ESSAYS ON DESIGNING AND MANAGING SERVICE OUTSOURCING CONTRACTS

A Dissertation

Presented to

The Faculty of C.T. Bauer College of Business

University of Houston

In Partial Fulfillment

Of the Requirements for the Degree

Doctor Of Philosophy

By

Yuan Ye

June, 2017

ABSTRACT

The global market for outsourced services has doubled to more than one hundred billion dollars over the past decade. While firm-level service outsourcing has received growing attention in the literature, there is less research on designing and managing contracts for outsourced services (i.e., service contracting). Practically speaking, many services are highly specialized or unique, creating significant challenges when it comes to designing and managing outsourcing contracts effectively. By examining decisions related to contract design and management, this dissertation seeks to provide managerial insights on service outsourcing not revealed in the prior literature. Specifically, an in-depth survey has been conducted in multiple industries (healthcare, oil and gas, and manufacturing) to collect information on a variety of outsourced services.

The dissertation consists of two essays. Drawing on transaction cost theory (TCT), the first essay investigates the relationships among transaction hazards, contract specificity, monitoring, and service performance. The empirical results unlock these relationships by revealing that 1) transaction hazards drive contract specificity, and 2) monitoring mediates the relationship between contract specificity and performance. The second essay applies the Kraljic Portfolio Model to manage service outsourcing contracts strategically. The framework first maps services into four quadrants based on the importance of purchasing and market complexity. It further develops detailed sourcing practices for services in each quadrant based on the strategies proposed by the Kraljic portfolio purchasing model. The empirical findings of this essay shed light on identifying the most effective supply management practices for services.

ACKNOWLEDGEMENTS

First of all, I would like to express my sincere gratitude to Dr. David Peng, without whose guidance and efforts this dissertation would not have been possible. Dr. Peng has not only given me his insight on this field of study but devoted an incredible amount of time to advise me to proceed. He has been an excellent dissertation chair and a concerned friend.

My true appreciation extends to my other committee members: Dr. Powell Robinson for his guidance, experience, and support through my Ph.D. career; Dr. Chalam Narayanan for his advice and insightful comments, as well as his support for my research as a Ph.D. candidate; and Dr. Dusya Vera for introducing me to strategy theories and her contributions as a committee member.

I gratefully acknowledge the financial support for my doctoral studies from the Department of Decision and Information Sciences, Bauer College of Business, and the Institute for Supply Management (ISM).

Thanks also to the other faculty in the department: Dr. Funda Sahin, Dr. Nickolas Freeman, Dr. Ming Zhao, Dr. Michael Murray, and Dr. Dale Tibodeau. I greatly appreciate their encouragement, support, and help in my journey.

Finally, I would like to acknowledge the long-term moral and emotional support of my family: my father, Wanqiao Ye; my mother, Lingli Guan; my husband, Zhenhua Xie. They have supported and encouraged every step I had taken. I dedicate this dissertation to them.

TABLE OF CONTENTS

LIST OF TABLES

LIST OF FIGURES

DISSERTATION OVERVIEW

In the past few decades, companies have increasingly outsourced services that are not part of their core competencies (Tate et al., 2009; Stouthuysen et al., 2012). The global service outsourcing market has almost doubled from 2001 to 2009 and is expected to expand (Gartner, 2009). With more services being outsourced, the need to manage and control these services is also growing. Failure to manage and control outsourced services can create terrible results, leading to profit loss, damaged reputation, and in some cases legal liability. Take the British Petroleum (BP) oil spill as an example. Integrated oil and gas companies such as BP keep their core competencies (e.g., exploration) in-house and typically outsource rig drilling services to oil service companies (e.g., Halliburton, Transocean). Inadequate control of drilling service contractors contributed to a massive oil spill, with an estimated 210 million gallons and eleven lives lost. The subsequent criminal and civil settlement cost BP more than $60 billion.

While the importance of managing outsourced services has received increased attention, academic research has provided limited insight on how companies can effectively manage outsourced services. Our literature review indicates that a majority of the relevant OM research focuses on manufacturing outsourcing, while research on service outsourcing is scant. By reviewing the small number of studies on service outsourcing, we identify two important gaps and further develop the dissertation to bridge these gaps.

The first gap is associated with the governance mechanisms (i.e. contract specificity and monitoring) that control outsourced services. One stream of research suggests that a specific contract provides a safeguard against transaction hazards, improves coordination between service exchange parties, and enables better adaption to unforeseeable changes (Wuyts & Geyskens, 2005; Anderson & Dekker, 2005; Mooi & Ghosh, 2010; Susarla, 2012). This stream mainly focuses on contracts but does not include managers' perceptions about management practices. The other research stream demonstrates that monitoring allows frequent communication and information exchange between buyer and supplier, and thus has a positive impact on performance (Heide et al. 2007; Kashyap et al. 2012; Stouthuysen et al. 2012). However, the relevant studies that capture contract managers' perceptions of managerial practices usually leave out detailed information about contracts. In sum, the previous literature on governance mechanisms either emphasizes contract specificity or monitoring, but not both.

The first essay draws on transaction cost theory (TCT) to consider the roles of contract specificity and monitoring simultaneously. We propose a conceptual framework to investigate the relationships among transaction hazards, contract specificity, monitoring, and service performance. The results suggest that the buyer mainly responds to transaction hazards through a specific contract. The findings also reveal the important role of monitoring in managing outsourced services—monitoring not only improves performance but also mediates the relationship between contract specificity and performance. This essay contributes to the service outsourcing literature by unlocking the mediation relationships among contract specificity, monitoring, and performance.

The second gap is related to the Kraljic purchasing model, as used to manage outsourced services. Although this model has great influence over purchasing practices, a majority of the discussions involve supplies and physical products like raw materials, rather than services. In fact, few studies have empirically verified this model in the context of service procurement. Thus, it is unknown if the sourcing practices developed in the Kraljic purchasing model apply to services.

The second essay empirically tests the Kraljic Portfolio Purchasing Model in the context of service outsourcing. We first classify services into four categories (i.e., strategic, bottleneck, leverage, and routine services) based on purchasing importance and market complexity. We further discuss five sourcing factors to match with the primary goals of managing each group of services, as proposed by the Kraljic matrix. We find that 1) negotiation is positively related to the performance of strategic services, 2) sourcing from a regional supplier drives the performance of bottleneck services, 3) strategic risk assessment positively affects the performance of leverage services, and 4) information technology drives the performance of routine services.

The definitions of the key constructs in this dissertation are presented in Table 1.

Table 1: Construct and Definition

Construct	Definition	References
Professional services	Services that require for high levels of customer contact and expertise.	Silvestro et al., 1992
Mass services	Services that require for low levels of customer contact and expertise.	Silvestro et al., 1992
Service complexity	The complexity that arises from the scope, size, interdependent activities, or novelty of the service.	Tiwana & Bush, 2007
Transaction size	The initial contract price in thousands of U.S. dollars.	Susarla et al., 2010
Switching costs	The difficulty that a buyer faces to switch its current supplier.	Mooi & Ghosh, 2010
Measurement ambiguity	The degree of difficulty of defining ex-ante and verifying ex-post the products and services for which the parties are contracting.	Anderson & Dekker, 2005
Strategic risks assessment	The degree to which the contracting team comprehensively evaluates the strategic risks of contracting a service.	Handley & Benton, 2009
Information technology support	The use of information technology (IT) functionality for facilitating inter-organizational coordination.	Bensaou & Venkatraman, 1995
Fixed-price contracts	The price specified in the contract does not change, regardless of the incurred expenses.	Monczka et al., 2009
Cost-based contracts	The costs are charged based on the incurred expenses and the additional fee.	Monczka et al., 2009
Contract specificity	The extent to which that a contract specifies detailed clauses regarding prices, procedures, service levels, responsibilities, performance requirements and etc.	Lacity et al., 2009; Mooi & Ghosh, 2010
Monitoring	The procedures designed and incorporated within an exchange relationship by one party to acquire information and ascertain a partner's activities and conduct.	Heide et al., 2007; Kashyap et al. 2012

ESSAY 1: UNLOCKING THE RELATIONSHIPS AMONG TRANSACTION HAZARDS, CONTRACT SPECIFICITY, MONITORING, AND PERFORMANCE

Introduction

Unlike physical goods, services tend to be intangible, heterogeneous, inseparable, and perishable (Ellarm et al., 2007). Intangibility suggests it is harder to specify the requirements and performance metrics of the outsourced services. Heterogeneity implies difficulty in standardizing services, although standardization and aggregation are important means to create economic advantages. Inseparability of services suggests intensive interaction between the exchange parties since production and consumption of services often happen simultaneously. Finally, service perishability means there is no inventory to buffer uncertainty, so buyers need service providers to be flexible and adaptable to change. All these characteristics make it a challenge to develop effective governance mechanisms for outsourced services to ensure quality, efficiency, and timeliness of service delivery.

Transaction cost economics (TCE) offers a theoretical lens to investigate the governance mechanisms and their influences on outsourced service performance. TCE posits that transaction hazards (e.g., switching cost, measurement ambiguity) increase transaction risks. To mitigate these risks, organizations can align governance mechanisms with transaction conditions. Two important governance mechanisms emerge in the literature. The first is contract specificity, defined as "*the extent to which a contract specifies detailed clauses regarding prices, procedures, service levels, responsibilities, performance requirements, etc.*" (Wuyts & Geyskens, 2005; Mooi & Ghosh, 2010). By crafting specific contracts, organizations can safeguard against transaction hazards and adapt to unforeseen changes. The other is monitoring, defined as "*procedures designed and incorporated within an exchange relationship by one party to acquire information*

and ascertain a partner's activities and conduct" (Heide et al., 2007; Kashyap et al., 2012). Organizations can monitor service providers via frequent communication, timely information exchange, and collaboration to solve problems, thus improving performance. We review the operations management literature related to contract specificity, monitoring and supplier performance and present a summary in Table 2.

Table 2: Empirical Studies on Outsourcing

References	Context	Contract specificity	Supplier Monitoring	Performance
Poppo & Zenger, 2002	IS services	×		Perceived performance
Wuyts & Geyskens, 2005	Multiple services	×		Supplier opportunism
Anderson & Dekker, 2005	IT services	×		Ex-ante and ex-post transaction costs
Heide et al., 2007	Building materials		×	Supplier opportunism
Chen & Bharadwaj, 2009	IT services	×		Not examined
Ryall & Sampson, 2009	IT services	×		Repeated deals
Susarla et al., 2010	IT services	×		Not examined
Mooi & Ghosh, 2010	IT services	×		Ex-ante and ex-post transaction costs
Stouthuysen et al., 2012	Multiple services		×	Perceived Performance
Lumineau & Henderson, 2012	Multiple services	×		Not examined
Srivastava & Teo, 2012	IS Services	×		Quality performance
Susarla, 2012	IT services	×		Pareto improving amendments
Kashyap et al., 2012	Automotive products	×	×	Supplier compliance and opportunism
Handley & Gray, 2013	Manufacturing	×	×	Relative quality importance
Handley & Angst, 2015	Multiple services	×		Supplier opportunism
Liu, 2015	IS services		×	Perceived Performance
Benaroch et al., 2016	IT services	×		Ex-ante and ex-post transaction costs
Our study	**Multiple services**	×	×	**Perceived performance**

Our literature review regarding contract specificity and monitoring uncovers two notable gaps. First, although the relationships between transaction hazards and contract specificity have been examined extensively (e.g. Poopo & Zenger, 2002; Mooi & Ghosh,

2010), very limited literature is devoted to the influences of transaction hazards on monitoring. A majority of the related empirical studies rely on TCE to understand how organizations design contracts in response to transaction hazards. However, transaction hazards not only increase costs incurred in contract design, but also increase monitoring costs during contract execution (Williamson, 1979; 1985). Thus, contract specificity is only one of the approaches a buyer can use to mitigate transaction hazards. The literature is also unclear whether a buyer can also reduce transaction hazards via alternative governance mechanisms such as monitoring suppliers.

Second, relationships among contract specificity, monitoring, and performance are vague. One stream of literature considers contract specificity and monitoring as two parallel governance mechanisms and suggests that they both have direct effects on performance. This research suggests a direct positive impact of contract specificity on performance but not one mediated through monitoring (e.g. Poppo & Zenger, 2002; Wuyts & Geyskens, 2005; Anderson & Dekker, 2005; Mooi & Ghosh,2010; Susarla, 2012). In contrast, the other stream demonstrates that contract specificity drives monitoring, leading to better performance. In other words, contract specificity not only directly affects performance but also indirectly affects performance through the mediation of monitoring (e.g. Kashyap et al., 2012; Handley & Gray, 2013). Given the competing arguments and conflicting empirical evidence, it is important to test these potential direct and mediating relationships among contract specificity, monitoring, and performance rigorously. Unlocking these relationships can help service exchange parties to identify the key drivers of service performance, and develop effective plans to achieve

desired performance accordingly. To bridge the gaps discussed above, we propose three research questions:

(1) *What are the antecedents of contract specificity and monitoring*?

(2) *How do contract specificity and monitoring influence service performance?*

(3) *Does monitoring mediate the relationship between contract specificity and service performance?*

We use a rigorously-designed survey to collect data from professionals managing service sourcing in a variety of industries. The respondent pool consists of randomly-selected members of the Institute of Supply Management (ISM). Our survey yields 261 completed and usable responses. Analyses of the data yield two significant findings. First, transaction hazards significantly affect contract specificity but not monitoring, even though TCE suggests both. The findings are consistent with the previous literature, which suggests transaction hazards lead to more specific contracts (e.g. Poppo & Zenger, 2002; Mooi & Ghosh, 2010). Second, we reveal a mediation path from contract specificity to monitoring and then to service performance, which has not been verified in the previous service outsourcing literature and is our most significant result.

This essay makes several important contributions. First, our study empirically tests the relationships suggested by TCE. While both contract specificity and monitoring are viable mechanisms to mitigate transaction hazards, previous studies only test the linkages between transaction hazards and contract specificity. Our study investigates the effects of transaction hazards on both contract specificity and monitoring.

Second, we find the mediation relationships among contract specificity, monitoring, and performance. We merge the two streams of literature that seemingly

provide contradictory empirical evidence. We then propose a conceptual framework that links the three core constructs, namely contract specificity, monitoring, and contract (supplier) performance. Our conclusion that monitoring fully mediates the relationship between contract specificity and performance in the service outsourcing context is important. This suggests that creating a specific contract and relying on suppliers to comply fully with the contract clauses may not be enough to ensure high service performance, perhaps due to the unique service characteristics discussed earlier, namely intangibility, heterogeneity, inseparability, and perishability.

Third, our study empirically tests the proposed relationships in the context of service outsourcing. Compared to manufacturing outsourcing, service outsourcing has received much less attention in the Operations Management (OM) field. However, because of the unique characteristics of services, managing service outsourcing is a more difficult task than managing other outsourcing (Ellram et al., 2008). For example, service outsourcing usually involves greater uncertainty, such that it is impossible to specify all the contingencies ex-ante (Tate et al., 2009). Given the differences between service and manufacturing outsourcing, insights drawn from research on manufacturing outsourcing may not apply to service outsourcing. Thus, a research study of service outsourcing such as ours can provide new insights on governance, processes, and practices for effectively managing service outsourcing.

The remainder of this paper is organized as follows. In Section 2, we review the literature on TCE, contract specificity, and monitoring. Section 3 draws on TCE to develop hypotheses regarding the drivers and consequences of contract specificity and monitoring. Section 4 covers research design and data collection. In Section 5, we use

Structural Equation Modeling (SEM) to test the proposed hypotheses. In Section 6, we conduct post-hoc analyses to check the robustness of our findings. We conclude the paper by discussing findings, contributions, and managerial implications in Section 7.

Literature Review

Transaction Cost Economics

Transaction cost economics (TCE) is mainly used to explain make-or-buy decisions based on transaction characteristics including asset specificity, measurement ambiguity, and transaction frequency (Coase, 1937; Williamson, 1979; 1985). These give rise to transaction risks and consequently increase transaction costs related to designing, monitoring, and enforcing contracts between parties. If the total transaction costs are greater than the cost savings from using external providers, organizations should perform the service in-house (insourcing) rather than sourcing from external suppliers.

First, asset specificity, which describes the degree to which a relationship between parties requires specific investments that have less value outside the relationship, is a transaction hazard. A buyer's investments in specific assets increase costs of changing suppliers and may lock the buyer into the buyer-supplier relationship (Poppo & Zenger, 2002). Hence, higher switching costs can be a potential source of transaction hazards (Mooi & Ghosh, 2010; Handley & Angst, 2015).

Second, measurement ambiguity increases the difficulty in anticipating all the future contingencies that may arise during contract execution, leading to incomplete contracts. A lack of specific measurements of processes and deliverables increases the likelihood of supplier opportunism since it becomes difficult for the buyer to measure

suppliers' efforts and/or performance (Anderson & Dekker, 2005; Heide et al., 2007). Third, transaction frequency could also contribute to transaction costs (Williamson, 1979). In the context of the buyer-supplier relationship, each transaction involves certain expenses, no matter the transaction volume. All else being equal, transaction costs should increase as transaction frequency increases. However, the literature does not provide enough support for the influence of transaction frequency on transaction costs (Poppo & Zenger, 2002), possibly due to wider use of automated procurement systems that drastically reduce ordering and documentation costs.

In addition to serving as a theoretical lens for interpreting make-or-buy decisions, TCE has also been widely used to understand contract design practices based on transaction characteristics (e.g. Anderson & Dekker, 2005; Mooi & Ghosh, 2010; Susarla et al., 2010). As transaction risks rise with increased transaction hazards, contracts should be designed to align with transaction characteristics that reduce risks (Lumineau & Malhotra, 2011). From a sourcing perspective, facing higher transaction risks, a buyer should design detailed contracts to "define remedies for foreseeable outcomes, or specify processes for resolving unforeseeable outcomes" (Poppo & Zenger, 2002), allowing the buyer to mitigate transaction risks.

Although many studies have drawn on TCE to examine the relationships between transaction hazards and contract design practices, few studies have tested the effects of transaction hazards on monitoring. According to TCE, transaction hazards increase not only the costs of designing contracts but also the costs of monitoring suppliers (Williamson, 1979; 1985). Since both contract specificity and monitoring can be viewed as governance mechanisms for the outsourced services, investigating the effects of

transaction hazards on monitoring in addition to contract specificity can provide a more complete empirical model to verify the relationships implied by TCE.

Contract specificity

A contract is an agreement between parties for the exchange of a service or product (Mooi & Ghosh, 2010). Contract specificity refers to the extent to which a contract includes thorough and specific contract clauses covering prices, procedures, service levels, responsibilities, performance requirements, and contingencies (Lacity et al., 2009; Mooi & Ghosh, 2010). Detailed contract specifications help a supplier better understand the buyer's expectations and reduce risks of transaction hazards (Malhotra & Lumineau, 2011; Bai et al., 2016).

Transaction hazards stimulate organizations to design specific contracts. Service complexity, switching costs, measurement ambiguity, and transaction size are primary drivers of contract specificity (Anderson and Dekker, 2005). These factors determine the needs for knowledge transfer (Kogut & Zander, 1996), coordination, and information exchange between the buyer and suppliers, and further influence the level of transaction risks (Poppo & Zenger, 1998; Coles & Hesterly, 1998b; Novak & Eppinger, 2001; Tiwana & Bush, 2007; Narayanan et al., 2011; Handley & Benton, 2012). Empirical findings concerning the influences of transaction hazards on contract specificity are mixed. Anderson and Dekker (2005) find that asset specificity and transaction size are both positively associated with contract specificity, while measurement ambiguity has no association. Mooi and Ghosh (2010) identify a positive relationship between switching costs and contract specificity, yet a negative relationship between measurement

ambiguity and contract specificity. Gopal and Koka (2012) suggest that asset specificity should be related to more specific contracts, but did not provide any empirical evidence.

Concerning the consequences of contract specificity, a majority of the related studies suggest that contract specificity has a positive impact on supplier performance. Specifically, previous empirical works suggest contract specificity reduces opportunism (Wuyts & Geyskens, 2005), improves quality, and reduces transaction costs (Anderson & Dekker, 2005; Srivastava & Teo, 2012).

Monitoring

In addition to designing specific contracts, contract managers can also reduce transaction hazards and improve outsourcing performance by implementing non-contractual governance mechanisms such as supplier monitoring (Heide et al., 2007; Kashyap et al., 2012). Monitoring refers to "procedures designed and incorporated within an exchange relationship by one party to acquire information and ascertain a partner's activities and conduct" (Heide et al., 2007, p.426). It allows a buyer to control suppliers' behavior and performance more effectively.

Several studies differentiate two types of monitoring, namely behavior monitoring and output monitoring (Choudhury & Sabherwal, 2003; Heide et al., 2007; Kashyap et al., 2012; Liu, 2016). Behavior monitoring mainly relies on procedures and activities, such as service delivery processes, while output monitoring focuses more on the measurable consequences like service quality and delivery accuracy. That is, behavior monitoring controls *how* service is delivered, while output monitoring focuses on *what* services are provided.

To our knowledge, Handley and Gray (2013) is the only work that empirically tests the relationships between transaction hazards and monitoring. They use frequency of audits as a measure of monitoring and reveal that product complexity drives monitoring. Yet, they test these relationships in the context of manufacturing outsourcing, not services outsourcing. It is unclear if the organizations also mitigate transaction hazards through monitoring in the context of service outsourcing.

The literature that examines the consequences of monitoring contains notable gaps. First, research that investigates the mediation effects of monitoring tends to use supplier behaviors such as opportunism and compliance as outcome measures rather than supplier performance measures. For instance, Kashyap et al. (2012) find monitoring acts as a mediator between contract design characteristics and supplier opportunism and compliance. In fact, contracts may contain specific clauses that authorize the buyer to carry out the monitoring plans (Chen & Bharadwaj, 2009). Yet, very few studies have investigated the interrelationships between these two governance mechanisms.

Second, the studies that discuss the impacts of monitoring on perceived supplier performance (e.g. Stouthuysen et al., 2012; Liu, 2016) have not investigated the potential mediation effects of monitoring that link contract design features and supplier performance. To fill these gaps, we use perceived supplier performance as an outcome measure and examine whether monitoring mediates the relationship between contract specificity and supplier performance.

Conceptual Framework and Hypotheses

TCE suggests that transactional hazards are positively associated with transaction risks (Coase, 1937; Williamson, 1985). Increased transaction hazards imply greater needs for specific contracts and intensive monitoring so that the buyer can mitigate transaction risks and control performance of the outsourced services. Figure 1 presents the conceptual framework. We first propose that transaction hazards are positively related to two governance mechanisms, namely contract specificity and monitoring. Next, we discuss the subsequent influences of contract specificity and monitoring on service performance. Finally, we investigate whether monitoring mediates the relationship between contract specificity and service performance.

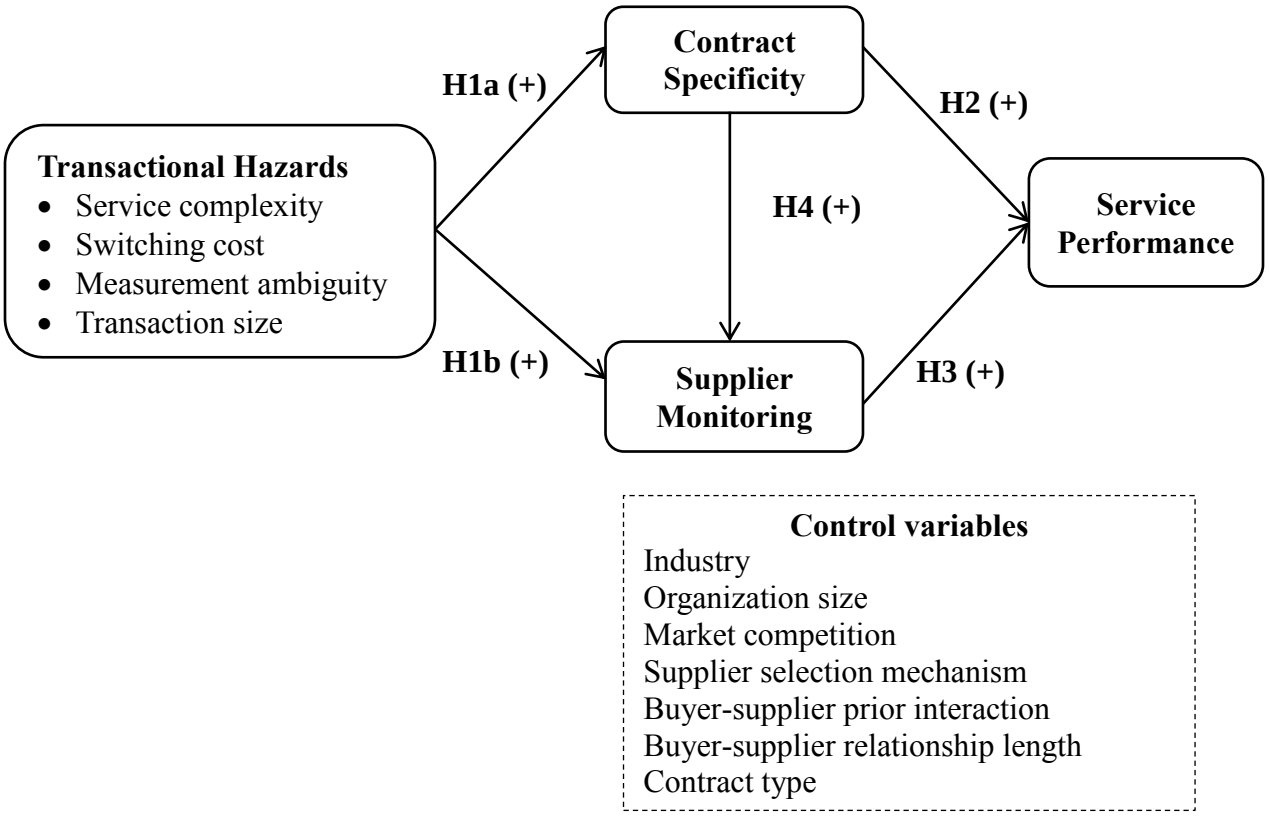


Figure 1: Conceptual Framework

Antecedents of contract specificity and monitoring

Drawing on TCE, we propose four types of transaction hazards: service complexity, switching costs, measurement ambiguity, and transaction size as antecedents of contract specificity and monitoring.

Service complexity refers to the complexity that arises from the scope, size, interdependent activities, or novelty of the service (Tiwana & Bush, 2007). Complexity increases the ambiguity and uncertainty of service delivery (Kalnins & Mayer, 2004), creates challenges for integration and coordination between the buyer and the supplier, and increases the risks associated with the transaction (Anderson & Dekker, 2005; Tiwana & Bush, 2007). To cope with complexity and hedge against transaction risks, the buyer should try to anticipate the potential contingencies and develop specific contract clauses to address the risks (Kalnins & Mayer, 2004), as well as put greater effort into controlling the supplier (Tiwana & Bush, 2007) via monitoring.

Switching costs represent the degree of difficulty for the buyer to switch suppliers (Mooi & Ghosh, 2010). Switching costs increase when the buyer makes a specific investment in the service exchange relationship that has little or no value outside the relationship (Weiss & Anderson, 1992; Handley & Angst, 2015). When a buyer has invested in developing assets tailored for doing business with a particular supplier, then such investments could be viewed as sunk costs and may lock the buyer into the relationship. For example, consider a railroad built by a buyer to bring raw materials from a specific supplier's mining site. If the relationship with that supplier were to end, the railroad would have little value to the buyer. The supplier would be well aware that terminating the relationship would mean the investment to build the railroad would

become nearly worthless, and could take advantage of this and demand concessions regarding price, quality or other terms (Mooi & Ghosh, 2010). Thus, higher switching costs can exacerbate the supplier's opportunistic behavior (Williamson, 1985; Murray & Kotabe, 1999). If the buyer anticipates this vulnerability, it can attempt to develop specific contract terms to reduce the possibility of opportunistic supplier behavior (Mooi & Ghosh, 2010).

In the above example, the buyer may specify in the contract that if the contract is terminated before a specified date, the supplier will bear part of the railroad construction costs. In addition to writing detailed contract terms to reduce the supplier's opportunistic behavior, the buyer can carefully monitor the supplier during contract execution. The monitoring can be partially based on the contract terms, which should give the buyer the right to audit the supplier and require the supplier to comply with the audits and provide necessary information to the buyer. Monitoring need not be limited to contract terms. A proactive buyer can move above and beyond a contract to monitor the supplier as needed and provide technical or financial support to the supplier when necessary. This effort will not only ensure that the supplier makes every effort to comply with contract terms, but also identify potential problems as early as possible and therefore mitigate potential negative impacts.

Measurement ambiguity, defined as "the degree of difficulty of defining ex-ante and verifying ex-post the products and services for which the parties are contracting" (Anderson & Dekker, 2005, p.1739), gives rise to underperformance and maladaptation (Benaroch et al., 2016). Previous literature suggests that measurement ambiguity requires both the buyer and the supplier to adapt to circumstances, thereby increasing the need for

coordination during the transaction. As a result, measurement ambiguity drives the buyer to remove vagueness with a more detailed contract, and communicate with the supplier more frequently to guarantee the quality of outsourced service.

Transaction size typically refers to contract price (Susarla et al., 2010). Larger transaction size implies greater influence on the activities within an organization. Hence, the buyer will face a greater need to facilitate communication and information exchange between the organizations. Previous literature indicates that the degree of contract specificity is closely related to transaction size (Anderson & Dekker, 2005; Mooi & Ghosh, 2010). Transition size is also associated with the need to manage the outsourced services (Susarla et al., 2010), and thus drives greater monitoring efforts on the buyer's side.

Given the above discussions, we propose two hypotheses:

H1a: Transaction hazards are positively related to contract specificity.

H1b: Transaction hazards are positively related to monitoring.

Performance implications of contract specificity and monitoring

TCE assumes that suppliers have an incentive *not* to completely fulfill their responsibilities (i.e., engage in opportunism). Contract specificity, therefore, can be used as an effective mechanism to manage relationships with suppliers and reduce the risks of opportunism (Williamson, 1979). A buyer can design a detailed contract that clearly defines processes, rights, expectations, liabilities, etc. Detailed requirements encourage suppliers to meet detailed performance targets (Wuyts & Geyskens, 2005). The buyer can also specify procedures that the suppliers must follow, thereby reducing the probability of

supplier opportunism (Lumineau & Malhotra, 2010). In addition, the buyer can also specify terms that govern the relationship, allowing the buyer to receive supplier inputs and evaluate the supplier's performance against pre-specified metrics (Ghosh and John 2005). A buyer can include specific dispute resolution clauses to settle disagreements and offer remedies for foreseeable contingencies (Susarla, 2010). For example, a price adjustment or redetermination clause gives the buyer and the supplier flexibility to respond to dramatic changes in environmental factors (e.g., a spike in material costs that cannot be adequately forecast) and other unforeseeable events, thereby enabling a price adjustment that is acceptable to both parties (e.g., indexing a raw material price to a benchmark). Therefore, contract specificity enables both the buyer and the supplier to understand their mutual needs and responsibilities, thus leading to more effective service delivery.

H2: Contract specificity is positively related to service performance.

As opposed to contract clauses, which mainly focus on foreseeable outcomes, monitoring concentrates more on managerial actions and processes during contract execution (Keil et al., 2013). It protects the buyer against transaction risks (Handley & Gray, 2013). A supplier can behave opportunistically in the process of service delivery. If the buyer proactively monitors the supplier's progress during contract execution, problems can be detected, and the supplier can be held accountable for its conduct. Monitoring allows the buyer to understand in-process accomplishments, as well as identify ongoing problems (Heide et al., 2007; Kashyap et al., 2012). Also, the buyer can provide feedback to the supplier regarding how to modify and improve the processes of service delivery. If the supplier follows the buyer's suggestions, it may achieve better

performance. In sum, monitoring is an essential tool for the buyer to obtain more complete information from the supplier, reduce the possibility of supplier opportunism, and motivate the supplier to improve service performance.

H3: Supplier monitoring during contract execution is positively related to service performance.

A thorough contract typically includes clauses related to monitoring practices (Benaroch et al. 2016) and authorizes the buyer to monitor the supplier (Reuer & Arino, 2007). The contract specifies a framework regarding how the buyer can monitor supplier performance (Ryall & Sampson, 2009). For instance, the buyer can implement a facility audit program and define the frequency of audits in the contract (Handley and Gray, 2013). Also, a specific contract develops an information exchange plan between buyer and supplier (Benaroch et al. 2016), and such a plan clarifies what information can be shared and through which medium (i.e. email, phone calls, etc.). Therefore, we expect contract specificity to improve monitoring efforts.

H4: Contract specificity is positively related to monitoring.

Mediation effect of monitoring

Our last discussion concerns the mediation effect of monitoring. We integrate the previous two streams of literature that hold different views on the relationships among contract specificity, monitoring, and performance, and aim to provide a more comprehensive understanding of how monitoring mediates the relationship between contract specificity and service performance.

Although a contract has several purposes, such as safeguarding, coordinating, and providing adaptability (Benaroch et al. 2016), whether the buyer can realize all these

benefits depends on the procedures it implements to monitor the supplier. For example, a company that outsources transportation services from a third-party logistics company can craft a detailed contract that specifies the expected service level or other performance metrics, such as the number of delays. However, the buyer may not be aware of whether the supplier has achieved or fallen short of expectations if it doesn't monitor the supplier at regular intervals. Moreover, the buyer cannot provide timely feedback to encourage improvement if they do not monitor supplier processes or performance.

To summarize, contract specificity directs the buyer to develop specific procedures to monitor the supplier. In the process of monitoring, the buyer frequently collects information from the supplier regarding service delivery, and ascertains that the supplier's activities and conduct are consistent with pre-specified requirements in the contract. As a result, monitoring improves service performance.

H5: Monitoring mediates the relationship between contract specificity and service performance.

Research Method

Data collection

We obtained a primary dataset through a survey-based approach. First, a thorough literature review was performed to develop the survey questionnaire. Next, interviews were conducted with practitioners in healthcare and manufacturing industries to improve the survey. Based on their suggestions, we edited the survey based on specific industry characteristics. Third, the survey was reviewed by academics to clarify the constructs and validate the items.

Survey questions are anchored on a five-point Likert-type scale. The unit of analysis for this research is the contract for outsourcing a particular service. The professionals (i.e. supply chain leader, director, vice president, managers, procurement specialist, etc.) from the organizations who are responsible for service purchasing were asked to respond to the survey. A pilot test was conducted to verify the instruments before sending out the survey. The results from the pilot test enabled us to further refine the survey.

We used an internet-based tool to administer the survey. We approached the Institute for Supply Management (ISM), one of the largest supply management associations in the world to collect data from multiple industries. ISM launched this survey in November 2016 and completed the survey in January 2017. The survey was administered to 14,000 members of ISM. Only 728 members started to respond to it, some of them quit the survey when encountered the contract-level questions. Our final sample contains 261 completed and useable survey responses, which represent 35.6% of those who have opened the survey.

There are two reasons for why only a few members of an association respond to the survey. First, it is usually difficult to obtain survey responses from corporate-level managers (Poppo & Zenger, 2002). Second, it is difficult to solicit contract-level information through the survey, as many respondents may not be willing to answer the detailed questions such as contract value or specificity. In fact, many empirical studies that investigate contract-level issues are usually based on archival data and have a smaller sample size. The response rate is line with what ISM receives for this type of academic study.

Key informants and descriptive statistics

We conducted a series of examinations on the sample. To check whether non-response bias is a problem, we examined the variances between the responses of early and late waves of the returned survey (Krause, 1999). This test assumed that the opinions of the late responders somehow represent the views of non-respondents (Armstrong & Overton, 1977). The results indicated there was no noticeable difference between early and late respondents. More detailed information regarding respondent profile, company size, industrial sector, supplier location, contract size, service type that outsourced (e.g. logistics, and etc.) are presented in Table A1 and Table A2.

Measurement instrument

Table 3 shows the correlation matrix for the key variables examined in the structural equation modeling (SEM). Table B1 in Appendix B presents the measurement scales and the corresponding descriptive statistics in this study.

Table 3: Descriptive Statistics

Variable	1	2	3	4	5	6	7	8	9
1.Contract type (fixed-price)	1.00								
2.Contract value	-0.12+	1.00							
3.Prior interaction	0.03	-0.07	1.00						
4.Relationship length	0.05	0.16*	-0.40	1.00					
5.Service complexity	-0.06	0.21**	0.01	0.01	1.00				
6.Switching costs	0.01	0.14*	0.05	0.04	0.3**1	1.00			
7.Measurement Ambiguity	-0.14*	-0.12*	-0.10	-0.04	-0.01	0.15*	1.00		
8. Contract specificity	0.04	0.23**	0.01	0.03	0.20**	0.10	-0.08	1.00	
9. Monitoring	-0.01	0.12*	-0.08	0.03	0.21**	0.15*	0.01	0.33**	1.00
10.Service Performance	0.06	0.08	0.01	0.05	0.07	0.07	0.00	0.16**	0.25**

Notes: **p<0.01; *p<0.05; +p<0.1

Service complexity. A majority of the extant literature measures task complexity, transaction, or project complexity rather than service complexity (Anderson & Dekker,

2005; Tiwana & Bush, 2007; Mooi & Ghosh, 2010). Very few have developed the measures for service complexity. We developed the measurement items by incorporating the unique issues that relate to services. We propose a four-scale instrument that reflects the extent to which the service delivery 1) contains interrelated sub-services, 2) involves the use of shared resources, 3) requires frequent interactions between buyer and supplier, and 4) incorporates a variety of distinct knowledge bases, skills, and competencies.

Switching costs. Switching costs represent the difficulty the buyer encounters in switching the supplier. Following Mooi & Ghosh (2010), we capture this construct based the cost, time and learning efforts that the buyer will face if switching from the current supplier to another supplier.

Measurement ambiguity. Measurement ambiguity implies the degree of difficulty in measuring supplier performance. We integrate the measures from Anderson and Dekker (2005) and Poppo and Zenger (2002) to form the construct. The first scale capture whether evaluating this supplier's performance is a highly subjective process. The second and third scales solicit the difficulty of evaluating supplier compliance and service quality respectively. The final one enquires about the difficulty of comparing the outsourced service to similar services in the market.

Transaction size. Transaction size refers to the total value of the contract with excluding subsequent fees incurred after signing a contract. Respondents were asked to choose between seven categories of value in US dollars: <$200,000,$200,000–$500,000, $500,000–$1 million, $1 million–$2.5 million, 2.5 million–$5 million, $5 million–$10 million, and >$10 million.

Contract specificity. Contract specificity is measured as the extent to which the contractual features are clearly specified with respect to (1) Contract implementation procedures 2) technical specifications, (2) performance requirements, 4) scope of work, 5) financial and commercial terms, 6) legal terms and conditions, and (7) overall contract are specified in detail in the contract. We capture the level of contract specificity from buyer's perspective. We derive this instrument from Wuyts and Geyskens (2005) and Mooi and Ghosh (2010), by slightly modifying the items based on the suggestions given by industrial practitioners.

Monitoring. Monitoring represents the procedures that enable the buyer to obtain information and verify the supplier's behavior and performance (Heide et al., 2007). Although some of the existing literature distinguishes monitoring into behavior-based and output-based monitoring (e.g. Heide et al., 2007; Kashyap et al., 2012; Stouthuysen et al., 2012), we decided to keep monitoring as a one-dimensional construct for two reasons. First, the primary goal of this paper is to test mediating role of monitoring, but not verify which type of monitoring that mediates the relationship between contract specificity and performance. Second, output-based monitoring is similar to contract specificity since they both put a great emphasis on foreseeable outcomes. Thus, we use a four-scale instrument to measure monitoring by adopting three items from Stouthuysen et al. (2012) and adding one item from industry practitioner. We mainly focus on the practices that are carried out in stage of contract execution (i.e. after the relationship has formed), and measure monitoring as the extent to which that the buyer 1) continuously monitors the achievement of the objectives set for the supplier 2) executes an on-boarding process for

contract, 3) evaluates the procedures of the supplier on a periodic basis, and 4) provides feedback and information to the supplier about the results of its activities.

Service performance. Service performance refers to the extent to which that the supplier's performance has met the buyer's expectations, and this measure is mainly related to buyer satisfaction. Poppo and Zenger (1998; 2002) suggest that the satisfaction with supplier performance can better reflect governance efficiency than governance costs. Specifically, we reviewed several relevant studies (e.g. Poppo & Zenger. 2002; Stouthuysen et al. 2012; Handley & Gray, 2013) and construct a measure of service performance using five-scale item as follows:1) adhere to the contract requirements, including agreed budgets; 2) offer accurate and timely information; 3) respond to changes efficiently and effectively; 4) offer consistent level of service; and 5) offer customized service as allowed by the contract.

Control variables. We control for a series of variables that may contribute to potential bias. They are:

Industry sector. The industry is distinguished between manufacturing industry and service industry.

Organization size. Organization size refers to the total gross revenue in the most recent year for the organization.

Market competition. Market competition represents the degree of which that there are a sufficient number of qualified external suppliers for the current contract.

Relationship length. Relationship length is measured as the number of years that the buyer has been working with the supplier who provides the outsourced the service: less than 1 year; -3 years; 3-5 years; 5-7 years; more than 7 years.

Prior interaction. Prior interaction refers to whether the buyer has worked with the supplier before signing the current contract.

***Contract type*.** We distinguish the contract based on two types, fixed-price and cost-based contract.

Reliability and validity

We first conduct exploratory factor analysis (EFA) for the reflective multi-item scales that used in the study. The results extract six factors reflecting the constructs of service complexity, switching costs, measurement ambiguity, contract specificity, monitoring, and supplier performance. The results show that the tested items loaded very strongly on their intended constructs. Table 4 presents the results of EFA.

Table 4: Exploratory Factor Analysis

Item	Factor1	Factor2	Factor3	Factor4	Factor5	Factor6
SC1	0.10	0.02	0.01	0.00	**0.65**	0.21
SC2	0.04	-0.01	0.05	0.08	**0.66**	0.10
SC3	0.10	0.07	-0.08	0.16	**0.55**	0.10
SC4	0.22	-0.01	0.01	0.02	**0.62**	0.06
SW1	0.08	0.02	0.11	-0.02	0.09	**0.78**
SW2	0.03	-0.03	0.13	0.06	0.17	**0.74**
SW3	0.07	0.10	0.06	0.14	0.24	**0.60**
MA1	-0.04	0.06	**0.63**	0.04	0.03	0.03
MA2	-0.07	0.02	**0.76**	0.00	-0.08	0.06
MA3	-0.10	-0.05	**0.72**	-0.06	0.06	0.05
MA4	-0.03	-0.01	**0.57**	0.06	-0.01	0.13
CS1	**0.72**	0.15	-0.06	0.25	0.07	0.06
CS2	**0.61**	0.06	-0.07	0.12	0.13	0.14
CS3	**0.68**	0.07	-0.02	0.10	0.14	-0.02
CS4	**0.75**	-0.04	-0.11	0.09	0.09	-0.03
CS5	**0.72**	0.11	-0.03	0.15	0.06	0.03
CS6	**0.61**	0.07	-0.03	0.15	0.09	0.06
MN1	0.23	0.13	0.00	**0.61**	0.04	0.06
MN2	0.20	0.26	0.17	**0.43**	0.30	-0.01
MN3	0.20	0.07	0.03	**0.73**	0.09	0.05
MN4	0.24	0.12	-0.02	**0.72**	0.08	0.06

Table 4: Exploratory Factor Analysis (Continued)

PC1	0.13	**0.75**	0.03	0.05	-0.04	-0.02
PC2	0.05	**0.74**	-0.02	0.12	0.00	0.07
PC3	0.06	**0.72**	-0.01	0.03	0.03	0.02
PC4	0.09	**0.75**	0.01	0.10	-0.01	-0.01
PC5	0.01	**0.74**	0.02	0.13	0.12	0.05
Eigenvalue	**4.95**	**2.49**	**2.36**	**1.49**	**1.06**	**0.96**

We next perform confirmatory factor analysis (CFA) to assess the reliability and validity of the constructs. The CFA was conducted using AMOS with the results presented in Table 5. Specifically, Table 7 displays the factor loadings for each individual items, as well as Cronbach's alpha, composite reliability (CR), and average variance extracted (AVE) for the latent construct. The statistics related to model fit are given below the table.

The overall fit of the measurement model is good since the expected thresholds for RMSEA, χ^2/df, CFI, IFI are all within the suggested range. Moreover, previous literature suggests that factor loadings should exceed 0.4 to demonstrate convergent validity (Hair et al., 1998; Handley & Benton Jr., 2012). The respective results show that all the factor loadings are above 0.5 and thus reflect good convergent validity. The p-values for the factor loadings are all less than 0.001. Construct reliability is supported since Cronbach's alpha and composite reliability are all greater than (surpass) 0.7 for each construct. Divergent validity is also supported as average varianc0e extracted (AVE) are greater than 0.4. Although the ideal AVE should surpass 0.50, prior literature suggests that 0.4 is an acceptable threshold (Fornell & Larcker, 1981; Handley & Benton, 2012).

Table 5: Confirmatory Factor Analysis

Constructs	Item	Factor loading
Contract specificity		
Cronbach's $\alpha = 0.86$	CS1	0.80
Composite reliability = 0.86	CS2	0.64
AVE = 0.51	CS3	0.72
MSV = 0.15	CS4	0.70
	CS5	0.75
	CS6	0.65
Service complexity		
Cronbach's $\alpha = 0.77$	SC1	0.73
Composite reliability = 0.77	SC2	0.71
AVE = 0.46	SC3	0.55
MSV = 0.05	SC4	0.70
Switching costs		
Cronbach's $\alpha = 0.79$	SW1	0.81
Composite reliability =0.80	SW2	0.81
AVE = 0.57	SW3	0.63
MSV = 0.03		
Measurement Ambiguity		
Cronbach's $\alpha = 0.78$	MA1	0.62
Composite reliability =0.79	MA2	0.82
AVE = 0.49	MA3	0.73
MSV = 0.08	MA4	0.60
Supplier Monitoring		
Cronbach's $\alpha = 0.78$	MN1	0.69
Composite reliability = 0.79	MN2	0.53
AVE = 0.49	MN3	0.76
MSV = 0.15	MN4	0.80
Performance		
Cronbach's $\alpha = 0.87$	PC1	0.76
Composite reliability = 0.87	PC2	0.76
AVE = 0.56	PC3	0.71
MSV = 0.02	PC4	0.78
	PC5	0.75

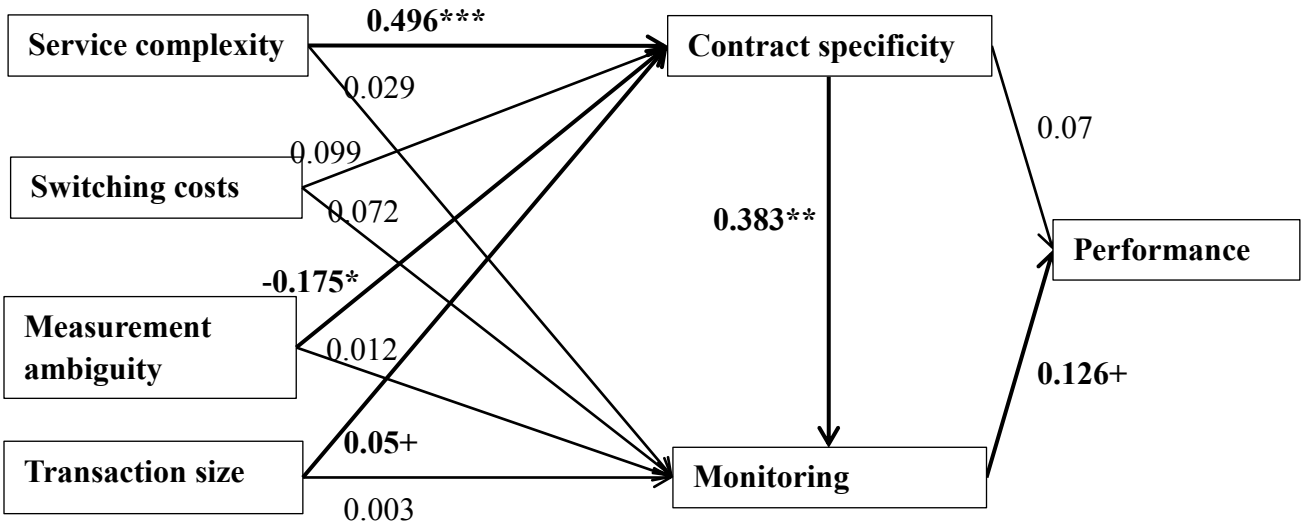
***Model fit indicators:** χ^2/df = 1.49; RMSEA = 0.043; CFI = 0.943; IFI = 0.945

Common method variance

We next followed the procedures recommended by Podsakoff et al. (2003) to evaluate common method bias. First, we conduct Harman's single-factor test with adding a single factor to the model to measure the covariance in the independent variables and dependent variables. The results show that only 22.6% of the variance is explained by the single factor, which is far below the suggested range 50%. Second, we perform common latent factor test with and without two independent marker variables to adjust for common method bias. The results showed that common variance is 10.9% without adding marker variables, and is 9% with marker variables. In sum, both the tests indicate that common method bias is not a strong concern.

Analysis and Results

We utilize Structural Equation Model (SEM) to investigate the proposed hypotheses. First, we use multiple measures to assess the fit of the structural model. Specifically, root mean squared error of approximation (RMSEA) is 0.042, RMSEA 90% confidence interval is (0.035; 0.052), root mean square residual (RMR) is 0.814. All these statistics indicate a good absolute model fit. The comparative fit index (CFI) is 0.93, and incremental fit index (IFI) is 0.94, which suggests a good incremental model fit. In sum, all these indexes indicate a good fit of the structural model. The results of the structural model are given in Figure 2 and Table 6.



Note: + p-value < 0.1;* p-value < 0.05; ** p-value < 0.01

Figure 2: Structural Equation Modeling Results

Table 6: Structural Equation Modeling Analysis

Paths	Standard coefficient	Standard deviation	P-value
Contract specificity ← Service complexity	**0.496**	**0.155**	**0.001**
Contract specificity ← Switching costs	0.099	0.079	0.211
Contract specificity ← Measurement ambiguity	**-0.175**	**0.084**	**0.037**
Contract specificity ← Transaction size	**0.050**	**0.027**	**0.067**
Monitoring ← Service complexity	0.029	0.115	0.799
Monitoring ← Switching costs	0.072	0.060	0.23
Monitoring ← Measurement ambiguity	0.012	0.064	0.849
Monitoring ← Transaction size	0.003	0.021	0.867
Monitoring ← Contract specificity	**0.383**	**0.064**	**< 0.001**
Performance ← Contract specificity	0.070	0.052	0.174
Performance ← Monitoring	**0.126**	**0.067**	**0.057**

***Hypothesis 1*: Antecedents of contract specificity and monitoring**

It was hypothesized that transaction hazards will drive contract specificity (the buyer to craft more detailed contracts). Specifically, 1) the path coefficient from service complexity to contract specificity ($\alpha = 0.496, p < 0.001$) is positive and statistically

significant; 2) the path coefficient from switching costs to contract specificity ($\alpha = 0.099, p = 0.211$) is insignificant; 3) the path coefficient from measurement ambiguity ($\alpha = -0.175, p = 0.037$) is negative and statistically significant; and 4) the path coefficient from transaction size (i.e. contract value) to contract specificity ($\alpha = 0.050, p < 0.067$) is positive and marginally significant. Thus, both service complexity and transaction size are the drivers of detailed contract design, while measurement ambiguity hinders the buyer from clarifying the requirements and expectations in the contract. Surprisingly, although many previous literature suggests a strong linkage between switching costs and contract specificity (e.g. Wuyts & Geyskens; 2005; Mooi & Ghosh, 2010), we fail to identify this relationship in our analysis. One possible explanation is that switching costs in service sourcing is not as major as product sourcing—they are not explicit costs like infrastructure but rather human capital and knowledge. Perhaps it is necessary for both the parties to make an investment in the relationship to smooth coordination and achieve mutual benefits. Thus, relatively higher switching costs are common for service outsourcing, and the buyer will not respond to it by crafting detailed contracts. In sum, the results provide partial support for hypothesis 1a.

It was hypothesized that transaction hazards will also drive the buyer to closely monitor the supplier. The path coefficient from service complexity ($\alpha = 0.029, p = 0.799$), switching costs ($\alpha = 0.072, p = 0.23$), measurement ambiguity ($\alpha = 0.012, p = 0.849$), and contract size ($\alpha = 0.003, p = 0.867$) to monitoring are insignificant. Thus, none of the transaction hazards are significantly related to monitoring. The results provide no support for hypothesis 1b. Since monitoring is mainly carried out in stage of

contract execution rather than contracting, organizations may already respond to transaction hazards through early stage practices such as contracting.

***Hypothesis 2-4*: Performance implications of contract specificity and Monitoring**

Contract specificity was hypothesized to have a positive impact on service performance. The standardized path coefficient from contract specificity to supplier performance (α=0.070, p<0.174) is insignificant. This counter-intuitive finding is not consistent with our conjecture and fails to support hypothesis 2. On the other hand, since our study context is service outsourcing—which is quite different from manufacturing and involves a lot of uncertainties in the process of service delivery, it is usually difficult to specify all the details in a contract. Therefore, it is possible for contract specificity to not have a significant impact on service performance. To further investigate the relationship between contract specificity and supplier performance, we will carry out more detailed analysis in the section of the posthoc analysis.

Monitoring was also hypothesized to positively affect service performance. Very limited literature has empirically tested the influences of monitoring on supplier performance, especially in the context of service outsourcing. Yet, monitoring enables the buyer to communicate with the supplier on a regular basis, as well as allows the buyer to provide useful information to the supplier to improve service quality accordingly. It is imperative to understand the effect of monitoring on performance. The results show that the standardized path coefficient from monitoring to supplier performance ($\alpha = 0.126, p = 0.057$) is positive and statistically significant, indicating monitoring plays a positive role in improving supplier performance. Thus, hypothesis 3 is supported.

Contract specificity was also hypothesized to positively influence monitoring. We argued that a specific contract includes clauses that clarify requirements and expectations for the buyer to monitor the supplier. In fact, previous literature has indicated that one important functional area of contract design is to dictate future needs for monitoring the supplier (Chen & Bharadwaj; 2009). Our results show that the path coefficient from contract specificity to monitoring ($\alpha = 0.383,\ p < 0.001$), and hence provide support for hypothesis 4.

***Hypothesis 5*: Mediation effect of monitoring**

We follow the procedures proposed by Baron and Kenny (1986) and Rungtusanatham et al. (2014) to examine the mediating effects of monitoring. In the first step, we test the effect of contract specificity on service performance without including monitoring in the model, and find that the path coefficient from contract specificity to service performance is significant ($\mathrm{c} = 0.082, \mathrm{p} = 0.069$). In the second step, we include monitoring as a mediator in the model and report the relevant coefficients. We find that the path coefficient from contract specificity to monitoring($\mathrm{a} = 0.383, \mathrm{S.E.} = 0.064, \mathrm{p} < 0.001$), as well as the path coefficient from monitoring to performance ($\mathrm{b} = 0.126, \mathrm{S.E.} = 0.067, \mathrm{p} = 0.057$) to be both significant. By utilizing Sobel test, we verify that the corresponding mediating coefficient is also significant ($\mathrm{ab} = 0.048, \mathrm{S.E.} = 0.027, \mathrm{t} = 1.794, \mathrm{p} = 0.072$). We also obtain the path coefficient from contract specificity to service performance from the mediation model and find this coefficient is insignificant ($\mathrm{c}' = 0.070, \mathrm{S.E.} = 0.052,\ \mathrm{p} = 0.174$). Moreover, the coefficient identified

in the mediation model is less than the coefficient obtained in step 1 (i.e. model without including monitoring).

We present the corresponding results in Figure 3. Based on the results, we conclude that monitoring partially mediates the relationship between contract specificity and performance, and thus find support for Hypothesis 5.

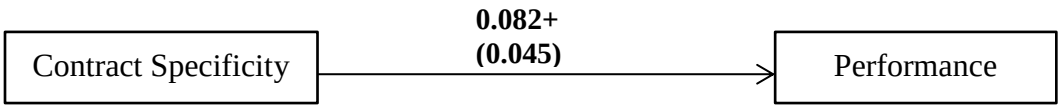


Figure 3 Part A: Model without Mediator

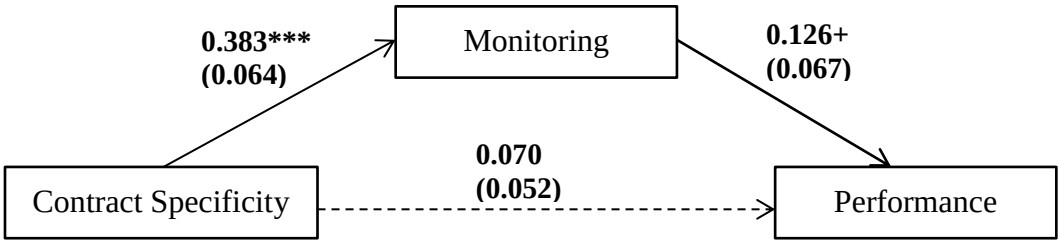


Figure3 Part B: Model with Monitoring as a Mediator

Figure 3: Mediation Effect of Monitoring

Post-hoc Analysis

In this section, we carry out two additional analyses to verify the robustness of our findings. We mainly build on two articles to carry out the analysis. Following Mooi and Ghosh (2010), we investigate the deviation between actual contract specificity and predicted contract specificity on service performance. Accordingly, we verify if the alignment between transaction hazards and governance mechanisms lead to superior

service performance. Based on Gopal et al. (2012), we further test the proposed conceptual framework in Section 3 with splitting sample by contract type. We identify that contract specificity and monitoring have different impacts on service performance for fixed-price contracts and cost-based contracts. We describe the analysis and results in the following two subsections.

Alignment between transactional attributes and contract specificity

Mooi and Ghosh's (2010) indicate that the deviation between predicted contract specificity and the actual contract specificity (i.e. the alignment between governance structure and the transaction attributes), rather than contract specificity itself, has a positive impact on performance. Likewise, we investigate if the misalignment between transaction hazards and contract specificity is the real driver of performance. Following Mooi and Ghosh (2010), we carry out the analysis in three steps. First, we use regression to estimate the relationships between transactional attributes and contract specificity. Given the estimated parameters in regression analysis, we obtain the predicted values of contract specificity. Secondly, we calculate the difference between the predicted value and the actual value and obtain the residuals. Thirdly, we define positive and negative residuals as below:

Assume the residual for observation i is η_i.

$$\text{Negavite} = |\eta_i| \text{ if } \eta_i < 0, \text{ else Negavite} = 0$$

$$\text{Positive} = \eta_i \text{ if } \eta_i > 0, \text{ else Positive} = 0$$

Further, we use predicted the level of contract specificity as a proxy and include these split residuals in the analysis based on the following equation:

Service Performance

$$= \beta_0 + \beta_1 \times Positive + \beta_2 \times Negative + \beta_3 \times Conttact\ specificity + \beta_4 \times Service\ complexity \times Contract\ specificity + \beta_5 \times Switching\ cost \times Contract\ specificity + \beta_6 \times Measurement\ Ambiguity \times Contract\ specificity + \beta_7 \times Transaction\ size \times Contract\ specificity + \varepsilon_i$$

Table 7 shows the results of the split residual analysis. We found that the impact of Negative residual on service performance is negative and significant (β_2 =-0.28, p-value = 0.025), indicating contracts that are less specific than predicted decreases service performance. We also found that the effect of Positive residual on service performance is insignificant (β_2 =-0.11, p-value = 0.60), suggesting the contracts that are more specific than predicted has no significant impact on service performance. Our findings are consistent with those revealed by Mooi and Ghosh (2010).

Table 7: Split Residual Regression Analysis

	Coefficient	S.E.	P-value
Positive	-0.105	0.198	0.595
Negative	**-0.284**	**0.126**	**0.025**
Contract specificity	0.374	0.736	0.612
Service complexity ×Contract specificity	0.846	0.316	0.008
Switching cost ×Contract specificity	-0.320	0.321	0.320
Measurement Ambiguity× Contract specificity	-0.824	0.313	0.009
Transaction size ×Contract specificity	0.053	0.167	0.749

Moderation effect of contract type

Gopal et al. (2012) found that contract type moderates the effects relational flexibility (an inverse measure of contract specificity) on supplier performance and profitability. Likewise, we expect different governance mechanisms have varying effects

on supplier performance given the specific contract type adopted to manage the outsourced service. Accordingly, we split the sample into two groups based on whether the contract is fixed-price or cost-based. We conduct Structural Equation Modeling (SEM) to test our conceptual model with comparing two types of contracts.

The results are presented in Table 8. In fixed-price contracts, contract specificity has a positive impact on supplier performance ($\alpha = 0.184, p = 0.010$), while the effects of monitoring on performance is insignificant ($\alpha = 0.007, p = 0.932$). In contrast, contract specificity in cost-based contracts does not significantly influence supplier performance ($\alpha = -0.065, p = 0.394$), but monitoring has a positive and significant effect on performance ($\alpha = 0.455, p = 0.004$). Additionally, contract specificity has a significant positive influence on monitoring for both fixed-price contracts ($\alpha = 0.439, p < 0.001$) and cost-based contracts ($\alpha = 0.258, p = 0.002$).

Our findings are aligned with the characteristics of two types of contracts. First, fixed-price contract is typically more detailed than cost-based contracts (Gefen et al., 2008). It is appropriate to use fixed-price contracts if the buyer has a clear understanding of its requirements for the outsourced services. The buyer can clarify its expectations in the contract; contract specificity will have a positive impact on supplier performance. In contrast, cost-based contracts are usually used in larger or more complicated service outsourcing. In such a scenario, it is impossible to anticipate everything and specify all the contingencies in contracts. As such, close monitoring can more effectively manage the outsourced services than detailed contracts.

Table 8: Structural Equation Modeling Analysis by Contract Type

	Fixed-price contract			Cost-based contract		
	Coefficient	S.E.	P-value	Coefficient	S.E.	P-value
Contract specificity ← Service complexity	0.447	0.281	0.111	**0.420**	**0.179**	**0.019**
Contract specificity ← Switching costs	0.085	0.100	0.395	0.238	0.146	0.103
Contract specificity ← Measurement ambiguity	**-0.237**	**0.111**	**0.034**	-0.215	0.159	0.177
Contract specificity ← Transaction size	0.046	0.038	0.228	0.046	0.044	0.299
Monitoring ← Service complexity	0.008	0.213	0.972	0.145	0.116	0.209
Monitoring ← Switching costs	0.074	0.078	0.342	0.019	0.094	0.838
Monitoring ← Measurement ambiguity	0.020	0.088	0.819	0.042	0.102	0.678
Monitoring ← Transaction size	-0.014	0.030	0.638	0.027	0.028	0.332
Monitoring ← Contract specificity	**0.439**	**0.088**	**<0.001**	**0.258**	**0.084**	**0.002**
Supplier performance ← Contract specificity	**0.184**	**0.071**	**0.010**	-0.065	0.076	0.394
Supplier performance ← Monitoring	0.007	0.079	0.932	**0.455**	**0.158**	**0.004**

Discussions and Future Work

Research contributions

We live in the era of the service economy, where the service sector accounts for more than 70% of U.S. economic growth. The global service outsourcing market has increased rapidly over the past decade (Tate et al., 2009; Gartner, 2009), and it is essential for organizations to understand how to control and manage outsourced services successfully.

Our findings have managerial implications and make several important contributions to the literature. First, TCE proposes that transaction hazards increase the costs associated with contract design, negotiation, monitoring, etc. (Williamson, 1985). However, a majority of the existing literature focuses on examining the relationship between transaction hazards and the details enumerated in a contract (i.e. contract specificity), while ignoring the role monitoring plays in the framework. To fill this gap, we simultaneously examine the influences of transaction hazards on contract specificity

and monitoring. Although we find that transaction hazards only significantly impact contract specificity, we are among the first to address whether organizations respond to transaction hazards through some other formal governance mechanisms rather than just contract design. The findings regarding contract specificity are consistent with the prior literature (e.g. Anderson and Dekker, 2005; Mooi & Ghosh, 2010), while the findings related to monitoring are the first to empirically examine a link implied by TCE that had not been thoroughly discussed in the previous works.

Second, our study provides new information on how service exchange parties should collaborate to improve service performance. Compared to prior studies that investigate the impact of either contract specificity or monitoring on service performance, our study is among the first to consider the effects of both contract specificity and monitoring on service performance. Since services are more intangible and heterogeneous than physical products, and service outsourcing involves more uncertainty than manufacturing outsourcing (Ellarm et al., 2007; Stouthuysen et al., 2012), service outsourcing typically requires more frequent communication between buyer and supplier. Accordingly, the most effective governance mechanisms identified for these two types of outsourcing could vary significantly. Our findings indicate that in the context of service outsourcing, monitoring, rather than contract specificity, has a significant and positive impact on performance.

Lastly, our study combines two streams of literature, which provide different perspectives on the relationships between contract specificity and performance. One stream suggests a direct effect of contract specificity on performance, while the other stream proposes an indirect effect. Our findings support full mediation, such that

monitoring accounts for all of the relationships between contract specificity and service performance. The results are consistent with Kashyap et al. (2012), who propose that contract specificity drives monitoring, and monitoring subsequently influences performance. Yet our work is different from Kashyap et al. (2012) in two respects. First, they examine these relationships in the context of automotive products procurement (product outsourcing) rather than service outsourcing. Second, the underlying assumption of their conceptual framework is that monitoring plays the full mediation role, while we do not. Therefore, our work extends their findings to service procurement and also statistically confirms the mediating effect of monitoring.

In sum, our study confirms the relationships among transaction hazards, contract specificity, monitoring, and service performance. We present the identified significant paths in Figure 4. Our results show the procedures that improve outsourced service performance. In the beginning, the buyer anticipates and responds to transaction hazards through a detailed contract. In a specific contract negotiation, the service exchange parties clarify responsibilities and expectations. Next, the contract should include clauses for the buyer to monitor the supplier. Lastly, the buyer should frequently exchange information with the supplier and closely monitor what the supplier is doing, thereby improving the performance of outsourced service.

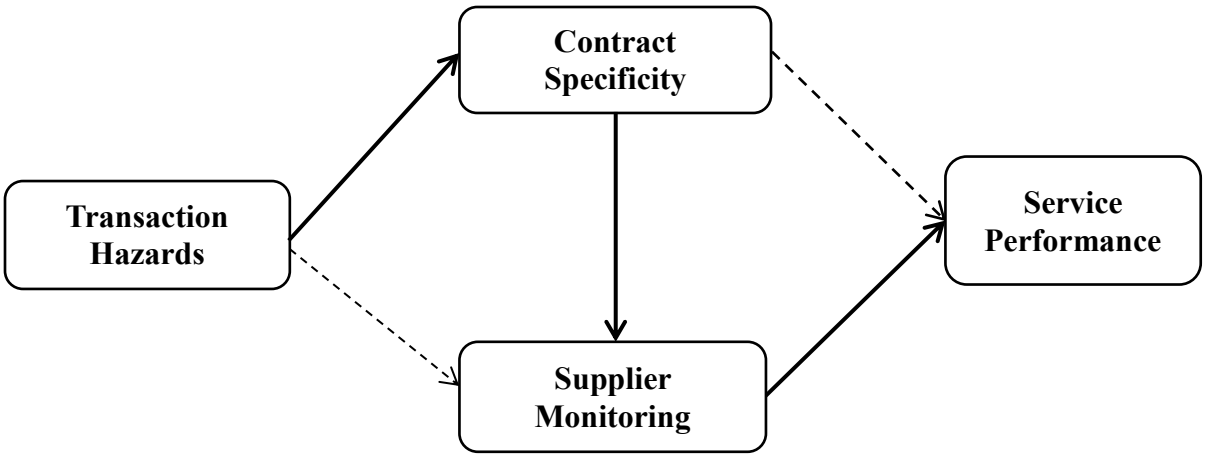


Figure 4: Identified Significant Paths

Managerial implications

Compared with the previous literature that emphasizes the complete or detailed contract as a major driver of successful outsourcing, our findings provide significantly different managerial insights regarding how to effectively control supplier performance in the context of service outsourcing. Our results imply that monitoring is critical to improve service performance. Given this finding, the buyer should closely monitor its supplier's behavior and performance through frequent information exchange, coordination, and evaluation. In doing so, service managers should adopt the most suitable mechanism to govern the supplier, since service outsourcing typically incorporates more uncertainty and requires more interaction between service exchange parties.

Our work also demonstrates the positive relationship between contract specificity and monitoring. In the extant literature, only a small number of studies have empirically examined links between contract specificity and monitoring. To best of our knowledge,

only two papers have done so: Kashyap et al. (2012) and Handley and Gray (2013). However, they have not tested the relationship in the context of service outsourcing, but in manufacturing or product outsourcing. Thus, it is unclear if the relationship still holds for service outsourcing. Our analysis verifies that the effect of contract specificity on monitoring is positive and significant. Therefore, a procurement manager should also pay attention to contract design features that enable the buyer to monitor supplier activities closely.

Additionally, our detailed post-hoc analysis suggests buyers should use different governance mechanisms based on contract type. We find that contract specificity has a strongly positive impact while monitoring has no significant impact on service performance if a fixed-price contract is used. The result indicates crafting a detailed contract is a more effective mechanism for fixed-price contracts. In contrast, we find that monitoring alone has a significant impact on service performance in cost-based contracts. This implies monitoring is a more effective mechanism than contract specificity for such contracts.

Limitations and future studies

Given the limitations of this paper, several future research directions are possible. First, we focus only on two formal governance mechanisms in this study. As mentioned by many other studies, informal governance mechanisms such as trust can also improve service performance (Dyer & Singh, 1998; Poopo & Zenger, 2002; Wuyts & Geyskens, 2005). Future studies can investigate the influences of relational governance in managing service outsourcing contracts. Second, our sample is obtained from a single respondent.

Although we show that common method bias is not an issue in our data, future research should consider obtaining data from different sources to verify the relationships identified in this work. Finally, we primarily rely on TCE to investigate the relationships among transaction hazards, contract specificity, monitoring, and performance. However, TCE is only one of many possible lenses through which to examine the buyer-supplier relationship. Future research can combine TCE and other theories to investigate these relationships. For example, from the perspective of agency theory, contract specificity is more relevant to output-based control, while monitoring is more related to behavior-based control (Eisenhardt, 1985; 1989). As such, these two types of control mechanism could be substituted for each other. Since our findings indicate these two control mechanisms tend to be complementary, future works could further validate how contract specificity and monitoring affect one another.

ESSAY 2: EMPIRICAL INVESTIGATION OF KRALJIC PORTFOLIO PURCHASING MODEL

Introduction

The U.S. has transitioned from a manufacturing-dominated employment structure to a service-dominated employment structure over the past few decades. As manufacturing increasingly relies on technology and machines, it is important to investigate other sectors that depend more on human resources and offer more job opportunities. For instance, the service sector accounts for about 70% of gross domestic product (GDP) growth but has not received much attention in the operations management (OM) field (Ellram et al., 2007; Stouthuysen et al., 2012).

Services tend to be more heterogeneous than tangible products, implying that it is difficult to standardize outsourced services, although standardization and aggregation are important means for creating economic advantage. However, developing different strategies to manage each individual service is too time-consuming. It makes more sense for organizations to find a middle ground between these two extremes to manage outsourced services. Portfolio analysis is useful to achieve this goal. This model classifies services based on two primary dimensions related to service characteristics. It further suggests that organizations develop plans and sourcing strategies to manage each group of services based on their particular characteristics (Monczka et al., 2009).

Kraljic (1983) first proposed a purchasing portfolio model based on complexity and purchasing value. The main idea was to develop sourcing strategies based on risks and the importance of the supplies or services. Following Kraljic (1983), a stream of literature has further proposed other portfolio models, primarily relying on a two-dimensional construct for examination. For example, Hadeler and Evans (1994) recommend a supply strategy model based on a product's value and potential complexity.

Olsen and Ellram (1997) suggest management difficulty and strategic importance as two dimensions of the portfolio model. Van Weele (2002) present a portfolio model that uses profit impact and supply risk as two dimensions. Generally, these portfolio models define four groups of items, including strategic items, leverage items, bottleneck items, and routine items, and provide recommendations for developing the sourcing strategies for each group of items.

However, a majority of the existing portfolio models neglects the difference between services and tangible products. For example, the development of Kraljic's matrix is mainly focused on supplies and physical products like raw materials. Much less discussion has been devoted to services. As we know, the process of sourcing services is usually associated with more uncertainty than purchasing tangible products (Ellram et al., 2007). For instance, the Kraljic portfolio purchasing model suggests that maintaining extra inventory is an effective approach to ensure availability for bottleneck products (i.e., products that represent low purchasing value and are obtained from a highly complex market). However, a major characteristic of services is perishable, which implies no available inventory to buffer against uncertainties in service delivery. Thus, it is not feasible for the buyer to carry out the same plan for managing services delivery as for controlling products. Likewise, the other unique features of services also create challenges in developing effective sourcing strategies for services.

Given the above discussions, we design a conceptual framework that applies the Kraljic portfolio purchasing model to strategically manage the outsourced services. Our main research question is: ***How can the Kraljic portfolio purchasing model be applied to strategically manage service outsourcing contracts?*** By addressing this research

question, the study makes two important contributions. First, we extend the Kraljic portfolio model from materials-focused sourcing strategies to services-focused sourcing strategies. Our discussions of the sourcing strategies are developed based on the specific characteristics of services. Second, we identify the best sourcing strategies for each category of services through empirical tests. Since very few existing studies have provided empirical evidence to support the Kraljic portfolio purchasing model, our study sheds light on the effectiveness of this model.

Specifically, we convert the primary strategy of managing each group of services into five strategic sourcing decisions that have been broadly discussed in the existing literature. The factors under investigation include strategic risk assessment, single sourcing vs. multi-sourcing, competitive bidding vs. negotiation, local sourcing, and information technology (IT) support. We propose a series of hypotheses, relying on the idea that the sourcing strategies adopted to manage each category of services should be aligned with their unique features. To test the proposed hypotheses, we further adopt a survey-based approach to collect information from multiple industries.

The remainder of this essay is organized as follows. In Section 2, we review the literature on the Kraljic portfolio purchasing model and service classification. In Section 3, we further develop hypotheses in line with the primary sourcing objectives proposed by the Kraljic portfolio purchasing model. In Section 4, we provide a description of our data collection processes. By using the collected data, we next employ regression to test the proposed hypotheses and summarize the results in Section 5. Last, we discuss the contributions and managerial implications in Section 6.

Literature Review

The Kraljic portfolio purchasing model (1983) has been considered an important breakthrough in supply management and is widely used for designing strategies for purchased products/services. This model suggests categorizing items based on market complexity and the importance of purchasing. Market complexity is associated with supplier scarcity, pace of technology, and materials substitution. The importance of purchasing is related to the cost of materials or the value-added profile. Based on these two dimensions, Kraljic classifies items into four groups: strategic, bottleneck, leverage, and routine items. Organizations are encouraged to develop supply management strategies for a particular group of items that share similar characteristics. Generally, the main idea behind the Kraljic portfolio purchasing model can be described as "form partnerships for strategic products; assure supply for bottleneck products; exploit power for leverage products and ensure efficient processing for non-critical products" (Canels & Gelderman, 2005, p. 141).

Most of the existing studies on purchasing portfolio models focus on developing the conceptual frameworks but rarely validate these models through empirical analysis. To our best knowledge, none of the extant studies has adopted the Kraljic purchasing model to discuss specific sourcing strategies for services or empirically verified these strategies. Empirically, it is challenging to measure the sourcing strategies. For example, the Kraljic portfolio purchasing model suggests that the key performance criterion for noncritical items (i.e., routine items) is functional efficiency. However, how to measure functional efficiency is not clearly defined in the model. Likewise, this model proposes that the key performance criterion for strategic items is long-term availability.

Nevertheless, the model does not describe in detail how to capture long-term availability. In fact, measurement vagueness has been criticized in several relevant studies (e.g., Olsen & Ellram, 1997; Gelderman & Van Weele, 2005). Thus, it is necessary to develop concrete measures that can capture the essence of sourcing strategies and the targeted performance metrics within each quadrant in the portfolio model.

Beyond the portfolio purchasing models, some empirical studies demonstrate that organizations choose different sourcing strategies based the nature of products or services (Novak & Eppinger, 2001; Balakrishnan et al., 2010). For example, Novak and Eppinger (2001) find that product complexity has a negative impact on the extent of outsourcing. The finding is aligned with the Kraljic model, which suggests complexity as a primary factor that affects sourcing strategies. However, how to clearly distinguish between high and low market complexity is still unknown given the lack of existing studies proposing concrete measures to do so. Practically, it is desirable to find a measure that not only represents market complexity but also is easily implemented in the real world.

One potential measure that meets the above-discussed criteria is service type. As suggested by many service operations management (SOM) studies, professional services and mass services represent various levels of market complexity (Schmenner, 1986). Specifically, professional services are defined as services that require high levels of customer contact and expertise (Silvestro et al., 1992). Examples include consulting, accounting, and engineering. For instance, services like business consultations usually need the service provider to have specific knowledge and customize the services based on customers' requirements. Professional services also require the service provider to have intense interactions with customers (Schmenner, 1986; Stouthuysen et al., 2012).

Accordingly, the market complexity of this type of service is usually high. Mass services are defined as services that require low levels of customer contact and expertise (Silvestro et al., 1992). These services are mainly used to facilitate organizations' management functions and general operations. Examples include janitor and transportation services, which typically require less specific knowledge than professional services and are associated with low levels of market complexity. Thus, we suggest using service type as a measure of market complexity in the Kraljic matrix.

Conceptual Framework

Classification

We follow Kraljic's purchasing portfolio model to classify services for portfolio analysis, mainly based on the importance of the purchase and the complexity associated with sourcing (e.g., Kralijic, 1983; Olsen & Ellram, 1997; Gelderman & Van Weele, 2003). We propose the classification model shown in Figure 6. We segment the sample into four cells: (I) strategic services, (II) bottleneck services, (III) routine services, and (IV) leverage services.

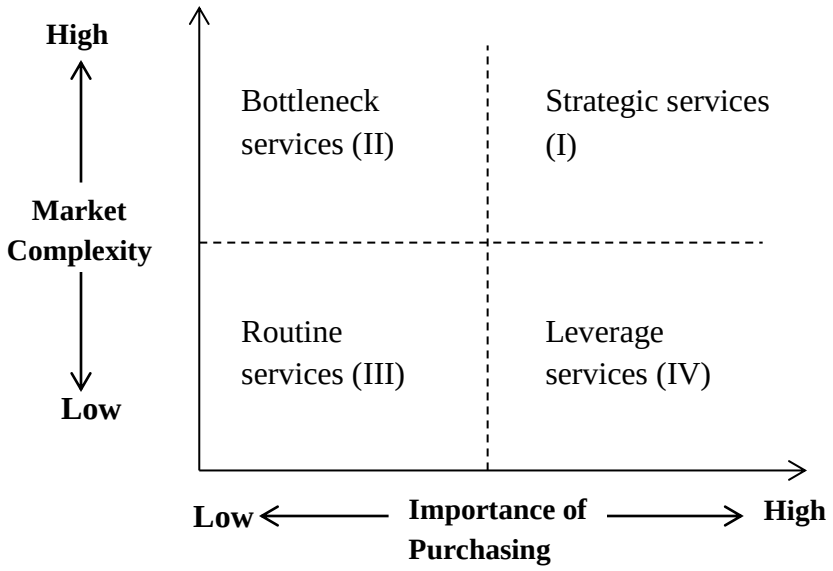


Figure 5: Classification Matrix

Quadrant I: Strategic services. Services account for a great amount of expense and require a high level of expertise. Engineering or IT services that represent high purchase value can be regarded as strategic services. The sourcing decisions related to strategic services are critical because these services typically have a high financial impact and are associated with more sourcing risks (Gelderman & Van Weele, 2003). The buyer should improve service performance and save cost beyond a simple outsourcing contract (Monczka et al., 2009). The primary objective of managing this group of services is to build a close relationship with the supplier.

Quadrant II: Bottleneck services. Services represent low value but require a high level of expertise. This category of services usually has a moderate financial impact. Nevertheless, these services are vulnerable regarding complexity and needs. The service provider plays a dominant role in the relationship. Examples include specified services such as a specialized lawsuit and consulting or training service that demands unique knowledge but only carries a small purchasing expense. The main objective is to ensure

the continuity of the supply and to have in place backup plans (Kralijic, 1983; Canels & Geldman, 2005; Monczka et al., 2009).

Quadrant III: Routine services. Services in this quadrant are usually available from the market at low cost and thus have a low financial impact. Examples include janitorial, landscaping, and facility management services (Monczka et al., 2009). For instance, electronic tools (e.g., IT applications) can be used for efficient management of routine services. The principle of managing routine services is to simplify sourcing procedures through standardization and automation (Kraljic, 1983).

Quadrant IV: Leverage services. Services represent a significant portion of expenses and require relatively lower expertise than strategic services. Leverage services are typically available from the market and provide the potential for cost savings. Few existing studies have given specific examples of leverage services. We suggest that uncomplicated services like transportation/logistics and maintenance, repair, and operations (MRO) that are associated with a lot of purchasing expenses are leverage services. The central tenet of managing this group of services is to exploit buying power and negotiate a price with the supplier to maximize cost savings. Thus, the buyer that relies on a limited number of suppliers can leverage economies of scale through large sourcing volumes.

Sourcing Strategies

Evaluating the outsourced services based on the proposed classification scheme shown in Figure 6 enables the buyer to develop sourcing strategies to match the characteristics of the services. In line with Kraljic portfolio purchasing model (e.g.,

Kralijic, 1983; Gelderman & Weele, 2003; Canels & Gelderman; 2005), we summarize the sourcing strategies as follows: (1) form close partnerships with limited suppliers for strategic services, (2) develop contingency plans and source from multiple suppliers for bottleneck services, (3) standardize and automate the sourcing processes for routine services, and (4) leverage purchasing power and demand lower prices for leverage services.

As an extension of the Kraljic portfolio model, we develop detailed descriptions to reflect the essential strategies. We focus on five sourcing practices that are broadly discussed in the sourcing literature. We discuss these practices one by one and propose a series of hypotheses in the following sections. The framework is presented in Figure 7.

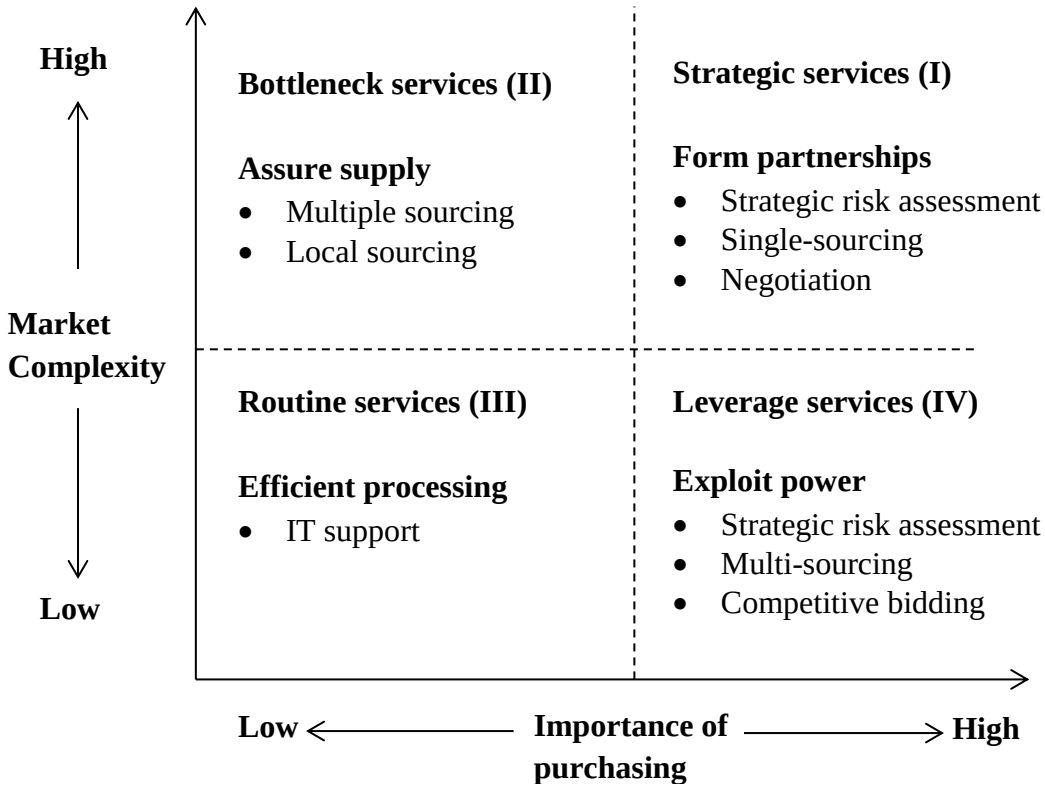


Figure 6: Portfolio Model

Strategic risk assessment

Strategic risk assessment refers to the degree to which the buyer comprehensively evaluates the strategic risks of outsourcing a service (Handley & Benton, 2009). Anticipating the potential problems allows the buyer to develop a clear understanding of costs and resources needed to manage the activities associated with outsourcing (Handley & Benton, 2009). Strategic risk assessment also enables the buyer to evaluate the substantial impacts of contracting a service on the other relevant activities within an organization. Being aware of such impacts can help the buyer organize internal stakeholders and encourage them to exchange information, communicate, and achieve mutual agreement regarding the outsourced service.

Although strategic risk assessment brings a lot of benefits to the buyer, it also requires the buyer to devote human resources to carry out the evaluations and coordinate with internal stakeholders. While different groups of services exhibit various impacts on financial and operational performance, organizations must allocate the resources to the services that have greater influence on organizational performance. Thus, we propose two hypotheses, as follows:

H1a*: Strategic risk assessment is positively related to the performance of leverage services.*

H1b*: Strategic risk assessment is positively related to the performance of strategic services.*

Single sourcing vs. multiple sourcing

A majority of OM studies conceptualizes single sourcing as a cooperative strategy and multi-sourcing as a competitive strategy (Treleven, 1987). However, empirical studies on this practice have not reached a consistent conclusion. On the one hand, some studies support the strategy of single sourcing (Feigenbaum et al., 1983) because it promotes a close relationship between buyer and supplier. Thus, the buyer has a better understanding of the supplier through long-term cooperation. Meanwhile, single sourcing allows the buyer to aggregate volume and reduce cost through economies of scale. Other benefits associated with single sourcing include increased customer responsiveness and better financial performance (Chen et al., 2004). In sum, the gains of single sourcing are aligned with the objective of managing strategic services. Thus, we propose:

H2a*: Single sourcing is positively related to the performance of strategic services.*

Multi-sourcing strategy empowers the buyer to select the supplier that can offer the best price among all the competitors. The buyer will also get more information regarding price. It can also switch from using the contracts from one supplier to another supplier if the latter offers a lower price or better quality than the former. Thus, the benefits of multi-sourcing are aligned with the main purpose of managing leverage services, which advocates leveraging buying power and obtaining the best price from the market:

H2b*: Multiple sourcing is positively related to the performance of leverage services.*

The primary goal for managing bottleneck services is to ensure availability. The buyer is typically advised to source from multiple suppliers in case one supplier faces

issues in delivering the service. In this way, the buyer has a backup plan to mitigate uncertainty. Accordingly, we propose a hypothesis, as follows:

***H2c**: Multiple sourcing is positively related to the performance of bottleneck services.*

Local sourcing

Domestic sourcing is defined as "the activity of contracting for goods or services that are delivered or manufactured within the buyer's home country borders."[1] Likewise, we define local sourcing as the activity of contracting for services that are delivered within the buyer's region. Sourcing from a regional supplier implies a short geographic distance between the buyer and supplier. From a relational standpoint, proximity improves the relationship between the buyer and supplier since they can coordinate quickly and respond to each other's needs more promptly. Meanwhile, the buyer and supplier have an opportunity to interact more frequently with each since it is convenient to do so. In this way, the buyer can more effectively handle problems that arise from uncertainties in delivering a complicated service, as well as adapt to unpredictable changes.

Global sourcing can create economic value through low labor costs (Steven et al., 2014); however, it is hard to achieve cost savings if the value or volume of outsourced services is low. This is because the savings obtained from low labor costs might be offset by the increased cost created by coordination and transportation needs. Hence, sourcing from a regional supplier brings more benefits to the buyer that outsources bottleneck services; the primary objective of managing this group of services is to ensure availability. Accordingly, we suggest the following:

---

1 https://en.wikipedia.org/wiki/Domestic_sourcing#cite_note-1

H3: *Local sourcing is positively related to the performance of bottleneck services.*

Supplier selection mechanism

Competitive bid and negotiation are the two primary mechanisms that the buyer uses to select its intended supplier. Competitive bid requires the invited suppliers to provide the best price for a defined scope of work (Monczka et al., 2009). That is, several eligible suppliers submit their sealed bid to the buyer, and the buyer awards the contract to the supplier that offers a lower price or better contract terms. Through competitive bidding, the buyer can compare prices across multiple suppliers and better control the costs associated with outsourcing (Monczka et al., 2009). However, this mechanism requires that the buyer be capable of defining the scope of work clearly in the requirements and constrains the buyer from further leveraging its power to demand price concessions from the supplier. Since (1) it is usually easier to specify requirements for mass services than professional services and (2) the buyer doesn't have to spend extra time negotiating with the supplier for lower value services, we suggest that the competitive bid is a good fit for mass services with low value (i.e., routine services):

H4a*: Competitive bidding is positively related to the performance of routine services.*

Negotiation means the buyer discusses with a single supplier to reach an agreement (Monczka et al., 2009). Through negotiation, the buyer may demand a particular price or set up a well-defined performance metric for an outsourced service. In return, the supplier will decide whether to accept the buyer's offer and make a certain commitment to deliver the service. Different from competitive bidding, the buyer does

not just focus on price but also emphasizes other aspects of service delivery. This mechanism provides a good fit for strategic services, for which forming partnership is the primary goal. Accordingly, we propose:

H4b*: Negotiation is positively related to the performance of strategic services.*

Information Technology Support

IT provides a useful means for revealing information regarding the transaction to the buyer (Eisenhardt, 1989). Following Bensaou and Venkastraman (1995), we define IT support as the use of IT functionality to facilitate inter-organizational coordination. Although the impact of IT has been empirically tested in the literature that examines manufacturing outsourcing (Bardhan et al., 2006), the literature on service outsourcing has rarely validated its role (Ellram et al., 2007). In fact, IT enables the buyer and supplier to coordinate in a more efficient manner. Since efficient processing is extremely important for sourcing routine services, we propose the following:

H5*: The use of information technology is positively related to performance for routine services.*

Research Method

Data collection

We used a survey-based approach to test the proposed framework. We first developed the survey questions based on the relevant literature. We next conducted a series of interviews with the industry practitioners to refine the existing survey questions, as well as developed some additional questions that were important to service

outsourcing professionals but neglected in the previous literature. Lastly, we invited academics to review and verify the content of questions.

Survey questions were anchored on a five-point Likert-type scale. The unit of analysis for this research is the contract that used for outsourcing a service. The professionals (i.e. supply chain leader, director, vice president, managers, etc.) who are responsible for service purchasing were asked to respond to the survey. A pilot test was conducted to verify the instruments before sending out the survey. The survey was further refined based on the results of the pilot test.

We approached the Institute for Supply Management (ISM) to administer the survey to its professional members. ISM is one of the largest supply management associations in the world. ISM launched this survey in November 2016 and completed the survey in January 2017. Although the survey was administered to 14,000 ISM members, only 728 members started to respond to it. Some respondents quitted the survey when saw the questions that solicit detailed information of contracts. The final sample contains 261 completed and useable survey responses, which represent 35.6% of those who have opened the survey.

Key informants and descriptive statistics

We performed a series of tests to verify the effectiveness of the sample. To check the non-response bias, we first examined the variances between the responses of early and late waves of the returned survey (Krause, 1999). This test assumed that the opinions of the late responders somehow represent the views of non-respondents (Armstrong & Overton, 1977). The results indicated that there was no noticeable difference between

early and late respondents. We present detailed information regarding respondent profile, company size, industrial sector, supplier location, and contract value in Table A1 and Table A2 respectively.

Measurement instrument

Professional/Mass service. We invited 12 academic scholars to classify our sample into professional services and mass services. To assist them consistently categorize the services, we provide the definition of professional services and mass services based on previous literature. We integrated the opinions of these 12 scholars and finally distinguished between professional and mass services. Table 9 presents the detailed information of outsourced service in our sample.

Table 9: Service Description

	Frequency	Percent (%)	Service type
Transportation/logistics	37	14.23	Mass Service
Information technology	31	11.92	Professional Service
Construction	25	9.62	Mass Service
MRO	23	8.85	Mass Service
Engineering	18	6.92	Professional Service
Contract labor	11	4.23	Mass Service
Telecommunications	11	4.23	Mass Service
Consulting	10	3.85	Professional Service
Business consultants	9	3.46	Professional Service
Healthcare	7	2.69	Professional Service
Janitorial	7	2.69	Mass Service
Travel	7	2.69	Mass Service
Waste management	7	2.69	Mass Service
Landscaping	6	2.31	Mass Service
Business consultants	5	1.92	Professional Service
Human capital	4	1.54	Professional Service
Advertising	3	1.15	Professional Service
Delivery and Messenger services	3	1.15	Mass Service

Table 9: Service Description (Continued)

Marketing	3	1.15	Professional Service
Temporary labor	3	1.15	Mass Service
Training	3	1.15	Professional Service
Relocation	2	0.77	Mass Service
Benefits administration	1	0.38	Mass Service
Insurance brokerage services	1	0.38	Professional Service
Utility services	1	0.38	Mass Service
Other	22	8.46	Professional/Mass Service

Contract value. The total value of the contract with excluding subsequent fees incurred after signing a contract. Respondents were asked to choose between seven categories of value in US dollars: <$200,000,$200,000–$500,000, $500,000–$1 million, $1 million–$2.5 million, 2.5 million–$5 million, $5 million–$10 million, and >$10 million. We use the median value of contract value in our sample as a threshold to distinguish between high and low-value contract.

Strategic risk assessment. Strategic risk assessment reflects the degree to which the contracting team comprehensively evaluates the strategic risks of outsourcing a service. Following Handley and Benton (2009), we measure this construct as the extent to which that a buyer evaluates 1) the impact that outsourcing the service would have on its customers, 2) the impact that outsourcing the service would have on its employees, 3) the potential negative consequence of losing internal capability to perform this service, and 4) the risk of external supplier(s) not fulfilling their responsibilities.

Regional sourcing. We ask the respondent to indicate if the contract regional US, domestic US, or global. We consider a regional supplier that has shorter physical distance with the buyer. We use a dummy variable to measure regional sourcing, where 1 implies that the supplier is the regional US, and 0 implies national or global supplier.

Competitive bidding. We ask whether the buyer selects the supplier through competitive bidding or not. The alternative choices include negotiation, through a purchasing alliance, and others.

Information technology support. Information technology support is measured as the extent to which IT supports the following activities associated with outsourcing (1) bidding 2) contract design,, 3) information integration, 4) coordination, 5) monitor and control, and (6) payment. We first obtained this instrument from Ellarm et al. (2007), and further included some additional items based on the suggestions from industrial practitioners.

Service performance. Service performance refers to the extent to which that the supplier's performance has met the buyer's expectations, and this measure is mainly related to buyer satisfaction. Poppo and Zenger (1998; 2002) suggest that the satisfaction with supplier performance can better reflect governance efficiency than governance costs. Specifically, we reviewed several relevant studies (e.g. Poppo and Zenger. 2002; Stouthuysen et al., 2012) and measure service performance from five aspects:1) adhere to the contract requirements, including agreed budgets; 2) offer accurate and timely information; 3) respond to changes efficiently and effectively; 4) offer consistent level of service; and 5) offer customized service as allowed by the contract.

Control variables. We control a series of variables to account for the potential bias. We briefly describe these variables as follows.

***Contract type*.** Contract type is measured by a dummy variable, such that 1 represents a fixed-price contract, while 0 implies a cost-based contract.

Industry sector. The industry is distinguished between manufacturing industry and service industry.

Organization size. Organization size refers to the total gross revenue in the most recent year for the organization.

Prior interaction. Prior interaction is measured by a dummy variable, where 1 represents means that the buyer has worked with the supplier before signing the current contract.

Relationship length. Relationship length is measured as the number of years that the buyer has been working with the major supplier who provides the outsourced the service: less than 1 year; -3 years; 3-5 years; 5-7 years; more than 7 years.

Market competition. Market competition represents the degree of which that there are a sufficient number of qualified external suppliers for the current contract.

Table 10 shows the correlation matrix for the key variables examined in this study. Table B2 presents the constructs used in this paper.

Table 10: Descriptive Statistics

Variable	1	2	3	4	5	6	7	8	9
1. Fixed-price contract	1.00								
2.Contract value	-0.12+	1.00							
3.Strategic risk assessment	-0.06	0.13*	1.00						
4.Prior interaction	-0.01	0.07	0.08	1.00					
5.Relationship length	0.05	0.16*	0.05	0.40**	1.00				
6.Single sourcing	0.14*	-0.14*	-0.03	-0.02	0.00	1.00			
7.Regional supplier	0.01	-0.10+	-0.02	-0.02	0.01	0.13*	1.00		
8.Competitive bidding	0.12*	0.09	-0.04	-0.04	-0.11+	-0.04	0.18**	1.00	
9.Service Performance	0.06	0.08	0.20**	-0.01	0.05	0.06	-0.03	-0.10	1.00

Notes: **p<0.01; *p<0.05; +p<0.1

Reliability and validity

We conduct exploratory factor analysis (EFA) and confirmatory factor analysis (CFA) to assess the quality of three constructs used in this essay, including strategic risk assessment, IT support and service performance. The results of EFA and CFA are presented in Table 11 and Table 12 respectively. EFA shows that the tested items loaded very strongly on their intended constructs. CFA verifies the reliability and validity of the constructs. Factor loadings for the checked items, Cronbach's alpha, composite reliability (CR), and average variance extracted (AVE) for the latent construct are all within the accepted range. Specifically, factor loadings all exceed 0.4 (Hair et al., 1998), Cronbach's alpha and composite reliability are all greater than 0.7, and AVE is greater than 0.4 (Fornell & Larcker, 1981; Handley & Benton, 2012).

Table 11: Exploratory Factor Analysis

Item	Factor1	Factor2	Factor3
SR1	0.21	0.03	**0.50**
SR2	-0.02	0.14	**0.55**
SR3	0.06	0.01	**0.61**
SR4	0.07	0.13	**0.68**
IT1	**0.81**	0.05	0.10
IT2	**0.83**	0.08	0.04
IT3	**0.81**	0.02	0.13
IT4	**0.90**	0.11	0.12
IT5	**0.90**	0.10	0.11
IT6	**0.73**	0.03	0.01
PC1	0.07	**0.73**	0.07
PC2	0.13	**0.74**	0.08
PC3	-0.04	**0.72**	0.07
PC4	0.06	**0.76**	0.01
PC5	0.11	**0.71**	0.21
Eigenvalue	**4.23**	**2.74**	**1.49**

Table 12: Confirmatory Factor Analysis

Constructs	Item	Factor loading
Strategic risk assessment		
Cronbach's $\alpha = 0.77$	SR1	0.51
Composite reliability = 0.77	SR2	0.53
AVE = 0.42	SR3	0.59
	SR4	0.68
IT support		
Cronbach's $\alpha = 0.93$	IT1	0.82
Composite reliability = 0.92	IT2	0.84
AVE = 0.64	IT3	0.82
	IT4	0.91
	IT5	0.90
	IT6	0.72
Performance		
Cronbach's $\alpha = 0.87$	PC1	0.76
Composite reliability = 0.87	PC2	0.76
AVE = 0.56	PC3	0.71
	PC4	0.78
	PC5	0.75

Analysis and Results

Service classification

Following the classification scheme proposed in Section 3, we classify the survey sample into four categories based on contract value and service type. The description of each category is given in Table 13. We find that about two-thirds of the services in our sample are mass services, and the rest of them are professional services. This is consistent with the fact that organizations tend to outsource the services that are not regarded as their core competence. Since mass services are more general than professional services and usually are available from the market, it is very likely organizations incline to outsource mass services more often than professional services.

Table 13: Service Classification Summary

Service category	Contract value	Service feature	Observation number	Percent (%)
Strategic service	High	Professional	51	19.5
Bottleneck service	Low	Professional	48	18.5
Leverage service	High	Mass	81	31.0
Routine service	Low	Mass	81	31.0

Sourcing strategies by service category

As discussed in section 3, we focus on five factors related to service outsourcing, including strategic risk evaluation, single-sourcing vs. multi-sourcing, local sourcing vs. non-local sourcing, competitive bidding vs. negotiation, and information technology support. Table 14 represents the mean value and F-statistics regarding the key sourcing factors examined in this paper. Further, we rely on ordinary least squares (OLS) regression to analyze the effects of these factors on service performance within each service category. We also report variance inflation factor (VIF) and R^2 for each regression model. VIF value for each regression model is below 3, indicating multicollinearity is not a problem for our model. Generally, R^2 are all above 15%, suggesting the models can well explain our data. The detailed results are presented in Table 15.

Table 14: Sourcing factors by service category

	Service Category			
Sourcing factors	**Strategic**	**Bottleneck**	**Leverage**	**Routine**
	0.07	-0.23	0.04	-0.19
Strategic risk assessment	(0.74)	(0.97)	(0.73)	(0.78)
	0.35	0.46	0.25	0.38
Single sourcing	(0.48)	(0.50)	(0.43)	(0.49)
	0.63	0.52	0.65	0.64
Competitive bidding	(0.49)	(0.50)	(0.48)	(0.48)
	0.18	0.23	0.23	0.36
Local supplier	(0.39)	(0.42)	(0.43)	(0.48)
	0.29	0.52	0.39	0.01
IT support	(1.07)	(0.96)	(0.93)	(0.89)
Number of observations	**51**	**48**	**81**	**81**

a. Mean value for each category shown as cell values, with standard deviation given in parentheses. Strategic risk assessment and IT support are given as factor scores

Table 15: Regression Analysis by Service Category

	Service category			
D.V. Service performance	**Strategic**	**Bottleneck**	**Leverage**	**Routine**
Company size	0.029	-0.054	-0.071	-0.007
	(0.060)	(0.047)	(0.048)	(0.044)
Industry	-0.438	-0.558*	-0.278	-0.339
	(0.312)	(0.212)	(0.225)	(0.212)
Contract type (fixed price)	0.393	-0.401+	0.183	0.189
	(0.301)	(0.216)	(0.211)	(0.200)
Market competition	-0.009	0.322*	0.230+	0.308**
	(0.139)	(0.139)	(0.129)	(0.109)
Strategic risk assessment	-0.022	-0.024	**0.464****	0.068
	(0.192)	(0.127)	**(0.146)**	(0.138)
Single sourcing	-0.191	**0.386+**	0.185	-0.049
	(0.272)	**(0.222)**	(0.257)	(0.217)
Local supplier	-0.122	**0.544***	-0.120	0.080
	(0.393)	**(0.255)**	(0.242)	(0.232)
Prior interaction	**-0.861+**	0.347	-0.046	0.023
	(0.433)	(0.261)	(0.275)	(0.213)
Relationship length	0.044	0.089	0.145	-0.062
	(0.148)	(0.086)	(0.100)	(0.079)
Bidding	**-0.933****	0.218	-0.250	-0.110
	(0.320)	(0.227)	(0.229)	(0.226)
IT support	0.119	0.105	-0.149	**0.313***
	(0.134)	(0.120)	(0.118)	**(0.119)**

+p-value<0.1; *p-value<0.05; **p-value<0.01

Sourcing strategies for strategic services

It was hypothesized that strategic risk assessment, single-sourcing, and negotiation will positively affect the performance of strategic services. Specifically, 1) the regression coefficient of strategic risk assessment on service performance is not significant ($\alpha = -0.022, p > 0.1$), 2) the coefficient of single sourcing is insignificant ($\alpha = -0.191, p > 0.1$), and 3) the coefficient of competitive bidding is negative and statistically significant, implying negotiation has a positive and significant impact on service performance. Thus, only negotiation is identified as a positive driver of service performance for strategic services. Our results provide support for hypothesis 5b. We assume negotiation allows the buyer and supplier to better understand each other's requirements and responsibilities, and thus improves the development of close partnership. Thus, this finding is almost consistent with the Kraljic portfolio purchasing model that discusses strategic services

Sourcing strategies for bottleneck services

Multi-sourcing and local-sourcing were hypothesized as the primary drivers of the performance for bottleneck services. The results show that the coefficient of single-sourcing is positive and marginally significant ($\alpha = 0.386, p = 0.090$), implying that our hypothesis is not supported. The coefficient of local-sourcing is positive and significant ($\alpha = 0.544, p = 0.041$), which provides support for hypothesis 4. The findings are partially consistent with the Kraljic portfolio model, which recommends ensure availability is critical for managing bottleneck services. Sourcing from a regional supplier enables the buyer to adjust faster to unpredictable changes than sourcing from a supplier

that locates further. In this way, the buyer can interact more frequently with the supplier and have more opportunity to identify the availability of the bottleneck services.

Sourcing strategies for leverage services

It was hypothesized that strategic risk assessment and multi-sourcing will positively affect the performance of leverage services. The regression coefficient of strategic risk assessment on service performance is positive and significant ($\alpha = 0.464, p = 0.002$), which suggests evaluating the potential risks of sourcing improves the performance of leverage services. The impact of multi-sourcing on service performance is positive but insignificant ($\alpha = 0.184, p > 0.1$). The findings offer support for Hypothesis 1a. The results are partially aligned with the Kraljic's portfolio model, which suggests the primary goal of managing leverage services is to exploit power. It is anticipated that understanding the potential risk of supplier opportunism will help the buyer to exploit its power, and thus improve service performance.

Sourcing strategies for routine services

Competitive bidding and IT support were hypothesized as the main drivers of the performance for routine services. The regression coefficient competitive bidding on service performance is negative and insignificant ($\alpha = -0.110, p > 0.1$). The coefficient of IT support on service performance is positive and significant ($\alpha = 0.313, p = 0.011$). Our findings provide support for Hypothesis 6 by identifying IT as an effective tool to manage routine services. The results are also almost aligned with the sourcing strategy for routine services that emphasizes on efficient processing. As we expected, IT can

efficiently process information between the buyer and supplier, as well as expedite processes such like bidding and payment. Thus, IT can save the buyer more time to improve service performance.

Given the above discussions, we summarize our findings in Figure 8. We identify that 1) negotiation as a primary driver of the performance of strategic services, 2) sourcing from a regional supplier positively affects the performance of bottleneck services, 3) strategic risk assessment drives the performance of leverage services, and 4) IT facilitates efficient processing and positively influences the performance of routine services.

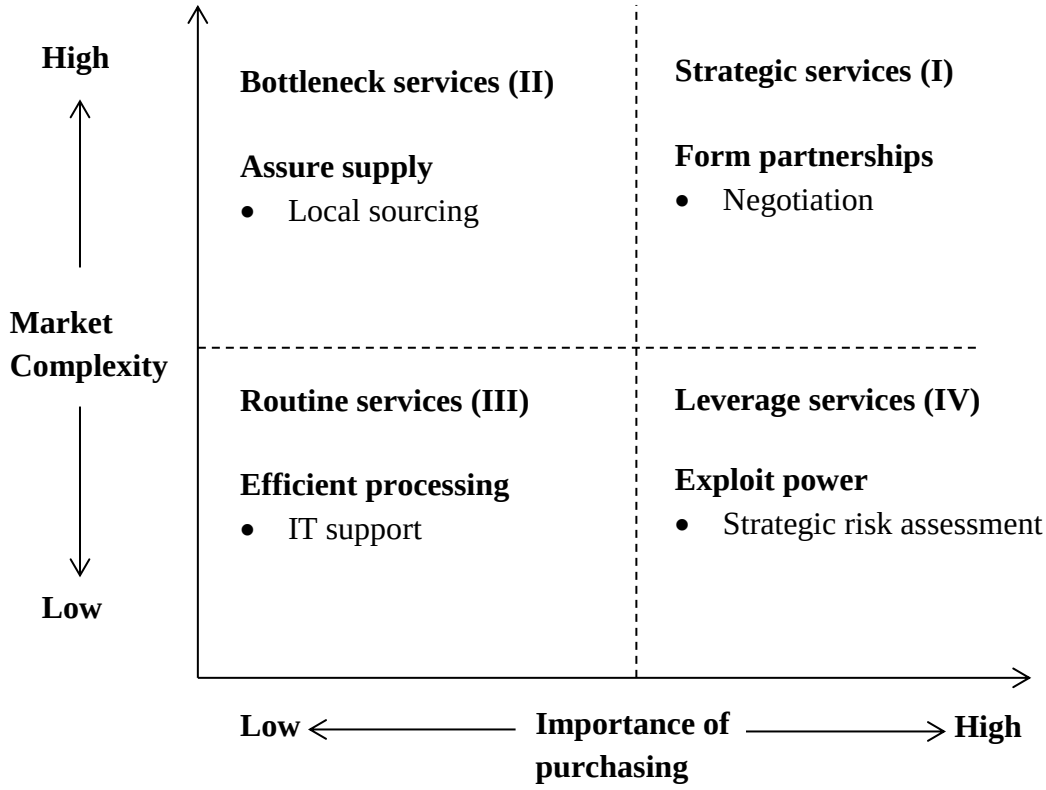


Figure 7: Identified Sourcing Practice

Discussion

Contributions

The study develops a conceptual framework that integrates the Kraljic portfolio purchasing model with service taxonomies to examine the sourcing practices for services. We suggest categorizing services into four categories based on contract value and service type (i.e., professional service vs. mass service). We next discuss the most efficient sourcing practices for each category of services and propose a series of hypotheses. We make both theoretical and empirical contributions to the existing literature on service outsourcing.

From a theoretical point of view, the current study applies the Kraljic portfolio purchasing model in the context of service outsourcing. To our best knowledge, most of the discussions on this model are devoted to purchasing of products rather than services. Services differ from products provided in that services are more intangible and complex (Ellram et al., 2007). Thus, a critical dimension proposed by the Kraljic model—complexity—may not comprehensively reflect the features of services. The literature on service taxonomies suggests differentiating between professional services and mass services based on the level of expertise required to deliver the services (e.g., Schemenner, 1986; Silvestro et al., 1992). Likewise, we propose professional/mass services as a central dimension to substitute for complexity in the portfolio model.

Moreover, the portfolio model only proposes key objectives to manage different groups of products but does not systematically discuss the sourcing factors from a practical point of view. Accordingly, we consider five sourcing factors that have been emphasized in the sourcing literature: strategic risk assessment, single sourcing vs. multi-

sourcing, regional supplier vs. non-regional supplier, competitive bidding vs. negotiation, and IT support. In this way, we convert the abstract strategies in the portfolio model into concrete practices that can be implemented in the real world. We propose a series of hypotheses to configure the effective sourcing practices for each category of services.

From an empirical standpoint, this study examines the proposed portfolio model based on survey data on service outsourcing information from multiple industries. Limited existing studies have empirically tested the portfolio model, especially in the context of service outsourcing. Therefore, our work is among the first to verify the purchasing portfolio model for services. We obtain several significant findings based on the empirical analysis.

First, we identify negotiation as the primary performance driver of strategic services. This is because negotiation allows the buyer and supplier to know more about each other and offers them more opportunity to form a close relationship. This is also related to our dependent variable. We measure performance mainly based on buyer satisfaction and expect that the buyer will be more satisfied with the supplier if it can specify its expectations and requirements clearly through negotiation.

Ensuring availability is proposed as a primary goal to manage bottleneck services. Our findings indicate that sourcing from a regional supplier helps the buyer achieve better service performance. A shorter physical distance between them allows the buyer and supplier to more conveniently interact and thus adjust to unpredictable changes. We also suggest that sourcing from multiple suppliers protects the buyer against supplier interruption; our analysis results do not show a significant effect of multi-sourcing on service performance. We assume that the buyer may not have enough bargaining power

to negotiate a good price from multiple suppliers. Thus, multi-sourcing may decrease the economic benefits obtained from single sourcing, and the overall effect from multi-sourcing may not be significant.

The portfolio model suggests that the major goal of managing leverage services is to exploit power. Accordingly, we propose strategic risk assessment and multi-sourcing as two essential practices to achieve this goal. The findings support the positive relationship between strategic risk assessment and service performance. Strategic risk assessment allows the buyer to fully understand the potential risks of outsourcing a service, and the buyer can better develop plans to hedge against these risks to manage its supplier. The buyer can also better understand its advantages and restrictions by sourcing from a particular supplier. Although multi-sourcing creates competition among suppliers, we do not identify any significant relationship between multi-sourcing and service performance. This might be because single sourcing allows the buyer to aggregate sourcing volume and thus to have more power to demand the best price. As both single sourcing and multi-sourcing create unique benefits for strategic services, it is difficult to conclude which one is more useful.

Last, efficient processing is important in managing routine services. We propose competitive bidding and IT support as the major factors to improve performance for this group of services. The analysis results identify a positive linkage between IT support and service performance for routine services but reveal that competitive bidding has an insignificant impact on performance. IT enables the buyer to more efficiently communicate with the supplier and also supports automatic processing. In sum, our findings verify the positive impact of IT on managing routine services.

Managerial implications

Our study has several managerial implications. The classification scheme proposed in this study suggests that organizations categorize services based on service type and value. As the Kraljic portfolio purchasing model discusses the sourcing strategies for each quadrant without considering the difference between services and products, we make an attempt to fill this gap. We suggest that organizations categorize services based on the required level of expertise and contract value.

Organizations can further develop sourcing practices to match the primary goal of managing each category of services. Specifically, we find that (1) negotiation is a primary driver for managing strategic services, (2) sourcing from a regional supplier improves the performance for bottleneck services, (3) strategic risk assessment positively affects the performance of leverage services, and (4) IT enhances the performance of routine services. These findings provide organizations with guidelines to control service performance more effectively through the practices identified in the study.

Limitations and Future Work

This study has several limitations. First, the five practices examined are mainly carried out in the early stage of building a relationship. However, strategically managing outsourced contracts also requires the buyer to pay attention to the strategies that developed in the stage of contract execution. This study has not considered the specific practices developed later that also may influence the performance of outsourced services. Thus, future research can explore other practices that are developed in the other stages of outsourcing. For instance, some portfolio models indicate that it is important to include

contingency plans to manage bottleneck services. It would be interesting to investigate whether contingency plans can improve the performance of bottleneck services. Second, the study only tests the individual effect of each sourcing practice on performance and does not examine the interaction effects of these sourcing practices. However, these practices may interact with each other to influence the outsourcing outcomes. A future extension study can be conducted to investigate the combined effects of two or more sourcing practices. Last, the dependent variable in this study is buyer satisfaction. Several other performance metrics such as costs have not been investigated. Thus, the current study may not provide enough evidence to verify the Kraljic model. For example, although we identify a positive link between negotiation and buyer satisfaction for strategic services, the possibility exists that negotiation can also increase costs. Hence, future work can explore the effects of sourcing practices on various performance metrics.

REFERENCES

Anderson, S. W. & Dekker, H. C., 2005. Management control for market transactions: The relationship between transaction characteristics, incomplete contract design and subsequent performance, *Management Science*, 51 (12):1734–1752.

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

Aymard & Brito, 2015. Proximity as a key factor to narrow the relationship between supplier and its customer – a case study in the auto industry. *Independent Journal of Management and Production*, 6(4): 962–971.

Balakrishnan, R., Eldenburg, L., Krishnan, R. & Soderstrom, N., 2010. The influence of institutional constraints on outsourcing. Journal of Accounting Research, 48(4):767–794.

Bai, X., Sheng, S. & Li, J.J., 2016. Contract governance and buyer-supplier conflict: The moderating role of institutions. *Journal of Operations Management*, 41:12–24.

Baron, R. M., & Kenny, D. A., 1986. The moderator-mediator variable distinction in social psychological research: Conceptual, strategic, and statistical considerations. *Journal of Personality and Social Psychology*, 51(6): 1173-1182.

Benaroch, M., Lichtensten, Y., & Fink, L., 2016. Contract design choices and the balances of ex ante and ex post transaction costs in software development outsourcing. *MIS Quarterly*, 40(1): 57–82.

Bensaou, M. & Ventatraman, N., 1995. Configuration of inter-organizational relationships: A comparison between U.S. and Japanese automakers. *Management Science*, 41(9), 1471–1492.

Bardhan, I., Whitaker, J. & Mithas, S., 2006. Information technology, production process outsourcing, and manufacturing plant performance. *Journal of Management Information Systems*, 23(2): 13–40.

Canels, M.C.J. & Gelderman, C.J., 2005. Purchasing strategies in the Kraljic matrix—A power and dependent perspective. *Journal of Purchasing & Supply Management*, 11:141–155.

Chase, 1981. The customer contact approach to services: Theoretical bases and practical extensions. *Operations Research*, 21:98–105.

Choudhury, V. & Sabherwal, R., 2003. Portfolios of control in outsourced software development projects. *Information Systems Research*, 14(3): 291–314.

Chen, I.J. & Paulraj, A., 2004. Towards a theory of supply chain management: the constructs and measurements. *Journal of Operations Management*, 22: 119–150.

Chen, Y. & Bharadwaj, A., 2009. An empirical analysis of contract structures in IT outsourcing. *Information Systems Research*, 20(4): 484–506.

Coase, R. H., 1937. The nature of the firm. *Economica*, 4(16): 386-405.

Coles, J. W., & Hesterly, W. S. (1998b). The impact of firm specific assets and the interaction of uncertainty: an examination of make-or-buy decisions in public and private hospitals. *Journal of Economic Behavior and Organization*, 36: 383–409.

Corts, K. S. & Singh, S., 2004. The effect of repeated interaction on contract choice: Evidence from offshore drilling. *The Journal of Law, Economics, & Organization*, 20(1): 230–260.

Dean, T. Griffith, D. & Calantone, R.J., 2016. New product creativity: Understating contract specificity in new product introductions. *Journal of Marketing*, 80(3): 39–58.

Dyer, J.H. & Singh, H., 1998. The relational view: cooperative strategy and sources of interorganizational competitive advantage. *Academy of Management Review*, 23, 660–679.

Eisenhardt, K.M., 1985. Control: Organizational and economic approaches. *Management Science*, 31(2): 134–149.

Eisenhardt, K.M., 1989. Agency theory: An assessment and review. *The Academy of Management Review*, 14(1): 57–74.

Ellarm, L. M., Tate, W. L. & Billington, C. 2007. Services supply management: the next frontier for improved organizational performance. *California Management Review*, 49(4): 44–66.

Feigenbaum, A.V., 1983. Total Quality Control. Engineering and Management (3rd ed.), McGraw-Hill, New York.

Fornell, C. & Larcker, D.F., 1981. Evaluating structural equation models with unobservable variables and measurement error. *Journal of Marketing Research*, 18 (1): 39–50.

Gartner, 2009. Gartner on outsourcing, 2009–2010. Gartner ID no. G00173421, Stamford, CT, December 23, 2009.

Gefen, D., Wyss, S. & Lichtenstein, Y. 2008. Business familiarity as risk mitigation in software development outsourcing contracts. *MIS Quarterly*, 32(3): 531–551.

Gelderman, C.J. & Van Weele, A.J., 2003.Handling measurement issues and strategic directions in Kraljic's purchasing portfolio model. *Journal of Supply Chain Management*. 41(3): 19–28.

Gelderman, C.J. & Van Weele, A.J., 2003. Purchasing portfolio models: a critique and update. *Journal of Supply Chain Management*, 41(3): 19–28.

Gopal, A. Sivaramakrishnan, K. Krishnan, M.S. & Mukhopadhyay, T., 2003. Contracts in offshore software development: An empirical analysis. *Management Science*, 49(12):1671–1683.

Gopal, A., Koka, B.R., 2010. The role of contracts on quality and returns to quality in offshore software development outsourcing. *Decision Sciences*, 41(3):491–515.

Gopal, A. & Koka, B.R., 2012. The asymmetric benefits of relational flexibility: Evidence from software development outsourcing. MIS Quarterly, 36(2):553–576.

Hadeler, B.J. & Evans, J.R., 1994. Supply Strategy: capturing the value. Industrial Management, 36(4): 3–4.

Hair,J., Anderson, R., Tatham, R., & Black, W., 1998. Multivariate Data Analysis, 5th. Prentice Hall International, London.

Handley, S. M. & Benton, Jr., W. C., 2009. Unlocking the business outsourcing process model, *Journal of Operations Management*, 27(5):344–361.

Handley, S. M., Angst & C. M. 2015. The impact of culture on the relationship between governance and opportunism in outsourcing relationships. *Strategic Management Journal*, 36(9), 1412–1434.

Heide, J.B., Wathne, K. & Rokkan, A.I., 2007. Interfirm monitoring, social contracts, and relationship outcomes. *Journal of Marketing Research*, 44 (3), 425–433.

Kalnins, A. & Mayer, K.J., 2004. Relationships and hybrid contracts: An analysis of contract choice in information technology. *The Journal of Law, Economics, & Organization*, 20(1):207–229.

Kashyap, V., Antia, K. D. & Frazier, G. L., 2012. Contracts, extra-contractual incentives, and ex post behavior in franchise channel relationships. *Journal of Marketing Research*, 49(2), 260–276.

Keil, M., Rai, A. & Liu, S., 2013. How user risk and requirements risk moderate the effects of formal and informal control on the process performance of IT projects. *European Journal of Information Systems*, 22(6): 650–672.

Kellog, D.L. & Nie,W., 1995. A framework for strategic service management. *Journal of Operations Management*, 13: 323–327.

Kogut, B., & Zander, U., 1996. What firms do? Coordination, identity, and learning. *Organization Science*, 7(5): 502-518.

Kraljic P., 1983. Purchasing must become supply management. *Harvard Bus Review*. 61:109–17.

Krause, D. R. 1999. The antecedents of buying firms' efforts to improve suppliers. *Journal of Operations Management*, 17(2): 205–224.

Lacity, M.C. & Willcocks, L. P., 1998. An empirical investigation of information technology sourcing practices: lessons from experience. *MIS Quarterly*, 22(3): 363–408.

Liu, Y., Luo, Y. & Liu, T., 2009. Governing buyer-supplier relationships through transactional and relational mechanisms: Evidence from China. *Journal of Operations Management*, 27(4): 294–309.

Liu, S. 2015. Effects of control on the performance of information systems projects: The moderating role of complex risk. *Journal of Operations Management*, 36: 46–62.

Lumineau, F. & Malhotra, D., 2011. Shadow of the contract: how contract structure shapes interfirm dispute resolution. *Strategic Management Journal*, 32(5): 532–555.

Lumineau, F. & Henderson, J.E., 2012. The influence of relational experience and contractual governance on the negotiation strategy in buyer-supplier disputes. *Journal of Operations Management*, 30(5): 382–395.

Malhotra, D., & Lumineau, F., 2011. Trust and collaboration in the aftermath of conflict: the effects of contract structure. Academy of Management Journal, 54 (5): 981–998.

Mooi, E. A. & Ghosh, M., 2010. Contract specificity and its performance implications. *Journal of Marketing*, 74(2), 105–129.

Monczka, R.M., Handfield, R.B., Giunipero, L.C. & Patterson, J.L., 2009. Purchasing and Supply Chain Management, Fifth Edition, South-Western, Cengage Learning.

Murray, J.Y. & Kotabe, M., 1999. Sourcing strategies of U.S. service companies: a modified transaction–cost analysis. *Strategic Management Journal*, 20(9): 791–809.

Narayanan, S., Balasubramanian, S. & Swaminathan, J. M., 2011. Managing outsourced software projects: An analysis of project performance and customer satisfaction. *Production and Operations Management*, 20(4): 508–521.

Novak, S., Eppinger, S.D., 2001. Sourcing by design: Product complexity and the supply chain. *Management Science*, 47(1): 189–204.

Olsen, R.F. & Ellram, L.M., 1997. A portfolio approach to supplier relationships. *Industrial Marketing Management*, 26(2): 101–103.

Podsakoff, P.M., MacKenzie, S.B., Lee, J-Y. & Podsakoff, N.P., 2003. Common method biases in behavioral research: a critical review of the literature and recommended remedies. *Journal of Applied Psychology*, 88 (5): 879–903.

Poppo, L. & Zenger, T. 1998. Testing alternative theories of the firm: transaction cost, knowledge-based, and measurement explanations for make-or-buy decisions. *Strategic Management Journal*, 19 (9): 853–877.

Poppo, L. & Zenger, T. 2002. Do formal contracts and relational governance function as substitutes or complements? *Strategic Management Journal*, 23(8):707–725.

Ravindran, K., Susarla, A., Mani, D., & Gurbaxani, V., 2015. Social capital and contract duration in buyer-supplier networks for information technology outsourcing. *Information Systems Research*, 26(2): 379–397.

Rungtusanatham, M., Miller, J.W., & Boyer, K.K., 2014. Theorizing, testing, and concluding for mediation in SCM research: Tutorial and procedural recommendations. Journal of Operations Management, 32(3): 99-113.

Ryall, M.D. & Sampson, R.C., 2009. Formal contracts in the presence of relational enforcement mechanisms: Evidence from technology development projects. *Management Science*, 55(6): 906–925.

Schmenner, R., 1986. How can service businesses survive and prosper, Sloan Management Review, Spring: 21–32.

Silvestro, R., Fitzgerald, L., Johnston, R. and Voss, C., 1992. Towards a classification of service processes. International Journal of Service Industries Management, 3(3): 62–75.

Srivastava, S.C. & Teo, T. H., 2012. Contract performance in offshore systems development: Role of control mechanisms. *Journal of Management information systems*, 29(1): 115–158.

Steven, A.B., Dong, Y. & Corsi, T., 2014. Global sourcing and quality recalls: An empirical study of outsourcing-supplier concentration-product recalls linkages. *Journal of Operations Management*, 32: 241–253.

Stouthuysen, K., Slabbinck, H. & Roodhooft, F., 2012. Controls, service type and perceived performance in interfirm service exchanges. *Journal of Operations Management*, 30(5): 423–435.

Tate, W., Ellram, L. & Brown, S., 2009. Offshore outsourcing of services: a stakeholder perspective. *Journal of Service Research*, 12(1): 56–72.

Tiwana, A. & Bush, A.A., 2007. A Comparison of Transaction Cost, Agency, and Knowledge-based Predictors of IT Outsourcing Decisions: A US-Japan Cross-

Cultural Field Study. *Journal of Management Information Systems*, 24(1): 263-305.

Trevelen, M. 1997. Single sourcing: a management tool for quality supplier. *Journal of Purchasing and Materials Management*, 23 (Spring): 19–24.

Rai, A., Keil, M., Hornyak, R. & Wüllenweber, K., 2012. Hybrid relational-contractual governance for business process outsourcing. *Journal of Management Information Systems*, 29(2):213–256.

Reuer, J.J. & Ariño, A., 2007. Strategic alliance contracts: Dimensions and determinants of contractual complexity. *Strategic Management Journal*, 28(3): 313–330.

Susarla, A., Subramanyam, R. & Karhade, P. 2010. Contractual provisions to mitigate holdup: Evidence from information technology outsourcing. *Information Systems Research*, 21(1):37–55.

Susarla, A., 2012. Contractual flexibility, rent seeking and renegotiation design: An empirical analysis of information technology outsourcing contracts. *Management Science*, 58(7): 1388–1407.

Tiwana, A. & Bush. A., 2007. A Comparison of transaction cost, agency, and knowledge-based predictors of IT outsourcing decisions. *Journal of Management Information Systems*, 24(1): 263–305.

Van Weele, A.J., 2000. Purchasing Management: Analysis, Planning, and Practice. Chapman & Hall, London.

Weiss, A.M. & Anderson, E., 1992. Converting from independent to employee sales forces: The role of perceived switching costs, *Journal of Marketing Research*, 29 (2): 101–115.

Williamson, O. E., 1979. Transaction-cost economics: The governance of contractual relations. *The Journal of Law & Economics*, 22(2): 233–261.

Williamson, O. E., 1985. The Economic Institutions of Capitalism. The free press, New York.

Wuyts, S. & Geyskens, I., 2005. The formation of buyer–seller relationships: Detailed contract drafting and close partner selection. *Journal of Marketing*, 69 (10): 102–117.

APPENDIX A

Table A-1: Respondent Profile

	Percent
Sector	
Manufacturing	44%
Service	56%
Respondent Title	
Senior VP, Executive VP, CEO	3%
Vice President	3%
Director, Senior Director	17%
Manager	45%
Practitioner	18%
Consultant	7%
Other	8%
Outsourced services	
Transportation/Logistics	14%
Information technology	12%
Construction	10%
MRO	9%
Engineering	9%
Telecommunications	7%
Consulting	4%
Contract labor	4%
Other	32%
Company Size (gross revenue)	
Under $50 million	20%
$50 million - $99 million	5%
$100 million - $499 million	16%
$500 million - $0.99 billion	10%
$1 billion - $4.99 billion	20%
$5 billion - $9.99 billion	6%
Over 10 billion	22%

Table A-2: Sample Description

	Frequency	Percent
Contract type		
Fixed price	144	55%
Cost-based	114	44%
Not Applicable	3	1%
Contract value		
Less than $200,000	55	21%
$200,000-$499,999	37	14%
$500,000-$999,999	29	11%
$1,000,000-$2,499,999	46	18%
$2,500,000-$5,000,000	22	8%
$5,000,000-$10,000,000	22	8%
Great than $10,000,000	42	16%
Not Applicable	8	3%
Regional/National supplier		
Regional	68	26%
National	75	29%
Global	113	43%
Not Applicable	5	2%
Supplier selection mechanism		
Competitive bidding	162	62%
Negotiation	71	27%
Through a purchasing alliance	12	5%
Other	16	6%
Relationship length		
Less than 1 year	32	12%
1-3 years	77	30%
3-5 years	64	25%
5-7 years	36	14%
More than 7 years	46	18%
Not Applicable	6	2%
Prior interaction		
No	181	69%
Yes	78	30%
Not Applicable	2	1%

APPENDIX B

Table B-1: Constructs and Measures in Essay 1

Constructs	Items	Mean	Standard deviation
	How specific (detailed) were the contractual features with respect to the following terms? *(1-Very general 2-General 3-Moderately specific 4-Specific 5-Very specific)*		
Contract specificity (PCS)	PCS1: Implementation procedures	3.82	1.02
	PCS2: Technical specifications	3.92	1.01
	PCS3: Scope of work	4.02	0.85
	OCS1: Performance requirements	4.13	0.85
	OCS2: Financial and commercial terms	4.11	0.87
	OCS3: Legal terms and conditions	4.14	0.97
	Referring to the <u>contracted service</u> you identified, please evaluate the extent to which you agree with the following statements. *(1—strongly disagree 2—disagree 3—neither agree nor disagree 4—agree 5—strongly agree)*		
Service complexity	CF1: Contract price may be revised by parties.	3.84	0.97
	CF2: Performance-based provisions are included in the contract.	3.78	1.03
	CF3: We have an option to terminate the agreement prematurely.	4.28	0.85
	CF4: Our contract enables us to renegotiate terms at short notice.	4.13	0.89
Switching costs (SW)	SW1: It would be costly for our hospital to transfer its business from the current supplier to another supplier.	3.29	1.15
	SW2: It would take some time for our hospital to transfer its business from the current supplier to another supplier	3.65	1.08
	SW3: We spent a lot of effort learning to work effectively with the supplier.	3.73	0.92
Measurement Ambiguity (MA)	MA1: Evaluating this supplier's performance is a highly subjective process.	2.97	1.01
	MA2: It is difficult to determine whether agreed-upon quality standards and specifications are adhered to.	2.60	0.94
	MA3: It is difficult to assess the quality of this contracted service at the time of delivery.	2.69	1.01
	MA4: It is difficult to compare this contracted service to similar services.	2.75	0.99
Supplier monitoring (SM)	SM1: Our company continuously monitors the achievement of the objectives set for the service	4.00	0.86

	provider.		
	SM2: Our company executes an on-boarding process for each contract.	3.70	0.93
	SM3: Our company evaluates the procedures of the supplier on a periodic basis.	3.88	0.86
	SM4: Our company provides feedback and information to the supplier about the results of its activities.	4.02	0.78
	Please indicate the primary supplier's performance as compared to your expectations. *(1-Far below expectations 2-Below expectations 3-Meet expectations 4-Exceed expectations 5-Greatly exceed expectations)*		
Performance	PC1: Adhere to the contract requirements, including agreed budgets	3.28	0.60
	PC2: Offer accurate and timely information	3.24	0.64
	PC3: Respond to changes efficiently and effectively	3.28	0.64
	PC4: Offer consistent level of service	3.26	0.60
	PC5: Offer customized service as allowed by the contract	3.33	0.60

Table B-2: Constructs and Measures in Essay 2

Constructs	Items	Mean	Standard deviation
	Referring to the <u>contracted service</u> you identified, please evaluate the extent to which you agree with the following statements. *(1—strongly disagree 2—disagree 3—neither agree nor disagree 4—agree 5—strongly agree)*		
Strategic risks assessment (SR)	SR1: The impact that contracting this service would have on our customers was evaluated.	3.97	0.96
CR = 0.73	SR2: The impact that contracting this service would have on our employees was evaluated.	3.80	0.99
AVE = 0.42	SR3: The potential negative consequence of losing internal capability to perform this activity was considered.	3.77	0.99
	SR4: The risk of external supplier(s) not fulfilling their responsibilities was considered.	4.29	0.73
IT support (IT)	**To what extent does IT support the following activities associated with this contract?** *(1-Very little 2-Little 3-Moderate 4-Great 5-Very great)*		
CR = 0.93	IT1: Bidding	2.46	1.31
AVE = 0.64	IT2: Contract design	2.24	1.26
	IT3: Information exchange	3.00	1.32
	IT4: Coordination	2.66	1.36
	IT5: Monitor and control	2.62	1.38
	IT6: Payment	2.72	1.40
	Please indicate the primary supplier's performance as compared to your expectations. *(1-Far below expectations 2-Below expectations 3-Meet expectations 4-Exceed expectations 5-Greatly exceed expectations)*		
Performance	PC1: Adhere to the contract requirements, including agreed budgets	3.28	0.60
	PC2: Offer accurate and timely information	3.24	0.64
	PC3: Respond to changes efficiently and effectively	3.28	0.64
	PC4: Offer consistent level of service	3.26	0.60
	PC5: Offer customized service as allowed by the contract	3.33	0.60