplier's market dynamism, and long-term relationship (cf. Ellis, Henry, & Shockley 2010). In fact, the 46 percent explained variance falls within the range from moderate to substantial for social science research (Chin 1998). That provides further evidence that visibility is an important concept that needs including, together with several other variables, when examining perceived supplier risk.

Several control variables for perceived supplier risk should be noted. First, in the model, I found that supplier's market dynamism and relationship duration are significantly associated with perceived supplier risk. While the former is consistent with the finding by Ellis et al. (2010), the latter has not been considered in previous research. These findings, even though are not in my main thesis, are interesting. This is because supplier's market dynamism is still positively associated with perceived supplier risk even in the presence of other variables including visibility and relationship duration. This may be explained by the fact that even though visibility could provide the sense of control and forecast ability for the buying firm, there are still uncertainty elements which come from the external environment (i.e. the supplier's market) that the buying firm may not be able to forecast and control for. Such elements may be the black swans which are disproportionately high-impact, hard-to-predict, and rare events that blind-sight the managers. (Seville et al 2008; Taleb 2007).

Similarly, relationship duration was found to have a significant negative relationship with perceived supplier risk even in the presence of visibility and supplier's market dynamism. It is possible that the mere fact of working with the supplier for a long period of time is an evidence for lower possibility of disruptions from the supplier. The suppliers with disruptive history may have been cut off or changed by the buying firm as the relationship matures. All in all, further research is worthwhile for the relationships between visibility and other control variables with perceived supplier risk.

Second and interestingly, I did not find a significant relationship between supplier substitutability and perceived supplier risk. This is in contrast with the finding by Ellis et al. (2010) that the degree to which a buying firm has a limited number of alternative sources of supply to meet a need has a positive relationship with the probability of supplier disruption. In

fact, Ellis et al. (2010) offered two possible mechanisms for the positive relationship: (1) lock-in and (2) reduced information flow. They argued that because a buyer has fewer alternatives, the relationship with its supplier will be subjected to opportunism and the information flows will be limited. These lines of argument, however, may not hold if we consider one particular relationship. In particular, in a cooperative relationship where a buyer could gain high visibility into its supplier, for example, the fact that it has fewer alternatives may not have a simple linear relationship with the opportunism nor may it reduce information flow. In contrast, as the number of suppliers a buyer has increases to a very high level, the supply base may become too complex to deal with, increasing the supply risk (Choi & Krause 2006). Thus this relationship may not be linear or simple as we thought and may require further research.

Next, hypotheses 2 and 3 link the potential information-based capabilities to visibility. I found supports for both hypotheses. In particular, hypothesis 2 based on the argument that because a buying firm with higher potential absorptive capacity is more able than others to value and assimilate external knowledge (cf. W. M. Cohen & Levinthal 1990; Lane & Lubatkin 1998). This is because absorptive capacity depends on investments in individual absorptive capacity. Trained and adequately equipped employees in the buying firm then can learn easily to overcome the barriers to knowledge transfer and therefore absorb the knowledge and information from its supplier faster and easier. Thus firms with higher absorptive capacity may have higher visibility into its supplier. The supported result for this hypothesis is consistent with previous studies. For example, Lyles and Salk found that capacity to learn and investment in training are positively related to knowledge acquisition by a firm from its partner (Lyles & Salk 2007). Similarly, in international joint-venture context, Phan et al. (2006) found that investment in training

employees will facilitate knowledge acquisition by the employees from their joint-venture partner.

In the same vein, I found supports for hypothesis 3, which posited the positive relationship between IT integration and visibility. This hypothesis was founded on the argument that IT integration and alignment between partners' systems provide the firms with common supporting operations to exchange information. Thus IT integration will smooth out the flow of active information within and across firms (Wu et al 2006), facilitating a buying firm to gain information of good quality from its partnering supplier. The empirical finding for this hypothesis is consistent with the findings in previous articles where researchers found IT integration lead to better quality of information exchanged (Kim, Cavusgil, & Calantone 2006) or IT alignment facilitates supply chain to increase the amount of information exchange (Wu et al 2006).

One of the main theses in this study is that visibility is a key capability via which other capabilities will operate to mitigate perceived supplier risk. Thus hypotheses 4a and b posited that visibility will mediate the relationships between potential capabilities such as absorptive capacity and IT integration with perceived supplier risk. Our data analysis provided supports for hypothesis 4a but not 4b. This finding is interesting because while important, the capabilities such as absorptive capacity and IT integration will not operate well without visibility to gain the needed income. On the one hand, absorptive capacity may influence the risk outcome but only via visibility. IT integration, on the other hand, may have no effects on the risk outcome directly or indirectly. IT integration only has its influence on visibility. Thus absorptive capacity and IT integration will only provide the necessary, not sufficient, conditions for mitigating supplier risk. Making the distinction and the configuration of the capabilities are also important as it helps

explain why some buying firms may perceive very high risk from its suppliers even though they have similar absorptive capability and degree of IT integration. This line of argument parallels the distinction between potential and realized absorptive capacity (Zahra & George 2002) or the roles of IT alignment versus supply chain capability (Wu et al 2006), which have not been tested empirically. This study could be the first to test such line of argument. In short, the above hypotheses provided supports for our main model with the central thesis that some key information-based capabilities in their bundles can support and leverage each other to mitigate supplier risk proactively.

The last two hypotheses, which explored the contextual conditions for the main model, found mixed support. In particular, hypothesis 5 posited that the influence of absorptive capacity on visibility will be weakened when the supplier's market is highly dynamic. This is because a dynamic environment surrounding the supplier will make it difficult to make sense of the environment. The supplier therefore may not be able to transfer the needed information to the buyer even it is willing to do so. Moreover, the buyer will find it training knowledge for employees become obsolete very fast. As a result, under such dynamic environment, firms with even high absorptive capacity may not be able to turn it into high degree of visibility into its supplier. Data analysis results provided support for this hypothesis.

Interestingly, supplier's market dynamism was found not to moderate the relationship between IT integration and visibility. An explanation could be offered for this finding. This is because when two firms have established their system integration, the information transferred via the system is standardized and institutionalized. The market conditions thus may have been taken into account or they may not disrupt the information transfer process. This finding, however, may not necessarily mean that the effect of IT integration on visibility is more important because

it is less context-dependent, compared to absorptive capacity. In fact, a post-hoc analysis in the sample of 64 firms found that the effect size of absorptive capacity on visibility is about 30 percent while the effect size of IT integration is only about five percent. Moreover, only absorptive capacity was found to have an indirect effect on perceived supplier risk. The finding here thus may only mean that absorptive capacity is more difficult for a buying firm to develop as it is context-dependent but when adequately invested it can fruitfully lead to higher visibility into it supplier for mitigating supplier risk, compared to IT integration.

In the last hypothesis, I argued for a possible substitutability of visibility and goodwill trust for each other in mitigating perceived supplier risk. This is because goodwill trust could act as an informal control and therefore can substitute for visibility in mitigating risk. Our data analysis, however, found no significant relationship between the interaction term and perceived supplier risk even though the effect sign is positive as expected. Further examination of the arguments and data provides some possible explanations for this.

First, the argument that goodwill trust can act as the substitute for visibility may not be valid, at least for the sample of the firms in the United States in this study. The notion that trust is "not a naïve faith where people take for granted the reliability…of their counterpart based on decision made in the distant past" (McEvily, Perrone, & Zaheer 2003, p. 99) makes trust fragile and not enough to substitute for visibility. In another word, firms still need to periodically process information and clues about their counterparts to assess a situation. "Trust requires intermittent information processing because it is an intrinsically social organizing principle" (McEvily, Perrone, & Zaheer 2003, p. 99). Due to the limitations of sample size and dimensions of trust measured, however, further discussions or interpretation for this finding may be misleading.

Second, non-significant findings of the moderation effect should always be checked if they can be attributed to the problems in the measurement and data sampling. In this study, however, the construct of goodwill trust seems to be measured adequately with good reliability and validity. Caution, however, may be taken with the small sample size because it may prevent us from finding a significant relationship for the interaction term. In fact, the interaction term is a second-order term. Finding an effect for such high-order terms thus usually requires a larger sample size than for low-order term. A sample size of only 64 or 66 thus may restrict the range, preventing us from finding a significant relationship (J. C. Cohen, Jacob; Cohen, Patricia; West, Stephen G; Aiken, Leona S; 2003). Together with other hypotheses supported, this testing result provides implications theoretically and practically which I would discuss next.

5.2. Theoretical Implications

This dissertation makes several contributions to theories of supplier risk, resource-based view and relational view, and the inter-firm trust literature. First, the concepts of risk in general and perceived supplier risk in particular have been clearly explicated. In this dissertation, the concept of supplier risk is conceptualized as a subjective and relationship-specific construct. In another words, the supplier risk to a buyer has to be considered within their particular relationship. A buyer may be sourcing one item from several suppliers. The buyer's perceived supplier risks thus may be different toward different suppliers. This is important because how a firm perceives its particular supplier will determine the behaviors or strategies that the firm may have toward the particular partner.

Second, this study contributes to the literature of resource-based view and the relational view (Barney 1991; Dyer & Singh 1998). In particular, the model in this dissertation posited a

relationship between relationship-specific capabilities and perceived supplier risk. Findings in this study confirm the view that a buying firm's capabilities, such as absorptive capacity, IT integration, and visibility, when developed, can help it mitigate the supplier risk, thus improving the relationship-specific performance for the buying firm when dealing with its supplier. A frequently disruptive supply chain is costly for a buying firm (Hendricks & Singhal 2005a, 2005b) and thus lowers the firm's performance. In fact, a post-hoc analysis in this study confirmed the assumption that perceived supplier risk can be considered a reverse of relationship-specific performance. The correlation between perceived supplier risk and a scale of relationship-specific performance (R. Klein & Rai 2009) is negatively high and significant ($r = -.534$, significant at 0.01 level).

Third, and more importantly, this study adds to the capability discussion of the resource-based and relational views (Barney 1991; Dyer & Singh 1998; Wernerfelt 1984). For example, a nuance to those views is the way that capabilities may facilitate each other in mitigating risk. The general views on resource and capabilities usually state that the resources and/or capabilities, when developed and when they meet several conditions, could lead to high performance or competitive advantage for a firm. Few attempts have been made to clarify the configurations and mechanisms under which capabilities could result in higher performance. In this paper, I made a distinction between absorptive capacity and IT integration with visibility with the emphasis on the latter in risk mitigation. This is important because absorptive capacity and IT integration can only operate via visibility to result in higher performance outcome with regards to supplier risk. Findings from this study confirmed this argument.

In another way, a nuance has been added to the views by examining the contextual conditions under which capabilities will operate. In particular, I have argued and found that the condition

surrounding a supplier may facilitate or hamper the effect of absorptive capacity on visibility but have no influence on the relationship between IT integration and visibility. Such contextual or boundary conditions are important to understand when a relationship may work or may not work. Similarly, I argued for the moderating effect of goodwill trust on the relationship between visibility and perceived supplier risk even though I did not find support for this argument with the data sample in this study.

In fact, the non-significant findings for the moderation effect of goodwill trust could be a contribution to the literature of trust, at least for its dimension of benevolence or goodwill. This is because findings in this study seem to demonstrate that trust, and more particular the goodwill trust, may be fragile and should not considered a naïve faith (McEvily, Perrone, & Zaheer 2003). While important, trust alone is not enough and may need to be complemented by other important organizing principles such as visibility. The fact that visibility has significant (negative) relationship with supplier risk even when other variables have been controlled, while goodwill trust does not, seems to direct to the critical role of visibility in a buyer-supplier relationship, rather than trust. Again, further extrapolation can be misleading and dangerous given the limitations of sample size and the dimensions of trust examined in this study, issues that I will discuss in the limitation and future research section.

5.3. Practical Implications

Given the recent disruptions in multiple supply chains and the global economic crisis, a study on factors that could help mitigate supplier risks proactively is in urgent need. This study provides several implications which can be classified into two categories: implications for buyers and for suppliers.

For buying firms who are dealing with international suppliers, this study suggested that a key capability that needs to be developed to mitigate supplier risks proactively is visibility. A buying firm thus may want to ensure it gets the information from its supplier accurately, relevantly, and in a timely manner. The information here should include not only the operation activities but the strategies and technological knowledge. Lacking visibility into its supplier is similar to conducting business blindly with the supplier. Those who lack visibility are vulnerable and when disruptions occur they have to try to resolve the damages by costly remedies. The losses accrued by Boeing recently with its project of Dreamliner 787 is a valuable lesson that any firms should learn (see Greising & Johnsson 2007 among others for more details).

It is important to note that developing visibility is a capability that other mechanisms may not be able to substitute for. First, a long relationship with a supplier alone may not be enough to ensure lower supplier risk for a buyer. Usually a long relationship means the relationship is stable and working with the supplier is still considered valuable for a buyer that it may not want to change yet. However, even after controlling for relationship duration, visibility is still significantly related to supplier risk. This result means that visibility into a supplier thus is important for the buyer regardless the fact that it has a short or long relationship with the supplier.

Second, despite the market conditions surrounding the supplier, visibility is still the key to ensure a lower supplier risk. Results from this study seem to show that there may be still elements in the macro environment that managers in a buying firm may not be able to control for or at least they feel that they cannot control for. Huge disruptions that rarely happen such as the earthquake in Japan in 2011 may be uncontrollable, nor predictable. Still many other disruptions and/or their consequences can be mitigated proactively or at least, the impacts of the rare events may be lessened if a buying firm could gain adequate visibility into its supplier.

Third, developing trust through supplier's goodwill may not help nor substitute for visibility in mitigating supplier risk. In many instances, a supplier is benevolent and does not have any intent to cheat or take advantage of the buyer. However, many other factors may involve and operate that possibly cause disruptions for the supplier and then ripple through to the buyer. Gaining visibility thus is not about if a firm wanted to trust its supplier or not. It is about mitigating the potential disruption risk from the supplier.

The last factor that has been controlled for in the model is supplier's substitutability. Data analysis, however, showed that this factor is not significantly related to supplier risk. The implication for a buyer then is that we may no longer be able to depend on the old-fashioned approach that the U.S. manufacturing usually follows: using multiple sources for a needed item. This is because using multiple sources may not reduce the disruption risk from a particular supplier as specified in this study result. Increasing the number of suppliers may even hamper visibility into each supplier because the supply base becomes more complex to manage. Moreover, given the accelerating failure rate of suppliers due to the recent economic slowdown (McKinsey & Company Operations Extranet 2010), it cannot be guaranteed that a buyer can turn to other suppliers when one supplier fails to supply the needed item. Note that, however, this observation does not recommend buyers to use a single-source approach. In some cases, some alternative sources for a needed item may be necessary. The key here is to gain visibility into the suppliers that a buyer is sourcing from to prevent possible disruptions and mitigate their subsequent losses.

Moreover, the model in this study also provides some pathways for buying firms to develop visibility into its suppliers. Visibility can be developed through investing in developing absorptive capacity and IT integration. Thus to gain visibility, a buying firm may invest in

training its boundary employees to be able to value and assimilate the external knowledge related to the supplier and the item sourced. Aligning and integrating the information systems with the supplier are also recommended because such alignment can facilitate information exchange between the firms. Note that, however, the model results seem to show that developing absorptive capacity for employees is more important than the IT systems themselves. It should be remembered that whatever systems can be, they are designed by people and the information exchanged via the systems must be and can only be for the institutionalized and standardized ones. Investing in training employees for higher absorptive capacity, however, may be costly and a continuing job because in a changing environment, knowledge can be obsolete very soon.

Also for the above reason, it is not recommended that a buyer should develop visibility into just any suppliers. Developing such capability is costly and time-dependent. A buyer thus should consider the cost-benefit balance for gaining visibility. When a sourced item is strategically important, gaining visibility to lower supplier risk may be worthwhile.

From practical point of view, managers in a buyer may use the measurement scales developed in this study to measure the degree of visibility and perceived supplier risk by surveying their boundary employees. These measurement scales have been proved to have reliability and validity and thus could be used to monitor the current status of risk and visibility when a buying firm is dealing with its supplier. Because disruptions could occur any time and a reliable supplier today may not guarantee disruptions will not happen in the future, measuring the degrees of visibility and risk should be done on a regular basis, especially for the strategically important items.

Even though the model in this study takes a buyer's perspective, it has implications for suppliers. Thus some recommendations can also be made for suppliers who are doing business with international buyer. For example, as visibility is very important for a buyer to reduce the supplier risk, it is important for a supplier to help a buyer gain its visibility too. This is because a buyer that perceives high risk from its supplier may consider change its supplier and go for an alternative (Ellis, Henry, & Shockley 2010). Moreover, helping a buyer to gain transparency into the supplier's operation and capabilities can help the buyer foster capability and performance improvement for the supplier (Joshi 2009).

But should a supplier disclose full information, even the most sensitive, to any buyers? The simple answer is no even though the model in this study cannot help answer the question directly because it was only examined from a buyer's perspective. Lessons from fostering bilateral strategic relationships, however, seem to show that if a supplier considers a buyer as a strategic partner, it may be worthwhile to disclose sensitive information. Of course, disclosing such sensitive information can be a matter of relationship evaluation in terms of not only the power-dependence structure but also the trust sentiment over a partner (Frazier 2009). Moreover, in exchange, the supplier may require the same degree of information sharing from its buyer because transparency may be and should be a balanced and bilateral issue that no side could do to force the other to disclose information unilaterally (Lamming et al 2005).

Besides other mechanisms, the least a supplier can do to help its buyer gaining visibility, as the model in this paper suggests, is to align and integrate its IT system with the buyer's. Such alignment will help facilitate information sharing in an efficient and speedy manner. The supplier may also facilitate its buyer to absorb new knowledge related to the item it is providing.

5.4. Limitation and Future Research

Though most of the hypotheses are supported and the study provides a useful perspective in mitigating supplier risk, this study has several shortcomings that should be addressed in future research. The limitations for this study will be discussed in terms of both the methodological design and theoretical framework.

Methodologically, this study involves the collection of perceptual data from a single source at a particular point in time. Thus it may entail several methodological limitations. For example, the use of single data source for both dependent and independent variables may create a common method bias. This limitation has been somewhat addressed in this study by using key informant method. The informants here are at a high level of management and work with the supplier for a certain period of time. Thus they could have good knowledge about the relationship with the variables and can answer the questionnaire adequately. Moreover, methods have been carried out to reduce the potential for common method bias by separating the dependent and independent variables and by adding a marker variable for testing such bias. Still, to address these concerns further, additional research should consider using other source of data such as archival measures and in-depth examination of the firms studied. Dyadic data and/or multiple informants within an organization can also be considered to provide a triangulated view on the variables examined.

Another methodological limitation is the use of cross-sectional data to test cause-and-effect relationships. This violates a key condition for establishing cause and effect, namely the cause must exist before the effect. However, this is a common practice in our field because surveying managers become more challenging and costly. Moreover, the model in this study has been subjected to theoretical lens to provide the logics for cause-and-effect relationships. Still,

additional studies should consider using experimental and quasi-experimental methods or longitudinal data to facilitate temporal separation between cause and effect variables.

Small sample size is another limitation of this study. Although most of the hypotheses were supported and the measurement items seem to be reliable and valid, small sample size may lower the power to detect high-order relationship (J. C. Cohen, Jacob; Cohen, Patricia; West, Stephen G; Aiken, Leona S; 2003). In fact, this study employed PLS with bootstrapping method to calculate t-values more accurately for the path estimates. To some extent, the method can mitigate the limitation of small sample size when relationships are tested. Still, replication research with larger sample size may be needed to further confirm results in this study.

In addition to the methodological limitations, future studies should attempt to deepen the extant knowledge about supplier risk in several theoretical aspects. First, in this study only the disruption risk is examined. Even though it is the focus of this study and motivated by some observations about the recent phenomenon, it represents only one type of supplier risk. Other types of risks from suppliers such as relational risk, IT system risk, and social corporate risk (Spekman & Davis 2004) could be examined in their relationships or interaction with the disruption risk in the future studies.

Second, this study identified and tested the model for some key information-based capabilities including visibility, absorptive capacity, and IT integration. Examining these information-based capabilities is appropriate given the nature of supplier risk is uncertainty which is information-related. Other control variables have also been used and the model provided a substantial 46 percent of explained variance for the variable of supplier risk. Still other variables may be considered to increase further the explained variance in additional studies.

Third, in this study only goodwill trust is examined as a moderator on the relationship between visibility and supplier risk. Although the focus on goodwill trust is appropriate in light of the attempt to identify an informal substitute for visibility in mitigating supplier risk, other components of trust may be considered in future research including ability and honesty. Future research should examine how different components of trust may influence or moderate the pathways to perceived supplier risk.

Fourth, while visibility has been identified and proved to be the key capability to mitigate supplier risk, in this study, only two key information-based potential capabilities have been examined as the antecedents to visibility. Although examining absorptive capacity and visibility is appropriate because they represent the groups of factors that may influence visibility. Given the fact that visibility can be a bilateral issue which involves both sides in a relationship, other factors as antecedents to visibility may be considered in additional research. These include, for example, other IT resources or capabilities such as IT advancement and internal IT integration (Wu et al 2006). With data from the supplier side, other relational variables such as supplier's trust and commitment on buyer can also be included in future studies.

As a conclusion, this study provides a useful framework and a valuable perspective for mitigating supplier risk. In general, data collected for this study provided support for the model proposed. Future research, however, can capitalize on the limitations of this study to design better studies to understand supplier risk. This is an important and interesting phenomenon. The mere fact that disruptions from global suppliers become more and more prominent recently while many managers still pay little attention to these, at least in our sampling frame of U.S. manufacturers, makes it a very interesting and worthwhile topic for further research.

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BENCHMARK SURVEY OF LEADING-EDGE PRACTICES IN
MITIGATING GLOBAL PROCUREMENT RISKS

How do corporate procurement executives cope with inherent risks encountered in global sourcing?

What vulnerabilities associated with sourcing from foreign suppliers?

What risk mitigation strategies do leading-edge firms use to minimize their risks?

May 2011

GEORGIA STATE UNIVERSITY

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GEORGIA STATE UNIVERSITY CIBER
BENCHMARK SURVEY OF LEADING-EDGE PRACTICES IN MITIGATING GLOBAL PROCUREMENT RISKS

Please answer all questions in this survey as they relate to **your *most important foreign supplier*** (we refer to this as a ***key supplier***). This should be an independent foreign firm that is supplying a critical and frequently-purchased product to your company. We refer to this product as the ***key item***. This key item likely represents an important purchase in terms of business volume and/or criticality. **Please respond to all questions in the context of the key foreign supplier and the key item.**

Please briefly describe the key item (i.e., equipment, components, etc.) that this key foreign supplier sells to your firm: _____

Please indicate the degree of criticality of the key item for your manufacturing process:

Moderately Critical						Extremely Critical
1	2	3	4	5	6	7

How substitutable is the key supplier of the key item to your firm?

Easily Substitutable						Non-Substitutable
1	2	3	4	5	6	7

A. For each of the following questions, otherwise indicated, please mark the number that best describes your answer on the scale from 1= Strongly Disagree to 7= Strongly Agree.
I. Doing Business with this Key Supplier

		Strongly Disagree						Strongly Agree
1	In doing business with our key supplier, we rely on our familiarity of the **business culture in our key supplier's market**.	1	2	3	4	5	6	7
2	We commit resources to acquire new knowledge from our key supplier.	1	2	3	4	5	6	7
3	We commit resources to understand our key supplier's processes.	1	2	3	4	5	6	7
4	We invest in training our employees to make better use of knowledge of our key supplier.	1	2	3	4	5	6	7

II. Key Supplier's Business Environment

How would you describe **the business environment** in the key supplier's territory with regard to the key item?								
Stable	1	2	3	4	5	6	7	**Volatile**
Certain	1	2	3	4	5	6	7	**Uncertain**
Changes slowly	1	2	3	4	5	6	7	**Changes rapidly**
Predictable	1	2	3	4	5	6	7	**Unpredictable**
Stable market conditions	1	2	3	4	5	6	7	**Erratic market conditions**

III. Information Technology (IT) Systems:

		Strongly Disagree						**Strongly Agree**
1	My firm's IT system is compatible with our key supplier's IT system.	1	2	3	4	5	6	7
2	My firm's IT system is aligned with our key supplier's.	1	2	3	4	5	6	7
3	My firm and our key supplier have invested in our IT systems to make them interoperable.	1	2	3	4	5	6	7
4	Both my firm and our key supplier work together to integrate our IT systems.	1	2	3	4	5	6	7
5	IT advances for supply chain communication system are well aligned between my firm and our key supplier in order to achieve the best supply chain performance.	1	2	3	4	5	6	7

IV. Perceptions of the Key Supplier:

		Strongly Disagree						Strongly Agree
1	If our firm required assistance, our key supplier would do its best to provide it.	1	2	3	4	5	6	7
2	Our key supplier is interested in our firm's well being, not just its own.	1	2	3	4	5	6	7
3	In times of difficulty (e.g. shortages), our key supplier has "gone out on a limb" for us.	1	2	3	4	5	6	7
4	Our key supplier tends to be candid in our dealings with it.	1	2	3	4	5	6	7
5	We would characterize our key supplier as being fair in its dealing with us.	1	2	3	4	5	6	7
6	Overall, our key supplier keeps its commitments.	1	2	3	4	5	6	7

Supplier's operational information relates to process issues on the supplier's side including delivery schedules, production and operation schedules, and logistic arrangements.
Please answer the following questions with regard to the key supplier and the key item.

		Strongly Disagree						Strongly Agree
1	We believe that our operational information about our key supplier is accurate.	1	2	3	4	5	6	7
2	Overall, information regarding our key supplier's operations is available to us in a timely manner.	1	2	3	4	5	6	7
3	The operational information we have about our key supplier is relevant to **our operation**.	1	2	3	4	5	6	7
4	The operational information we have about our key supplier is useful to improve our **performance.**	1	2	3	4	5	6	7
5	Our key supplier shares with us the information regarding its process issues in a timely manner.	1	2	3	4	5	6	7

Supplier's strategic information relates to resource, commitment, and relatively irreversible intentions and actions of the supplier.
Please answer the following questions with regard to the key supplier and the key item.

		Strongly Disagree						Strongly Agree
1	We have a good understanding of the resource and capabilities of our key supplier.	1	2	3	4	5	6	7
2	We believe that the strategic information we have about our key supplier is accurate.	1	2	3	4	5	6	7
3	The strategic information we have about our key supplier is up-to-date.	1	2	3	4	5	6	7
4	The strategic information we have about our key supplier is relevant to our business.	1	2	3	4	5	6	7
5	We have access to long-term plans of our key supplier in a timely manner.	1	2	3	4	5	6	7
6	The strategic information we have about our key supplier is useful for improving our performance.	1	2	3	4	5	6	7

With regard to the key supplier and the key item, to what extent would you agree with the following statements?

		Strongly Disagree						Strongly Agree
1	We fear that potential **disruptions from our key supplier** may result in significant losses for us.	1	2	3	4	5	6	7
2	We fear that sourcing the item from our key supplier may expose us to significant losses.	1	2	3	4	5	6	7
3	We fear that disruptions in our key supplier's **business environment** may result in significant losses for us.	1	2	3	4	5	6	7
4	We fear that our key supplier's vulnerabilities may expose us to significant loss.	1	2	3	4	5	6	7
5	We fear that our key supplier may expose us to potential disruptions.	1	2	3	4	5	6	7

With regard to the key supplier and the key item, to what extent would you agree with the following statements?

		Strongly Disagree						Strongly Agree
1	We don't have workable plans to cope with potential disruptions to the key item availability.	1	2	3	4	5	6	7
2	Our key supplier does not have strong controls for unexpected events.	1	2	3	4	5	6	7
3	In case of disruptions, we have limited legal grounds to force our key supplier to address our claims.	1	2	3	4	5	6	7
4	Our key supplier's performance is resilient to volatile changes in its business environment.	1	2	3	4	5	6	7

With regard to the key item purchased from the key supplier, to what extent would you agree with the following statements?

		Strongly Disagree						Strongly Agree
1	There is a high possibility of untimely delivery of the key item.	1	2	3	4	5	6	7
2	There is a high possibility of cost overruns for the key item.	1	2	3	4	5	6	7
3	Our key supplier is not reliable in providing the key item.	1	2	3	4	5	6	7
4	Our key supplier is financially stable.	1	2	3	4	5	6	7
5	Our key supplier is not capable of providing the key item with consistent quality.	1	2	3	4	5	6	7
6	Our key supplier does not have the technological capability to ensure stability in the supply of the key item.	1	2	3	4	5	6	7

With regard to the relationship-specific performance, how would you agree with the following statements?

Our firm has realized the following performance outcomes as a result of our interactions with this key supplier:

		Strongly Disagree						Strongly Agree
1	Improved asset management.	1	2	3	4	5	6	7
2	Increased productivity.	1	2	3	4	5	6	7
3	Lower operating costs.	1	2	3	4	5	6	7
4	Improved production planning.	1	2	3	4	5	6	7
5	Improved resource control.	1	2	3	4	5	6	7
6	Increased flexibility.	1	2	3	4	5	6	7

B. Finally, with our full respect to confidentiality, we seek your opinion on the impact of the key supplier on your firm. We are not asking for accounting data, just some rough indicators.

1. Do you have a formal, signed contract with the key supplier? _____ yes _____ no.

2. If yes, how frequently do you renew the contract? _____.

3. Please name the country from which the key item is sourced?_____.

4. How long has your firm been buying from this key supplier? _____ year(s).

5. During the past year, approximately what percentage of your firm's total procurement budget was allocated to purchases from this key supplier? _____ %.

6. What percentage of cost of the final product is accounted for by this key item? _____ %.

7. How would describe the **market of the final product** you mentioned in the above question?

Stable	1	2	3	4	5	6	7	Erratic
Certain	1	2	3	4	5	6	7	Uncertain
Predictable	1	2	3	4	5	6	7	Unpredictable

8. Which industry does your firm operate in? _____.

9. About how many non-administrative employees are there in your division or business unit in the

U.S.A.?_____employees.

10. About how many non-administrative employees does your firm employ worldwide?

_____employees.

11. Please estimate the approximate total sales of your firm last year: $_____.

12. Please state your current title in the firm: _____.

13. How long have you been working for your current firm? _____ years.

14. Your opinions are important to us. Feel free to give us any comments that you may have:

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As a token of appreciation, we will be happy to share with you the summary of the research findings.

Please indicate your email address where you would like to receive the summary report:

_____.

Thank you so much! Your opinions are important to us.
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APPENDIX B. ITEM INTER-CORRELATIONS

#	Items	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23
1	We commit resources to acquire new knowledge from our key supplier.	1.00																						
2	We commit resources to understand our key supplier's processes.	0.66	1.00																					
3	We invest in training our employees to make better use of knowledge of our key supplier.	0.54	0.50	1.00																				
4	My firm's IT system is compatible with our key supplier's IT system.	0.08	0.03	0.24	1.00																			
5	My firm's IT system is aligned with our key supplier's.	0.19	0.11	0.32	0.84	1.00																		
6	My firm and our key supplier have invested in our IT systems to make them interoperable.	0.07	0.05	0.26	0.74	0.80	1.00																	
7	Both my firm and our key supplier work together to integrate our IT systems.	0.11	0.06	0.23	0.73	0.82	0.91	1.00																
8	IT advances for supply chain communication system are well aligned between my firm and our key supplier in order to achieve the best supply chain performance.	0.18	0.17	0.24	0.74	0.73	0.68	0.69	1.00															
9	Supplier Environment – Stable/Volatile	0.02	-0.29	-0.12	-0.04	-0.02	0.01	0.07	-0.03	1.00														
10	Supplier Environment – Certain/Uncertain	-0.02	-0.31	-0.21	-0.16	-0.15	-0.10	-0.05	-0.14	0.87	1.00													
11	Supplier Environment –Predictable/ Unpredictable	-0.04	-0.22	-0.15	-0.18	-0.14	0.04	-0.02	-0.13	0.63	0.63	1.00												
12	We believe that our operational information about our key supplier is accurate.	0.20	0.19	0.13	0.25	0.33	0.20	0.13	0.30	-0.25	-0.32	-0.12	1.00											
13	Overall, information regarding our key supplier's operations is available to us in a timely manner.	0.39	0.55	0.32	0.13	0.25	0.15	0.11	0.28	-0.16	-0.22	0.00	0.67	1.00										
14	The operational information we have about our key supplier is useful to improve our performance.	0.28	0.38	0.44	0.26	0.38	0.32	0.31	0.31	-0.16	-0.16	-0.07	0.29	0.53	1.00									
15	We have a good understanding of the resource and capabilities of our key supplier.	0.31	0.55	0.31	0.22	0.27	0.16	0.11	0.23	-0.14	-0.19	-0.04	0.49	0.61	0.52	1.00								
16	We believe that the strategic information we have about our key supplier is accurate.	0.39	0.47	0.24	0.21	0.31	0.15	0.15	0.22	-0.13	-0.18	0.00	0.59	0.67	0.52	0.67	1.00							
17	The strategic information we have about our key supplier is relevant to our business.	0.30	0.48	0.29	0.07	0.17	0.15	0.10	0.19	-0.18	-0.14	0.00	0.54	0.68	0.64	0.76	0.76	1.00						
18	If our firm required assistance, our key supplier would do its best to provide it.	0.01	0.21	0.02	0.08	0.09	0.10	0.05	0.05	-0.26	-0.32	-0.08	0.58	0.50	0.15	0.31	0.26	0.27	1.00					

#	Items	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23
19	Our key supplier is interested in our firm's well being, not just its own.	0.23	0.33	0.30	0.20	0.36	0.28	0.24	0.25	-0.11	-0.24	-0.12	0.62	0.58	0.29	0.38	0.46	0.41	0.68	1.00				
20	In times of difficulty (e.g. shortages), our key supplier has "gone out on a limb" for us.	0.16	0.27	0.15	0.18	0.28	0.24	0.21	0.24	-0.09	-0.12	-0.09	0.56	0.63	0.44	0.40	0.36	0.39	0.68	0.77	1.00			
21	Our key supplier does not have strong controls for unexpected events.	-0.27	-0.47	-0.26	-0.17	-0.26	-0.12	-0.13	-0.17	0.27	0.27	0.31	-0.28	-0.46	-0.28	-0.41	-0.38	-0.37	-0.36	-0.39	-0.37	1.00		
22	Our key supplier is not capable of providing the key item with consistent quality.	-0.31	-0.45	-0.13	-0.12	-0.09	-0.01	-0.02	-0.16	0.30	0.22	0.26	-0.29	-0.40	-0.28	-0.43	-0.37	-0.36	-0.30	-0.19	-0.31	0.47	1.00	
23	Our key supplier has the technological capability to ensure stability in the supply of the key item (reverse).	-0.29	-0.49	-0.36	-0.12	-0.17	-0.06	-0.04	-0.11	0.46	0.46	0.32	-0.30	-0.44	-0.20	-0.43	-0.32	-0.34	-0.30	-0.29	-0.22	0.50	0.70	1.00

APPENDIX C. MODEL TEST RESULTS FOR SAMPLE SIZE OF 66

Table C-1. Structural Path Results

Independent Variables	Control Variable Only Model		Theoretical Variable Only Model		Full Model	
	Visibility	*Perceived Supplier Risk*	*Visibility*	*Perceived Supplier Risk*	*Visibility*	*Perceived Supplier Risk*
Theoretical Variables						
Absorptive Capacity			**0.507****		**0.488****	
t-value			6.176		4.317	
IT Integration			**0.201***		**0.197***	
t-value			2.524		2.191	
Visibility				**-0.489****		**-0.316***
t-value				4.768		2.304
Control Variables						
Supplier's Market Dynamism	***-0.267***	***0.265****			***-0.074***	***0.240****
t-value	1.558	2.157			0.538	1.992
Relationship Duration		***-0.330*****				***-0.314*****
t-value		3.326				3.475
Supplier's Substitutability		***-0.056***				***-0.028***
t-value		0.522				0.280
Goodwill Trust		***-0.289*****				***-0.111***
t-value		2.587				0.995
R-square	**7%**	**37%**	**35%**	**24%**	**35%**	**43%**

* significant at 0.05 level

** significant at 0.01 level

N = 66; Bootstrapping = 500

Table C-2. Mediation Test Results

Independent Variables	Perceived Supplier Risk as Dependent Variable		
	Without-Mediator Model	*With Mediator Model*	*Full Mediation Model*
<u>**Main Model Variables**</u>			
Absorptive Capacity	**-0.289****	**-0.201**	
t-value	2.880	1.507	
IT Integration	**0.018**	**0.044**	
t-value	0.177	0.470	
Visibility		**-0.224**	**-0.316***
t-value		1.304	2.304
<u>**Control Variables**</u>			
Supplier's Market Dynamism	*0.214**	*0.217**	*0.240**
t-value	2.045	1.979	1.992
Relationship Duration	*-0.304***	*-0.299***	*-0.314***
t-value	3.468	3.359	3.475
Supplier's Substitutability	*-0.030*	*-0.018*	*-0.028*
t-value	0.286	0.176	0.280
Goodwill Trust	*-0.223*	*-0.122*	*-0.111*
t-value	1.911	1.007	0.995

* significant at 0.05 level

** significant at 0.01 level

N = 66; Bootstrapping = 500

Table C-3. Supplier's Market Dynamism as Moderator

Independent Variables	Paths to Visibility	
	Model 1	*Model 2*
Absorptive Capacity	**0.488****	**0.450****
t-value	4.317	4.614
IT Integration	**0.197***	**0.205****
t-value	2.191	2.579
Supplier's Market Dynamism	**-0.074**	**-0.175**
t-value	0.538	1.557
Absorptive Capacity X Supplier's Market Dynamism		**-0.304***
t-value		2.061
R-square	**35%**	**43%**

* significant at 0.05 level

** significant at 0.01 level

N = 66; Bootstrapping = 500

Table C-4. Supplier's Market Dynamism as Moderator

Independent Variables	Paths to Visibility	
	Model 1	*Model 2*
Absorptive Capacity	**0.488****	**0.501****
t-value	4.317	4.955
IT Integration	**0.197***	**0.160**
t-value	2.191	1.697
Supplier's Market Dynamism	**-0.074**	**-0.102**
t-value	0.538	0.832
IT Integration X Supplier's Market Dynamism		**-0.229**
t-value		1.264
R-square	**35%**	**40%**

* significant at 0.05 level

** significant at 0.01 level

N = 66; Bootstrapping = 500

Table C-5. Goodwill Trust as Moderator

Independent Variables	Paths to Perceived Supplier Risk	
	Model 1	*Model 2*
Visibility	**-0.316***	**-0.153**
t-value	2.304	1.131
Goodwill Trust	**-0.111**	**-0.126**
t-value	0.995	1.066
Visibility x Goodwill Trust		0.306
t-value		0.986
Supplier's Market Dynamism	**0.240***	**0.343****
t-value	1.992	2.980
Relationship Duration	**-0.314****	**-0.289****
t-value	3.475	3.123
Supplier's Substitutability	**-0.028**	**-0.005**
t-value	0.280	0.047
R-square	**43%**	**49%**

* significant at 0.05 level

** significant at 0.01 level

N = 66; Bootstrapping = 500

BIBLIOGRAPHY

Amit, R., & Schoemaker, P. J. H. (1993), "Strategic Assets and Organizational Rent," *Strategic Management Journal, 14* (1), 33-46.

Anand, G., & Ward, P. T. (2004), "Fit, Flexibility and Performance in Manufacturing: Coping with Dynamic Environments," *Production & Operations Management, 13* (4), 369-385.

Anderson, J. C., & Gerbing, D. W. (1988), "Structural Equation Modeling in Practice: A Review and Recommended Two-Step Approach," *Psychological Bulletin, 103* (3), 411-423.

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

Armstrong, J. S., & Overton, T. S. (1977), "Estimating Nonresponse Bias in Mail Surveys," *Journal of Marketing Research, 14* (3), 396-402.

Arrow, K. J. (1965), *Aspects of the Theory of Risk Bearing.* Helsinki: Yijo Jahnssonis Saatio.

Barney, J. (1991), "Firm Resources and Sustained Competitive Advantage," *Journal of Management, 17* (1), 99.

Baron, R. M., & Kenny, D. A. (1986), "The Moderator-Mediator Variable Distinction in Social Psychological Research: Conceptual, Strategic, and Statistical Considerations," *Journal of Personality and Social Psychology, 51*, 1173-1182.

Barratt, M., & Oke, A. (2007), "Antecedents of Supply Chain Visibility in Retail Supply Chains: A Resource-Based Theory Perspective," *Journal of Operations Management, 25* (6), 1217-1233.

Bello, D. C., Chelariu, C., & Zhang, L. (2003), "The Antecedents and Performance Consequences of Relationalism in Export Distribution Channels," *Journal of Business Research, 56* (1), 1.

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

Bergen, M., Dutta, S., & Walker Jr, O. C. (1992), "Agency Relationships in Marketing: A Review of the Implications and Applications of Agency and Related," *Journal of Marketing, 56* (3), 1-24.

Bharadwaj, A. S. (2000), "A Resource-Based Perspective on Information Technology Capability and Firm Performance: An Empirical Investigation," *MIS Quarterly, 24* (1), 169-196.

Blackhurst, J., Craighead, C. W., Elkins, D., & Handfield, R. B. (2005), "An Empirically Derived Agenda of Critical Research Issues for Managing Supply-Chain Disruptions," *International Journal of Production Research, 43* (19), 4067-4081.

Bresman, H., Birkinshaw, J., & Nobel, R. (2010), "Knowledge Transfer in International Acquisitions," *Journal of International Business Studies, 41* (1), 5-20.

Byrne, P. M. (2007), "Impact and Ubiquity: Two Reasons to Proactively Manage Risk," *Logistics Management, 46* (4), 24-25.

Chin, W. W. (1998), "The Pls Approach to Sem," in *Modern Methods for Business Research*, Marcoulides, G. A., ed. eds. Mahwah, NJ: Lawrence Erlbaum Associates.

Choi, T. Y., & Krause, D. R. (2006), "The Supply Base and Its Complexity: Implications for Transaction Costs, Risks, Responsiveness, and Innovation," *Journal of Operations Management, 24* (5), 637-652.

Chopra, S., & Sodhi, M. S. (2004), "Managing Risk to Avoid Supply-Chain Breakdown," *MIT Sloan Management Review, 46* (1), 53-62.

Christopher, M., & Lee, H. (2004), "Mitigating Supply Chain Risk through Improved Confidence," *International Journal of Physical Distribution & Logistics Management, 34* (5), 388-396.

Churchill Jr, G. A. (1979), "A Paradigm for Developing Better Measures of Marketing Constructs," *Journal of Marketing Research (JMR), 16* (1), 64-73.

Cohen, J. C., Jacob; Cohen, Patricia; West, Stephen G; Aiken, Leona S; (2003), *Applied Multiple Regression/Correlation Analysis for the Behavioral Sciences.* Mahwah, N.J. ;. L. Erlbaum Associates.

Cohen, W. M., & Levinthal, D. A. (1990), "Absorptive Capacity: A New Perspective on Learning and Innovation," *Administrative Science Quarterly, 35* (1), 128-152.

Collis, D. J. (1994), "Research Note: How Valuable Are Organizational Capabilities?," *Strategic Management Journal, 15* (ArticleType: primary_article / Issue Title: Special Issue: Competitive Organizational Behavior / Full publication date: Winter, 1994 / Copyright © 1994 John Wiley & Sons), 143-152.

Coombs, C. H. (1983), *Psychology and Mathematics.* Ann Arbor: University of Michigan Press.

Crawford, S., Mccabe, S., Couper, M., & Boyd, C. (2002, August 25-28). *Improving Response Rates and Data Collection Efficiencies.* Paper presented at the International Conference on Improving Surveys, Copenhagen, Denmark.

Das, T. K., & Bing-Sheng, T. (1998), "Between Trust and Control: Developing Confidence in Partner Cooperation in Alliances," *Academy of Management Review, 23* (3), 491-512.

Das, T. K., & Teng, B.-S. (2001), "Trust, Control, and Risk in Strategic Alliances: An Integrated Framework," *Organization Studies, 22* (2), 251.

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

Dowling, G. R. (1986), "Perceived Risk," *The Concept and Its Measurement, 3* (3), 193-210.

Dowling, G. R., & Staelin, R. (1994), "Model of Perceived Risk and Intended Risk-Handling Activity," *Journal of Consumer Research, 21* (1), 119-134.

Dyer, J. H., & Nobeoka, K. (2000), "Creating and Managing a High-Performance Knowledge-Sharing Network: The Toyota Case," *Strategic Management Journal, 21* (3), 345.

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

Eisenhardt, K. M. (1989), "Agency Theory: An Assessment and Review," *Academy of Management Review, 14* (1), 57-74.

Ellis, S. C., Henry, R. M., & Shockley, J. (2010), "Buyer Perceptions of Supply Disruption Risk: A Behavioral View and Empirical Assessment," *Journal of Operations Management, 28* (1), 34-46.

Fishburn, P. C. (1977), "Mean-Risk Analysis with Risk Associated with Below-Target Returns," *American Economic Review, 67*, 116-126.

Fornell, C., & Larcker, D. F. (1981), "Evaluating Structural Equation Models with Unobservable Variables and Measurement Error," *Journal of Marketing Research, 48*, 39-50.

Frazier, G. L. (2009), "Physical Distribution and Channel Management: A Knowledge and Capabilities Perspective," *Journal of Supply Chain Management: A Global Review of Purchasing & Supply, 45* (2), 23-36.

Frazier, G. L., Maltz, E., Antia, K. D., & Rindfleisch, A. (2009), "Distributor Sharing of Strategic Information with Suppliers," *Journal of Marketing, 73* (4), 31-43.

Frishammar, J., & Sven Åke, H. (2005), "Managing External Information in Manufacturing Firms: The Impact on Innovation Performance," *Journal of Product Innovation Management, 22* (3), 251-266.

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

Gates, D. (2008). Latest Delay of Boeing 787 Pushes Back First Delivery to Third Quarter of 2009. Retrieved from seattletimes.nwsource.com

Gefen, D., Rigdon, E. E., & Straub, D. (2011), "An Update and Extension to Sem Guidelines for Administrative and Social Science Research," *MIS Quarterly, 35* (2), 3-14.

Gefen, D., Straub, D. W., & Boudreau, M. C. (2000), "Structural Equation Modeling and Regression: Guidelines for Research Practice," *Communications of the Association for Information Systems, 4* (7), 1-77.

George, G., Zahra, S. A., Wheatley, K. K., & Khan, R. (2001), "Effects of Alliance Portfolio Characteristics and Absorptive Capacity on Performance a Study of Biotechnology Firms," *Journal of High Technology Management Research, 12* (2), 205-226.

Geyskens, I., Steenkamp, J.-B. E. M., Scheer, L. K., & Kumar, N. (1996), "The Effects of Trust and Interdependence on Relationship Commitment: A Trans-Atlantic Study," *International Journal of Research in Marketing, 13* (4), 303-317.

Gilliland, D. I., & Bello, D. C. (2002), "Two Sides to Attitudinal Commitment: The Effect of Calculative and Loyalty Commitment on Enforcement Mechanisms in Distribution Channels," *Journal of the Academy of Marketing Science, 30* (1), 24-43.

Giunipero, L. C., & Eltantawy, R. A. (2004), "Securing the Upstream Supply Chain: A Risk Management Approach," *International Journal of Physical Distribution & Logistics Management, 34* (9), 698-713.

Gosain, S., Malhotra, A., & El Sawy, O. A. (2004), "Coordinating for Flexibility in E-Business Supply Chains," *Journal of Management Information Systems, 21* (3), 7-45.

Greising, D., & Johnsson, J. (2007). Behind Boeing's 787 Delays: Problems at One of the Smallest Suppliers in Dreamliner Program Causing Ripple Effect. Retrieved from www.chicagotribune.com

Griffith, D. A., & Lusch, R. F. (2007), "Getting Marketers to Invest in Firm-Specific Capital," *Journal of Marketing, 71* (1), 129-145.

Griffith, D. A., Myers, M. B., & Harvey, M. G. (2006), "An Investigation of National Culture's Influence on Relationship and Knowledge Resources in Interorganizational Relationships between Japan and the United States," *Journal of International Marketing, 14* (3), 1-32.

Grover, V., & Saeed, K. A. (2007), "The Impact of Product, Market, and Relationship Characteristics on Interorganizational System Integration in Manufacturer-Supplier Dyads," *Journal of Management Information Systems, 23* (4), 185-216.

Gustin, C. M., Daugherty, P. J., & Stank, T. P. (1995), "The Effects of Information Availability on Logistics Integration," *Journal of Business Logistics, 16* (1), 1-21.

Hair, J. F., Anderson, R. E., Tatham, R. L., & Black, W. C. (1998), *Multivariate Data Analysis.* Upper Saddle River, NJ: Prentice Hall.

Hallikas, J., Karvonen, I., Pulkkinen, U., Virolainen, V.-M., & Tuominen, M. (2004), "Risk Management Processes in Supplier Networks," *International Journal of Production Economics, 90* (1), 47-58.

Hallikas, J., Virolainen, V.-M., & Tuominen, M. (2002), "Risk Analysis and Assessment in Network Environments: A Dyadic Case Study," *International Journal of Production Economics, 78* (1), 45-55.

Harland, C., Brenchley, R., & Walker, H. (2003), "Risk in Supply Networks," *Journal of Purchasing & Supply Management, 9* (2), 51.

Heide, J. B., & John, G. (1992), "Do Norms Matter in Marketing Relationships?," *Journal of Marketing, 56* (2), 32-44.

Heide, J. B., & Miner, A. S. (1992), "The Shadow of the Future: Effects of Anticipated Interaction and Frequency of Contact on Buyer–Seller Cooperation.," *Academy of Management Journal, 35* (2), 265–291.

Hendricks, K. B., & Singhal, V. R. (2003), "The Effect of Supply Chain Glitches on Shareholder Wealth," *Journal of Operations Management, 21* (5), 501-522.

Hendricks, K. B., & Singhal, V. R. (2005a), "Association between Supply Chain Glitches and Operating Performance," *Management Science, 51* (5), 695-711.

Hendricks, K. B., & Singhal, V. R. (2005b), "An Empirical Analysis of the Effect of Supply Chain Disruptions on Long-Run Stock Price Performance and Equity Risk of the Firm," *Production & Operations Management, 14* (1), 35-52.

Hoek, R. I. V. (1998), "Logistics and Virtual Integration," *International Journal of Physical Distribution & Logistics Management, 28* (7), 508-523.

Hult, G. T. M., Ketchen, D. J., Cavusgil, S. T., & Calantone, R. J. (2006), "Knowledge as a Strategic Resource in Supply Chains," *Journal of Operations Management, 24* (5), 458-475.

Hultman, J., & Axelsson, B. (2007), "Towards a Typology of Transparency for Marketing
Management Research," *Industrial Marketing Management, 36* (5), 627-635.

Hunt, S. D., & Morgan, R. M. (1995), "The Comparative Advantage Theory of Competition,"
Journal of Marketing, 59, 1-15.

Jarvis, C. B., Mackenzie, S. B., Podsakoff, P. M., Mick, D. G., & Bearden, W. O. (2003), "A
Critical Review of Construct Indicators and Measurement Model Misspecification in
Marketing and Consumer Research," *Journal of Consumer Research, 30* (2), 199-218.

Jean, R.-J. B., Sinkovics, R. R., & Cavusgil, S. T. (2010), "Enhancing International Customer–
Supplier Relationships through It Resources: A Study of Taiwanese Electronics
Suppliers," *Journal of International Business Studies, 41* (September), 1218–1239.

Jemison, D. B. (1987), "Risk and the Relationship among Strategy, Organizational Processes,
and Performance," *Management Science, 33* (9), 1087-1101.

Joshi, A. W. (2009), "Continuous Supplier Performance Improvement: Effects of Collaborative
Communication and Control," *Journal of Marketing, 73* (1), 133-150.

Katsikeas, C. S., Skarmeas, D., & Bello, D. C. (2009), "Developing Successful Trust-Based
International Exchange Relationships," *Journal of International Business Studies, 40* (1),
132-155.

Khan, O., & Burnes, B. (2007), "Risk and Supply Chain Management: Creating a Research
Agenda," *International Journal of Logistics Management, 18* (2), 197.

Kim, D., Cavusgil, S. T., & Calantone, R. J. (2006), "Information System Innovations and
Supply Chain Management: Channel Relationships and Firm Performance," *Journal of
the Academy of Marketing Science, 34* (1), 40-54.

Klein, R., & Rai, A. (2009), "Interfirm Strategic Information Flows in Logistics Supply Chain Relationships," *MIS Quarterly, 33* (4), 735-762.

Klein, S., Frazier, G. L., & Roth, V. J. (1990), "A Transaction Cost Analysis Model of Channel Integration in International Markets," *Journal of Marketing Research (JMR), 27* (2), 196-208.

Kleindorfer, P. R., & Saad, G. H. (2005), "Managing Disruption Risks in Supply Chains," *Production & Operations Management, 14* (1), 53-68.

Knemeyer, A. M., Zinn, W., & Eroglu, C. (2009), "Proactive Planning for Catastrophic Events in Supply Chains," *Journal of Operations Management, 27* (2), 141-153.

Knight, R., & Pretty, D. (1996). *The Impact of Catastrophes on Shareholder Value*. Oxford.

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

Lamming, R. C., Caldwell, N., & Harrison, D. (2004), "Developing the Concept of Transparency for Use in Supply Relationships," *British Journal of Management, 15* (4), 291-302.

Lamming, R. C., Caldwell, N., Phillips, W., & Harrison, D. (2005), "Sharing Sensitive Information in Supply Relationships: The Flaws in One-Way Open-Book Negotiation and the Need for Transparency," *European Management Journal, 23* (5), 554-563.

Lamming, R. C., Caldwell, N. D., Harrison, D. A., & Phillips, W. (2001), "Transparency in Supply Relationships: Concept and Practice," *Journal of Supply Chain Management: A Global Review of Purchasing & Supply, 37* (4), 4-10.

Lane, P. J., & Lubatkin, M. (1998), "Relative Absorptive Capacity and Interorganizational Learning," *Strategic Management Journal, 19* (5), 461-477.

Laudon, K., & Laudon, J. (2009), *Management Information Systems.* Upper Saddle River: Prentice Hall.

Lee, H. L., & Padmanabhan, V. (1997), "Information Distortion in a Supply Chain: The Bullwhip Effect," *Management Science, 43* (4), 546.

Lee, H. L., Padmanabhan, V., & Seungjin, W. (2004), "Information Distortion in a Supply Chain: The Bullwhip Effect," *Management Science, 50* (12), 1875-1886.

Lee, H. L., Padmanabhan, V., & Wang, S. (1997), "The Bullwhip Effect in Supply Chains," *Sloan Management Review, 38* (3), 93-102.

Lee, H. L., So, K. C., & Tang, C. S. (2000), "The Value of Information Sharing in a Two-Level Supply Chain," *Management Science, 46* (5), 626.

Lindell, M. K., & Whitney, D. J. (2001), "Accounting for Common Method Variance in Cross-Selectional Research Designs," *Journal of Applied Psychology, 86* (1), 114-121.

Lui, S. S., & Ngo, H.-Y. (2004), "The Role of Trust and Contractual Safeguards on Cooperation in Non-Equity Alliances," *Journal of Management, 30* (4), 471-485.

Lyles, M. A., & Salk, J. E. (2007), "Knowledge Acquisition from Foreign Parents in International Joint Ventures: An Empirical Examination in the Hungarian Context," *Journal of International Business Studies, 38* (1), 3-18.

Manuj, I., & Mentzer, J. T. (2008), "Global Supply Chain Risk Management," *Journal of Business Logistics, 29* (1), 133-113+.

March, J. G., & Shapira, Z. (1987), "Managerial Perspectives on Risk and Risk Taking," *Management Science, 33* (11), 1404-1418.

Markowitz, H. M. (1952), "The Utility of Wealth," *Journal of Political Economy, 60*, 151-158.

Mascarenhas, B. (1982), "Coping with Uncertainty in International Business," *Journal of International Business Studies, 13* (2), 87-98.

Mayer, R. C., Davis, J. H., & Schoorman, F. D. (1995), "An Integrative Model of Organizational Trust," *The Academy of Management Review, 20* (3), 709-734.

McEvily, B., & Marcus, A. (2005), "Embedded Ties and the Acquisition of Competitive Capabilities," *Strategic Management Journal, 26* (11), 1033-1055.

McEvily, B., Perrone, V., & Zaheer, A. (2003), "Trust as an Organizing Principle," *Organization Science, 14* (1), 91-103.

Mcginnis, M. A., & Kohn, J. W. (1993), "Logistics Strategy, Organizational Environment, and Time Competitiveness," *Journal of Business Logistics, 14* (2), 1-23.

McKinsey & Company Operations Extranet. (2010). Risky Business: Managing Supplier Defaults.

Miller, K. D. (1992), "A Framework for Integrated Risk Management in International Business," *Journal of International Business Studies, 23* (2), 311-331.

Mitchell, V.-W. (1995), "Organizational Risk Perception and Reduction: A Literature Review," *British Journal of Management, 6* (2), 115-133.

Mohr, J. J., Fisher, R. J., & Nevin, J. R. (1996), "Collaborative Communication in Interfirm Relationships: Moderating Effects of Integration and Control," *The Journal of Marketing, 60* (3), 103-115.

Mohr, J. J., Fisher, R. J., & Nevin, J. R. (1999), "Communicating for Better Channel Relationships," *Marketing Management, 8* (2), 39-45.

Mohr, J. J., & Nevin, J. R. (1990), "Communication Strategies in Marketing Channels: A Theoretical Perspective," *Journal of Marketing, 54* (4), 36-51.

Mohr, J. J., & Sohi, R. S. (1995), "Communication Flows in Distribution Channels: Impact On," *Journal of Retailing, 71* (4), 393-416.

Mohr, J. J., & Spekman, R. (1994), "Characteristics of Partnership Success: Partnership Attributes, Communication Behavior, and Conflict Resolution Techniques," *Strategic Management Journal, 15* (2), 135-152.

Moore, G. C., & Benbasat, I. (1991), "Development of an Instrument to Measure the Perceptions of Adopting an Information Technology Innovation.," *Information Systems Research, 2* (3), 192-222.

Moorman, C., Zaltman, G., & Deshpande, R. (1992), "Relationships between Providers and Users of Market Research: The Dynamics of Trust within and between Organizations," *Journal of Marketing Research (JMR), 29* (3), 314-328.

Morgan, R. M., & Hunt, S. D. (1994), "The Commitment-Trust Theory of Relationship Marketing," *Journal of Marketing, 58* (3), 20-38.

Nonaka, I. (1994), "A Dynamic Theory of Organizational Knowledge Creation," *Organization Science, 5* (1), 14-37.

Noordewier, T. G., John, G., & Nevin, J. R. (1990), "Performance Outcomes of Purchasing Arrangements in Industrial Buyer-Vendor Relationships," *Journal of Marketing, 54* (4), 80-93.

Nooteboom, B., Berger, H., & Noorderhaven, N. G. (1997), "Effects of Trust and Governance on Relational Risk," *Academy of Management Journal, 40* (2), 308-338.

Nunnally, J. C., & Bernstein, I. H. (1994), *Psychometric Theory.* New York: McGraw-Hill.

Ouchi, W. G. (1979), "A Conceptual Framework for the Design of Organizational Control Mechanisms," *Management Science, 25* (9), 833–848.

Peck, H. (2006), "Reconciling Supply Chain Vulnerability, Risk and Supply Chain Management," *International Journal of Logistics: Research & Applications, 9* (2), 127-142.

Petersen, B., Pedersen, T., & Lyles, M. A. (2008), "Closing Knowledge Gaps in Foreign Markets," *Journal of International Business Studies, 39* (7), 1097.

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

Phan, T. T. A., Baughn, C. C., Ngo, T. M. H., & Neupert, K. E. (2006), "Knowledge Acquisition from Foreign Parents in International Joint Ventures: An Empirical Study in Vietnam," *International Business Review, 15* (5), 463-487.

Podsakoff, P. M., Mackenzie, S. B., Jeong-Yeon, L., & Podsakoff, N. P. (2003), "Common Method Biases in Behavioral Research: A Critical Review of the Literature and Recommended Remedies," *Journal of Applied Psychology, 88* (5), 879.

Powell, T. C. (1992), "Organizational Alignment as Competitive Advantage," *Strategic Management Journal, 13* (2), 119–134.

Pratt, J. W. (1964), "Risk Aversion in the Small and in the Large," *Econometrica, 32*, 122-136.

Rai, A., Patnayakuni, R., & Seth, N. (2006), "Firm Performance Impacts of Digitally Enabled Supply Chain Integration Capabilities," *MIS Quarterly, 30* (2), 225-246.

Rebolledo, C., Halley, A., & Nagati, H. (2009), "The Effects of Absorptive Capacity on Operational Performance within the Context of Customer-Supplier Relationships," *Supply Chain Forum: International Journal, 10* (2), 52-62.

Rindfleisch, A., & Heide, J. B. (1997), "Transaction Cost Analysis: Past, Present, and Future Applications," *Journal of Marketing, 61* (4), 30.

Ringle, C. M., Wende, S., & Will, S. (2005). Smartpls 2.0 (M3) Beta (Version M3). Hamburg: http://www.smartpls.de.

Robson, M. J., Katsikeas, C. S., & Bello, D. C. (2008), "Drivers and Performance Outcomes of Trust in International Strategic Alliances: The Role of Organizational Complexity," *Organization Science, 19* (4), 647-665.

Sahin, F., & Robinson, J. E. P. (2002), "Flow Coordination and Information Sharing in Supply Chains: Review, Implications, and Directions for Future Research," *Decision Sciences, 33* (4), 505-536.

Sahin, F., & Robinson, J. E. P. (2005), "Information Sharing and Coordination in Make-to-Order Supply Chains," *Journal of Operations Management, 23* (6), 579-598.

Saparito, P. A., Chen, C. C., & Sapienza, H. J. (2004), "The Role of Relational Trust in Bank-Small Firm Relationships," *Academy of Management Journal, 47* (3), 400-410.

Seville, E., Brunsdon, D., Dantas, A., Le Masurier, J., Wilkinson, S., & Vargo, J. (2008), "Organisational Resilience: Researching the Reality of New Zealand Organisations," *Journal of Business Continuity & Emergency Planning, 2* (3), 258-266.

Shapira, Z. (1995), *Risk Taking: A Managerial Perspective.* New York: Russel Sage Foundation.

Shrout, P. E., & Bolger, N. (2002), "Mediation in Experimental and Nonexperimental Studies: New Procedures and Recommendations," *Psychological Methods, 7* (4), 422-445.

Simonin, B. L., & Özsomer, A. (2009), "Knowledge Processes and Learning Outcomes in Mncs: An Empirical Investigation of the Role of Hrm Practices in Foreign Subsidiaries," *Human Resource Management, 48* (4), 505-530.

Snyder, L. V., Atan, Z., Peng, P., Rong, Y., Schmitt, A. J., & Sinsoysal, B. (2010). *Or/Ms Models for Supply Chain Disruptions: A Review*.Unpublished manuscript.

Sobel, M. E. (1982), "Asymptotic Confidence Intervals for Indirect Effects in Structural Equation Models," in *Sociological Methodology*, Leinhardt, S., ed. eds. San Francisco: Jossey-Bass.

Spekman, R. E., & Davis, E. W. (2004), "Risky Business: Expanding the Discussion on Risk and the Extended Enterprise," *International Journal of Physical Distribution & Logistics Management, 34* (5), 414-433.

Srivastava, R. K., Fahey, L., & Christensen, H. K. (2001), "The Resource-Based View and Marketing: The Role of Market-Based Assets in Gaining Competitive Advantage," *Journal of Management, 27* (6), 777-802.

Srivastava, R. K., Shervani, T. A., & Fahey, L. (1998), "Market-Based Assets and Shareholder Value: A Framework for Analysis," *Journal of Marketing, 62* (1), 2– 18.

Stiglitz, J. E. (2000), "The Contributions of the Economics of Information to Twentieth Century Economics," *Quarterly Journal of Economics, 115* (4), 1441-1478.

Straub, D. W., Hoffman, D. L., Weber, B. W., & Steinfield, C. (2002), "Toward New Metrics for Net-Enhanced Organizations," *Information Systems Research, 13* (3), 227-238.

Stump, R. L., & Heide, J. B. (1996), "Controlling Supplier Opportunism in Industrial Relationships," *Journal of Marketing Research, 33* (4), 431-441.

Swafford, P. M., Ghosh, S., & Murthy, N. (2008), "Achieving Supply Chain Agility through It Integration and Flexibility," *International Journal of Production Economics, 116* (2), 288-297.

Swaminathan, J. M., & Tayur, S. R. (2003), "Models for Supply Chains in E-Business," *Management Science, 49* (10), 1387-1406.

Szulanski, G. (1996), "Exploring Internal Stickiness: Impediments to the Transfer of Best
    Practice within the Firm," *Strategic Management Journal, 17*, 27-43.

Taleb, N. N. (2007), *The Black Swan : The Impact of the Highly Improbable.* New York:
    Random House.

Tang, C. S. (2006a), "Perspectives in Supply Chain Risk Management," *International Journal of
    Production Economics, 103* (2), 451-488.

Tang, C. S. (2006b), "Robust Strategies for Mitigating Supply Chain Disruptions," *International
    Journal of Logistics: Research & Applications, 9* (1), 33-45.

Tippins, M. J., & Sohi, R. S. (2003), "It Competency and Firm Performance: Is Organizational
    Learning a Missing Link?," *Strategic Management Journal, 24* (8), 745– 761.

Von Hippel, E. (1994), ""Sticky Information" and the Locus of Problem Solving: Implications
    for Innovation," *Management Science, 40* (4), 429-439.

Wagner, S. M., & Bode, C. (2006), "An Empirical Investigation into Supply Chain
    Vulnerability," *Journal of Purchasing and Supply Management, 12* (6), 301-312.

Wagner, S. M., & Bode, C. (2008), "An Empirical Examination of Supply Chain Performance
    Along Several Dimensions of Risk," *Journal of Business Logistics, 29* (1), 307-325.

Wallace, J. (2008). Boeing Jet Production Will Be Slow to Restart. Retrieved from Seattlepi.com

Wang, E. T. G., & Wei, H.-L. (2007), "Interorganizational Governance Value Creation:
    Coordinating for Information Visibility and Flexibility in Supply Chains," *Decision
    Sciences, 38* (4), 647-674.

Ward, P., & Zhou, H. (2006), "Impact of Information Technology Integration and Lean/Just-in-
    Time Practices on Lead-Time Performance," *Decision Sciences, 37* (2), 177-203.

Wareham, J., Mathiassen, L., Rai, A., Straub, D., & Klein, R. (2005), "The Business Value of Digital Supply Networks: A Program of Research on the Impacts of Globalization," *Journal of International Management, 11* (2), 201-227.

Werner, S., Brouthers, L. E., & Brouthers, K. D. (1996), "International Risk and Perceived Environmental Uncertainty: The Dimensionality and Internal Consistency of Miller's Measure," *Journal of International Business Studies, 27* (3), 571-587.

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

Williamson, O. E. (1991), "Comparative Economic Organization: The Analysis of Discrete Structural Alternatives," *Administrative Science Quarterly, 36* (2), 269-296.

Williamson, O. E. (1993), "Calculativeness, Trust, and Economic Organization," *Journal of Law and Economics, 36* (1), 453-486.

Wu, F., Yeniyurt, S., Kim, D., & Cavusgil, S. T. (2006), "The Impact of Information Technology on Supply Chain Capabilities and Firm Performance: A Resource-Based View," *Industrial Marketing Management, 35* (4), 493-504.

Yates, J. F., & Stone, E. R. (1992a), "Risk Appraisal," in *Risk-Taking Behavior*, Yates, J.F., ed. eds. New York: John Wiley & Sons.

Yates, J. F., & Stone, E. R. (1992b), "The Risk Construct," in *Risk-Taking Behavior*, Yates, J.F., ed. eds. New York: John Wiley & Sons.

Zahra, S. A., & George, G. (2002), "Absorptive Capacity: A Review, Reconceptualization, and Extension," *Academy of Management Review, 27* (2), 185-203.

Zander, U., & Kogut, B. (1995), "Knowledge and the Speed of the Transfer and Imitation of Organizational Capabilities: An Empirical Test," *Organization Science, 5* (1), 76-92.

Zhou, H., & Benton Jr, W. C. (2007), "Supply Chain Practice and Information Sharing," *Journal of Operations Management, 25* (6), 1348-1365.

Zsidisin, G. A. (2003), "A Grounded Definition of Supply Risk," *Journal of Purchasing & Supply Management, 9* (5/6), 217-224.

Zsidisin, G. A., & Ellram, L. M. (2003), "An Agency Theory Investigation of Supply Risk Management," *Journal of Supply Chain Management: A Global Review of Purchasing & Supply, 39* (3), 15-27.

Zsidisin, G. A., Melnyk, S. A., & Ragatz, G. L. (2005), "An Institutional Theory Perspective of Business Continuity Planning for Purchasing and Supply Management," *International Journal of Production Research, 43* (16), 3401-3420.

Zsidisin, G. A., Ragatz, G. L., & Melnyk, S. A. (2005), "The Dark Side of Supply Chain Management," *Supply Chain Management Review, 9* (2), 46-52.

VITA

Hung Vu Nguyen was born in 1977 in Hanoi, Vietnam. Having grown up in a developing economy like Vietnam, Hung has developed his passion for understanding the thriving business and marketing practices in the country and other developed nations even though his early focus was on mathematics. After graduated from the top business school in Vietnam, Hanoi Foreign Trade University, in 2000, Hung joined several companies including Vietnam Datacommunication Company, Acorn Marketing and Research Consultants Limited, and Hyundai Pentatel Inc. with various positions including economics-news editor, marketing consultant executives, and marketing director. With experience and access to the world business from the companies, Hung was encouraged to further follow his academic career in marketing and international business science. He attended an MBA program in University of North Alabama in 2006 and finished his degree with distinction within one year. Such achievement together with a high score in the GMAT exam has helped him earn a place in the Ph.D. program in Marketing in J. Mack Robinson College of Business, Georgia State University, since 2007.

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