

The Impacts of Bridge Transfer on Service Outsourcing

A Social Network Perspective

by

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## ABSTRACT

Services outsourcing is a prevalent yet problematic phenomenon. On the one hand, more and more firms are outsourcing services function. On the other hand, we are faced with many services outsourcing failures. This research attempts to uncover some of the omitted causes of services outsourcing failure. It extends a conceptual paper that used social network theory to examine the shifting of the triadic relationship structures among the service buyer, service supplier and the buyer's customers at different stages of the services outsourcing arrangements and its performance implications. This study empirically examines these performance implications. Specifically, this research defines the concept of bridge transfer, which denotes the weakening and dissolution of operational ties between the service buyer firms' and their end customers and the appearing and strengthening of operational ties between the service supplier firms and the end customers. It also empirically derives a measurement scale for this new construct. Further, the effects of bridge transfer on supplier's appropriation behavior, buyer's cost of quality and end customers' quality perception are examined in the context of customer facing services and are contrasted with those entail little or no customer interactions. In addition, the moderating roles of buyer-supplier relationship on the effects of bridge transfer are also examined.

An Internet-based survey was administered to firms affiliated with CAPS Research and the Institute of Supply Management as the primary data source (n=137). Principal Component Analyses were used to derive a composite score

for each of the model construct. Then linear regressions were used to detect the effects of bridge transfer on services outsourcing outcomes and to detect the moderating role of buyer-supplier relationships on these effects.

The results show that bridge transfer is positively correlated to suppliers' appropriate behavior and negatively correlated to end customer's quality perception in the context of customer facing services. The effects of bridge transfer are not found for services that entail little or no interactions with the end customers. Instead, buyer-supplier relationship is found to be a key influencing factor to services outsourcing outcomes in this context. This study helps to pinpoint some of the omitted causes of services outsourcing failures and shed light on how to manage services outsourcing for success.

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## Chapter 1

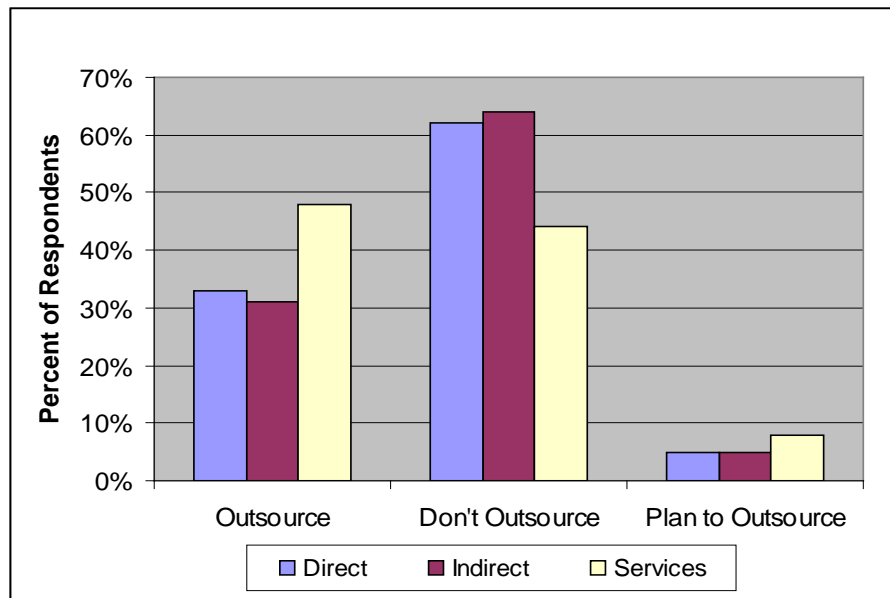
### INTRODUCTION

Services outsourcing is gaining more prominence in the business world (Grossman and Helpman 2002; Roth and Menor 2003; Amiti and Wei 2005). A 2006 CAPS Research study on services outsourcing (Tate and Ellram, 2006) showed that 48% of the respondents reported existing outsourcing arrangements in services areas. As a comparison, only 33% were found in indirect material areas and 30% in direct material areas. Similarly, on the future plan to outsource, respondents rated highest for service functions, followed by direct and indirect materials. Not surprisingly, the intention of not to outsource is lowest for services (44%), followed by direct material (62%) and indirect material (64%). (See attached Figure 1 Outsourcing Practice and Intentions in the following page).

The prominence of services outsourcing not only manifests itself via the large percentage of firms adopting service outsourcing strategy, but also the varieties of functions to be outsourced, ranging from product design, research and development to marketing, distribution and after-sales service (Grossman & Helpman, 2005). An interesting trend has been noted that in many sectors, firms are outsourcing customer facing services that formerly would have been produced in house (Taylor and Bain, 2005; Tate, 2006; Aksin, Armony and Mehrotra, 2007; Tate, Ellram and Brown, 2009). One prominent example of such customer facing services is customer services and support. Many major financial institutions such as Capital One and J. P. Morgan Chase have all outsourced a portion of their customer services (McLaughlin and Peppard 2006). And this type of outsourcing



is not unique to the service industry. In companies that are traditionally considered as manufacturing firms, we have seen the outsourcing of many after-sales services such as software/hardware support (Aubert and Croteau 2005). In the few years proceeding 2005, the growth in outsourcing of customer service and support functions has reached a staggering 30 percent or higher (Brown, 2005).



(Source: *Services Spend Management: Outsourcing/Offshoring Your Services Spend* published by CAPS Research, August 31<sup>st</sup>, 2006.)

**Figure 1-1. Outsourcing Practice and Intentions**

### 1.1 The Dark-Side of Services Outsourcing

In spite of the popularity gain in services outsourcing, it is not without problems. According to a 2009 InformationWeek survey, 58% of companies that had outsourced services casted doubts on whether outsourcing could deliver

values to their firms or their shareholders. Specifically, two issues are repeatedly mentioned in services outsourcing reports. One is the reduction in service quality and customer satisfaction (King, 2010; Chopra, 2010). For example, Chopra (2010) reported that post services outsourcing “the average user satisfaction deficit was 13 percent” (p. 1, Chopra, 2010). Another is the failure in realizing cost savings. Kaushik (2008) stated that the hidden costs of services outsourcing are substantial and as a result as many as 53% of customers failed to realize their projected cost savings. Not surprisingly, “...the number of buyers prematurely terminating an outsourcing relationship has doubled to 51 percent” (Weakland 2005, p. 2) and some even ended with expensive lawsuits. One such example is the state of Indiana, who cancelled its services outsourcing deal with its former service provider in 2009 and later sued the provider for \$1.3 billion for breach of contract.

Why have there been so many failed services outsourcing attempts? Is there anything special about services operations that warrants special attention? Are there specific strategies we should adopt in order to successfully manage services outsourcing? These questions motivate this research. Specifically, this research examines the triadic relationship structure among the service buyer, service supplier and the buyer’s customer post services outsourcing implementation and its impacts on buyer firms’ outsourcing outcomes. Further, it examines the roles of buyer-supplier relationships in mitigating negative outcomes. Lastly, it compares the effects of bridge transfer across two different services contexts: customer facing pure services and quasi-manufacturing type of

services that do not contain a large amount of customer inputs into the services production process.

## **1.2 Existing Research in Services Outsourcing**

Services outsourcing is defined as the conscious choice of using external agents to perform one or more service activities that used to be performed internally (Lacity & Hirschheim, 1993). The extant literature on services outsourcing appears to heavily cluster around two broad research questions: 1) Should we outsource services? 2) What portion of the services should we outsource? The former question is mainly addressed by economists who were interested in understanding the impacts that the outsourcing of services had on economic indicators, such as domestic employment, incomes and productivity (Amiti and Wei, 2005; Amiti and Wei, 2004; Fixler and Siegel, 1999; Gorg and Hanley, 2004). In general, services outsourcing was found to be a positive contributor to the national economy in the long run. The later question was addressed by researchers from Information Technology and Operations Management fields (Poppo and Zenger, 1998; Grover, Cheon and Teng, 1996; Safizadeh, Field, and Ritzman, 2008; Cook, 1999; Roberts, 2001; Ono, 2001). Scholars in these fields used multiple theoretical lenses such as the Transaction Cost Economics, Core Competence Theory and Game Theory to examine under what conditions firms should make the service outsourcing decisions.

However, conspicuously lacking is the theory of the underlying relational dynamics that take place in services outsourcing and how to manage these

relationship dynamics toward outsourcing success. Implicit in this theoretical void may be an assumption that the relational dynamics in services outsourcing is similar to those in manufacturing with which we are already familiar - we already know about the buyer-supplier relationship in manufacturing outsourcing, we do not have a need to reconsider it in the service sector.

In case there ever was such an assumption, this study asserts that the outsourcing of services involves entirely different dynamics from the outsourcing of manufacturing items in terms of how the relationships will be seen. In a services setting, relationships among the supplier, the buyer company, and the buyer's customers are much more dynamic than those in the manufacturing sector. In a manufacturing setting, the buyer company sources a product from a supplier and then sells the final products to its customers—the supplier is generally invisible to the buyer's customers. In services outsourcing, however, the service supplier, by design, comes in direct contact with the buyer's customers (Maltz and Ellram, 1997). This direct contact is the underpinning characteristic of service operations and is the key to distinguish the relationship dynamics in service outsourcing from other types of outsourcing. The consequence of this direct contact motivates this study.

### **1.3 Framing Services Outsourcing from the Social Network Perspective**

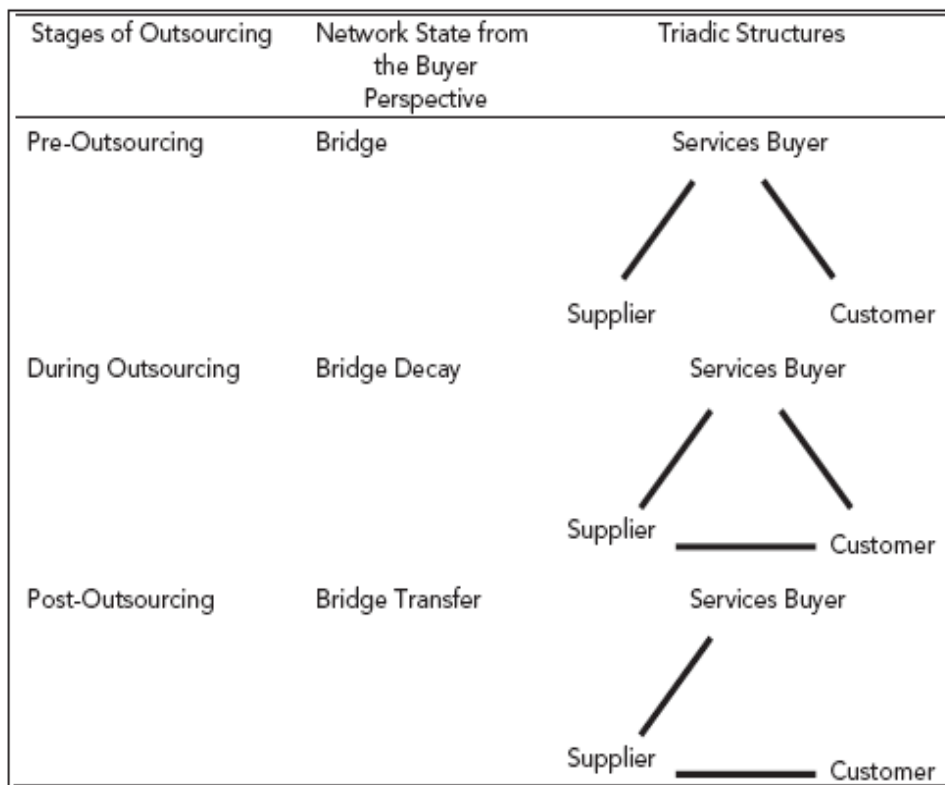
This research borrowed literature from the social network perspective to explain the consequences of having services suppliers directly interfacing with services customers. Social network studies are concerned with the positions

and/or connectivity of a network agent relative to other agents of the network and their performance implications (Burt 1992; Watkins, 2003; Wellman and Berkowitz, 1988; Barabasi and Crandall, 2003; Granovetter, 1983; Cook, Emerson and Gillmore, 1983; Li and Choi, 2009; etc.). One branch of the social network theory, the structural hole perspective, examines the leverage gained when network agents spanned across structural holes among social networks (Burt, 1992, 1997; Gargiulo and Benassi, 2000; Johnson, 2004; Walker, Kogut and Shan, 1997; etc.). Here a structural hole can be denoted as the lack of connection between two disconnected networks (Burt, 1992, 1997, etc). The network agent that spans across a structure hole is said to be in a bridge position (Burt, 1992, 1997, etc).

The structural hole perspective stresses the advantage of bridging two disconnected networks. The actor in the bridge position enjoys information and control benefits and can profit by playing off actors on each side of the structural hole. However, this advantage may not last forever and is subject to decay and transfer. Bridge decay happens when the previously disconnected agents establish a direct link with each other and thus effectively eliminating the advantage of the network actor who has had the bridge position (Li and Choi, 2009). Bridge transfer has been rarely studied and it refers to the transfer of the bridge position (and the advantages associated with the position) to another actors in the social network (Li and Choi, 2009).

In the services outsourcing context, the service buyer, service supplier and the buyer's customers form a triadic supply network. Li and Choi (2009) noted

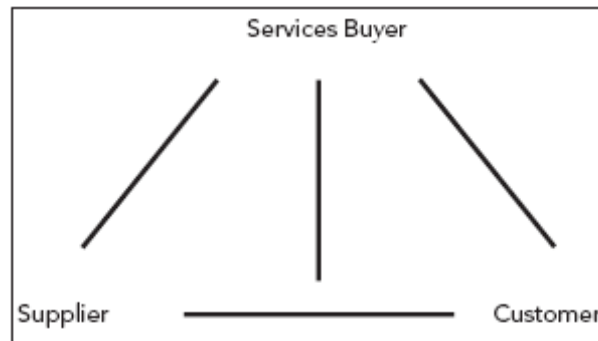
that before outsourcing (i.e. during contract negotiation stage), the buyer is the “bridge” between its supplier and its customers. During implementation, this bridge position begins to “decay” as its suppliers come in direct contact with the buyer’s customers. Post implementation, the bridge position is intended to be “transferred” to the supplier. Figure 1-2 depicts the bridge, bridge decay and bridge transfer concepts in services outsourcing.



**Figure 1-2. Shifting Relationship Structures in Services Outsourcing**

Further, Li and Choi (2009) posit that the state of “bridge transfer” has serious performance implications for the buyer. It is negatively correlated to

services outsourcing outcomes. The higher the degree of bridge transfer, the worse off the services buyer company becomes. Instead, the buyer should continue to actively interact with its customer and closely monitor the supplier. Figure 1-3 depicts this strategy of guarding against bridge transfer.



**Figure 1-3. Guarding against Bridge Transfer**

In this study, the effects of bridge transfer on services outsourcing outcomes are empirically examined.

*Research question 1: What is the impact of bridge transfer on each node within the services supply triad (service buyer, service supplier and buyer's customers)?*

Specifically, we followed Brindley (2004)'s framework and examined supplier's appropriation behavior (Walker, 1988; Brindley, 2004), and quality degradation as offered to the end customers (Anderson, Fornell and Lehmann, 1994; Fornell, 1992; Dick and Basu, 1994, etc.) In addition, we also examined buyer's cost of quality (Feigenbaum, 1956; Juran, 1951, 1962; 1988; Carr, 1992; Campanella, 1987a; 1987b, etc.) which is an important concept in operations management.

Supplier's appropriation behavior refers to the situation where a supplier takes advantage of his/her customer's dependence on him/her and thereby increases his/her part of the total end customer revenue (Walker, 1988; Brindley, 2004). Suppliers can exert appropriation behavior throughout the outsourcing contract. For example, when a process change needs to be implemented post initial contract signing, the supplier can charge an amount that is above and beyond the expectation of the buyer firm. Supplier's appropriation behavior increases the transaction cost (and thus decreases profitability) of the service buying firm (Walker, 1988). Therefore, it is important to understand what triggers supplier's appropriation behavior in a services outsourcing context and how to control it.

Buyer's cost of quality is the buyer's cost associated with the discovery and prevention of service failures and the costs associated with service recovery (Juran, 1951, 1992; Baiman, Fischer and Rajan, 2000). Cost of quality is a key contributor to a firm's operating performance and therefore has received wide attention in the operations management field over the past two decades (Omachonu, Suthummanon and Einspruch, 2004; Crosby, 1983; Campanella, 1987a; Plunkett and Dale (1986, 1987, 1988); Campanella (1987b), Feigenbaum (1991), Carr (1992), Gray (1995), Diallo et al. (1995), Johnson (1995), Willis and Willis (1996) quoted in Grimm, 1987, pp. 397-412) Harrington, (1987, 1999), Robinson (1997), Shah and Fitzroy (1998), Gryna (1999), Dale (1999), Dale and Plunkett (1999), Campanella (1999) and Griffith (2003), etc.).



End customers service quality perception measures how a given service supplied by a company meets or exceeds customer expectations (Zeithamal and Bitner, 1996; Parasuraman, Zeithamal and Berry, 1985). In a competitive marketplace where businesses compete for customers, service quality is seen as a key differentiator and increasingly has become a key element of business strategy (Gitman and McDaniel, 2005).

Besides the effects of bridge transfer on a buyer's outsourcing outcomes, the role of buyer-supplier relationships in containing these effects was also examined. In a triadic service supply network or any supply network, one party (buyer) relies on another party (supplier) to provide resources. Therefore, there is an inherent degree of reliance between service buyers and suppliers. Developing a good buyer-supplier relationship becomes an important factor in facilitating the exchange between parties in the supply network (Coleman, 1990; Uzzi, 1996). It also plays an important role in finding and maintaining a competitive advantage (Mohr and Spekman, 1994; Liker and Choi, 2004).

Although the buyer-supplier relationship is considered important, its impact is largely examined within the dyadic contexts, i.e., how does the buyer-supplier relationship impact the buyer or the supplier's outcome? This study extends existing research by investigating the moderating role of buyer-supplier relationship in the context of a triadic network that includes the buyer, the supplier and the buyer's customers. Specifically, this study examines the following:

*Research Question 2: How does buyer-supplier relationship moderate the effect of bridge transfer on services outsourcing outcomes?*

Services functions are diverse. Some services are customer facing and entail a large amount of customer inputs during the services delivery process (Chase & Aquilano, 1977). On the other hand, there are services that entail little customer inputs and are quasi-manufacturing in nature (Chase, 1981; Chase and Tansik, 1983; Chen, Gupta and Rom, 1994; Gupta and Chen, 1995; Walley and Amin, 1994). The last research question compares the effects of bridge transfer in the context of customer facing pure services with that in the context of quasi-manufacturing types of services.

*Research Question 3: How do the effects of bridge transfer differ across different services type?*

#### **1.4 Summary of Methodology**

This study utilizes a survey as the primary mode of data collection. The context of analysis is at a triadic level. Multi-item scales measuring the triadic relationship structures among the service buyer, service supplier and buyer's customers (the degree of bridge transfer), the type of relationships between the service buyer and the service suppliers and the outsourcing outcomes were developed based on existing literature (social network theory, service operations and relationship management) and based on the theoretical definition of the terms used. These scales were then pilot-tested with Executive MBA students for face validity. The resulting survey was subsequently tested with executives of services outsourcing firms and modified accordingly. A final version was distributed to

selected companies affiliated with the CAPS Research and the Institute of Supply Management (ISM). The selection of companies was based on the following two criteria: 1) They have outsourced a service function prior to September, 2007; 2) They are willing to cooperate with our research. The total sample size is 137 services outsourcing initiatives.

Data collected first went through a set of Principal Component Analyses to compute a composite score for each of the key model constructs. Then three separate multiple regressions were run to test the direct effects of bridge transfer and the moderating effects of buyer-supplier relationships on the three outcome constructs in the context of pure services. Another three regressions were run to test the direct effects of bridge transfer and buyer-supplier relationship on the three outcomes constructs in the context of the quasi-manufacturing services. Details will be provided in the methodology section.

### **1.5 Summary of Contributions**

This study focuses on how to manage services outsourcing for success, which is a natural progression from the “what to outsource” research that dominates our field (Quinn and Hilmer, 1995; Venkatatesan, 1992; Barney, 1991; 2001; Wernerfelt, 1984; Williamson, 1975; etc.). Its theoretical contribution is four-fold. First, it introduces social network theory into the services outsourcing context. As such, it offers a unique perspective on the underlying triadic relationship dynamics and their performance implications in a service supply network. This study also extends the social network research by discovering and

addressing a state of “bridge transfer”, and derives a measurement scale for the degree of bridge transfer. Third, this study explores the role of buyer-supplier relationships in moderating the effects of bridge transfer. Lastly, this study delineates the effects of bridge transfer by comparing them in the customer facing pure services context with those in the quasi-manufacturing context.

The results of this research provide importance guidance for managers of services outsourcing firms. While relying on their suppliers to provide services to their end-customers, it is also imperative for the buying firms themselves to remain connected with their end-customers when outsourcing customer facing pure services. However, outsourcing managers should use discretion when managing different types of services. While it is important to maintain a close connection with ones’ end customers for customer facing pure services, there is no evidence to warrant such practice for the outsourcing of quasi-manufacturing types of services.

## Chapter 2

### **LITERATURE REVIEW**

The literature review section served three purposes. First, extant literature on services outsourcing are reviewed and gaps are identified. Then this study draws strengths from two separate streams of research in supply chain management in order to lay the ground for building the theoretical models. These two streams of research include the service operations literature and the social network perspective. Lastly, two theoretical models are presented based on extant literature.

#### **2.1 Existing Literature on Services Outsourcing**

Overall, literature in the services outsourcing field clustered into three major areas: 1) Should we outsource services? 2) Which portion of services should we outsource? And lastly, to a lesser extent, 3) How to manage services outsourcing relationships for success? Please refer to Table 1a-1c for a summary of key readings in each of these three areas. It is worth noting that while there is a wealth of research in the first two areas, research in the last area is lacking. This study is grounded in this less-researched area. But first, a brief overview of existing studies is provided in the first two areas.

##### **2.1.1 Cluster One: Should We Outsource Services?**

Scholars have tackled the question of “should we outsource services?” from three perspectives (see Table 1a). Firstly, at macro level, is service outsourcing good for the economy? Secondly, at an industry and firm level, what

are the risks associated with services outsourcing? And lastly, at the firm level, how does service outsourcing impact company performance? The first perspective was mainly studied by economists. In economics, research topics focus on the impact that the outsourcing of services has on economic indicators, such as domestic employment, incomes and productivity (Amiti and Wei, 2005; Amiti and Wei, 2004; Fixler and Siegel, 1999; Gorg and Hanley, 2004). Overall, services outsourcing is found to be positively correlated to the national economy in the long run.

On a less macro level, scholars also examined the risks of outsourcing and its impacts on a firm's performance. Risks of outsourcing include being leveraged by suppliers (Aubert, Patry, and Rivard, 1998; Walker, 1988; Brindley, 2004), poor quality of supply (DiRomualdo and Gurbaxani, 1998; Lonsdale and Cox, 2000; Young and Hood, 2003) and customer dissatisfaction (Weakland, 2005). Other outsourcing risks include information security risks (Pemble, 2004), loss of core activities (Welch and Nayak, 1992); loss of strategic flexibility; interruptions of supply; and fall in employee morale and loss of internal coherence (DiRomualdo and Gurbaxani, 1998; Lonsdale and Cox, 2000; Young and Hood, 2003). However, these scholars tended to not fully appreciate the inherent difference between services and manufacturing, and sometimes blanket implications to both service and manufacturing outsourcing were made, when in fact the evidence comes from manufacturing (Welch and Nayak, 1992; Lonsdale and Cox, 2000).

A limited number of studies have touched on specific risks associated with services outsourcing. Among these, a majority of them focused on a particular industry, such as IT outsourcing. Clemons, Hitt, and Snir (2000) proposed a risk analysis framework for understanding the benefits as well as costs of a vendor's services in an IT domain. Aubert et al. (1998) used transaction cost and agency theories as primary theoretical bases and categorized risk factors associated with IT outsourcing. Apte and Mason's (1995) research is one of the few papers (and may be the only one) that provided a systematic view of risks associated with service outsourcing in general without being tied to any specific industry. These authors list a number of disadvantages of global outsourcing of information-intensive services, which include difficulties in communication and coordination and potential for violation of intellectual property rights.

Based on a review of literature on services outsourcing, very few scholarly writing's have focused on the risks caused by allowing customers to directly interface with one's suppliers, a fundamental phenomenon in services outsourcing. It is worth noting that in the research conducted by Maltz and Ellram (1997 on total cost of relationship, they recognized the additional interface between the logistics service suppliers and the customers and proposed the cost of managing this interface should be factored in when making the outsourcing decisions. This study also grounds on this additional interface. Yet the focus is not whether we should outsource services, but how to manage services outsourcing relationships to mitigate these risks.

**Table 2-1**

***Summary of Key Research in Services Outsourcing***

**Table 2-1a**

***Summary of Key Research in Services Outsourcing-Should We Outsource Services?***

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<b>Should We Outsource Services?</b>	
<b>• The Importance of Services Outsourcing to National Economy</b>	
Fixler and Siegel, 1999;	Analyzed the implications of outsourcing on output and productivity growth of service industries. Findings indicated that services outsourcing has reduced service sector productivity in the short run. However, projected that productivity growth in services is likely to increase in the future.
Heshmati, 2003;	Discussed the relationship between outsourcing and productivity growth in manufacturing and services. Showed that with adjusted production function, there is a positive relationship between productive and services outsourcing.
Gorg and Hanley, 2004;	Investigated the relationship between outsourcing and profitability. Distinguished outsourcing of materials from outsourcing of services inputs. Findings suggested that plants that are substantially larger than the mean employment size benefitted from outsourcing materials while the relationship from services outsourcing was not clear-cut.
Amiti and Wei, 2005.	Showed that in the United States and many other industrial countries ‘insourcing’ of services was greater than outsourcing. Using the United Kingdom as a case study, the authors found that job growth at a sectoral level was not negatively related to service outsourcing.
<b>• Risks of Services Outsourcing</b>	
Maltz and Ellram (1997)	Proposed an analytical framework for the logistics outsourcing decision. In this framework, the total cost of relationship

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	incorporates the cost of managing the supplier (logistics provider) and customer relationships.
Apte and Mason's (1995)	Analyzed the opportunities and challenges of global disaggregation of information-intensive services. Proposed a taxonomy of disaggregation, and developed a theoretical framework that identified the criteria and guidelines for successfully selecting service activities to be globally disaggregated.
Clemons, Hitt, and Snir (2000)	Proposed a risk analysis framework for understanding the benefits and costs of utilizing a vendor's services in IT domain. The fundamental drivers of risk are information asymmetries before contracting, inability to monitor partners' actions perfectly, and exogenous changes that allow one party to behave opportunistically. Provided prescriptions on efficient and effective contractual arrangements.
Aubert et al. (1998)	Identified components of IT outsourcing risk exposure.
<ul style="list-style-type: none"> <li>• <b>Impact on Company Performance</b></li> </ul>	
Poppo and Zenger, 1998;	Examined firm's boundary choice in IT services. Developed and tested a model of comparative institutional performance rather than institutional choice. Results suggested that a theory of the firm and a theory of boundary choice were likely to be complex, requiring integration of transaction cost, knowledge-based, and measurement reasoning.
Grover, Cheon, and Teng, 1996;	Overall IS outsourcing and its five component functions were examined for their relationships with outsourcing success. The effect of service quality of the provider and the ability of companies to build a partnership on these relationships were hypothesized and studied. Outsourcing success was found to be highly related to the degree of outsourcing of two functions, systems operations and telecommunications. The results indicated that transaction cost theory provided a good framework for IS outsourcing and that asset specificity of outsourcing transactions needed to be considered in any decision to outsource. Also, both service quality of the vendor and elements of partnership such as trust, cooperation, and communication were important for outsourcing success.
Elitzur and Wensley, 1997	Investigated some of the ways in which game theory can help us to understand the structure and function of information systems outsourcing arrangements.

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### **2.1.2 Cluster Two: Which Portion of Services Should We Outsource?**

Once scholars are over the debate of whether we should outsource services, a natural progression of research is then to identify which function(s) should be outsourced? Here one particular theoretical framework received a lot of attention-the Transaction Cost Economics (TCE). TCE posited that when a company faces the make vs. buy decision, it needs to consider both the production costs and the transaction costs associated with outsourcing. The decision should be based on which choice can minimize the sum of the two cost components (Williamson, 1975; Jensen & Meckling, 1976; Milgrom and Roberts, 1992; Lacity and Willcocks, 1995; Ang and Straub, 1998).

Various scholars applied TCE to services outsourcing settings. For example, Ellram, Tate and Billington (2008) utilized TCE to examine how firms manage the costs and risks of offshore outsourcing of professional services. They found that fixed costs of establishing the relationship dominated the variable costs of day-to-day transactions, and that organizations would not offshore outsource areas where there is high perceived degree of unmanageable risk. Grover, Cheon and Teng (1996) used TCE to examine the outsourcing decision in Information System (IS) projects and found TCE provided a good framework for IS outsourcing and one particular dimension of TCE, asset specificity, needed to be considered in any decision to outsource. Similarly, Klass et al (2001) and Poppo and Zenger (1998) all used TCE in analyzing services outsourcing decisions. Table 1b depicted existing research in this area.

It is worth noting that there is a limited application of another well-known theory - the core competence theory (CCT), in services outsourcing settings. CCT stated that companies should focus on a set of core competencies where they can achieve definable preeminence and outsource the rest (Prahalad and Hamel, 1990; Venkatesen, 1992; Quinn and Hilmer, 1995; Sharpe, 1997). While widely accepted as the guidance for outsourcing practice in general, it is peculiar that little research has empirically examined its application in services outsourcing settings. One exception is Mantel et al. (2006) which used an experimental design approach to investigate the impacts of three factors (strategic vulnerability, the degree of core competency and the formality of the information about supply alternatives) on outsourcing decisions. The results showed that core competency does influence the outsourcing decision. However, strategic vulnerability has greater influence than core competency and information formality moderates the make-buy decision when the strategic vulnerability and core competency conditions are mixed.

**Table 2-1b**

***Summary of Key Research in Services Outsourcing-What Services Functions to Outsource?***

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**What Services Functions to Outsource?**

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- **The application of Transaction Cost Economics**
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Ellram, Tate and Billington, 2008	Utilized the transaction cost economics (TCE) to examine how firms manage the costs and risks of offshore outsourcing of professional services. Found that fixed costs of establishing the relationship dominated the variable costs of day-to-day transactions, and that organizations would not offshore outsource areas where there is high perceived degree of unmanageable risk.
Grover, Cheon, and Teng, 1996;	Overall IS outsourcing and its five component functions were examined for their relationships with outsourcing success. The results indicated that transaction cost theory provided a good framework for IS outsourcing and that asset specificity of outsourcing transactions needed to be considered in any decision to outsource.
Poppo and Zenger, 1998;	Contrasted Transaction Cost Economics with knowledge based theory and measurement reasoning. Results suggested that a theory of the firm and a theory of boundary choice were likely to be complex, requiring integration of transaction cost, knowledge-based, and measurement reasoning.
Klaas et al, 2001	Using a Transaction Cost Economics perspective, this study examined whether organizational-level factors moderated the relationship between the degree of reliance on HR outsourcing and the perceived benefits produced by outsourcing. Support was found for a number of the transaction cost hypotheses regarding the impact of organizational characteristics.
<ul style="list-style-type: none"> <li>• <b>The application of Transaction Cost Economics</b></li> </ul>	
Mantel et al, 2006	Conducted an experiment to examine the impacts of three factors (strategic vulnerability, the degree of core competency and the formality of the information about supply alternatives) on outsourcing decisions. The results showed that: strategic vulnerability and core competency do influence the outsourcing decision, strategic vulnerability has greater influence than core competency and information formality moderates the make-buy decision when the strategic vulnerability and core competency conditions are mixed.

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### **2.1.3 Cluster Three: How to Manage Relationships in Services Outsourcing?**

Although there are a good number of research papers on “should we outsource” and “what to outsource”, research on how to manage relationships in services outsourcing is lacking. Among the limited number of studies, most (if not all) focused on the dyadic relationship structure between the buyer and the supplier. Grover et al (1996) found that elements of the buyer-supplier relationship such as trust, cooperation, and communication were important for outsourcing success. Similarly, Ellram et al (2008) found that the cost of setting up the buyer-supplier relationship was a key consideration in services outsourcing decisions and that managing and controlling outsourced services relationships were critical to outsourcing success. One common theme of these two studies is that only the buyer-supplier relationships were considered (See Table 1c).

Li and Choi (2009) improved upon the existing dyadic level studies and examined relationship management at a triadic level-among service buyer, service supplier and service customers. Specifically, Li and Choi (2009) used social network theory to examine different triadic relationship typologies prior, during and post services outsourcing arrangements. They also posited that the state of “bridge transfer” has serious performance implications for the buyer. Bridge decay is a more desirable strategy than bridge transfer. The buyer should continue to actively interact with its customers and closely monitor the supplier.

This research extended Li and Choi (2009)'s study and empirically examined the impact of degrees of bridge transfer on services outsourcing outcomes for both pure services and quasi-manufacturing services. It also examined the role of buyer-supplier relationships in mitigating negative outsourcing outcomes. To my knowledge, Li and Choi (2009) and this study are the only ones that evaluate services outsourcing in triadic contexts. By doing so, they were able to offer unique perspectives on the relationship dynamics among the service buyer, service supplier and the buyer's customers and to derive managerial relevant implications. In the next section, a theoretical framework was built based on the integration of two streams of literature – services operations literature and the social network theory literature.

**Table 2-1c**

*Summary of Key Research in Services Outsourcing-How to Manage Services Outsourcing Relationships?*

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**How to Manage Services Outsourcing Relationships?**

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<b>Author/Year</b>	<b>Key Findings</b>	<b>Relationship Structure</b>
Grover, Cheon, and Teng, 1996;	The effect of service quality of the provider and the ability of companies to build a partnership on these relationships were hypothesized and studied. Results indicated that both service quality of the vendor and elements of partnership such as trust, cooperation, and communication were important for outsourcing success.	Dyadic Relationship (Buyer-Supplier)
Ellram, Tate and Billington, 2008	Using the tenants of TCE, this paper postulated that fixed costs of establishing the relationship dominate the variable costs of day-to-day transactions. The paper expanded on themes provided by TCE and offers some lessons learned, and guidelines for managing and controlling offshore outsourced services relationships.	Dyadic Relationship (Buyer-Supplier)
Li and Choi, 2009	Used social network theory to examine the shifting of the triadic relationship structures among the service buyer, service supplier and the buyer's customers at different stages of the services outsourcing arrangements.	Triadic Relationship (Buyer-Supplier-Customer)

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## **2.2 Theoretical Framework**

In this section, two streams of supply chain literature were discussed from which the key theoretical framework was created. These two streams of literature included service operations literature and the social network perspective.

### **2.2.1 Services Operations Literature**

Two important insights were derived from the service operations literature: What are the unique characteristics of services operations? And secondly, what are the major types of services operations?

#### **What are the unique characteristics of services operations?**

There is one enduring characteristic of services—customer interaction during the process of delivery (Gaither and Frazier 1999; Sampson, 2001; Sampson and Froehle, 2006). Sampson and Froehle (2006) surveyed the service literature and proposed a definition of services that focuses on both interaction and the role of customer inputs in this interaction. Following Sampson and Froehle’s Unified Services Theory (UST) approach, this paper posited that the real-time interaction between the provider and customers underlies the basic nature of services.

Consider the service operations of a call center where customers call in to seek help on various issues, for example, those related to software usage. Based on the specific questions asked, the customer support representative attempts answers. It may take several iterations of questions and answers between them



before a final solution is offered. In this scenario, what distinguishes this transaction from a manufacturing transaction is the interactive process involved in defining customer needs and delivering the service.

The marketing literature also addressed the “customer inputs” nature in services operations, though sometimes it is termed as “co-production” (Bitner and Brown, 2006; Bendapudi and Leone, 2003; Ramirez, 1999; Auh, Bell, McLeod and Shih, 2007). The outcome of this interaction has been labeled intangible (Bannock, Baxter, and Reese 1982; Karmarkar and Pitbladdo 1995; Pearce, 1981), perishable (Lovelock and Gummesson, 2004; Sampson, 2001), heterogeneous (Nie and Kellogg, 1999), and simultaneous (Sampson, 2001). Scholars have also noticed the problem associated with measuring services operations. For example, Schonberger (1980) noticed that “measuring quality of intangible purchases is the central problem that makes purchasing intangibles a special challenge (p. 25 of Schonberger, 1980). Services “can seldom be tried out, inspected, or tested in advance” (Levitt, 1981). This paper posits that the root of the measurement problem goes back to the nature of services-customer inputs. Each customer brings in unique sets of inputs, therefore making services operations hard to be standardized or measured.

### **Customer Contact Theory and Services Classification**

Customer contact theory (CCT) (Chase & Aquilano, 1977; Kellogg & Chase, 1995) triangulates the “customer inputs” definition of services operations. *Customer contact* is defined as the time a customer spends in the system relative

to the total time of creating the service. Introduced by Chase and Aquilano (1977), this theory represents one of the first attempts to not apply product-oriented thinking when considering operations management problems inherent in service settings. As such, CCT emphasizes the importance of the interaction that occurs between the service provider and the customer. For instance, according to CCT, “the main feature that sets a service system apart from a manufacturing system is the extent to which the customer must be in direct contact” (Chase and Aquilano 1977, p. 17).

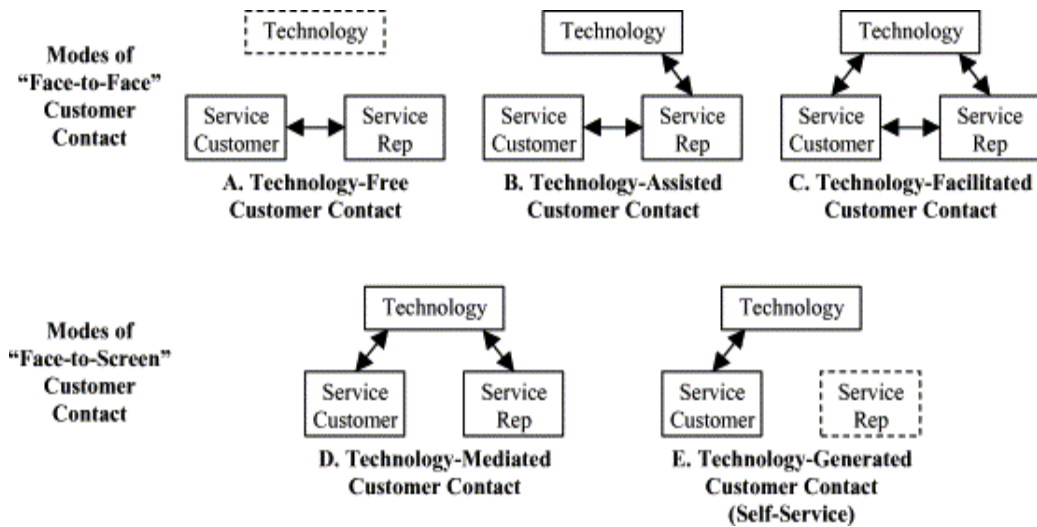
In keeping with CCT, services can be classified into three broad categories: pure services, mixed services, and quasi-manufacturing services (Chase, 1981; Chase and Tansik, 1983; Chen, Gupta and Rom, 1994; Gupta and Chen, 1995; Walley and Amin, 1994). “Pure services include those organizations whose major production is carried on in the presence of the customers” (Chase, 1981, p. 701). An example of pure service would be the customer service desk at the airport. Here the service representatives would have face-to-face contact with the customers and the majority (if not all) of the service production process is carried out in front of the customers. Mixed services “commonly involve a mix of face-to-face contact and loosely coupled back office work” (Chase, 1981, p. 701). An example of mixed service is X-ray service in the healthcare industry where the technician first meets face-to-face with the patient to take the X-ray image. Then a specialist would work in the back room to interpret and record the results, without the presence of the customer. As a final step, the doctor would meet face-to-face with the patient again and inform him/her of the results.

Lastly, quasi-manufacturing “entails virtually no face-to-face contact” (Chase, 1981, p. 702). An example of quasi-manufacturing is payroll processing services where no face-to-face contact with the customer is expected.

In this study, the main focus was on the outsourcing of customer facing pure services because it epitomized the “customer inputs” nature of services operations. The theoretical model was built for the outsourcing of customer facing functions which entail intensive interactions with the service representatives and the customers, such as in customer services or after-sales support. In addition, the effects of bridge transfer on services outsourcing outcomes were also tested in an opposite context, the quasi-manufacturing settings which entail no customer inputs. These effects were then compared to that of pure services to better delineate the effects of bridge transfer.

### **Technology Mediated Customer Contact**

While customer contact was originally defined as “face-to-face” interaction that requires the co-location of customers and service representatives (Chase, 1981), in recent years, this limitation has been reevaluated. Recognizing the rapid advancements in information technology, Frohle and Roth (2004) proposed five conceptual archetypes of customer contact in relation to technology. These five archetypes include: technology-free customer contact, technology-assisted customer contact, technology facilitated customer contact, technology mediated customer contact and technology-generated customer contact. Figure 2-1 depicts these 5 conceptual archetypes.



Source: (Frohle and Roth, 2004)

**Figure 2-1. Five Archetypes of Customer Contacts in Relation to Technology**

Technology free customer contact refers to service offerings where the customer is in physical proximity of, and interacts with, a service representative. This archetype is consistent with the traditional notions of face-to-face service encounters emphasized by Chase (1978). In technology-free customer contact, technology per se does not play a direct role in providing the service. Examples of technology-free customer contact include a psychiatrist's in-office consultation with a patient, a retail bank teller exchanging a customer's coins for paper currency, or an old-fashioned, general store clerk transacting the sale of merchandise with a cash drawer.

Technology assisted-customer contact refers to services encounters where the service representative employs technology as an aid to improve the face-to-face contact, but the customer does not have access to the technology. This situation often occurs during airline check-in: the service representative interacts with a computer terminal, but the customer does not.

Technology-facilitated customer contact happens where, during the face-to-face service encounter, both the service representative and the customer have access to the same technology. Here technology is employed to enhance the face-to-face communication between a customer and a service provider, such as when a financial consultant uses PowerPoint in a meeting with a client.

Technology-mediated customer contact happens where the customer and the human service representative are not physically co-located. Therefore, the service encounter is not a traditional face-to-face contact. To enable communication, some form of technology must be employed, such as when a voice telephone call or online instant messaging is initiated with a customer service rep in a back-office call center.

Finally, there is technology-generated customer contact, where the human customer service representative component of the service encounter is entirely replaced by technology. This is the most technology-intensive situation. For example, bank ATMs, self-service kiosks, automated car washes, and website-based knowledge-bases offer the option of service without the assistance of human service reps.

For this study, the first four archetypes (i.e., from technology-free customer contact to technology facilitated customer contact) were incorporated. This will allow the study of services operations where the service representatives and the customers are either physically co-located or virtually co-located. It is also in line with the outsourcing practice of customer facing functions. For example, most credit card companies that outsource their customer support expect their customers to “call” in on billing issues. In this case, the telephone has enabled the service representative and the customer to virtually co-located during this service encounter. Finally, this research purposely excluded technology-generated customer contact due to the absence of the service representatives.

### **2.2.2 Services and Services Outsourcing**

Outsourcing is typically defined as the conscious choice of replacing internal functions with the use of external agents to perform one or more production or service activities (Gilley and Rasheed, 2000). It seems then services outsourcing should be similar to manufacturing outsourcing: in services outsourcing we just outsource intangible goods, such as customer service; while in manufacturing outsourcing we outsource tangible goods such as parts and raw materials. Contrary to our initial intuition, there are fundamental differences underlying the two types of outsourcing arrangements and it is important to understand these differences.

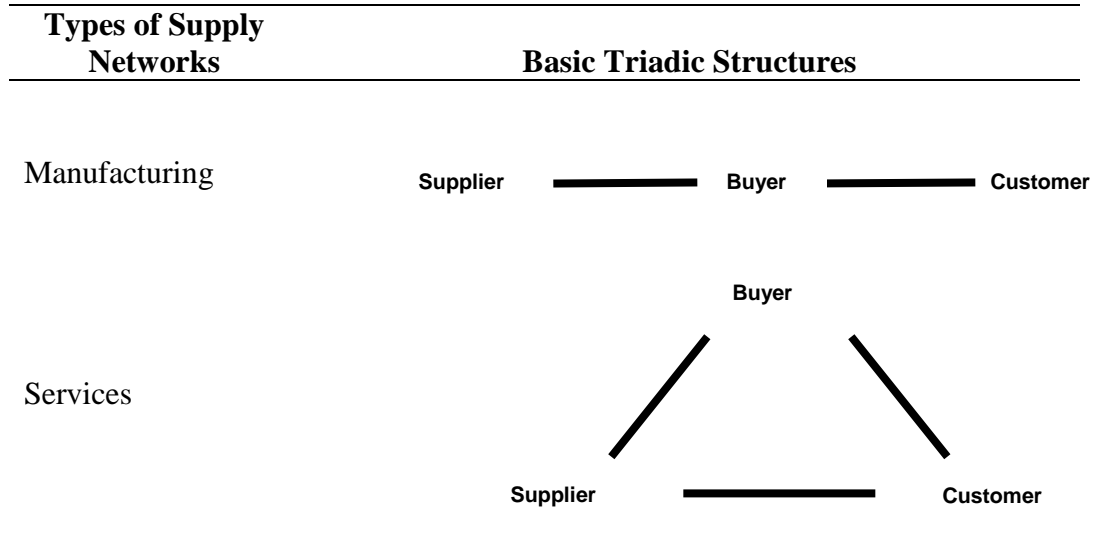
Hewlett-Packard (HP), one of the world’s top manufacturers of notebook PCs, was outsourcing its manufacturing in the 1990s. When a retail shop ordered

Pavilion zd8000 laptops, this shop interacted with HP but had no contact with the suppliers. It was HP that interfaced with the suppliers—an assembly supplier in Taiwan, a graphic chip supplier in Markham, Ontario, liquid crystal display screens and memory chip suppliers in South Korea and Taiwan, and a hard-disk drive supplier in Japan (Dean and Tam, 2005). In this type of manufacturing outsourcing arrangement, the customer is not in direct contact with any of HP's suppliers. HP, acting as a go-between or bridge, controls the direct information and product flows between its suppliers and its customers prior to, during, and after the outsourcing.

Such relational dynamics change when it comes to a services setting. Besides outsourcing its manufacturing operation, HP also outsourced some service work—a portion of its software support activity. In this case, the customer service representatives from the supplier company were in direct contact with the customers of HP when offering their services. HP had no ready measure to control this interaction while its suppliers delivered their services to HP's customers.

Figure 2-2 depicts these two different structural arrangements. The linear diagram on the top represents a manufacturing setting wherein manufacturing buyers can effectively control the interaction between its suppliers and its customers. The triangular diagram on the bottom of Figure 2-2 depicts the services setting where the services supplier and the buyer's customer contact each other directly. The triadic relationship structure among the services buyer, services supplier and buyer's customer in Figure 2-2 served as the foundation of

this study. Specifically, services outsourcing was framed from the lens of the social network theory and examined different triadic structural arrangements on services outsourcing outcomes.



**Figure 2-2. Comparison of Supply Chain Triadic Relationship Structures in Manufacturing vs. Services**

### 2.2.3 Social Network Perspective

A network is made of elements and the links that connect these elements (Borgatti and Li, 2009; ). When these elements represent “agents” that are able to make volitional choices, such as individuals or organizations, the network is called a social network (Borgatti and Li, 2009; Burt 1992; Watkins, 2003; Wellman and Berkowitz, 1988; etc). The theoretical model for this study was built on two key perspectives from the social network literature: social capital (Coleman, 1988, 1990) and the structural hole concept (Burt, 1992, 1997).



## Social Capital and the Structural Hole Perspective

Social capital derives from an agent's relationship with other agents in the same network through which the agent gains access to resources (Coleman, 1990). One particular type of relational arrangement is called a structural hole, wherein an agent works as a bridge between two other agents or networks with no links between them (Burt, 1992, 1997; Gargiulo and Benassi, 2000). After an explanation of both social capital and the structural hole concept, the theoretical framework of services outsourcing relational arrangements were built upon.

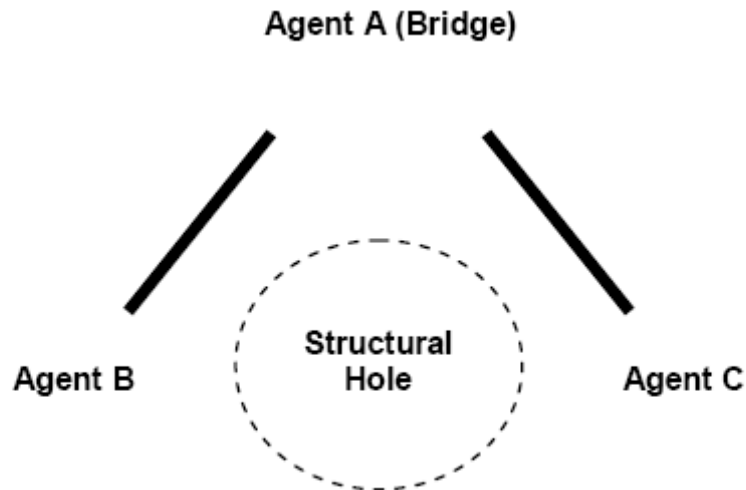
There are two schools of thought regarding social capital (Bae and Gargiulo, 2004; Balkundi, Kilduff, Barsness and Michael, 2007; Borgatti and Foster, 2003; Burt, 2000; Gargiulo and Benassi, 2000). While one school promotes the virtue of having connections, the other focuses on the virtue of *no* connections. The first group, known as the *traditional school*, focuses on making connections among agents in the network and the associated benefits of such connections (Coleman, 1988, 1990). These scholars encourage such connections. In contrast, others focus on the positive effects of no connections and negative effects of losing the unconnected state (Burt, 1992, 1997). The concept of a structural hole is a result of this school—the bridge that sits on a structural hole gains leverage, but such leverage is lost when the structural hole is filled when the two isolated agents or networks make a connection. In other words, the traditional school promotes network closure—the establishment of strong ties and, as a result, increasing trust and cooperation within a network (Gargiulo and

Benassi, 2000; Coleman, 1990; Coleman, 1988). Those in the opposite school take a positional approach and argue that actors benefit from brokering opportunities created by disperse ties, and thus they discourage network closure (Balkundi, Kilduff, Barsness and Michael, 2007; Gargiulo and Benassi, 2000; Burt, 1992, 1997). The latter approach, the positional view has received much current attention in social network research (Balkundi et al., 2007), and it offers the theoretical foundation for our concepts of bridge transfer.

### **Structural Hole Perspective**

The “hole” in a structural hole is represented by the state of no connection, and the “structure” of the relationships is obtained by the fact that the connections exist through the bridge. The bridge is the agent that is positioned on the structural hole. In the absence of a connection between two isolated agents, the bridge acts as a go-between and the gatekeeper of information.

The underlying premise of the structural-hole theory is that the structure of the network is what determines dynamics among actors because social actors in some positions in the networks are better off than those in other positions (Burt, 1992). Specifically, social actors that occupy the bridge position over a structural hole enjoy brokerage opportunities. Formally, a structural hole is defined as the “weak” connections between groups that are not directly linked together (Burt, 1992; Burt 2000). Figure 2-3 depicts the structural-hole concept.



**Figure 2-3. The Structural Hole Concept**

Figure 2-3 shows three agents. Agent 1 and Agent 2 are directly linked to Agent 3 but they are not directly linked to each other. This lack of connection forms a structural hole. A structural hole “creates a competitive advantage for an individual whose relationships span the holes” (Burt, 2000, p. 6). Agent 3 spans the structural hole between Agent 1 and Agent 2 and therefore reaps benefits that come with this position.

### **Benefits of Being Bridge**

Burt (2000, 2002) posits that the bridge position leads to two types of advantages. One is the information benefit (Burt, 1992, 2000, 2002). Since a structural hole can be viewed as a gap between two non-redundant networks, agents who occupy the bridge position can benefit from additional information from non-redundant sources rather than overlapping information from the same

source. The second advantage is the control benefit. Simmel (1955) and Merton (1968) introduced the ideal type of people who derive control from the structural hole—the *tertius gaudens* or a third person who benefits from brokering the connection between others (Burt, 2000; Burt 1992). In this study, *tertius gaudens* is equivalent to the bridge. The bridge can negotiate and exploit information to its advantage (Burt, 2000; Zaheer and Bell, 2005). “Accurate, ambiguous, or distorted information is strategically moved between contacts by the *tertius*” (Burt, 2000, p. 8).

Beyond gaining access to information and control of information as benefits, Zaheer and Bell (2005) pointed out additional advantages of the bridge. By accessing information from unique parts of the network, the bridge can hear about the impending threats and opportunities before other actors who are not in the bridge position. It can also learn about the quality of possible exchange partners and potential allies (Powell and Smith-Doerr, 1994; Uzzi, 1996; Zaheer and Bell, 2005.).

### **Bridge Decay and Bridge Transfer**

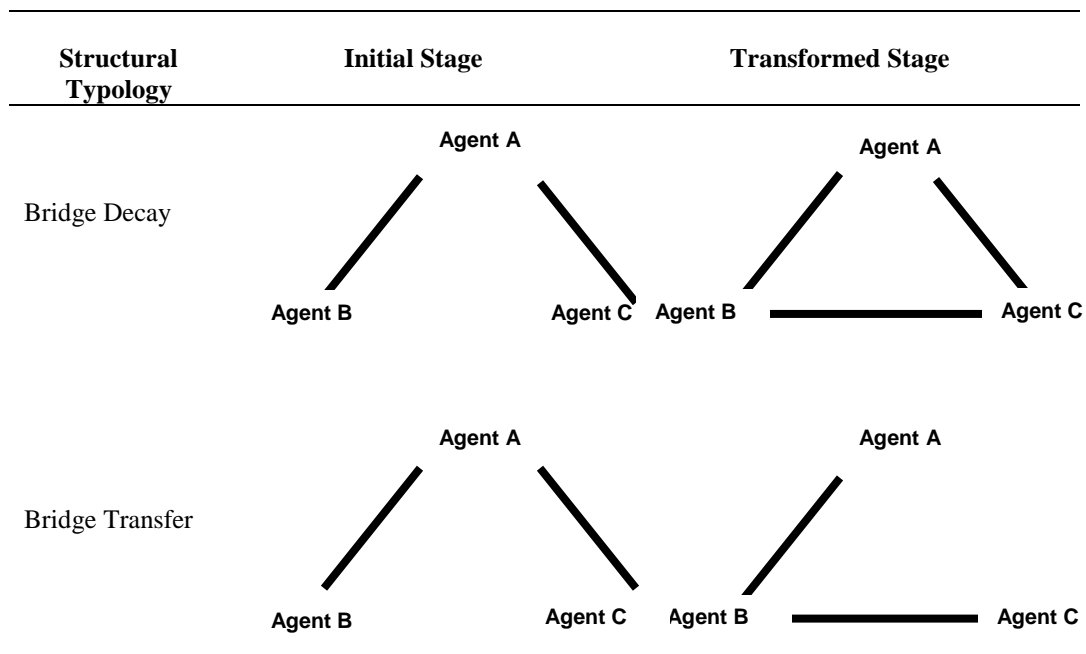
Being the bridge may be a good thing, but as the cliché goes, not all good things last forever. A firm’s bridge position, although beneficial, is not a permanent state and is subject to change (Burt, 2000; Burt, 2002; Soda, Usai and Zaheer, 2004). First, the two agents that are otherwise isolated by the bridge can begin making connections and reduce the leverage of the bridge, creating the state called “bridge decay.” Second, the bridge can willingly or unwillingly relinquish

its position to one of the other two agents and create a state we call “bridge transfer.” Structurally, bridge transfer happens if the existing structural hole is filled and one of the other two links is disconnected. Bridge decay happens once the agents on each side of the structural hole are able to link with each other directly, the connection to the agent that used to be the bridge becomes redundant and loses its value (Johnson, 2004). (A note here is that the term “bridge decay” first appeared in Burt (2000). In its original intent, Burt used the term “bridge decay” to denote the disappearance of bridge position caused by the broker’s loss of contacts with entities on either side of him/her. In this study, bridge decay concept was used in a different context. It referred to the disappearance of the bridge position caused by the setting up of direct linkages between the entities on either side of the broker. Conceptually, it is more closely linked to the “dissolution of structure hold brokerage” concept used by Johnson (2004)).

Bridge decay has implications for the stability of social capital. With the loss of the bridge position, a social agent also loses the advantage of social capital it has enjoyed. Therefore, it is seldom to the benefit of agents who hold the bridge position to encourage others to join them in linking groups, because then they become redundant and lose their value (Johnson, 2004). This puts the burden on the social agent to make extra effort to maintain the bridge position (Burt, 2001). Even after the decaying of the bridge, the shifting of the relationship structure is by no means over. This structural shifting is bridge transfer. Compared to bridge decay, bridge transfer is rarely studied.

Figure 2-4 depicts the concepts of bridge decay and bridge transfer. During the initial stage for both bridge decay and bridge transfer, A is in the bridge position across the structural hole created between two non-redundant agents, B and C. During the transformed stage, differences begin to emerge. In the bridge decay scenario, B and C establish a direct link with each other, effectively eliminating the structural hole and nullifying the A's bridge position. In the bridge transfer scenario, while B establishes a direct link with C, A loses its direct link with C, causing a structural hole between A and C. B now became the bridge and enjoys the benefits of social capital brought by its position and power and influence in the network of agents.

In this study, bridge transfer refers to the removal of the bridge status from one node and its simultaneous relocation to another node in a triadic network (Li and Choi, 2009). A bridge is defined as a structure that spans and provides connections over information and control chasms between two otherwise unconnected nodes (Burt, 1992; 2001). In this research context, bridge transfer encompasses the weakening and disappearing of operational ties between two previously connected actors (i.e, the service buyer and buyer's customers) and the appearing and strengthening of operational ties between two previously unconnected actors (i.e., the service suppliers and buyer's customers (Li and Choi, 2009.) Further, the removal and the relocation of the bridge position needs to happen concurrently in order to maintain the triadic structure.



**Figure 2-4. Bridge Decay versus Bridge Transfer**

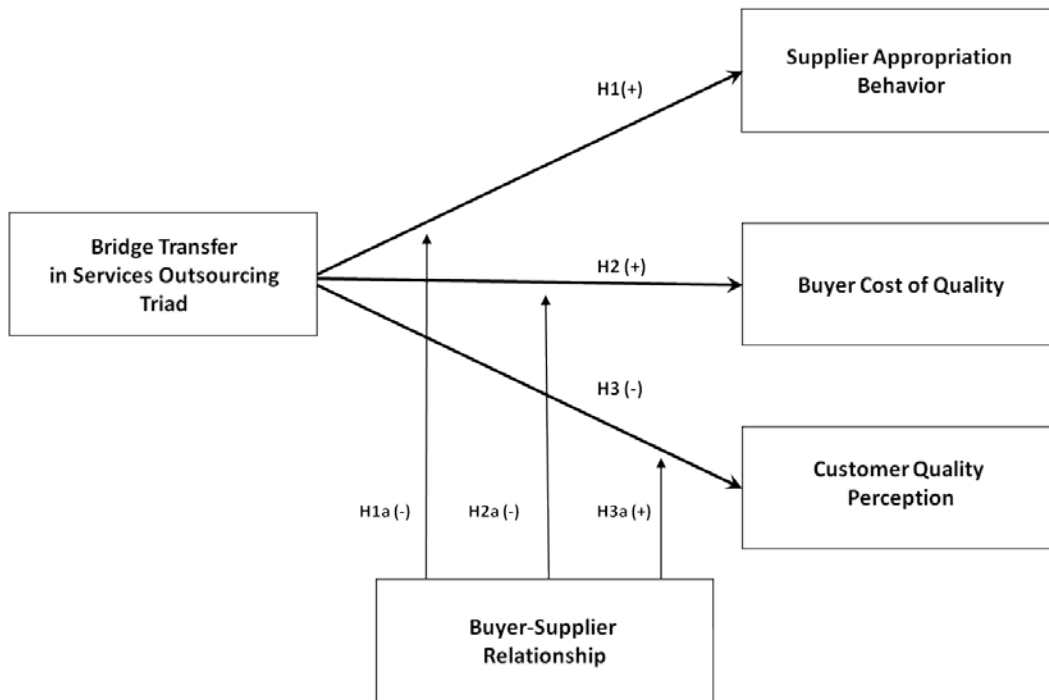
### **2.3 Towards a Theory of Dynamic Relationship Arrangement in Services Outsourcing**

Li and Choi (2009) was the first to apply the structural hole perspective in services outsourcing. They posited that prior to services outsourcing (during the contract negotiation stage), the buyer is the bridge between its suppliers and its end-customers and therefore enjoyed information and control benefits associated with the bridge position. However, once the negotiation is in place and the service suppliers are in direct contact with their customers, this bridge position began to decay, so did the benefits enjoyed by the buyer. Post implementation, if left unmanaged, the service supplier will resume the bridge position and enjoyed

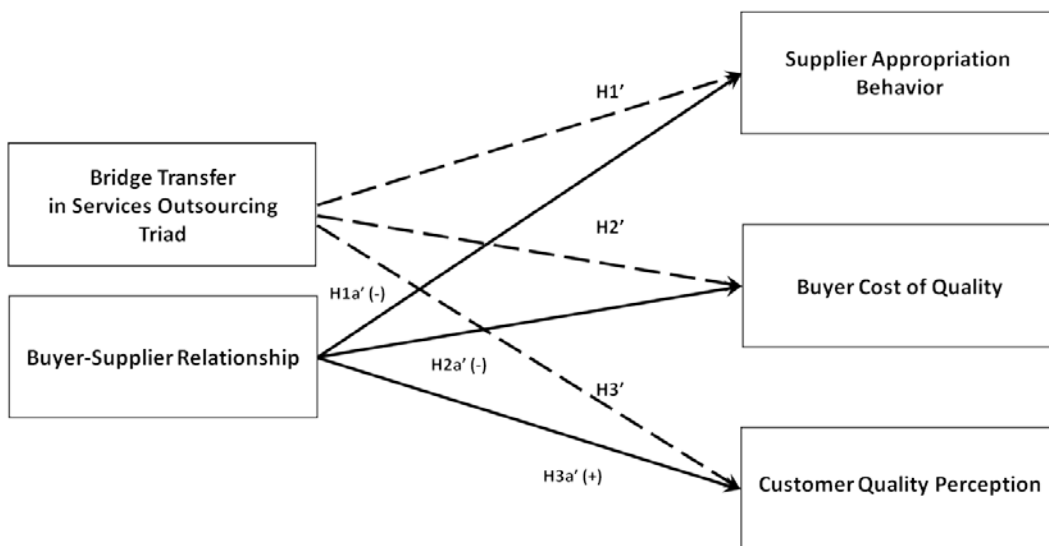
the benefits of the bridge (thus the bridge has been transferred to the supplier). Further, Li and Choi (2009) posited that bridge decay is a much more desirable strategy than bridge transfer for the buyer company. The buyer company should actively monitor its supplier, its customers and the relationship between its supplier and its customers even after the services outsourcing arrangements.

This study extends Li and Choi (2009)'s work and empirically tests the impacts of bridge transfer on services outsourcing outcomes. Figure 2-5 in the next page depicts the theoretical models. Figure 2-5a represents the key theoretical model for customer facing pure services context. It is also referred to as "the effect model" in future paragraphs. Figure 2-5b represents the comparison model for quasi-manufacturing context. It is referred to as "the no-effect model" in future paragraphs. Three services outsourcing outcomes are examined, namely the supplier's appropriation behavior, buyer's cost of quality, and end customer's quality perception, each corresponding to a node in the services supply triad. These three aspects are also key performance indicators in operations management literature (Bardhan, Mithas and Lin, 2007; Narasimhan, Jayaram and Carter, 2001; Venkataraman, 1997; Williamson, 1981; Samson and Terziovski, 1999; Shin, Collier and Wilson, 2000; Anderson and Sohal, 1999; Walker, 1988; Brindley, 2004). Each of these three outcomes is addressed below.





**Figure 2-5a. The Effect Model (Impacts of Bridge Transfer on Services Outsourcing Outcomes in the Context of Customer Facing Pure Services)**



**Figure 2-5b. The No-Effect Model (Impacts of Bridge Transfer on Services Outsourcing Outcomes in the Context of Quasi-Manufacturing Services)**

**FIGURE 2-5. Theoretical Models**

### **2.3.1 The Impact of Bridge Transfer on Supplier's Appropriation Behavior**

Supplier's appropriation behavior refers to a situation where a supplier takes advantage of his customer's dependence on him/her and thereby increases his/her part of the total end customer revenues (Walker, 1988; Brindley, 2004). In this case, the supplier is "appropriating" more money towards its income, away from the service buyer firm. An example of the supplier's appropriation behavior is that a supplier increases contract costs at renewal times above and beyond the expectation of the buyer firm. They can also charge a substantial amount of money for any contract revisions.

The existing research has emphasized the damaging effects of a supplier's appropriation behavior. Walker (1988) proposed that appropriation risk can lead to decline in the performance of the firm. Appropriation behavior of the supplier firm, the potential for a decline in an equitable exchange relationship between the buyer and supplier in favor of the supplier firm, can occur in the absence of specialized assets and increase total contract costs of the buyer firm (Walker, 1988; Brindley, 2004). Walker also examined this risk under varying conditions and found that it occurred in all cases where the supplier is downstream to the firm such as in services outsourcing cases.

However, in a service supply triad with three potentially links (buyer-supplier, buyer-end customer, supplier-end customer), the buyer-supplier link is not sufficient to address the added complexity in this triadic structure (Tate, Ellram and Brown, 2009; Maltz and Ellram, 1997). In this research, existing

relationship literature is extended by examining the effects of buyer-customer link on the service supplier's appropriation behavior.

In this study, appropriation behavior is operationalized as the tendency of supplier firm to increase contract prices above and beyond the expectation of the buyer firm. Although most contracts are negotiated prior to the outsourcing arrangements, it does not always remain constant. Firstly, service operations contract specifications are difficult to be described precisely (Levitt, 1981). This leaves a lot of room for interpretation of what is in and what is out of the scope of the pre-determined contract price. Service suppliers can then request additional payments for any service it regards as outside the original scope. Secondly, business processes are ever changing. Few if any contracts, of any complexity, will remain within the parameters of the pre-negotiated contract without any revisions/change of scope. The costs associated with these revisions/changes of scope all add to the total contract price. Thirdly, a lot of contracts are divided into different phases and renewal is needed at different thresholds. The renewal costs, which may be seen as a part of the total contract costs covering all project phases, may need to be re-negotiated. Fourthly, contract terms vary by firms. Instead of a fixed amount contract, suppliers may bill the buyer firm on time and material basis. In this case, the total contract cost will vary based on the amount of service tendered.

A price hike is more likely to occur when the buyer firm allows the supplier firm to assume the bridge position, i.e., bridge transfer, by taking a hands-off approach to its customers. If bridge transfer happens to the supplier

firm, the suppliers, being the only direct connection between its customers and its buyer, can play off the service buyer and its customers to gain advantages in subsequent contract negotiations. For example, it can exaggerate the task complexity or task volume involved to the buyer firm to demand more compensation for its work.

In pure services, or a service that entails a high degree of customer contact, it inherently contains a high degree of variability and uncertainty introduced by customers (Sampson and Froehle, 2006). These variability and uncertainty make it difficult to estimate tasks complexities and volumes unless one is closely connected with the end customers (Schonberger, 1980; Levitt, 1981). If the service buyer firm loses its connection with its end customer, it has to instead rely entirely on the accounts from the service suppliers for task complexity. This dependency gives suppliers a lot of room for gaming behavior (Nagin, Rebitzer, Sander and Taylor, 2002), i.e., strategically exaggerating task difficulties while demanding higher contract prices. The service supplier firm, acting as a rational actor striving to optimize its own profit, will choose to increase its end of the revenue by raising the price for the services rendered. Thus the following hypothesis is put forward:

*H1: In the context of outsourcing of pure service, bridge transfer is positively correlated with contract cost increase.*

Further, the effect of bridge transfer is not universal across all services outsourcing instances. Buyer-supplier relationship moderates the gaming behavior of the supplier. There are two major types of buyer-supplier relationships—adversarial and collaborative (Auster, 1994; Gulati, 1998; Humphreys, Shiu, and Chan, 2001). An adversarial relationship is characterized by a competitive price-driven arrangement (Lamming, 1993), which is a common approach practiced in the commodity market. On the opposite spectrum is the collaborative type of relationship, which has received considerable academic attention (Monczka, Petersen, Handfield, and Ragatz, 1998). A collaborative relationship is characterized by close cooperation between a buyer and a selected group of suppliers typically based on a long-term agreement.

The buyer and supplier in a strategic relationship typically align their goals closer compared to the buyer and supplier in an adversarial relationship, leading to less goal incongruence between them. Research has shown that goal congruence has been found to reduce the opportunistic behavior (Parkhe, 1993) and decrease perceptions of exchange hazards (Deeds and Hill, 1999). Further, in order to build a deeper supplier relationship, the buying company would typically invest in knowing the supplier firm's background, including past performance. It is less likely for them to select a supplier with excessive opportunistic behavior.

Trust is one of the most salient characteristics associated with the collaborative buyer-supplier relationship (Johnson, 2004; (Amabile et al., 2001; Davenport & Prusak, 1998; Goodman et al, 1998; Monge & Contractor, 2003; Powell, 1990; Smith, Carroll & Ashford, 1995; all via Johnson (2004), Chen,

Paulraj, and Lado, 2004). In a collaborative relationship, the buyer and supplier have high-level trust with each other. For this study, trust is used as a proxy for collaborative buyer-supplier relationship.

Research has shown that trust in a collaborative relationship tempers the buyer's opportunism or the possibility of intentionally abusing its power of being the bridge. The result is a more transparent information flow between the supplier and the buyer (Balakrishnan, Mohan, and Seshadri, 2008). Fewer "surprises" would occur in the resulting contractual relationship among the supplier, the buyer, and the buyer's customer. Thus the following hypothesis is put forward:

*H1a: Buyer-supplier trust negatively moderates the effect of HI such that the effect of HI is weaker when there is a high level of buyer-supplier trust.*

Lastly, the effect of bridge transfer is not universal across all services types. While it holds for customer facing services, it does not hold for quasi-manufacturing type of services. In quasi-manufacturing, on the contrary to pure services, there is no direct contact between the end customers and the service suppliers post services outsourcing arrangements. Therefore, the linkage between services suppliers and the buyer's customers does not exist in this context. The supplier firm will not be able to assume the powerful bridge position post services outsourcing arrangements. Furthermore, due to the lack of customer inputs in quasi-manufacturing, there is a low degree of variability and uncertainty in the service creation process. It is easier for the buyer firm to estimate task difficulties

and complexities. Therefore, it leaves less room for the supplier firm to game the system. Thus the following hypothesis is put forward:

*H1': The effect associated with H1 is not found in the outsourcing of quasi-manufacturing services.*

Although the effect of bridge transfer on contract cost increases does not apply to the quasi-manufacturing setting, the effect of buyer-supplier relationship is still salient in this context. Past research in incomplete contract theory has shown that there are elements in a contract that is difficult or impossible to specify (Bakos and Brynjolfsson, 1993) and investments in buyer-supplier trust can effectively contain any opportunistic behaviors of the supplier firm for these uncontractible items. Thus the following hypothesis is put forward:

*H1a': Buyer-supplier trust is negatively correlated to contract cost increases in the outsourcing of quasi-manufacturing services.*

### **2.3.2 The Impact of Bridge Transfer on Buyer's Cost of Quality**

Cost of quality refers to the “total cost incurred by (a) investing in the prevention of nonconformance to requirements, (b) apprising a product or service for conformance to requirements, and (c) failing to meet requirements. (Campanella, 1999, page 4). Cost of quality is one of the key variables of interest in operations management and it has received a lot of attention in the operations management field over the past two decades (Omachonu, Suthummanon and

Einspruch, 2004; Crosby, 1983; Campanella, 1987a; Plunkett and Dale (1986, 1987, 1988); Campanella (1987b), Feigenbaum (1991), Carr (1992), Gray (1995), Diallo et al. (1995), Johnson (1995), Willis and Willis (1996) quoted in Grimm, 1987, pp. 397-412) Harrington, (1987, 1999), Robinson (1997), Shah and Fitzroy (1998), Gryna (1999), Dale (1999), Dale and Plunkett (1999), Campanella (1999) and Griffith (2003).

There are three major components of cost of quality: prevention costs, appraisal costs and failure cost (Juran, 1962; Freigenbau, 1991; Baiman et al, 2000; etc). Prevention cost refers to all activities specifically designed to prevent poor quality in products or services. Some examples of prevention costs in a services setting are costs of services review, quality planning, supplier quality surveys, process quality evaluations, quality improvement team meetings, quality improvement projects, quality education and training (Campanella, 1999). Appraisal costs are costs associated with measuring, evaluating or auditing products or services to assure conformance to quality standards and performance requirements. Some examples of appraisal costs are the costs of in-process and final inspection; product, process or service audits. Failure costs are costs resulting from services not conforming to requirements or customer/user needs. Failure costs are divided into internal and external failure cost categories. Internal failure costs occurring prior to delivery or shipment of the product, or the furnishing of a service, to the customer. In a services outsourcing context, as stated earlier, the service suppliers will be in direct contact with the buyer's customers during the service delivery process and there is no ready measure for a



quality check prior to the service delivery. Therefore, internal failure cost does not apply to services outsourcing case. External failure costs occurs after delivery of services to the customer. Examples are the costs of processing customer complaints, customer returns and warranty claims (Campanella, 1999).

The extant research on cost of quality is primarily manufacturing driven and typically examines how manufacturing firms can ensure quality products, what is the cost of “no quality” and the trade-off between quality investments and costs of no quality (Feigenbaum, 1956; Juran, 1951, 1962; 1988; etc). Besides investigating the dynamics of cost of quality within a firm, a few studies also extended it to inter-firm setting and examined the implication of manufacturing outsourcing on cost of quality (Baiman et al, 2000).

Two gaps have been observed in the extant literature. One is that the existing cost of quality categories are manufacturing specific and do not fit services outsourcing context very well. In this study, the cost of quality categories and measurement items that are appropriate for services setting context were derived. More importantly, the existing research is dyadic (buyer-supplier) at best and omitted the dynamics at the triadic level (buyer-supplier-customer). This sole focus on the dyadic link between the service buyer and the service supplier is not sufficient for cost of quality concerns in a services outsourcing context. Maltz and Ellram (1997) proposed that the total cost of the relationship in logistics outsourcing decisions should consider both the costs of monitoring the service buyer and logistics service suppliers’ interface and logistics service suppliers and end customer interface. It calls for an examination beyond the

dyadic linkage between service buyers and service suppliers. This research answers this call by investigating the impact of the buyer-customer link on the buyer's cost of quality. In other words, what happens to the buyer firm's cost of quality when the buyer firm takes a hands-off approach and relies entirely on its supplier to take care of its customer was examined.

Specifically, appraisal cost, prevention cost and external failure costs are examined. Internal failure cost is excluded because it does not apply to a services outsourcing setting. (Service operation is carried out in front of customers so there is no internal quality check mechanism to catch the failure prior to its delivery to the final customers, as commonly used in the manufacturing setting). It is believed the triadic structure of bridge transfer will impact all of the three relevant categories of cost of quality for the service buyer firm.

When the service buyer firm takes a hands-off approach to the outsourced services and relies entirely on its suppliers to take care of the end customers, it makes quality appraisal very difficult. From the services operation literature it was noted that pure services entail a large amount of customer inputs and therefore it is difficult to be standardized and/or measured (Schonberger, 1980; Levitt, 1981). Further, service quality is defined as the gap between customer's quality expectation and perceptions. Since each customer has his/her own unique expectations and perceptions, it makes the service quality evaluation difficult. Therefore, the key to service quality measurements and evaluation is a thorough understanding of the customers' needs. This is only possible if the service buyer firm is in direct and constant contact with its end customers. When bridge

transfer occurs, there is a breakage between the service buyer and buyer's customers. As a result, the service buyer firm will not be in tune with the needs and expectations from its end customers. This makes the measurement and evaluation of service quality difficult. Thus, the buyer's costs associated with service appraisal will increase.

Prevention cost refers to all activities specifically designed to prevent poor quality in products or services. Some examples of prevention costs in a services setting are costs of services review, quality planning, supplier quality surveys, process quality evaluations, quality improvement team meetings, quality improvement projects, quality education and training (Campanella, 1999). Similar to service appraisal costs, without a thorough knowledge of customers' needs and expectations, it is difficult for the buyer firm to design a quality prevention program. Thus bridge transfer increases prevention cost as well.

External failure costs occurs after delivery of services to the customer. Examples are the costs of processing customer complaints, customer returns and warranty claims (Campanella, 1999). Bridge transfer has two negative effects on service recovery. First, it increases the total number of service failures and secondly, it increases the unit cost associated with each service recovery. Previous research has found that there is an inverse relationship between appraisal cost, prevention cost and failure cost (Omachonu, Suthummanon and Einspruch, 2004). When it is difficult to prevent service failure, there will be more occurrences of quality problems.

The disconnect between the service buyer firm and the buyer's customers also increases the unit costs associated with service recovery. Bridge transfer makes it difficult to detect the service failure point and trigger timely service recovery responds. Research has shown that the speed of service recovery matters (Hart et al, 1990; Miller, Craighead and Karwan, 2000). A service failure is more effective when the problem is solved promptly. In fact, Hart et al. (1990) posited that the ideal timing to identify and solve a service problem is before the customer becomes aware of it. When there is a disconnect between the service buyer firm and the buyer's customer, it slows down the service recovery speed and misses the ideal timing for service recovery. In addition, without a thorough knowledge of customer needs, it is difficult to know the content of the service recovery that would please its customers. In summary, bridge transfer will increase the appraisal cost, prevention costs and service recovery costs associated with service outsourcing. Thus, the following hypothesis is put forward:

*H2: In the context of outsourcing of pure service, bridge transfer is positively correlated to the buyer's cost of quality.*

Further, buyer-supplier trust would moderate the impact of bridge transfer on buyer's cost of quality. When the service buyer and service supplier engage in a trusting relationship, the service buyer firm can rely on the service supplier firm to communicate any quality problem openly and in a timely fashion. It is also linked to buyer-supplier commitment to work together for quality prevention and improvement projects. In a way, buyer-supplier trust complements the disconnect

between the service buyer firm and its end customers. The supplier becomes a reliable extension of the service buyer firm and thus reduces the buyer's cost of quality. Thus, the following hypothesis is put forward:

*H2a: Buyer-supplier trust negatively moderates the effect of H2 such that the effect of H2 is weaker when there is a high level of buyer-supplier trust.*

The effect of H2 is not applicable to quasi-manufacturing type of services. In the quasi-manufacturing context, due to the lack of customer interaction, thus less variation, services operations can be standardized. Much like in a manufacturing setting, a buyer can specify how long a given type of nail needs to be, a firm who outsources its payroll processing services can specify how many payroll forms need to be processed in a given timeframe. Because of this standardization and reduced variation, for quasi-manufacturing services, service buyer firms can better monitor the service processes and design service quality improvement programs, with or without maintaining constant operational contacts with their customers. They can also specify in the contract with more precision of what is required of the service supplier and can better gauge services outcomes. Continuing with our payroll processing example, the service buyer firm can evaluate suppliers' work by the number of payroll processing errors. This enables service buyers to put in preventive measures such as penalty clauses in their contract to punish suppliers for their service failures and thus effectively reducing external failures and the costs associated with them. Again, due to the reduced

variability, this can be done with or without maintaining constant operational linkages with their customers. Thus, the following hypothesis is put forward:

*H2': The effect associated with H2 is not found in the outsourcing of quasi-manufacturing services.*

Although the effect of bridge transfer on buyer's cost of quality does not apply to the quasi-manufacturing setting, the effect of buyer-supplier trust is still salient in this context. Past research has shown the direct and moderating effects of buyer-supplier trust on buyer's quality practices and quality performance (Fynes and Voss, 2002). When buyer firms and supplier firms engage in a trusting relationship, the cost to monitor the supplier firm will reduce. Further, it will reduce the external failure costs due to improved quality performance. Thus, the following hypothesis is put forward:

*H2a': Buyer-supplier trust is negatively correlated to the cost of quality of the buyer firm in the outsourcing of quasi-manufacturing services.*

### **2.3.3 The Impact of Bridge Transfer on Customer Satisfaction**

Lastly, this research examined service quality which is an important factor in services (Anderson et al, 1994; Bitner and Brown, 2006; Rust and Zahorik, 1993; Anderson and Sullivan, 1993; etc.). Service quality perception measures how a given service supplied by a company meets or exceeds customer

expectations (Zeithamal and Bitner, 1996; Parasuraman, Zeithamal and Berry, 1985).

Similar to the previous two services outsourcing outcomes, research in services quality perception mainly focused on how service providers can satisfy the end customer. Tate, Ellram and Brown (2009) expanded the research scope and proposed a stakeholder perspective where the expectation of outsourced services came from suppliers, business units, supply management and end customers and they assessed how a buying firm and supplier work together to meet these expectations. Similar to Tate et al (2009), this study stresses that the service supplier-end customer link is not the only important link that contributes to service quality. This research honed in on the service buyer-end customer link and examines the strength of this specific link on service quality perception.

The service quality offered to buyer's end customers is likely to drop if the service buyer firm takes a hands-off approach to the outsourced services and stop communicating with the end-customers, thus creating a structural hole between them. For pure service that entails a high degree of customer contact and thus a high degree of variability and uncertainty, it is very difficult to standardize, measure and specify services quality into contracts (Schonberger, 1980; Levitt, 1981). As the old saying goes, you cannot manage what you cannot measure. This "un-measurability" leaves room for further gaming behavior of the service supplier firm. When bridge transfer happens, the service supplier firm, strategically positioned in the path of communication between the service buyer firm and its end-customers, can play off the buyer and the end customers by

offering lower quality service to save costs. Service quality is shown to be closely related to customer satisfaction (Taylor and Baker, 1994; Cronin, Brady and Hult, 2000; Cronin and Taylor, 1992; etc.). Low service quality will decrease customer satisfaction.

However, service quality and customer satisfaction degradation is less likely if the service buyer firm is actively monitoring its customers and communicating directly with its customers, thus, effectively stopping bridge transfer from occurring. In this case, the buyer would have instant feedback on quality problems and customer satisfaction ratings and could exert influence on the supplier via contractual terms.

This study examines service quality perception for the customer node in the services outsourcing triad instead of directly examining customer satisfaction. Past research has shown a very close relationship between service quality perception and customer satisfaction (Cronin and Taylor, 1992). Further, research has confirmed the sequencing effects between these two constructs, i.e., one must first form a service quality perception before forming an emotional response of satisfaction (Cronin and Taylor, 1992). To test the effects of bridge transfer on service quality, the following hypothesis is put forward:

*H3: In the context of outsourcing of pure services, bridge transfer is negatively correlated with the service quality end customers received.*

Buyer-supplier relationship would also moderate the impact of bridge transfer on service quality and customer satisfaction. Trust in a collaborative



relationship tempers the buyer's opportunism or the possibility of intentionally abusing its power of being the bridge. When the service buyer and service supplier engage in a collaborative relationship, the supplier is entrusted to offer a consistent level of services to its customers and ensure a high level of customer satisfaction (Balakrishnan, Mohan, and Seshadri, 2008). Similarly, an adversarial relationship between the service supplier and the service buyer enhances the service supplier's opportunistic tendency of lowering service quality, leading to a low level of customer satisfaction. Thus the following hypothesis is put forward:

*H3a: Buyer-supplier relationship negatively moderates the effect of H3 such that the effect of H3 is weaker when there is a high level of buyer-supplier trust.*

Lastly, the effect of bridge transfer on service quality is not applicable to the outsourcing of quasi-manufacturing. In quasi-manufacturing setting, due to its less variability and high level of measurability, with or without constant operational linkage the buyer firms can easily spot quality problems and implement penalty clause in the contract to penalize suppliers for their quality problems. Thus, the following hypothesis is put forward:

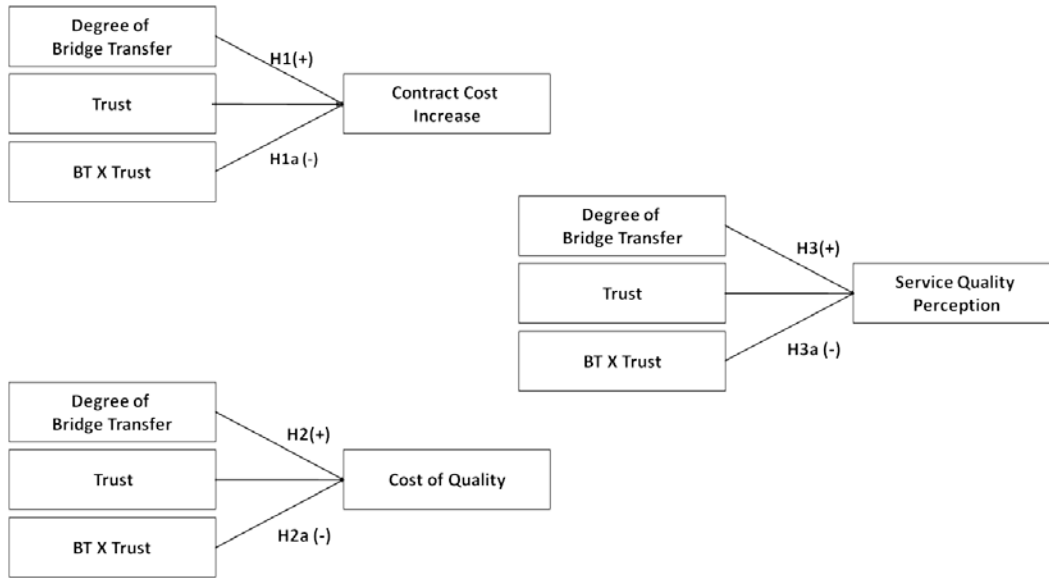
*H3': The effect associated with H3 is not found in the outsourcing of quasi-manufacturing services.*

Similar to the line of arguments for H1a' and H2a', although the effect of bridge transfer on service quality does not apply to the quasi-manufacturing setting, the effect of buyer-supplier trust is still salient in this context. Buyer-

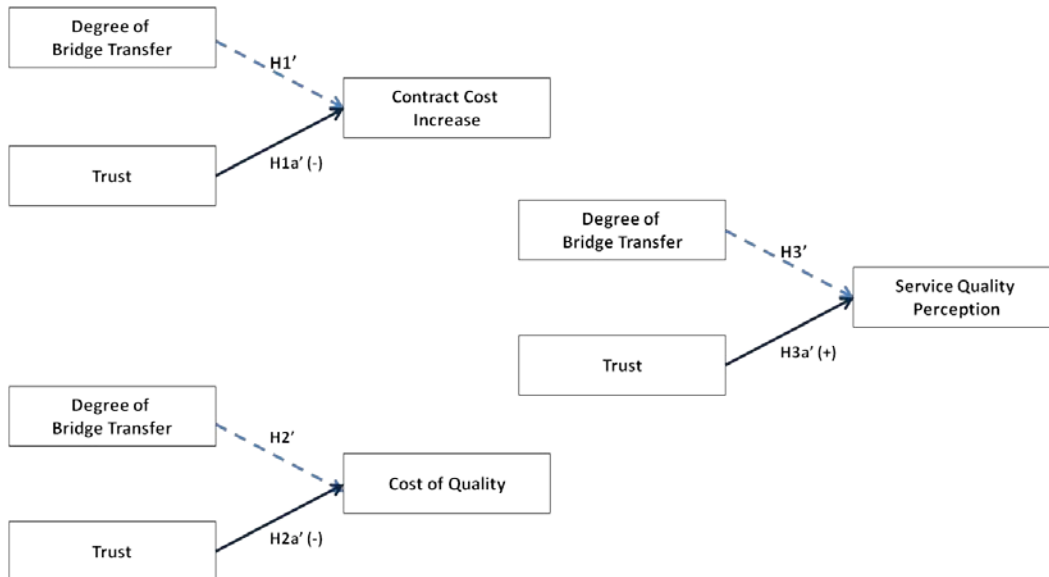
supplier trust is shown to have direct and moderating effects of suppliers' quality offering (Fynes and Voss, 2002; Goffin, Lemke and Szwejczewski, 2006). When buyer firms and supplier firms engage in a trusting relationship, the supplier's quality performance will improve. Thus, the following hypothesis is put forward:

*H3a': Buyer-supplier trust is positively correlated to the service quality of the supplier firm in the outsourcing of quasi-manufacturing services.*

In this chapter, the impacts of bridge transfer on outsourcing outcomes for customer facing pure services and for quasi-manufacturing types of services are hypothesized separately. In addition, the role of buyer-supplier trust is hypothesized. Figure 2-6 in the next page depicted the operationalized models for this study. In the next chapter, the methodology used to test these hypotheses will be discussed.



**Figure 2-6a. The Effect Model (the Impacts of Bridge Transfer on Services Outsourcing Outcomes in the Context of Customer Facing Pure Services)**



**Figure 2-6b. The No-Effect Model (the Impacts of Bridge Transfer on Services Outsourcing Outcomes in the Context of Quasi-Manufacturing Services)**

**FIGURE 2-6. Operationalized Models for Hypothesis Testing**

## **METHODOLOGY**

This section serves three purposes. First, data collection method is explained. Then, the operationalization of key constructs is described. Lastly, data analysis approach is discussed.

### **3.1 Data Collection**

In this sub-section, data collection method, the unit of observation, unit of analysis and context of analysis are addressed. Then sample selection is described.

#### **3.1.1 Survey Method**

This study utilized a survey as the primary mode of data collection. Questionnaires measuring the key model constructs (triadic structure, type of services, buyer-supplier relationships and outsourcing outcomes) were developed based on existing literature (social network theory, service operations and buyer-supplier relationship) and the theoretical definitions of these constructs. These questionnaires were pilot-tested with MBA students for face validity and then tested with business executives who had had services outsourcing experiences and modified accordingly. Then a final version was distributed to selected companies affiliated with CAPS Research and the Institute of Supply Management (ISM).

The distribution of the questionnaires to CAPS affiliated firms has gone through two steps. In step one, 131 email invitations were sent to Chief

Purchasing Officers (CPO) of firms affiliated with CAPS research to ask if 1) They had outsourced any service functions prior to September, 2007; 2) They were willing to cooperate with our research. If so, we also asked the CPOs to nominate employees within their organizations who were familiar with their services outsourcing initiatives and were able to answer questions regarding the key constructs of our study. As the result of step one, 40 employee contacts were identified.

In the second step, questionnaires were sent out to the target employees nominated by their CPOs in addition to contacts from firms affiliated to ISM. Altogether 2690 emails were sent out. Out of these firms, an estimate of 48% of the firms did not outsource services (based on Tate and Ellram, 2006). The effective number of emails sent out was then reduced to 1291. This number was used to compute response rate.

Two reminder emails were sent out to the target firms, each time extending the deadline to 3 more weeks. After the second extension, 120 responses were received. This number increased to 160 after the third and final extension. The response rate was 12.39% (based on the estimate of effective number of emails sent). To assess respondent bias, a set of 27 ANOVAs were run to compare the responses for key dependent and independent constructs across the early respondents and late respondents. The p-values for these 27 ANOVAs ranged from .073 to .961, none of them were statistically significant at the .05 level. Therefore, respondent bias was not of a major concern.

Four of the 160 responses were disregarded due to missing data. Of the remaining 156 responses, 50 of them were related to the outsourcing of pure services. Eighty-seven of the 156 responses were related to outsourcing of quasi-manufacturing type of services. The rest of the responses were related to mixed-services and were disregarded (n=19). Mixed services combine characteristics of pure services and quasi-manufacturing and therefore do not allow a clean separation of the effects.

### 3.1.2 Sample Descriptive

Table 3-1 broke down the observations by industry. Overall, observations from firms affiliated with CAPS Research and ISM covered a wide range of industries (27) including aerospace (n=15), health care (n=12), industrial manufacturing (n=11), pharmaceutical (n=9), etc.

**Table 3-1**

*Sample Observations by Industry*

Industry	Total Number of Obs.	Percentage
Aerospace and Defense	15	9.55%
Automotive and Transport	4	2.55%
Business Services	2	1.27%
Chemical	3	1.91%
Computer Hardware	3	1.91%
Computer Software	2	1.27%
Computer Products	7	4.46%

<b>Manufacturers</b>		
Diversified Foods & Beverages	3	1.91%
DOE/NNSA	3	
Contractors		1.91%
Electronics	3	1.91%
Engineering and Construction	3	
Financial Services	8	5.10%
Health Care Services	12	7.64%
Higher Education	2	1.27%
Industrial Manufacturing	11	7.01%
Leisure, Lodging & Restaurants	1	0.64%
Media	1	0.64%
Metal and Mining	4	2.55%
Pharmaceutical	9	5.73%
Retail	5	3.18%
Semiconductor	7	4.46%
Telecommunication Equipment	3	1.91%
Telecommunication Services	2	1.27%
Utility	4	2.55%
Petroleum	2	1.27%
Other	37	24.20%
<b>Total</b>	<b>156</b>	<b>100.00%</b>

### **3.1.3 Unit of Observation, Unit of Analysis and Context of Analysis**

The unit of observation is the “thing” on which measurements are originally taken (Knapp, 1982). For this study, the majority of the variables were observed at each outsourcing instance level.

The unit of analysis for this study was at the outsourcing instance level. It purposely stayed away from the firm level to avoid extrapolation. Each outsourcing instance has its unique characteristics such as the type of service being outsourced, the level of trust between team members from the buyer firm and the supplier firm, the triadic relationship arrangements, etc. What happens to one outsourcing instance may or may not represent the outcome of another instance and it certainly does not represent the outcome at the firm level. This is especially true in large corporations with many relatively independent divisions. The Hewlett-Packard (HP) Company offers a good example of the independent nature of divisions. HP has four relatively independent branches: the Imaging Group, the Personal Computer Group, the Server Group and HP Services. Within each branch, there are many high-level independent organizations. In fact, in 2006, there were over 200 sub-organizations within HP that had Executive Vice President (VP) level appointments. These organizations all had their own decision making capabilities, including the decision to outsource. In situations like this, what one team did may not have any impact on another team within a different department of a different division. For example, the outcome of one outsourcing instance in the IS department within the Personal Computing Division may not have any impact on the outcome of another outsourcing instance in the R&D Department within the Imaging Division. Therefore, it is inappropriate to analyze instance level data and derive conclusions at the firm level.



Although services outsourcing initiatives, specifically, the substitution type of outsourcing can happen to every firm, they are most prevalent in large corporations. This is due to the fact that large organizations are more likely to branch out to many functional units and later have the need to substitute its internal functions by external vendors. (Small firms typically use abstention outsourcing due to the lack of capabilities). This is why we should constrain our level of analysis at an instance level to deal with the independent nature of decision making within large firms. This does not mean our results do not generalize to small firms. For small firms that only have one outsourcing instance, it is still at each outsourcing instance level except there may only be one instance for that firm, in which case, the firm level data may be equal to instance level data.

The context of analysis refers to the framework in which the analysis is actually carried out (Knapp, 1982). This study examined outsourcing risks in the context of the triad of the service buyer, service supplier and the buyer's customers. As a triadic level construct, two implicit assumptions were made. One was that the buyer-supplier link remains post services outsourcing. This was a reasonable assumption given that the buyer firm still pays the bill for the services rendered by the supplier firm. The second was that the supplier-customer link remains post services outsourcing. This is consistent with the definition of pure services. In pure services, the service supplier and the end customer have intense physical or virtual contacts (Chase, 1978; Frohle and Roth, 2004). The two implicit assumptions ensured the existence of a triad in service outsourcing.

In this regard, our key independent construct, bridge transfer, was a triadic level construct.

### 3.2 Operationalization of Variables

Five key constructs were included in the theoretical model. Table 3-2 below provided definitions of these constructs. In the following section, the operationalization of these constructs is discussed, with particular attention pays to the construct of bridge transfer, which has not been examined or operationalized before.

**TABLE 3-2**

*Definitions of Constructs*

Construct	Definitions	Reference
Bridge Transfer	<p>Bridge transfer refers to the removal of the bridge status from one node and its simultaneous relocation to another node in a triadic network. It encompasses the weakening and disappearing of operational ties between two previously connected actors and the appearing and strengthening of operational ties between two previously unconnected actors. Further, the removal and the relocation of the bridge position needs to happen concurrently in order to maintain the triadic structure.</p> <p>In this study, bridge transfer is operationalized as the strength of operational ties between the service buyer firms and the buyers' end customers in their primary task environment. A primary task environment refers to the focal firms' immediate suppliers and customers.</p>	<p>Li and Choi, 2009; Anderson et al., 1994.</p>

Supplier's Appropriation Behavior	<p>A supplier takes advantage of his/her customers' dependence on him/her and thereby increases his/her part of the total end customer revenues.</p> <p>In this study, it refers to the tendency of suppliers to increase contract costs above and beyond the buyers' expectations.</p>	Walker (1988), Brindley (2004)
Buyer's Cost of Quality	<p>Total cost incurred by (a) investing in the prevention of nonconformance to requirements, (b) apprising a product or service for conformance to requirements, and (c) failing to meet requirements.</p>	Juran, 1962; Feigenbau, 1991; Baiman et al, 2000; Omachonu, Suthummanon and Einspruch, 2004; Crosby, 1983; Campanella (1999) and Griffith (2003), etc.
Customer Satisfaction	<p>Customer satisfaction refers to how a given service supplied by a company meets or exceeds customer expectation.</p> <p>In this study, service quality perception was used as a proxy for customer satisfaction.</p>	Zeithamal and Bitner, 1996; Parasuraman, Zeithamal and Berry, 1985.
Pure Service	<p>Pure services refer to operations where major production is carried out in the presence of the customers.</p>	Chase, (1977, 1978,1981, 1983), etc.
Quasi-Manufacturing	<p>Quasi-manufacturing services refer to operations where major production is carried out without the presence of the customers.</p>	Chase, (1977, 1978,1981, 1983), etc.
Buyer-Supplier Partnership	<p>Purposive strategic relationships between the independent firms who share compatible goals, strive for mutual benefit, and acknowledge a high level of mutual interdependence.</p> <p>In this study, buyer-supplier trust was used as a proxy for buyer-supplier partnership.</p>	Mohr and Spekman, 1994.

### 3.2.1 Key Model Variables

#### Bridge Transfer

In the context of the triadic structure in services outsourcing, bridge transfer describes the state of the weakening and loss of operational connections between the service buyer firm and the buyer's end customers and the establishment and strengthening of the operational connections to the service suppliers in their primary task environment (Li and Choi, 2009; Anderson et al, 1994). A primary task environment refers to the focal dyads' immediate suppliers and customers (Anderson et al., 1994).

Based on this description, we can see bridge transfer is closely related to the construct of "tie strength" (Granovetter, 1973; Wellman, 1982; Marsden and Campbell, 1984; Nelson, 1989; Krackhardt, 1992, etc.) For this study, tie strength is defined as the intensity of operational linkages between two firms. Therefore, the degree of bridge transfer in services outsourcing setting is operationalized as varying levels of "tie strength" between a service buyer firm and the buyer's end customers. Since bridge transfer involves both the weakening and disappearing of operational ties between two previously connected actors and the appearing and strengthening of operational ties between two previously unconnected actors, an implicit assumption here is the establishment of operational ties between the service supplier firm and the end customers. This assumption is supported by the definition of services operation, i.e., large amount of interaction between the service supplier and the end customer (Sampson and Froehle, 2006; Gaither and

Frazier 1999; Sampson, 2001; Chase & Aquilano, 1977; Kellogg & Chase, 1995) and therefore is a reasonable assumption. For this study, the focus is on the measurements of the tie strength between the service buyer firm and the buyer's end customers.

### **Existing Measurements of Tie Strength**

The measurement of tie strength for this study is built on existing literature. The network literature has provided measures for tie strength at individual and project levels. It has also offered a few examples of tie strength measurements at inter-organizational levels, though its application is limited to extended networks context and in binary settings (i.e., weak versus strong ties). The following paragraphs address existing measures of tie strengths at different levels of analyses and point out gaps in the existing literature. Then common characteristics of tie strength construct across different levels of analyses will be derived.

The concept of tie strength originated at interpersonal level of analysis (McEvily and Zaheer, 1999; Rindfleisch and Moorman, 2001; Granovetter, 1973; Nelson, 1983; Nelson, 1989; Reagans and McEvily, 2003). A large amount of literature investigated the effects of social ties and varying degree of tie strength on career mobility (McEvily and Zaheer, 1999). For example, Friedman and Krackhardt (1997) examined the career outcomes of Asian Immigrants and discovered a positive correlation between social capitals on improved career outcomes. Similarly, Podolny and Baron (1997) found that "individual's mobility is enhanced by having large, sparse network of informal ties for acquiring

information and resources (p.673)”. Here a sparse network is a synonym for weak ties. There are other studies at individual level that examined the impacts of tie-strengths in non-career settings such as in schools (Granovetter, 1983). These studies contrasted the effects of weak ties versus strong ties. It is commonly agreed that while strong ties build trusting relationships, weak ties are more useful in promoting career advancement (Podolny and Baron, 1997 and many others).

McEvily and Zaheer (1999) proposed that the concept of tie strength, although originated at individual level, works equally well at higher levels of analysis. Indeed, in recent years, there have been studies of tie-strength at both intra and inter-organizational level as well as at industry cluster levels (Achrol and Kotler, 1999; Gulati, 1998; Hansen, 1999; McEvily and Zaheer, 1999; Rindfleisch and Moorman, 2001). At firm level, Rindfleisch and Moorman examined the effects of tie strength on new product alliances. Their findings suggested that strong tie enhances the acquisition and utilization of information in new product alliance. On the other hand, McEvily and Zaheer (1999) noted that weak ties are good for access to new information, ideas and opportunities within a competitive network. Finally, Tiwana (2008) reconciled the differences and pointed out the complementary nature of strong ties and weak ties in innovation-seeking alliances. While weak tie can provide knowledge potentials, strong ties can provide integration capacities.

## **Gap in Existing Measurements**

A careful review of the existing literature on the measurement of tie-strength revealed three gaps. First, tie strength measurement has been largely used at individual level of analysis (Granovetter, 1979; 1982; Nelson, 1983; Nelson, 1989; Reagans and McEvily, 2003 and many more). For a few studies that applied this construct at firm level, it was used mostly in a network setting (McEvily and Zaheer, 1999; Rindfleisch and Moorman, 2001). It does not address the unique situation in services outsourcing where we have a focused triadic relationship structures among the buyer firm, the supplier firm and the buyer's end-customers. A triadic structure differs from a network structure in that many network level tie strength indicators such as network density and network distance do not apply at the triadic level. Yet triadic structure, being the fundamental block making up a social network, deserves much more attention (Madhavan, Gnyawali and He, 2004). Madhavan et al (2004) argues that triadic structure is "an important , but neglected aspect of interfirm networks" (p. 918) because it is strategically placed between the dyadic level of analysis we are used to and the higher-order network level analysis.

Secondly, tie strength measurement has been used almost exclusively as a binary variable, i.e., weak versus strong. Yet the treatment of tie strength is more of a "customary" rather than a must (Brown and Reigen, 1987; Krackhardt, 1992;). For example, in Brown and Reigen (1987)'s research on social ties and word-of-mouth referral behavior, the researchers collected measurements of tie strength indicators such as communication frequency at ordinal level. They then

arbitrarily split the data into two groups (strong ties versus weak ties). They justified their approach as “customary in the research on this topic” (page 350). There is no real theoretical justification of why this has to be done. This study sets out to measure tie strength as a continuous variable to capture the richness of information contained in varying levels of data values.

Thirdly, the existing tie strength measurements focused on innovation contexts (McEvily and Zaheer, 1999; Rindfleisch and Moorman, 2001, etc.). There has not been any research that can apply to services outsourcing context. This research attempts to fill in this gap. It sets out to derive a firm level measurement scale that is generic enough (not tied to a specific industry) for services outsourcing context and reflects the degree of connections in a continuous fashion.

### **Deriving an Empirical Measurement Scale for Tie Strength**

The existing network literature provides clues to the key indicators of tie strength. At the individual level of analysis, the frequency of contact has often been used as a proxy of tie strength (Podolny and Baron, 1997; Reagans and McEvily, 2003; Granovetter, 1973; Nelson, 1983; 1989). Other factors such as the presence of friendship and reciprocity are found to be closely related to the frequency of contact (Reagans and McEvily, 2003; Nelson, 1983, 1989). In addition, the emotional intensity and the intimacy (mutual confiding) are considered other indicators of tie strength (Granovetter, 1979; Marsden and Campbell, 1984; Krackhardt in *Networks and Organizations: Structure, Form and Action* edited by Nohria and Eccles, 1992).



Tie strength measurements at team and intra-organizational levels has also been discussed. In Tiwana (2008), tie strength at project levels was measured on a 5 items scale: 1) there is close, personal interaction among team members at multiple levels; At multiple levels, this project team is characterized by : 2) high reciprocity among members, 3) mutual trust among members; 4) mutual respect among members; 5) personal friendship between members. It is very obvious that these team-level measures have their roots in individual level indicators, i.e., the emphasis on interaction, reciprocity, mutual trust and friendships.

Tie-strength indicators at both inter-organizational level and industry cluster levels (Achrol and Kotler, 1999; Gulati, 1998; Hansen, 1999; McEvily and Zaheer, 1999; Rindfleisch and Moorman, 2001) have some resemblance to their individual level counter-parts but there are also differences. For example, McEvily and Zaheer (1999) measured firm-level tie strength with “infrequency of interactions”, “geographic dispersion” and “non redundancy” (p. 1145) which resembles individual level indicators. However, relationship intimacy, an inherent individual level construct, is not applicable to firm level (Granovetter, 1983). Researchers measured relational embeddedness (Rindfleisch and Moorman, 2001) instead. Rindfleisch and Moorman (2001) derived a four item scale that measured relational embeddedness among industry alliances in New Product Development settings. This scale includes indicators such as “indebtedness”, “close social relations”, “mutual gratifying” and intention for future collaboration.

Following Brown and Reingen (1987), this research actively distinguishes the form of connection and the content of connection. Brown and Reingen (1987) distinguished tie strength from tie content where tie strength represents the relational form and tie content represents the relational content. This distinction nicely captured the various key indicators of tie strength at the organizational level, as expressed by existing literature. The relational form represents the intensity aspect of tie strength, which can be measured by frequency, duration and quality of interactions. Some examples of such contacts are setting up meetings, exchanging email or telephone conversations. This aspect of tie strength is consistent with the classic tie strength literature across various levels (Granovetter, 1973; Marsden and Hurlbert, 1988; Burt, 1992). The relational content refers to the routine key operation steps involved in services production. An example of the key steps includes soliciting user requirements.

While the author agrees with Brown and Reingen's theoretical distinction of these two dimensions, I argue that relational form (tie strength) does not exist separate from relational content. In other words, when tie strength is measured, it has to be the strength of some content, i.e., the strength of content A vs. the strength of content B. Tie strength does not exist in vacuum. Therefore, instead of treating tie strength and tie contents as two unique concepts, this study embedded tie contents (operational linkage) into the measurement of tie strength and only addressed tie strength of a specific content.

The content of the tie in this study is the operational linkages between the services buying firms and the end customers. Operational linkage refers to a set

of routine interfirm interactions necessary to carry out operational tasks. Examples of these interactions can include gathering user requirements, monitoring service delivery process and soliciting user feedback. Based on the operational linkages between the service buyer firm and the buyer's customers at each key touch points of a service design and production process, a set of items were developed to measure the strength of operational ties between the service buyer and the buyer's customers. These measures contained both direct measurement of operational tie strength between service buyer firms and the buyers' end customers and indirect measurements. The indirect measurements refer to the reliance of the buyer firms on the service supplier firms to provide information regarding the end customers. This initial set of measurements contained 10 items and was further purified to 5 items for parsimony reasons and based on the amount of variance extracted. The respondents were required to rate them on a Likert-like scale of 6 points ranging from completely disagree (1) to completely agree (6). These 5 items include both direct measurements of tie-strength and indirect measurements. One example of the direct measurement items is "we regularly send out satisfaction surveys to our customer on outsourced services (reverse-scored)". On example of the indirect measurement items is "We relied on our supplier to obtain the latest user requirements." For a list of these items, please refer to Table 3-3 at the end of this section.

Tie strength in this study is treated as a continuous variable. The choice of treating tie strength as a continuous variable instead of a binary variable (weak vs. strong) is to guard against possible uneven sample sizes. Uneven sample size for

categorical data can create a problem on the robustness of the analytical results. Treating tie strength as a continuous variable can avoid this problem.

### **Buyer-Supplier Relationship**

The buyer-supplier relationship is measured as a continuous variable. In a way, the degree of the buyer-supplier partnership is measured. Since buyer-supplier trust is a salient characteristic in a collaborative buyer-supplier relationship (Pruitt, 1981; Williamson, 1985; Zand, 1972; Anderson and Narus, 1990; Mohr and Spekman, 1994; etc), it was used as a proxy for collaborative relationship in this study. While existing literature offered many dimensions of trust, for this study, trust in trading partner's honesty was used as it is closely related to opportunistic behavior. A 3-item scale was adopted to measure this construct. This is consistent with existing literature in trust in honesty measurements (Kwon and Suh, 2004; Bstieler, 2006).

### **Supplier's Appropriation Behavior**

A supplier's appropriation behavior was measured by the perceived increase in first term contract costs, repeat contracts costs and costs associated with changes to the existing contract (see table 3-3 for the exact measurement items used). First term contract is a new contract prior to which service provision was either by in-house staff or not required at all (Domberger, Fernandez and Fiebig, 2000). Repeat contracts are contracts that went beyond the first-period and have been renewed. In addition, we also measured perceived increase associated with any change requests that buyers initiated. An example of a

change request could be to increase the services scope currently offered by the suppliers. In a call center setting, the buyer could have asked the suppliers to take over the second level customer support in addition to the first level support.

The reason we used the perceptual measure is its versatility. Services outsourcing projects are diverse in their nature of work, scope of work and type of contract terms. Some projects require highly specialized personnel (such as the second and third level support in a call center) and therefore may have a high price tag associated with it. In addition, pricing arrangements vary. According to a research by Domberger et al. (2000), the most common contracts used in services outsourcing are fixed contracts, flexible contracts and a hybrid contract form with a good representation of each type in the actual services outsourcing arrangements. This diversity creates an obstacle for a unified “hard” contract price measure. At the same time, perception measures from experienced contract personnel reflects the perceived degree of contract costs increase above and beyond their expectations and can act as a more uniform base for comparison.

The respondents were asked five questions regarding their perception of first contract price, repeat contract price and change request costs as well as overall perception of contract cost. For overall contract cost, we asked both the direct perception and the perception of contract costs competitiveness across the industry. An example of these 5 questions include: “At the time of contract renewal (if applicable), our service suppliers had increased the total contract costs above and beyond the inflation rate.”

### **Buyer's Cost of quality**

Cost of quality categories include appraisal, prevention and failure costs (Gryna et al., 1999). In Omachonu et al, 2004, they have operationalized each sub-category of cost of quality along three dimensions: human inputs, materials and machine. For this study, only human inputs dimensions were adopted to fit the services context. External failure costs occur after delivery of shipment of the product, and during or after furnishing of a service, to the customer. This research operationalized the cost of external failure by the costs of service recovery. Cost of service recovery refers to the costs associated with offering psychological and tangible compensations for real and perceived damages (Bell and Zemke, 1987; Miller, Craighead and Karwan, 2000). Measurement items from both categories were created.

The final scale for cost of quality was composed of 6 items incorporating three categories: monitor cost, prevention cost and external failure cost. The exact items used are listed in table 3-3.

### **Service Quality Perception**

Service quality perception was measured by a 7-item scale. Respondents were asked their perception on 7 dimensions of service quality. This is consistent with Parasuraman et al., 1985. A composite score was then calculated for service quality perception.

### **3.2.2 Control Variables**

The key control variables included company size in number of employees, company size in gross sales dollars, the type of customers (internal customers vs. external customers) and contract type (new contracts vs. renewal of existing contracts). In addition, buyer-supplier relationship was a key control variable and was entered in the theoretical model for customer facing pure services. (It is a key independent variable in the theoretical model for quasi-manufacturing type of services). This study did not control for industry type because it covered a wide range of industries and because previous research has shown that in the context of research on outsourcing, industry type does not affect outsourcing outcomes (Daugherty, 1988; Loh and Venkatraman, 1992).

### **3.3 Data Analysis**

Data collected first when through a set of reliability analysis. Then Principal Components Analysis (PCA) was run to compute composite scores for each of the constructs. Based on the composite scores, six separate multiple regressions were run to detect the main and interaction effects of the theoretical models in the context of customer facing pure services as well as in the context of quasi-manufacturing type of services. Each step is briefly described below.

#### **3.3.1 Validation of the New Measurement Scale**

Bridge transfer is a new construct and has not been operationalized prior to this study. Therefore, construct validity is of our major concern. Construct validity refers to “the correspondence between a construct (conceptual definition

of a variable) and the operational procedure to measure or manipulate that construct” (Schwab, 1980, p.5). In a typical reflective construct paradigm, three essential components need to be established for construct validity: unidimensionality, reliability and validity (O’Leary-Kelly and Vokurka, 1998). However, as we later explain, the construct of bridge transfer is a formative construct and therefore does not fit into this paradigm.

Formative construct refers to the conceptualization of a latent construct where observed variables are modeled as the cause (instead of reflection) of latent constructs (Howell et al, 2007). As such, items within a scale that measure a formative construct do not have a requirement for high inter-item correlation. Rather, they are viewed as components of the construct.

Three key constructs in the theoretical models, i.e., Bridge Transfer (BT), Contract Cost Increase (CostInc) and Cost of Quality (CostQua) are formative in nature. Specifically, BT construct assesses the service buyer’s awareness of each of the key operational tasks such as defining user requirements, quality control and complaint handling. The awareness of one task does not have to be highly correlated with the awareness of another task. Yet collectively, they form an overall awareness score. Similarly, Cost of quality is assessed by a multi-item scale that is composed of three different cost categories (i.e., monitoring cost, prevention cost and external failure costs). Lastly, contract cost increase is a formative construct. It measures cost increase at each of the potential key contract stages: renewal, change request and final price. In the next few paragraphs, the three key aspects of construct validity for latent reflective



construct will be examined and explanation will be given as why they are not applicable measures for formative constructs.

Unidimensionality requires the establishment of a set of empirical indicators loads onto one and only one construct (Gerbing and Anderson, 1988; O’Leary-Kelly and Vokurka, 1998). This requirement does not work well with formative constructs where inter-item correlations are not always high. In fact, in a way, low inter-item ratings are preferred for formative constructs, indicating these items representing different dimensions of the construct. Therefore, unidimensionality was not assessed for the bridge transfer construct in this study.

Reliability refers to the consistency of a measure. It indicates how far the measurement is free from random error (Bollen, 1989; Carmines and Zeller, 1979; O’Leary-Kelly and Vokurka, 1998). For this study, the Cronbach  $\alpha$  coefficient was used to compute reliability for buyer-supplier trust (BST) scale and service quality perception (ServQual) scale. The Cronbach  $\alpha$  coefficient is regarded as one of the most popular methods for assessing reliability (Pedhazur and Schmelkin, 1991; Carmines and Zeller, 1979; O’Leary-Kelly and Vokurka, 1998). The Cronbach’s alpha for BST was 0.945 and the Cronbach’s alpha for ServQual was 0.941, providing evidence of reliability.

However, Cronbach  $\alpha$  coefficient computation depends highly on the inter-item correlations (Cortina, 1993) and therefore does not work well with formative construct. For the other three key formative constructs in the theoretical models, i.e., Bridge Transfer (BT), Contract Cost Increase (CostInc) and Cost of Quality, no reliability assessment was performed.

The validity of a measure refers to “the degree to which the variance in the measure is attributed to variations in the variable and not some other factor” (O’Leary-Kelly and Vokurka, 1998, p. 399). It encompasses two elements: convergent validity and discriminant validity (Campbell and Fiske, 1959). Convergent validity checks if items measuring the same construct loads together while discriminant validity checks if items measuring the same construct does not load onto other constructs (Campbell and Fiske, 1959). Similar to earlier discussion on the unidimensionality and reliability of formative constructs, convergent validity and discriminant validity do not readily apply to formative constructs.

### **3.3.2 Principal Component Analysis**

Since each construct was measured by a multi-item scale, Principal Component Analysis (PCA) was used to compute a composite score for each of them. PCA is a data reduction technique that assigns a weight to each measurement according to its relative contribution to a component. Compared to simply averaging each item within a scale to derive a mean score, PCA is more advantage in that its extraction maximizes the representation of a component.

### **3.3.3 Linear Regression**

Six linear regressions were run to test the main effect and moderation effects between the independent variable (the degree of bridge transfer), the moderating variable (level of buyer-supplier trust) and each of the three dependent variables (contract cost increase, cost of quality and service quality

perception). The control variables were included into the regression equation below. Three of the regressions were run on pure services data.

$$\text{CostInc} = \text{BT} * X_1 + \text{Trust} * X_2 + \text{Interact} * X_3 + \text{Employ} * X_4 + \text{Sale} * X_5 + \text{CustType} * x_6 + \text{ContractType} * X_7$$

$$\text{CostQua} = \text{BT} * X_1 + \text{Trust} * X_2 + \text{Interact} * X_3 + \text{Employ} * X_4 + \text{Sale} * X_5 + \text{CustType} * x_6 + \text{ContractType} * X_7$$

$$\text{ServQua} = \text{BT} * X_1 + \text{Trust} * X_2 + \text{Interact} * X_3 + \text{Employ} * X_4 + \text{Sale} * X_5 + \text{CustType} * x_6 + \text{ContractType} * X_7$$

The other three regressions were run on the quasi-manufacturing data.

$$\text{CostInc}' = \text{BT} * X_1 + \text{Trust} * X_2 + \text{Interact} * X_3 + \text{Employ} * X_4 + \text{Sale} * X_5 + \text{CustType} * x_6 + \text{ContractType} * X_7$$

$$\text{CostQua}' = \text{BT} * X_1 + \text{Trust} * X_2 + \text{Interact} * X_3 + \text{Employ} * X_4 + \text{Sale} * X_5 + \text{CustType} * x_6 + \text{ContractType} * X_7$$

$$\text{ServQua}' = \text{BT} * X_1 + \text{Trust} * X_2 + \text{Interact} * X_3 + \text{Employ} * X_4 + \text{Sale} * X_5 + \text{CustType} * x_6 + \text{ContractType} * X_7$$

### **3.3.4. Bootstrapping**

Although these observations were sufficient to provide partial support to the theoretical models, there was a concern over the accuracy of standard error estimation and confidence interval estimates. Toward that end, bootstrapping was performed. Bootstrapping is a “computationally intensive, non-parametric technique” (Mooney and Duval, 1993, p. 1) for making inference about population characteristics based on sample observations. It involves a large amount of repetitive re-sampling, with replacements, of the original sample data (Mooney and Duval, 1993). Bootstrapping has many advantages, one of which is that it has “superior small sample properties” (King, Tomz and Wittenberg, 2000, p. 352) and is useful in hypothesis testing when the sample size is relatively small (King, Tomz and Wittenberg, 2000; Ader, Mellenbergh and Hand, 2008). It accounts for “the distortions caused by the specific sample that may not be fully

representative of the population” (Ader et al, 2008, p 373). As such, bootstrap has been shown to improve error variances and confidence interval estimates (Felsenstein, 1985). In addition, bootstrapping overcomes problems associated with the violations of distribution assumptions (such as normality assumptions). Mooney and Duval (1993) offered detailed description of this procedure.

**Table 3-3**  
*Constructs, Item Measurements and Related Literature*

Construct/item measure	Source/construct
Bridge Transfer  Please rate the following statements pertaining to how you interfaced with your customers after your outsourced the services to your supplier. 1-Completely disagree 6-Completely agree	Based on theoretical definition.
BT1 We relied on our supplier to obtain the latest user requirements. BT2 After we outsourced our services to the supplier firm, we regularly surveyed our customers’ requirements on outsourced services*(reverse coded) BT3 We maintained close communication with our customers on the quality of the outsourced services*(reverse coded). BT4 We regularly sent out satisfaction surveys to our customers on outsourced services* (reverse coded) BT5 We responded to customer complaints directly* (reverse coded).	Strength of Operational Tie
Buyer-Supplier Trust  Please rate the following statements on a scale of 1 to 6 with 1 representing completely disagree and 6 completely agree.	Paulraj et al., 2008;
BS1 We can count on the supplier to be honest in its dealings with us.	Relational Trust
BS2 The supplier is a firm that stands by its word.	Relational Trust

BS5 The supplier can be counted on to do what is right. Relational Trust

---

Supplier's Appropriation Behavior Domberger, Fernandez and Fiebig, 2000.

Please rate the following statements on a scale of 1 to 6 with 1 representing completely disagree and 6 completely agree.

- |     |  |                        |
|-----|--|------------------------|
| BI1 | For the outsourced services, we have paid more than what had been anticipated in the beginning.  | Appropriation Behavior |
| BI2 | At the time of contract renewal (if applicable), our service suppliers had increased the total contract costs above and beyond the inflation rate. |                        |
| BI3 | Whenever we had requested additional work not specified in the signed contract, the supplier charged us above and beyond our expectation.          | Appropriation Behavior |
| BI4 | We felt we were charged a fair and reasonable amount of money for the services rendered by the supplier* (reverse coded).                          | Appropriation Behavior |
| BI5 | Compared to our competitors, we paid less for the overall contracted services.   | Appropriation Behavior |
- 

Buyer's Cost of quality Miller, Craighead and Karwan, 2000

Please rate the following statements on a scale of 1 to 6 with 1 representing completely disagree and 6 completely agree.

- |     |  |                       |
|-----|--|-----------------------|
| CQ1 | After we outsourced the services to our supplier firm, we allocated a large amount of resource (money or employees' time) to work on supplier quality review.                              | Appraisal Cost        |
| CQ2 | After we outsourced the services to our supplier firm, we allocated a large amount of resources (money or employees' time) to work on quality improvement programs at the supplier's site. | Prevention Cost       |
| CQ3 | We spent a large amount of time apologizing to our customers about services failures.  | Service Recovery Cost |
| CQ4 | We spent a large amount of time to fix services problems with the customers after the supplier rendered the services.  | Service Recovery Cost |
| CQ5 | We spent a large amount of resources on responding to customer complaints.   | Service Recovery Cost |

CQ6	Overall, we spent a large amount of money on services recovery.	Service Recovery Cost
Service Quality Perception		Parasuraman et al, 1985.
Please rate the following statements on a scale of 1 to 6 with 1 representing completely disagree and 6 completely agree.		
SQ1	Generally, the supplier provided services reliably, consistently, and dependably.	Service Quality Perception
SQ2	Generally, the supplier was willing and able to provide services in a timely manner.	Service Quality Perception
SQ3	Generally, the supplier was competent (i.e., knowledgeable and skillful).	Service Quality Perception
SQ4	Generally, the supplier was approachable and easy to contact.	Service Quality Perception
SQ5	Generally, the supplier was courteous, polite and respectful.	Service Quality Perception
SQ6	Generally, the employees made the effort to understand our customers' needs	Service Quality Perception
SQ7	Generally, the physical facilities and employees of our supplier's firm were neat and clean.	Service Quality Perception

## Chapter 4

### **RESULTS**

In this section, the results of the statistical analyses are presented. First, results of PCA analyses are addressed. Then assumptions and results of regression analyses are discussed.

#### **4.1 Principal Component Analysis**

Since there are multiple items for each of the 5 key constructs, Principal Component Analysis (PCA) was used to compute a composite score for each of them. The analysis was run using SPSS version 19.0.0 and the extraction method was principal component extraction. Only one component was extracted for each construct. The percentage variance extracted was 53.021% for the bridge transfer construct, 90.672% for the buyer-supplier trust construct, 49.763% for the contract cost increase construct, 74.404% for the service quality construct and 55.299% for the cost of quality construct. The component scores were then saved and used as inputs into the subsequent linear regressions.

#### **4.2 Linear Regression**

In this section, the results of the 6 linear regressions that tested the hypothesized theoretical frameworks are reported. Prior to reporting the regression results, the evaluation of the normality assumption are presented.

### **4.2.1 Normality Assessment**

Kolmogorov-Smirnov test was conducted to assess the normality of the composites scores. The p-value for the normality assessment was .200 for the bridge transfer composite, .200 for the cost of quality construct, .174 for the service quality construct, indicating no major problems with normality for these three constructs. The p-value for buyer-supplier trust construct was .047 and for contract cost increase construct was .023, indicating moderate problems with normality. Bootstrapping was then performed to account for the moderate violation to the normality assumption. Results of the bootstrapping are discussed later in this chapter.

### **4.2.2 Regression Results**

Ordinary Least Square (OLS) Regression analyses with list wise deletion were performed using SPSS version 19.0.0. Below the results of these analyses on sample data sets are reported. Further, the results of bootstrapping are reported.

#### **Regression on Contract Cost Increase for the Pure Service Model**

Table 4-1 presented the regression results on contract cost increase of the customer facing pure services model when all control variables were included. Specifically, BT\_operation refers to the degree of bridge transfer construct: the higher the number, the higher the degree of bridge transfer. BSREL refers to the degree of buyer-supplier trust: the higher the number, the higher the buyer trusts



the supplier firm. Interactionterm refers to the interaction between BT\_operation and BSREL: the higher the number, the more the increase in the magnitude (slope) for the relationship between BT\_operation and services outsourcing outcomes. CompanyEmployees is a control variable for company sizes as expressed in the number of employees. GrossSalesDollars is a control variable for company sizes as expressed in gross sales. Intvsext is a control variable for the type of customers, whether internal customers or external customers. Neworold is a control variable for whether the services outsourcing contract was a new one or renewal of an existing one. The same notations are used throughout all subsequent regression analyses.

**Table 4-1**

***Regression Results on Contract Cost Increase (the Effect Model)***

	Unstandardized		Standardized	t	Sig.
	Coefficients		Coefficients		
	B	Std. Error	Beta		
(Constant)	.817	.472		1.732	.094
BT_operation	.355	.172	.342	2.059	.049
BSREL	-.302	.180	-.287	-1.682	.104
interactionterm	.454	.167	.489	2.727	.011
CompanyEmployees	-1.086E-6	.000	-.130	-.824	.417
GrossSalesDollars	-1.065E-13	.000	-.101	-.609	.548
Intvsext	-.158	.402	-.063	-.394	.697
Neworold	-.487	.309	-.252	-1.575	.127

The linear combination of bridge transfer, buyer-supplier trust and the interaction between bridge transfer and buyer-supplier accounted for 37.8% of the

variance in contract cost increase,  $R^2=.378$ . The model was statistically significant,  $F(7,28)=2.428$ ,  $p=.045$ .

Based on table 4-1, none of the unstandardized coefficients for the control variables was statistically significant. Specifically, the unstandardized coefficient for company size (in the number of employees) was less than .01,  $p=.417$ . The unstandardized coefficient for company size (in gross sales dollars) was less than .01,  $p=.548$ . Along the same line, whether the end customers were internal customers or external customers did not make a difference on contract cost increase ( $p=0.697$ ). Whether the contract was a new contract or a renewal of existing contract did not make a difference on contract cost increase ( $p=0.167$ ).

The unstandardized coefficient for bridge transfer was 0.355 and it was significant at  $p=.049$  level. Hypothesis 1 was supported. A one unit increase in the degree of bridge transfer leads to a 0.355 unit increase in contract cost, holding everything else constant.

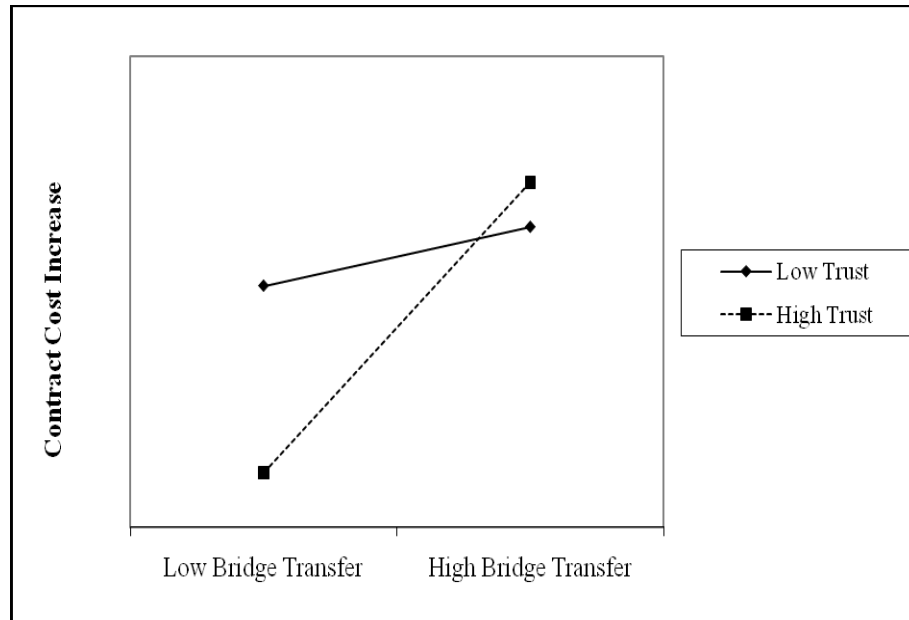
The unstandardized coefficient for the interaction of the degree of bridge transfer with buyer-supplier trust was 0.454 and it was significant at  $p=.011$  level. The slope of H1 varies based on the level of buyer-supplier trust. The effect was more pronounced when buyer firms and supplier firms engaged in a high trust relationship. Although the interaction term was significant, it was in the wrong direction. Therefore, Hypothesis 1a was not supported.

When multiple predictor variables were entered, multicollinearity among the predictor variables could distort parameter estimates. Therefore, Variance Inflation Factor (VIF) was computed to evaluate the severity of multicollinearity

among the predictor variables. For this set of data, the largest VIF was 1.2 and it was well below the commonly used 5.0 value. Therefore, multicollinearity was not of major concerns here.

Bootstrapping techniques was used to better gauge error variances and confidence interval estimates. Here control variables were removed from the original regression model for parsimony reasons (their unstandardized coefficients were not statistically significant) and because bootstrapping does not work well with categorical variables. One thousand random samples with replacement were drawn from the original data set and the confidence interval level was set to 95%. The results of the bootstrapping showed that the unstandardized coefficient for the bridge transfer variable was .395 and it was significant at .040 level. The 95% confidence interval was (.006, .743). Hypothesis 1 was supported based on data obtained via bootstrapping technique, in addition to evidence obtained from the original sample data set. In addition, the unstandardized coefficient for the interaction term was .491 and it was significant at .008 level. The 95% confidence interval was (.271, 1.020). Similar to the explanation made earlier, although the interaction term was significant, it was in the wrong direction. Therefore, Hypothesis 1a was not supported based on data obtained via bootstrapping technique, neither was it support based on evidence obtained from the original sample data set.

A subsequent post-hoc analysis was performed on the moderating effect of trust on the relationship between bridge transfer and contract cost increase. The result of this analysis is shown in Figure 4-1.



**Figure 4-1. Interaction Effect on Contract Cost Increase**

Figure 4-1 showed that when there was a low level of trust, the slope between bridge transfer and contract cost increase was comparatively mild. However, when there was a high level of trust, the slope between bridge transfer and contract cost increase was more steep than that of low trust. One unit increase in trust leads to .396 unit increases in the slope between the degree of bridge transfer and contract cost increases.

#### **Regression on Cost of Quality for the Pure Service Model**

The linear combination of bridge transfer, buyer-supplier trust and the interaction between bridge transfer and buyer-supplier accounted for 10.4% of the variance in contract cost increase,  $R^2=.104$ . However, the model was not statistically significant,  $F(7,30)=.499, p=.827$ .

Table 4-2 presented the regression results on cost of quality for the customer facing pure services model when all control variables were included (control variables were entered as a separate block of variables to get R squared change value). Based on Table 4-2, none of the unstandardized coefficients for the control variables was statistically significant. Specifically, the unstandardized coefficient for company size (in the number of employees) was close to 0,  $p=.480$ . The unstandardized coefficient for company size (in gross sales dollars) was close to 0,  $p=.784$ . Along the same line, whether the end customers were internal customers or external customers did not make a difference on contract cost increase ( $p=.865$ ). Whether the contract was a new contract or a renewal of an existing contract did not make a difference on contract cost increase ( $p=.586$ ).

**Table 4-2**

***Regression Results on Cost of Quality (The Effect Model)***

Model	Unstandardized Coefficients		Standardized Coefficients	T	Sig.
	B	Std. Error	Beta		
(Constant)	-.255	.565		-.452	.654
BT_operation	.206	.200	.192	1.030	.311
BSREL	-.179	.213	-.163	-.839	.408
interactionterm	-.068	.190	-.069	-.357	.724
CompanyEmployees	1.136E-6	.000	.127	.715	.480
GrossSalesDollars	-5.791E-14	.000	-.051	-.277	.784
Intvsext	-.084	.491	-.032	-.172	.865
Neworold	.198	.359	.099	.551	.586

The unstandardized coefficients for bridge transfer was 0.206 ,  $p=.311$ . Hypothesis 2 was not supported. There was no statistically significant relationship between the degree of bridge transfer and buyer's cost of quality. Similarly, the unstandardized coefficient for the interaction of bridge transfer and buyer-supplier trust was -.068,  $p=.724$ . Hypothesis 2a was not supported.

### **Regression on Service Quality Perception for the Pure Service Model**

The linear combination of bridge transfer, buyer-supplier trust and the interaction between bridge transfer and buyer-supplier accounted for 69.50% of the variance in contract cost increase,  $R^2=.659$ . The model was statistically significant,  $F(7,29)=8.016$ ,  $p<.001$ .

Table 4-3 presented the regression results on service quality perception for the customer facing pure services model when all control variables were included (control variables were entered as a separate block of variables to get R squared change value). Based on Table 4-3, none of the unstandardized coefficients for the control variables was statistically significant. Specifically, the unstandardized coefficient for company size (in the number of employees) was close to 0,  $p=.444$ . The unstandardized coefficient for company size (in gross sales dollars) was close to 0,  $p=.603$ . Along the same line, whether the end customers were internal customers or external customers did not make a difference on contract cost increase ( $p=.215$ ). Whether the contract was a new contract or a renewal of existing contract did not make a difference on contract cost increase ( $p=.457$ ).

The unstandardized coefficient for bridge transfer was -0.335 and it was significant at  $p=.017$  level. Hypothesis 3 was supported. A one unit increase in the degree of bridge transfer leads to a 0.335 unit decrease in service quality, holding everything else constant.

**Table 4-3**

***Regression Results on Service Quality Perception (The Effect Model)***

	Unstandardized Coefficients		Standardized Coefficients		
	B	Std. Error	Beta	T	Sig.
(Constant)	.591	.378		1.564	.129
BT_operation	-.335	.132	-.301	-2.535	.017
BSREL	.512	.141	.450	3.641	.001
Interactionterm	.396	.126	.388	3.144	.004
CompanyEmployees	-8.189E-7	.000	-.088	-.776	.444
GrossSalesDollars	7.267E-14	.000	.062	.525	.603
Intvsext	-.412	.325	-.148	-1.269	.215
Neworold	.186	.247	.087	.754	.457

The unstandardized coefficient for the interaction of bridge transfer and buyer-supplier trust was 0.396 and it was significant at  $p=.004$  level. The slope of H3 varies based on the level of buyer-supplier trust. The effect is less pronounced when buyer firms and suppliers firm engage in a high trust relationship. One unit increase in trust leads to .396 unit of change in the slope for the relationship between bridge transfer and service quality degradation. Hypothesis 3a was supported.

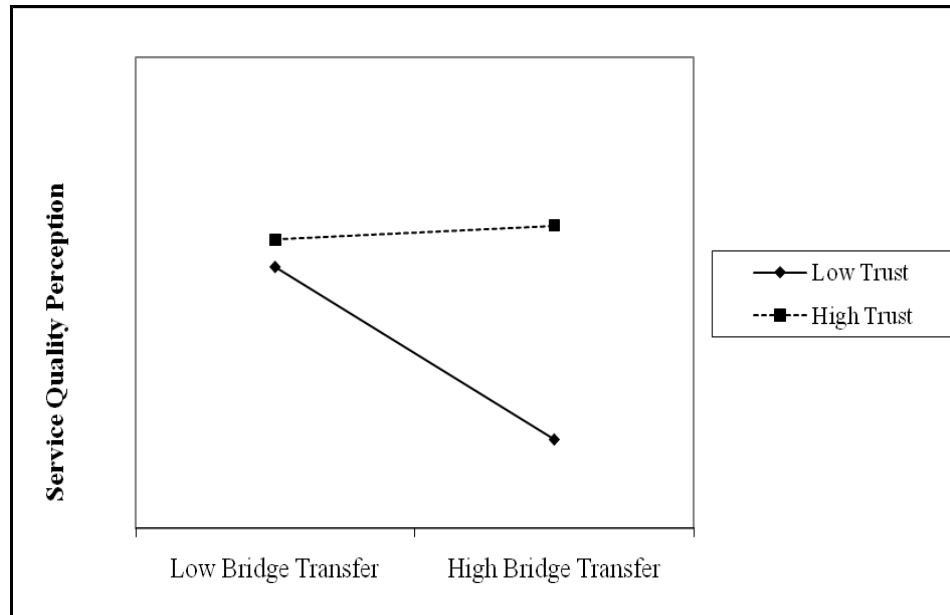
VIF values were examined to detect potential multicollinearity among the predictor variables. For this set of regression, none of the VIF was greater than 2.0. There was no evidence of multicollinearity present in the dataset.

Bootstrapping techniques was used to better gauge error variances and confidence interval estimates. Control variables were removed from the original regression model for parsimony reasons (their unstandardized coefficients were not statistically significant) and because bootstrapping did not work well with categorical variables. One thousand random samples with replacement were drawn from the original data set and the confidence interval level was set to 95%. The results of the bootstrapping showed that the unstandardized coefficient for the bridge transfer variable was .356 and it was significant at .025 level. The 95% confidence interval was (-0.697, -0.108). Hypothesis 3 was supported based on data obtained via bootstrapping technique, in addition to evidence obtained from the original sample data set. In addition, the unstandardized coefficient for the interaction term was .357 and it was significant at .016 level. The 95% confidence interval was (.136, .712). Hypothesis 3a was supported based on data obtained via bootstrapping technique in addition to data from the original sample data set.

Figure 4-2 depicted the moderation effect on service quality perception. When there was a low level of trust, the slope representing the relationship between bridge transfer and service quality perception was steep. However, when there was a high level of trust, the slope representing the relationship between



bridge transfer and service quality perception was relatively mild. One unit increases in trust level leads to .396 unit change in slope.



**Figure 4-2. Interaction Effect on Service Quality Perception**

#### **Regression on Contract Cost Increase for the Quasi-Manufacturing Model**

Table 4-4 presented the regression results on contract cost increase for the quasi-manufacturing model when all control variables were included. Based on Table 4-4 none of the unstandardized coefficients for the control variables was statistically significant. Specifically, the unstandardized coefficient for company size (in the number of employees) was close to 0,  $p=.923$ . The unstandardized coefficient for company size (in gross sales dollars) was close to 0,  $p=.783$ . Along the same line, whether the end customers were internal customers or external customers did not make a difference on contract cost increase ( $p=0.661$ ).

Whether the contract was a new contract or a renewal of existing contract did not make a difference on contract cost increase (p=0.721).

**Table 4-4**

***Regression Results on Contract Cost Increase (The No-Effect Model)***

Model	Unstandardized		Standardized		Sig.
	Coefficients		Coefficients		
	B	Std. Error	Beta	t	
(Constant)	.261	.425		.613	.542
BT	-.122	.138	-.124	-.883	.382
Trust	-.572	.161	-.537	-3.554	.001
BTBSR_interaction	-.028	.075	-.049	-.367	.715
CompanyEmployees	-9.357E-8	.000	-.012	-.097	.923
GrossSalesDollars	1.200E-12	.000	.034	.277	.783
intvsext	-.186	.421	-.059	-.441	.661
newvsold	-.094	.263	-.044	-.358	.721

The unstandardized coefficient for bridge transfer (as measured by tie strength) was -.122, p-value=.382. Hypothesis 1' was supported. There was no statistically significant relationship between bridge transfer and contract cost increase in quasi-manufacturing setting.

The unstandardized coefficient for buyer-supplier trust was -.572 and it was significant at p=.001 level. A one unit increase in buyer-supplier trust leads to a .572 unit of decrease in contract cost. Hypothesis H1a' was supported.

VIF values were examined to detect potential multicollinearity among the predictor variables. For this set of regression, none of the VIF was greater than 2.0. There was no evidence of multicollinearity present in the dataset.

Bootstrapping technique was used to better gauge error variances and confidence interval estimates. Here control variables were removed from the original regression model for parsimony reasons (their unstandardized coefficients were not statistically significant) and because bootstrapping does not work well with categorical variables. One thousand random samples with replacement were drawn from the original data set and the confidence interval level was set to 95%. The results of the bootstrapping showed that the unstandardized coefficient for the buyer-supplier trust was -.444 and it was significant at .001 level. The 95% confidence interval was (-0.717, -0.204). Hypothesis 1a' was supported based on data obtained via bootstrapping technique, in addition to evidence obtained from the original sample data set.

### **Regression on Cost of Quality for the Quasi-Manufacturing Model**

Table 4-5 presented the regression results on cost of quality for the quasi-manufacturing model when all control variables were included. Based on Table 4-5, none of the unstandardized coefficients for the control variables was statistically significant. Specifically, the unstandardized coefficient for company size (in the number of employees) was close to 0,  $p=.202$ . The unstandardized coefficient for company size (in gross sales dollars) was close to 0,  $p=.454$ . Along the same line, whether the end customers were internal customers or external customers did not make a difference on contract cost increase ( $p=0.297$ ). Whether the contract was a new contract or a renewal of existing contract did not make a difference on contract cost increase ( $p=0.773$ ).

**Table 4-5*****Regression Results on Cost of Quality (the No-Effect Model)***

Model	Unstandardized		Standardized		T	Sig.
	Coefficients		Coefficients			
	B	Std. Error	Beta			
(Constant)	-.380	.406		-.936		.353
BT	-.135	.126	-.145	-1.076		.286
Trust	-.524	.145	-.526	-3.614		.001
BTBSR_interaction	.041	.070	.074	.583		.562
newvsold	.069	.239	.034	.290		.773
intvsext	.424	.403	.135	1.052		.297
CompanyEmployees	1.145E-6	.000	.153	1.289		.202
GrossSalesDollars	-7.894E-14	.000	-.086	-.754		.454

The unstandardized coefficient for bridge transfer (as measured by tie strength) was -0.135, p-value=.286. There was no statistically significant relationship between bridge transfer and cost of quality in quasi-manufacturing setting. Hypothesis 2' was supported.

The unstandardized coefficient for buyer-supplier trust was -.524 and it was significant at p=.001 level. A one unit increase in buyer-supplier trust leads to .524 unit of decrease in cost of quality. Hypothesis H2a' was supported.

VIF values were examined to detect potential multicollinearity among the predictor variables. For this set of regression, none of the VIF was greater than 2.0. There was no evidence of multicollinearity present in the dataset.

Bootstrapping techniques was used to better gauge error variances and confidence interval estimates. Here control variables were removed from the original regression model for parsimony reasons (their unstandardized coefficients

were not statistically significant) and because bootstrapping did not work well with categorical variables. One thousand random samples with replacement were drawn from the original data set and the confidence interval level was set to 95%. The results of the bootstrapping showed that the unstandardized coefficient for the buyer-supplier trust was  $-.507$  and it was significant at  $.001$  level. The 95% confidence interval was  $(-0.718, -0.258)$ . Hypothesis 2a' was supported based on data obtained via bootstrapping technique, in addition to evidence obtained from the original sample data set.

### **Regression on Service Quality for the Quasi-Manufacturing Model**

Table 4-6 presented the regression results on service quality for the quasi-manufacturing model when all control variables were included. Based on Table 4-8, none of the unstandardized coefficients for the control variables was statistically significant. Specifically, the unstandardized coefficient for company size (in the number of employees) was close to 0,  $p=.854$ . The unstandardized coefficients for company size (in gross sales dollars) was close to 0,  $p=.874$ . Along the same line, whether the end customers were internal customers or external customers did not make a difference on contract cost increase ( $p=0.497$ ). Whether the contract was a new contract or a renewal of existing contract did not make a difference on contract cost increase ( $p=0.318$ ).

The unstandardized coefficient for bridge transfer (as measured by tie strength) was  $-0.102$ ,  $p\text{-value}=.452$ . There was no statistically significant

relationship between bridge transfer and service quality in quasi-manufacturing setting. Hypothesis 3' was supported.

The unstandardized coefficient for buyer-supplier trust was .458 and it was significant at  $p=.003$  level. A one unit increase in buyer-supplier trust leads to .458 unit of increase in service quality. Hypothesis H3a' was supported.

VIF values were examined to detect potential multicollinearity among the predictor variables. For this set of regression, none of the VIF was greater than 2.0. There was no evidence of multicollinearity present in the dataset.

**Table 4-6**

***Regression Results on Service Quality Perception (The No-Effect Model)***

Model	Unstandardized Coefficients		Standardized Coefficients	t	Sig.
	B	Std. Error	Beta		
(Constant)	-.441	.415		-1.063	.292
BT	-.102	.135	-.105	-.758	.452
Trust	.458	.148	.459	3.088	.003
BTBSR_interaction	-.064	.071	-.116	-.903	.371
CompanyEmployees	-1.670E-7	.000	-.022	-.185	.854
GrossSalesDollars	-1.687E-14	.000	-.018	-.159	.874
Newvsold	.249	.247	.118	1.007	.318
Intvsext	.279	.408	.089	.684	.497

Bootstrapping techniques was used to better gauge error variances and confidence interval estimates. Here control variables were removed from the original regression model for parsimony reasons (their unstandardized coefficients were not statistically significant) and because bootstrapping does not work well with categorical variables. One thousand random samples with replacement were

drawn from the original data set and the confidence interval level was set to 95%. The results of the bootstrapping showed that the unstandardized coefficient for the buyer-supplier trust was .472 and it was significant at .004 level. The 95% confidence interval was (.234, .788). Hypothesis 3a' was supported based on data obtained via bootstrapping technique, in addition to evidence obtained from the sample data.

### **4.2.3 Results Summary**

Table 4-7 below summarized the regression results in light of the hypothesized models. Results from the pure services model were presented in Table 4-7a and results from the quasi-manufacturing model was presented in Table 4-7b.

**Table 4-7*****Summary of Results*****Table 4-7a*****Summary of Results from the Pure Services Model***

	Hypothesized Relationship	Sample Data Sig.	Bootstrap Data Sig.	Hypothesis Supported?
H1	Bridge Transfer->Cost Increase	Yes	Yes	Yes
H1a	Interaction->Cost Increase	Yes	Yes	No
H2	Bridge Transfer->Cost of Quality	No	No	No
H2a	Interaction->Cost of Quality	No	No	No
H3	Bridge Transfer->Service Quality	Yes	Yes	Yes
H3a	Interaction->Service Quality	Yes	Yes	Yes

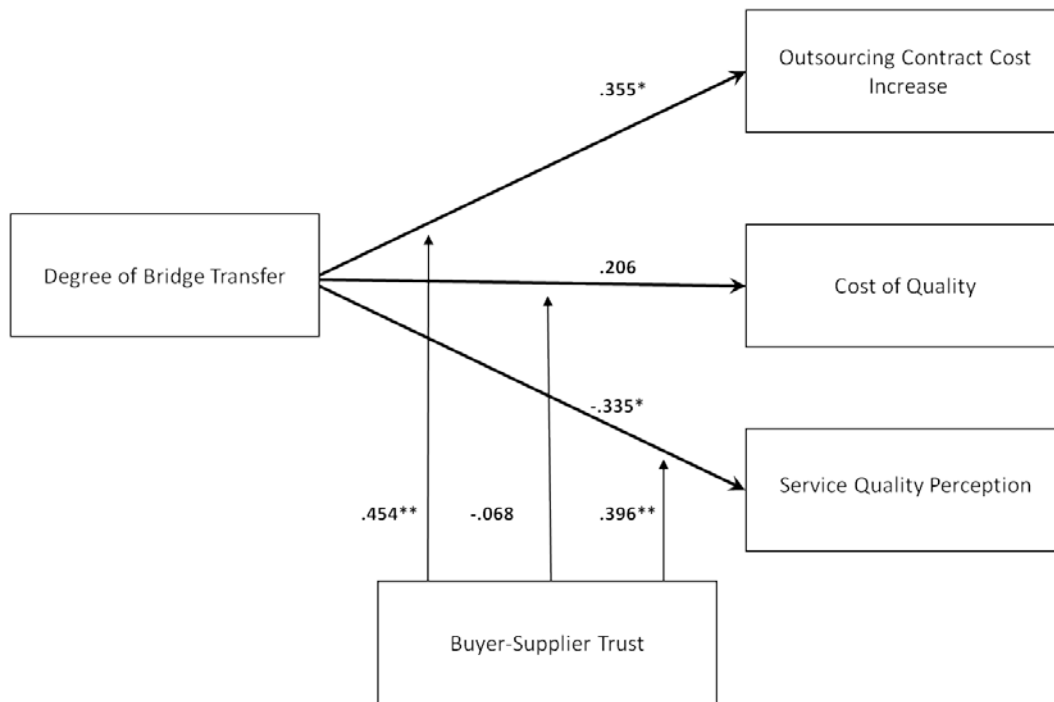
**Table 4-7b*****Summary of Results from the Quasi-Manufacturing Model***

	Hypothesized Relationship	Sample Data Sig.	Bootstrap Data Sig.	Hypothesis Supported?
H1'	Bridge Transfer->Cost Increase	No	No	Yes
H1a'	Trust->Cost Increase	Yes	Yes	Yes
H2'	Bridge Transfer->Cost of Quality	No	No	Yes
H2a'	Trust->Cost of Quality	Yes	Yes	Yes
H3'	Bridge Transfer->Service Quality	No	No	Yes
H3a'	Trust->Service Quality	Yes	Yes	Yes

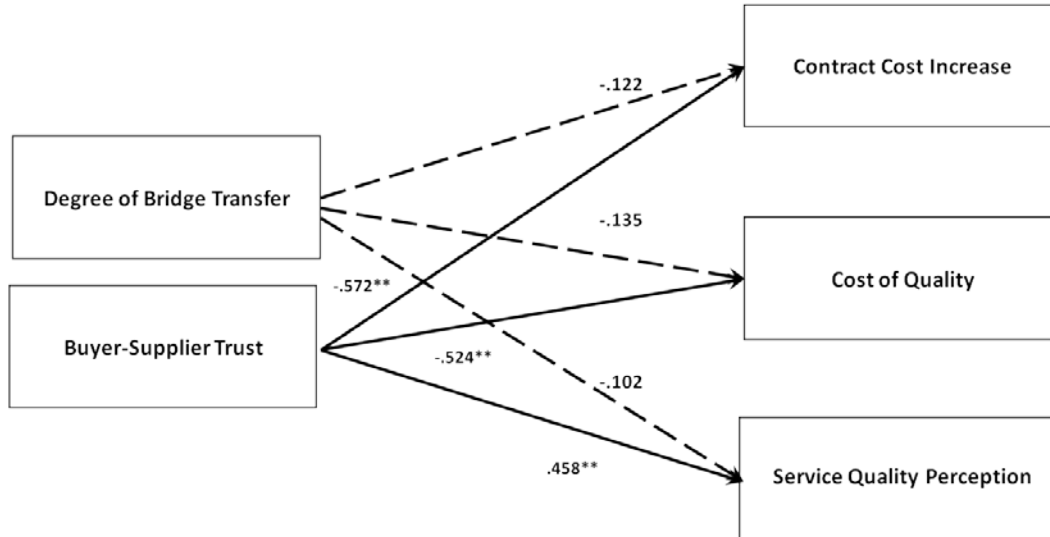


**DISCUSSION AND CONCLUSION**

In this section, the results of the hypotheses testing are discussed. Figure 5-1 summarized the results. Figure 5-1a depicted the hypothesized effect model for pure services (the Effect Model) and Figure 5-1b depicted the hypothesized non-effect model for quasi-manufacturing services (the No-Effect Model).



**Figure 5-1a. Results of Pure Service Model Testing**



**Figure 5-1b. Results of Quasi Manufacturing Model Testing**

**Figure 5-1. Summary of Model Results**

### 5.1 The Effects of Bridge Transfer on the Outsourcing of Pure Services

The results from both the sample data and the bootstrapped data supported the first hypothesis: bridge transfer leads to the increase of services outsourcing contract costs. When services buyer firm took a hand-off approach, the services supplier firm, who now occupies the bridge position and spanning across information and control gaps between the service buyer firm and the buyer's customers, will take advantage of this position and behave opportunistically. The supplier firm can strategically exaggerate task difficulties in order to appropriate more revenue toward its end. Thus, the sample data provides support to the theorized relationship between bridge transfer and supplier's appropriation behavior.

The sample data did not provide support for the hypothesis 2, i.e., the relationship between bridge transfer and buyer's cost of quality. Cost of quality is a compound measure that has four dimensions: monitor cost, prevention cost, internal and external failure costs. In this study, three of the four dimensions were included. It is arguably that the clustering of these dimensions was due to custom, rather than careful theoretical examination. Specifically, people lumped four cost of quality categories together, based on tradition, rather than based on inter-category correlations (in the case of a reflective latent construct) or complementary nature (in the case of a formative latent construct). As such, the different categories forming the construct of cost of quality may contradict to each other and mask any significant effect. For example, past research has shown that there is a negative correlation between prevention costs and external failure costs (Fargher and Morse, 1998). The higher the prevention costs, the lower the external failure costs. If this is the case, any detectable effects would be masked by the contradicting nature of these two dimensions. Therefore, we would not be able to detect any statistically significant effect.

The results from both the sample data and the bootstrapped data supported the third hypothesis: bridge transfer leads to the decrease of service quality provided by the service supplier firm. When the service buyer firm took a hand-off approach, the services supplier firm, who now occupies the bridge position, can strategically withhold service quality problems from the service buyer firm and offers low quality services to the end customers. Thus, the sample data

provided support to the theorized relationship between bridge transfer and service quality degradation.

Lastly, we have detected the moderation effects of buyer-supplier trust on the hypothesized relationship between bridge transfer and two of the services outsourcing outcomes: contract cost increase and perceived service quality. The results showed that trust can mitigate the negative effects of bridge transfer on service quality perception.

However, the surprising results came from the interaction effect for the outcome variable of contract cost increase. For contract cost increase, the effect was significant but in the opposite direction of the initial hypothesis. When buyer firms exhibit a high level trust toward the supplier firms, the effects of bridge transfer on contract cost increase tends to be more severe than when buyer firms exhibit a low level trust toward the supplier firms. This result suggested that too much trust is not necessary a good thing. Rather, there is an optimal amount. If a buyer firm goes over this optimal level and trusts the supplier firm too much, there is an increase in the supplier's appropriation behavior. Specifically, if a buyer firm placed too much trust in the supplier firm, the supplier firm may use that trust against the buyer firm and exercises an excessive amount of gaming behavior above and beyond a firm with a low level of trust, in terms of increasing contract cost.

## **5.2 The Effects of Bridge Transfer on the Outsourcing of Quasi-Manufacturing Services**

The results from the sample data did not detect any significant correlations between bridge transfer and any of the three services outsourcing outcomes, consistent with our hypothesized framework for quasi-manufacturing types of services. Because there is little or no customer interactions in quasi-manufacturing types of services, the service buyer firm will not be able to establish linkages with buyer's end customers and therefore, even if the service buyer firms take a hands-off approach, the service supplier firms will not occupy the powerful bridge position and be able to play off the service buyer firm and buyer's customers. Further, quasi-manufacturing services contain little variability and are easy to be standardized. This standardization and measurability leave no room for the service supplier firms to engage in opportunistic behavior. Thus, the sample data provided support to the theorized no effect model for the relationship between bridge transfer and services outsourcing outcomes.

Both the sample data and data obtained from bootstrapping provided support for the importance of buyer-supplier relationship in impacting services outsourcing outcomes for quasi-manufacturing services. In this context, the buyer-supplier link is more powerful than the buyer and end customer link.

**IMPLICATIONS, CONTRIBUTIONS, LIMITATIONS AND FUTURE  
RESEARCH DIRECTIONS**

**6.1 Contributions and Managerial Implications**

This study focuses on how to manage services outsourcing for success, which is a natural progression from the “what to outsource” research that dominates our field (Quinn and Hilmer, 1994; Venkatatesan, 1992; Barney, 1991; 2001; Wernerfelt, 1984; Williamson, 1975; etc.). Its theoretical contribution is four-fold. First, it introduces social network theory into the services outsourcing context. As such, it offers a unique perspective on the underlying triadic relationship dynamics and their performance implications in a service supply network. This study also extends the social network research by discovering and addressing a state of “bridge transfer”, and derive a measurement scale for the degree of bridge transfer that is applicable to services outsourcing settings. Third, this study explores the role of buyer-supplier relationship in mitigating the effects of bridge transfer. Lastly, the effects of bridge transfer on services outsourcing outcomes are delineated based on service types.

Services outsourcing has been met with an alarming amount of failed attempts. We posit that an important root cause of these failures is the lack of understanding of the dynamic nature of the triadic relationships among the services buyer, services supplier, and the buyer’s customer. By extending the social network theory into the services outsourcing context, we are able to reveal

the relationship structures within the triad of services supply network post service outsourcing implementation and its consequences. Once the service outsourcing arrangements are in place and a services supplier begins to interface with the customer, a situation unique to the services outsourcing emerges. The services buyer invariably loses its bridge position to the supplier. Loss of the bridge position means loss of leverage. Unless intervened, the services supplier would end up gaining the advantage that comes with being a *tertius gaudens*. To mitigate this risk, we propose the service buyer should continue to monitor the supplier, the buyer's customers, and the relationships between the services supplier and the buyer's customers after the outsourcing arrangements.

This approach may appear to be counter-intuitive. One of the major incentives behind outsourcing in a business setting is cost reduction, and extra monitoring costs extra money. What a buyer typically would prefer to do is only monitor its relationship with the service supplier after outsourcing because the buyer lets its supplier handle the relationship with its customers. After all, the supplier is being compensated for taking care of the buyer's customer. However, the buyer must realize the consequences of such bridge transfer. The field is littered with failed services outsourcing with the supplier as the new bridge, as illustrated earlier, and this outcome can have long-term, negative consequences to the buyer.

The effects of bridge transfer are not universal across all services instances. In quasi-manufacturing setting, due to the lack of interaction between the service suppliers and the buyer's end-customers, the bridge position may

never be transferred to the service supplier firm. Further, the lack of customer interaction makes quasi-manufacturing types of services easy to be standardized and measured and leaves less room for the opportunistic behavior of the service supplier firm. Therefore, while we advocate the bridge decay strategy for the outsourcing of pure services, it may not be necessary for firms who outsource quasi-manufacturing types of services.

## **6.2 Limitations and Future Research Directions**

This study took the buyer's perspective and collected data on contract cost increase, cost of quality and service quality perception from respondents from the buyer firms. Future research can expand this study and include perspectives from other nodes in the services outsourcing triad. For example, future study can measure the service quality perception from the end-customers' perspective to triangulate the research results and to understand how does bridge transfer impact end customers' repeat purchasing intentions? In addition, this study can be expanded to take the perspective from the supplier firms and examine the outsourcing dynamics happening in the suppliers' firms.

This study integrates the social network theory and services outsourcing context by focusing on triads and the advantages associated with *tertius gaudens* in the triad. There are ample additional opportunities to extend our research. Future research can expand beyond the triadic structures and examine how the embeddedness of a service firm impacts its structural choices. For example, if a services buyer is embedded in a sparse network or a service supplier relies on the



buyer's extended network for future business opportunities, the service buyer may have more enduring leverage over the supplier beyond a single services outsourcing contract. Under this type of scenario, bridge transfer may be a plausible strategy for the buyer. The buyer could potentially rely on its extended network as a containment mechanism for the supplier's opportunistic behaviors.

When the services buyer is the bridge to extended networks that are valuable to the supplier, the buyer can also exert its role as the *tertius iungens*, the third who joins (Obstfeld, 2005). Similar to the *tertius gaudens*, the *tertius iungens* also derives benefits from the bridge position. However, in contrast to the role of the *tertius gaudens* who derives benefits from playing off the nodes on each side of the structural hole, the *tertius iungens* derives benefits via mediating between two disconnected nodes. An intriguing question then arises as to when it would be more desirable for the buying firm to play the role of the *tertius iungens* instead of the *tertius gaudens*.

Besides social embeddedness, other areas of the social network theory deserve further exploration. For example, Tsai and Ghoshal (1998) distinguish three dimensions of social capital—the cognitive dimension, the relational dimension, and the structural dimension. How could these dimensions compete or complement each other in a services outsourcing context? How could they influence the formation and strength of different types of ties among the triad in the service supply network? These are all important questions that have significant managerial relevance.

One interesting scenario that can also be considered in future studies entails the complete supply chain disintermediation. Here, the services supplier completely bypasses the services buyer and works directly with the end customers. One common example of such disintermediation happens in tax preparation firms. Once the outsourced services suppliers (accountants) work with its customers, they are then able to obtain the contact information of these customers. They would have the option of contacting those customers directly for future tax returns, completely bypassing the tax preparation firm. Another interesting example happens in Internet portals such as the travel site hosted by Yahoo.com. In this case, the travelers (customers) use the portal (buyer) to locate an airline (services supplier) that sells the least expensive ticket. Once they have found the ticket, they can go directly to the airline's website to make the purchase and take advantage of a small savings by purchasing directly from the airline's website. In the above two scenarios, no triadic relationships remain among the service supplier, service buyer, and buyer's customer. At the end of the transaction, the service buyer is completely dropped out of the supply network. This loss of intermediary entity deserves further investigation.

The theoretical models in this study were limited largely to the substitution type of outsourcing, as opposed to the abstention type (Gilley and Rasheed, 2000). By doing so, this focus is on the conscious choice of replacing internal production with external purchases (i.e. substitution), which contrasts the regular "sourcing" decisions that occur because of the lack of internal production capabilities (i.e. abstention). In other words, these models do not apply to some

of the Internet sellers who purchase logistics services from carriers such as UPS to deliver their products to their customers. In this example, these Internet sellers simply do not have the capability to deliver their products on their own and have to purchase services from UPS. It is a regular sourcing decision, not an outsourcing decision. Therefore, the network dynamics involved in abstention types of services sourcing is left up to future studies.

Services outsourcing practices are indeed very complex. Social network theory offers a wide array of opportunities to tackle this complex task. This study is only the first step toward analyzing this challenging issue. Nevertheless, this study revealed insights omitted by other theories used in services outsourcing studies. The insights gained from integrating services outsourcing and social networks concepts are of great theoretical and managerial relevance that can help us move the field forward.

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