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Substitutes or complements? The impact of contractual and relational governance on logistics integration and operational performance

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ABSTRACT

How to safeguard and enhance logistics integration (e.g. information sharing, process coordination) between 3PL users and providers using different governance mechanisms is a crucial issue. Based on transactional cost economics (TCE), this study examined effects of contractual governance (e.g. detailed contract, contract application), relational governance (e.g. trust, relational norm), and their interaction effects on logistics integration, which further leads to operational performance. We conduct a survey to collect data from 247 3PL users in China and tested the conceptual model using the structural equation modeling method.

KEYWORDS: Contractual governance, Relational governance, Logistics integration, 3PL, China

INTRODUCTION

In recently years, more and more firms conduct logistics outsourcing to third-party logistics (3PL) providers, which can help firms to bring higher effectiveness and efficiency. China's 3PL industry is rapidly growing at an annual rate of 20 percent in recent years. In 2014, the total business income of China's 3PL firms is approximately 938 billion yuan, and this number reaches approximately 586 billion yuan at the first half year of 2015. However, most 3PL providers supply limited value-added services to users, such as transportation, distribution and warehousing. Only a small number of them are able to provide advanced logistics services, such as logistics system design and information management (Hong and Liu, 2007). Empirical evidence showed that integrating with supply chain members helps to create competitive advantages, but they more emphasize supplier integration and customer integration (e.g. Flynn et al., 2010), few emphasized logistics integration with 3PL providers (Jayaram and Tan, 2010; Mortensen and Lemoine, 2008; Sheikh and Rana, 2012). Our understanding on what is logistics integration between 3PL users and providers, and what are antecedents or outcomes of logistics integration, are still limited. For examples, how to safeguard and enhance logistics integration with 3PL providers by appropriate governance mechanisms is still under exploration.

According to transaction cost economics (TCE), both contractual and relational governance are important in interfirm relationships (Cannon et al., 2000; Ferguson et al., 2005; Wang et al., 2011; Yu et al., 2006; Zaheer and Venkatraman, 1995). Whether jointly using contractual and relational governance in 3PL relationships is more effective or not remains unclear. There is no consensus about whether they are substitutes (Dyer, 2002; Gulati, 1995), complements (Luo, 2002; Poppo and Zenger, 2002), or no interactions (Cavusgil et al., 2004). Also, we explored how two dimensions of logistics integration (e.g. information sharing, process coordination) improve operational performance.

LITERATURE REVIEW AND RESEARCH HYPOTHESES

Contractual governance and relational governance

Governance is a multidimensional phenomenon that refers to formal and informal rules for a transaction between parties (Griffith and Myers, 2005; Nickerson et al., 2001). According to TCE, firms need to design appropriate governance mechanisms to support transactions (Heide, 1994; Heide and John, 1992). Macneil (1980) developed a typology of “discrete” versus “relational” exchange to respectively represent economic and social relationships. That is, in a buyer-supplier dyad, governance can be realized through contractual or relational governance mechanisms (Heide and John, 1992; Jap and Ganesan, 2000). In this study, we will explore both contractual and relational governance mechanisms.

Detailed contract and contract application are two major contractual governance mechanisms (Faems et al., 2008; Woolthuis et al., 2005; Wuyts and Geyskens, 2005; Zhou and Xu, 2012). Detailed contract is identified “with a large number of clauses that are specified in detail” (Ariño and Reuer, 2005, p.149), and provides a legally bounded framework specifying goals, rights, duties, and responsibilities of each party, formally specifying what is and what is not allowed to behave during the contracting period (Dyer, 2002; Luo, 2002). As a coordination mechanism, detailed contract can entail clauses to safeguard specific assets and ensure the enforceability of a transaction against opportunistic behaviors (Ring and Van de Ven, 1992; Williamson, 1985). Previous studies mainly focus on the initial design element of contractual governance, contract application is also essential because the effectiveness of a contract depends on its application (Antia and Frazier, 2001), including monitoring, assessing or penalizing to prevent unexpected behaviors (Woolthuis et al., 2005).

Relational governance emphasizes soft and “human” elements to coordinate a transaction. Trust and relational norm are two major mechanisms that are widely used in an interfirm relationship (Anderson and Narus, 1990; Arranz and Arroyabe, 2012; Heide and John, 1992; Liu et al., 2009; Luo, 2007). Trust refers to the willingness and confidence to rely on a trading partner, and emphasizes the transaction’s cooperative atmosphere (Liu et al., 2009; Monczka et al., 1998; Spekman et al., 1998). It is also a firm’s belief that other firms’ behaviors will lead to positive outcomes and less unexpected behaviors that may be detrimental to the focal firm (Anderson and Narus, 1990). Relational norm reflects the expectation of attitudes and behaviors in which different parties work cooperatively to achieve mutual goals (Cannon et al., 2000). In particular, it represents a series of mutually oriented behaviors and underlying, flexible and intangible rules, values that are shared by transaction partners. Heide & John (1992) identified three dimensions of relational norm: flexibility, information exchange, and solidarity.

Logistics integration

As Towill (1997) mentioned, all players must think and act as one whole. In this study, based on Bowersox et al. (2002), Flynn et al. (2010), Frohlich and Westbrook (2001) and Romano (2003), we define logistics integration as the degree to which a 3PL user collaboratively manages interfirm logistics processes with its providers to facilitate accurate and timely flows for maximum customer value at low costs and high speed. From the flow perspective, 3PL providers and users need to be connected seamlessly with fully integrated information and material flows. Information sharing and process coordination are two major dimensions of integration (Cai et al., 2010; Liu et al., 2015; Sahin and Robinson, 2002, 2005; Wu et al., 2014). Information sharing implies that partners frequently share important information, such as demand forecast, schedule, and capacity information. Process coordination is more complex than information sharing and implies the synchronization of material flows, such as joint planning (Moharana et al., 2012; Mortensen and Lemoine, 2008; Rabinovich et al., 1999; Samaddar et al., 2006).

Contractual governance and logistics integration

Integration can be viewed as mutual investments to facilitate accurate and timely information and material flows (Vijayasarathy, 2010). A firm's task is to adopt appropriate governance mechanisms to support a transaction. Detailed contract serves as a form of quasi-integration and build a vertical interfirm authority that can subsequently guide both parties' behaviors (Stinchcombe and Heimer, 1985). First, well-articulated clauses narrow the domain in which parties can be opportunistic, such as selling an unauthorized territory and hiding important information; Second, detailed contract specifies of promises, obligations for logistics integration, which aligns partners' incentives and ensures credible information sharing (Cachon and Lariviere, 2001). Also, detailed contract creates a predictable cooperative environment that mitigates exchange hazards and facilitates coordination between parties (Faems et al., 2008). Therefore, we propose:

H1a. Detailed contract is positively related to information sharing.
H1b. Detailed contract is positively related to process coordination.

As contractual governance, detailed contracts and contract application serve distinct functions. (Malhotra and Lumineau, 2011; Mellewigt et al., 2007; Reuer and Arino, 2007). Detailed contract serves as an ex ante coordination mechanism, while contract application is a control mechanism to guarantee the ongoing integration process. Contract application endows 3PL users the legal right to effectively control the transaction, thus information sharing and process coordination can be under the protection of contract application against exchange hazards. Therefore, we propose:

H2a. Contract application is positively related to information sharing.
H2b. Contract application is positively related to process coordination.

Relational governance and logistics integration

Interfirm transactions are typically embedded in social relationships (Heide and John, 1992; Macneil, 1978, 1980). Relational governance mechanisms is effective to nourish cooperation in buyer-supplier dyads with less monitoring and bargaining costs (Barney and Hansen, 1994; Heide and John, 1992; Kim, 2000). When both parties perceive each other as trusted, potential

opportunistic behaviors are reduced and cooperative behaviors are promoted (Johnston et al., 2004; Zaheer et al., 1998a, b). Trust ensures a focal firm to be more selective for partners, and ensures their integration are more likely to bring benefits with minimal exchange hazards (Gulati, 1995; Kim et al., 2010; Poppo and Zenger, 2002; Vijayasarathy, 2010). In particular, trust helps firms to gain accurate, comprehensive, and timely information with mutual willingness (Chiles and McMackin, 1996; Lewicki and Bunker, 1995), which leads to improved information sharing between partners. Trust also facilitates coordination activities with mutual willingness and honesty. Therefore, we propose:

H3a. Trust is positively related to information sharing.
H3b. Trust is positively related to process coordination.

Relational norm is based on expectations of mutual interests and prescribes stewardship behaviors to consider both parties' well-being of as a whole (Heide and John, 1992). Logistics integration concerns the joint development of resources and capabilities from a mutual perspective instead of an individual perspective. For 3PL users, relational norm with mutual expectations can help to proactively share important information sharing and coordinate material process with 3PL providers. Therefore, we propose:

H4a. Relational norm is positively related to information sharing.
H4b. Relational norm is positively related to process coordination.

Contractual and relational governance function as complements or substitutes for logistics integration

In a complementary view, firms may simultaneously use several governance mechanisms to take more advantage (Bradach, 1997; Bradach and Eccles, 1989; Weitz and Jap, 1995) because they are constrained in their capacity to contractually foresee and resolve all potential problems. In this way, trust and relational norm can complement them by regulating some aspects that are not explicit in contractual governance (Arranz and Arroyabe, 2012; Macneil, 1978; Poppo and Zenger, 2002). Also, TCE views contractual governance as a legal prerequisite for relational governance by promoting the willingness to engage in a transaction (Roxenhall and Ghauri, 2004), thus trust and relational norm may not exert functions without detailed contract or contract application. Meanwhile, trust or relational norm provide atmosphere or expectations to informally employ contractual governance mechanisms for logistics integration. Thus, logistics integration may be enhanced more by combining contractual and relational governance. Therefore, we propose:

H5a-b. Detailed contract and trust (relational norm) are complements in enhancing logistics integration.
H5c-d. Contract application and trust (relational norm) are complements in enhancing logistics integration.

Nonetheless, contractual and relational governance mechanisms can also function as substitutes from two reasons. First, trust and relational norm essentially embed in a relationship especially in emerging markets, thereby reduce a firm's capacity for detailed contract or contract application. Second, the effective use of detailed contract or contract application may evoke conflicts (Gaski, 1984) and defensive behaviors (Hirschman, 1984; Zand, 1972). Some firms even discourage the use of elaborated contracts because it "indicates a lack of trust and blunts the demands of friendship, turning a cooperative venture into an antagonistic horsetrade"

(Macaulay, 1963, p. 64). Writing contracts may signal distrust, thus narrowing partners' behaviors and disrupting the development of relational governance (Jap and Ganesan, 2000; Pillutla et al., 2003). Therefore, we propose:

H6a-b. Detailed contract and trust (relational norm) are substitutes in enhancing logistics integration.
H6c-d. Contract application and trust (relational norm) are substitutes in enhancing logistics integration.

Logistics integration and operational performance

Operational performance includes cost, quality, delivery and flexibility performance, which indicates several dimensions of a firm's competitive advantages. 3PL Information sharing captures the reciprocal nature of information flows, including both upstream information flows (e.g. orders, demand forecasts, point-of-sales) and downstream information flows (e.g. capacity, delivery schedules, and product), not just information exchange or acquisition. Effective information sharing enhances operational efficiencies by sharing important information and using providers' information systems. For example, Lee et al. (2000) found that information sharing saved supply chain costs by about 23 percent. In contrast, the lack of information sharing and information asymmetry lead to operational inefficiencies. Process coordination between 3PL users and providers reduces the redundancy of inventory, transportation, and order processing, and is the key to attaining flexibility in response to fast-changing environments. Therefore, we propose:

H7a. Information sharing is positively related to operational performance.
H7b. Process coordination is positively related to operational performance.

Information sharing and process coordination play different roles in logistics integration, but some studies focuses on material flows and ignore information flow leads to sub-optimal performance. According to Lee et al. (2000), information sharing about production and delivery schedules improves common forecasts, synchronize production and delivery, which help process coordination to enhance performance. By sharing information about forecast demands with 3PL providers, firms can avoid material flow delays and conflicts, improving the efficiency of process coordination. Patnayakuni et al. (2006) claimed that integrated information flow can facilitate coordination to improve performance. Therefore, we propose:

H7c. Information sharing and process coordination are complements in improving operational performance.

METHODS

Sampling and data collection

To obtain a representative sample, our target samples were randomly selected from manufacturing and service sections of Firm Catalogue of Bohai Sea Economic Area (BSEA) in China. We chose logistics managers or executive managers as key informants who were familiar with their firms' internal and external logistics activities and processes. A total of 1000 questionnaires with the cover letter introducing our research objectives and potential

contributions were sent to firms who agreed to take our survey. Finally, 247 usable samples were received and the response rate was 24.7%.

Non-response analyses were tested by comparing the difference between early and late returned samples (Armstrong and Overton, 1977). We divided the sample into two halves based on the date of returned samples, and then compared the two groups on major traits of firms (i.e. firm size, firm ownership) by t-test (Handfield and Bechtel, 2002; Stank et al., 2001).. We also checked potential common method bias using Harman's single-factor test (Podsakoff et al., 2003; Podsakoff and Organ, 1986). Non-response bias and common method bias are not a serious problem in this study.

Measures

For contractual governance, four items of detailed contract that measures the completeness of contract clauses were adapted from Wuyts & Geyskens (2005). Three items of contract application that measures the strictness of contract enforcement ex post were adapted from Antia & Frazier (2001) and Jiang et al. (2013). For relational governance, three items of trust that measures benevolence, honesty and ability of trust were adapted from Kumar et al. (1995) and Tian et al. (2008). Ten items of relational norm that measure flexibility, information exchange, and solidarity were adapted from Heide & John (1992), we averaged the value of three sub-dimensions to get relational norm. Information sharing and process coordination measures are adapted from Narasimhan & Kim (2002) and Morash & Clinton (1998). Operational performance measures were adapted from Devaraj et al. (2007) and Miller & Roth (1994).

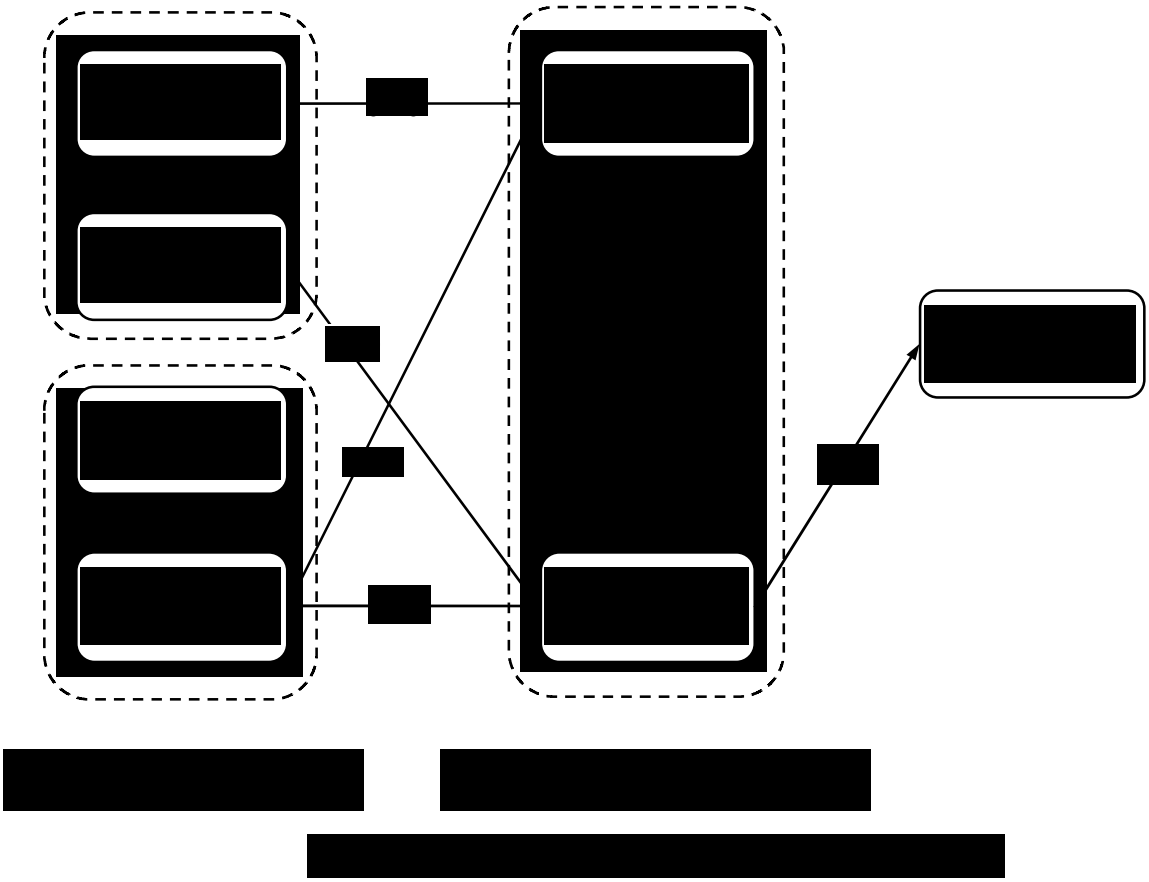
Reliability and validity

We used the partial least squares (PLS) method to test the structural equation model. The results were interpreted in two stages, first by an assessment of the measurement model, and second by the structural model. Using approaches of Fornell & Larcker (1981) in a PLS context, we assessed reliability and validity to ensure the appropriateness of the measurement model. Cronbach's alpha and composite reliability were used to assess reliability. Cronbach's alpha ranged from 0.763 to 0.927, and composite reliability ranged from 0.862 to 0.948, both indicating good reliability of our measures.

Convergent validity is the ability of items to convergent together as an expected construct. First, in the measurement model, most of factor loadings were higher than 0.70 with all t-values greater than 2.0. Only one item of operational performance was 0.67 but was still significant at the 0.01 significance level. Second, all values of average variance extracted (AVE) were higher than 0.50, both indicating good convergent validity (Fornell and Larcker, 1981).

The square root of AVE of each construct was greater than correlations between the construct and other constructs, indicating good discriminant validity (Fornell and Larcker, 1981).

RESULTS



DISCUSSION AND CONCLUSIONS

Safeguarding logistics integration using appropriate governance mechanisms

Our results show that both contractual and relational governance enhance logistics integration that further improves operational performance, which extends the “governance-integration” paradigm in supply chain management (Cai et al., 2010; Vijayasarathy, 2010; Wang et al., 2011; Wang et al., 2014; Yeung et al., 2009; Zaheer and Venkatraman, 1995; Zhang and Huo, 2013).

We find four governance mechanisms exert distinct functions in enhancing logistics integration between 3PL users and providers. Firms can contingently take advantage of different governance mechanisms to safeguard logistics integration. For contractual governance, detailed contract and contract application represent coordination and control mechanism, respectively. The results show that detailed contract enhances process coordination, while contract application enhances information sharing. This may be explained that process coordination is more complex and is well-defined in contractual clauses by both 3PL users and providers and is difficult to modify in the transaction, while information sharing is changeable and is enhanced by contract application that emphasizes to control the process. For relational governance, relational norm enhances both information sharing and process coordination between 3PL users and

providers through mutually shared ideas and initiatives, norm and expectations, or even through established common values and cultures. However, surprisingly, trust has no significant effect on both information sharing and process coordination, which are inconsistent with previous studies that demonstrated the positive effect of trust (e.g. Cai et al., 2010; Vijayasarathy, 2010). Two reasons may lead to the surprising result in the unique context of China. First, trust emphasizes the transaction's cooperative atmosphere between transaction parties, but this atmosphere is weak in China without legally contractual protections, which is confirmed by our results that show detailed contract can complement trust. Second, Gargiulo & Ertug (2006) described negative outcomes associated with overly trusted relationships as the "dark side of trust". Trust may lead to unwittingly deactivate monitoring mechanisms, and thus emerge negative results to mitigate positive outcomes, which may lead to the nonsignificant effect of trust on logistics integration.

Furthermore, we find that both complementary and substitutional relationships exist between contractual governance and relational governance mechanisms. First, jointly using detailed contract and trust is more effective in enhancing integration. Detailed contract endows the legitimacy basis for both parties to behave in a certain domain, and to decline negative effects of trust, thus protecting the trusted atmosphere to integrate with each other. Second, compared with other mechanisms, relational norm plays a more important role in enhancing logistic integration. It not only positively influences information sharing and process coordination, but also substitutes detailed contract in enhancing information sharing. Establishing shared norm and values, or even common cultures helps both parties proactively and cooperatively to achieve mutual goals. However, due to the complexity of process coordination, relational norm cannot substitute detailed contract or contract application. Third, trust and contract application substitute with each other in enhancing information sharing. The enforcement of obligations, promises, and expectations are achieved through a relationally-governed exchange because interpersonal and interfirm connections are crucial issues in Chinese firms (Luo, 2000).

Improving operational performance through logistics integration

Differently, an interesting finding shows that information sharing fails to significantly improve operational performance, but complements process coordination in improving operational performance, which indicates that information sharing is insufficient and needs process coordination to exploit its value in improving performance. Our results show that two dimensions of logistics integration exert their different functions. Information sharing plays a fundamental role in logistics integration, while process coordination contains complex transaction mechanisms and transcends organizational boundaries. Process coordination exploits the value of information flows and makes the material flow more fluent across the transaction, and enables 3PL users and providers to engage in complex coordination activities that are traditionally implemented by one party's activities alone (Heide and John, 1990). Thus, it is essential for both 3PL users and providers to focus on both dimensions of logistics integration.

CONTRIBUTIONS, CONCLUSIONS, AND LIMITATIONS

This study makes theoretical contributes in several ways. First, we provide a better understanding of safeguarding logistics integration between 3PL users and providers by simultaneously addressing both contractual (e.g. detailed contract, contract application) and relational governance (e.g. trust, relational norm). We find their different roles in enhancing logistics integration, enriching findings of previous studies. Second, in contrast to popular views,

we found that trust has no significant impact on either information sharing or process coordination, while relational norm is more effective on both. This finding makes a significantly unique insight into two relational governance mechanisms. Third, this study provides empirical evidence about how four contractual and relational governance mechanisms individually and jointly influence logistics integration, which further leads to operational performance. Thus, the seemingly paradoxical coexistence of complementary, substitutional, or nonsignificant relationships exists between contractual and relational governance. Fourth, this study identifies two dimensions of logistics integration from the flow perspective: information sharing and process coordination, and empirically examines the relationship between them. We also found the two complement in improving operational performance, enhancing the comprehensiveness and richness of literature.

This study also has some limitations that provide potential directions for future studies. First, we examined four typical governance mechanisms from both contractual and relational perspectives, but other mechanisms may also be important. Second, we collected data from one side of the dyadic relationship, namely, 3PL users. Future studies would design to collect data from both 3PL users and providers. Third, BESA is a region that has the economic and social representativeness of China, such as technology development, market conditions, supply chain management (Zhao et al., 2006), but some idiosyncrasies may be overlooked. Future studies can expand the research scope to other regions for better generalizability.

APPENDIX, TABLES, AND REFERENCES AVAILABLE UPON REQUEST!