

*Relational resources and performance of  
Chinese third-party logistics providers:  
The mediating role of innovation capability*

Article

Accepted Version

Shou, Y., Shao, J. and Chen, A. ORCID:  
<https://orcid.org/0000-0003-4796-2170> (2017) Relational  
resources and performance of Chinese third-party logistics  
providers: The mediating role of innovation capability.  
International Journal of Physical Distribution & Logistics  
Management, 47 (9). pp. 864-883. ISSN 0960-0035 doi:  
10.1108/IJPDLM-09-2016-0271 Available at  
<https://centaur.reading.ac.uk/108322/>

It is advisable to refer to the publisher's version if you intend to cite from the  
work. See [Guidance on citing](#).

To link to this article DOI: <http://dx.doi.org/10.1108/IJPDLM-09-2016-0271>

Publisher: Emerald

All outputs in CentAUR are protected by Intellectual Property Rights law,  
including copyright law. Copyright and IPR is retained by the creators or other  
copyright holders. Terms and conditions for use of this material are defined in  
the [End User Agreement](#).

[www.reading.ac.uk/centaur](http://www.reading.ac.uk/centaur)

## **CentAUR**

Central Archive at the University of Reading

Reading's research outputs online

# Relational resources and performance of Chinese third-party logistics providers: the mediating role of innovation capability<sup>1</sup>

## Abstract

**Purpose** – Drawing upon the theory of the resource-based view (RBV), this paper aims to examine the relationships among relational resources, innovation capability and firm performance in the third-party logistics (3PL) industry.

**Design/methodology/approach** – Based on data collected from 203 3PL providers in China, this study adopts the approach of structural equation modeling to examine the hypothesized relationships among relational resources, innovation capability and firm performance.

**Findings** – The results of this research confirm that relational resources have a positive effect on firm performance. However, the effect is not direct, but realized through the mediation of innovation capability. This study indicates that relational resources are important for 3PL providers to achieve superior performance, and innovation capability plays a mediating role between relational resources and firm performance.

**Originality/values** – The main contributions of this paper to the literature are twofold. Firstly, it extends the extant research by highlighting the mediating mechanism of innovation capability in relational resources' influence on firm performance. Secondly, it advances the existing perspectives on 3PL firms in the Chinese context and this sheds light on logistics research on emerging markets.

**Keywords** Innovation capability, Relational resources, Resource-based view, Third-party logistics, China

**Paper type** Research paper

## Introduction

With burgeoning global trade, rising customer expectations and booming outsourcing activities, third-party logistics (3PL) providers play an increasingly important role in supply chains. The services provided by 3PL firms add values to logistics users and improve customer satisfaction. Nowadays, many firms, especially manufacturers and retailers, choose to outsource all or part of their logistics activities to 3PL providers (Hong *et al.*, 2004; Sanders *et al.*, 2007). 3PL providers are generally defined as companies which perform a wide range of logistics activities on behalf of their clients (Sink *et al.*, 1996; Delfmann *et al.*, 2002). These services normally include warehousing, packaging, distribution, transportation, and inventory management (Sink *et al.*, 1996). In addition to these basic services, many 3PL providers have broadened their business scope by providing value-added services, such as secondary assembly and product installation (Berglund *et al.*, 1999).

In the competition among 3PL providers, firms aim to provide high-quality services and build long-term relationships with their customers to achieve superior performance. However, many 3PL providers are not able to deliver the cost reduction expected by customers, and fail to develop trustworthy relationships with customers or meet their increasing needs for a broader range of logistics services (Wong and Karia, 2010). Many logistics users are dissatisfied with the services of their 3PL providers, and this jeopardizes the competitiveness of 3PL firms. In addition, many

---

<sup>1</sup>This work was supported by the National Natural Science Foundation of China under Grant number 71472166.

3PL relationships fail because of the lack of shared/clear goals and effective communication between the two parties. The poor relationships cause negative impact on the benefits of both 3PL providers and their customers (Lambert *et al.*, 1999). Therefore, for 3PL providers, an imperative issue is how to develop sustainable competitive advantages and achieve superior performance.

Relational resources have been regarded as one of the critical resources for 3PL providers to achieve competitive advantages (Wong and Karia, 2010; Karia and Wong, 2013; Darkow *et al.*, 2015). According to Karia *et al.* (2015), relational resources refer to the strong relationships that the firm establishes with its suppliers and customers. Such resources are difficult and costly for the firm's rivals to imitate, because they require a long term to develop and involve significant ambiguity (Morgan and Hunt, 1999). Relational resources allow 3PL providers to work closely with their customers to improve competitiveness and achieve mutual benefits.

Some existing studies empirically tested the effects of relational resources on firm performance. For instance, Li and Ogunmokun (2001) emphasized the impact of relational resources on the firm's export performance. Karia and Wong (2013) examined the relationship between relational resources and the firm's logistics performance. Karia *et al.* (2015) investigated how relational resources, combined with other resources, influence firm performance. However, the link between relational resources and firm performance still remains to be tested. Moreover, little is known regarding the mechanism through which relational resources influence firm performance.

Shou *et al.* (2016) observed that most innovation ideas of 3PL providers originate from their interactions with customers. This implies that relational resources facilitate the innovations of 3PL providers. It was also argued that innovation is essential for logistics service providers to develop competitive advantages (Wagner, 2008; Grawe, 2009; Shou *et al.*, 2016). As a result, innovation capability serves as a potential link between relational resources and firm performance of 3PL providers.

This study extends the existing literature by examining relational resources' influence on firm performance through the mediating mechanism of innovation capability. Specifically, we seek to address the following two research questions:

*RQ1.* Do relational resources have an impact on firm performance of 3PL providers?

*RQ2.* Does innovation capability mediate the relationship between relational resources and firm performance of 3PL providers?

This study aims to contribute to the extant literature in several ways. Firstly, as previous studies limit their attention to the direct effect of relational resources on firm performance, we extend to investigate the mediation mechanism through which relational resources influence firm performance. Secondly, by collecting and analyzing the data of 3PL providers in China, this study enriches the extant China-based logistics research. Since China serves as a typical example of emerging markets, our study provides a meaningful perspective for further development of logistics research on emerging markets.

The rest of this paper is organized as follows. Section 2 introduces the research background. Section 3 develops the research hypotheses. Section 4 explains research methodology, discusses the development of the measurement scales, and describes the sampling process and data collection. Section 5 presents the analysis of the results. Section 6 discusses research findings and implications. The last section concludes the paper and provides suggestions for future research.

## **Theoretical background**

### *Resource-based view*

The resource-based view (RBV) suggests that firms achieve superior performance through competitive advantages developed with unique and idiosyncratic organizational resources and capabilities (Wernerfelt, 1984; Dierickx and Cool, 1989; Barney, 1991; Peteraf, 1993). Resources are assets either owned or controlled by the firm (Amit and Schoemaker, 1993), including tangible (e.g. plant and equipment) and intangible assets (e.g. information, brand, and human capital) (Grant, 1991). The firm's resources serve as the source of its competitive advantages, if they are valuable, rare, difficult to imitate, and non-substitutable (Barney, 1991). However, having these resources at disposal does not necessarily lead to competitive advantages of the firm. As Penrose (1959, p. 24-25) stated "Strictly speaking, it is never resources themselves that are the inputs in the production process, but only the services that the resources can render..." Resources are deployed by the firm through its internal processes and routines involved in the productive activities. Capabilities refer to the firm's ability to deploy its resources to achieve desired outcomes (Amit and Schoemaker, 1993). They enable the firm to enhance the productivity of resources and create economic rent more efficiently than competitors. Capabilities are deeply embedded in the firm's organizational processes and routines, and therefore are difficult to replicate. They enable the firm to create and maintain competitive advantages over the rivals (Grant, 1991; Makadok, 2001).

The RBV has been applied to logistics studies in the extant literature (Olavarrieta and Ellinger, 1997; Lai, 2004; Liu *et al.*, 2010). Olavarrieta and Ellinger (1997) demonstrated that logistics distinctive capability is a powerful strategic source of sustainable competitive advantages for 3PL providers. Lai (2004) identified four discernable types of 3PL providers according to the service capability displayed by each type. Liu *et al.* (2010) indicated 13 capabilities that are critical to the competitive advantages of Chinese 3PL providers. Some studies adopted the RBV to empirically examine the impact of resources and capabilities on firm performance in the 3PL industry (Lai *et al.*, 2008; Liu and Lyons, 2011). Specifically, Lai *et al.* (2008) investigated the way in which 3PL providers develop IT capability as the source of their competitive advantages. Liu and Lyons (2011) evaluated the effect of service capabilities on the performance of British and Taiwanese 3PL providers. This paper also adopts the RBV as the theoretical lens to examine the relationships among relational resources, innovation capability and firm performance of 3PL providers.

### *Relational resources*

Among various types of firm resources, relational resources have gained particular attention of management scholars (e.g. Hunt and Morgan, 1995; Hunt, 1997; Morgan and Hunt, 1999; Li and Ogunmokun, 2001; Moore *et al.*, 2007; Wong and Karia, 2010). Hunt and Morgan (1995) divided firm resources into seven categories (including relational resources), but they did not establish a clear definition of such kind of firm resources. Morgan and Hunt (1999, p. 281) referred to relational resources as "resources gained through relationships". Morgan and Hunt (1999) also highlighted that these relationships include those inside the firm (i.e. among various internal units), as well as those outside it (i.e. between the firm and its suppliers and customers).

Despite the continuous popularity of relational resources in recent studies, views on the definition of the concept have remained divergent. For example, Wong and Karia (2010) referred

to relational resources as the firm's abilities in building and maintaining stable cooperative relationships with its partners. Moore *et al.* (2007) adopted the concept of social capital to describe relational resources. This was a point shared by Gretzinger and Royer (2014), who borrowed from Nahapiet and Ghoshal (1998) to apply the multi-dimensional framework of social capital in analysing relational resources. More recently, Karia *et al.* (2015) stated that the firm's relational resources are the embedded relationships that it is involved in. These relationships help build trust between the firm and its partners, and serve as the basis of long-term collaboration and coordination. They help to enhance the effectiveness and efficiency of the firm's communication with its suppliers and customers, and therefore add value to the firm's activities and performance. Drawing upon Karia *et al.* (2015), in this paper we refer to relational resources as the strong relationships that the firm establishes with its suppliers and customers.

Existing literature includes some discussions on the impact of relational resources on firm performance. Much of this research, however, focuses on the specific aspect of marketing. For example, Morgan and Hunt (1999) analyzed the strategy of relationship marketing, arguing that long-term relationships create sustainable competitive advantages for the firm. Li and Ogunmokun (2001) also focused on relationships involved in marketing activities, and emphasized the impact of relational resources on the firm's export performance. Story *et al.* (2009) discussed the firm's marketing competences in product innovation, stating that relational resources, i.e. the firm's interactions, relationships and networks with its partners, contribute to its marketing competences and facilitate product development.

In summary, previous research has suggested the strategic importance of relational resources through their critical impact on the firm's competitive advantages (Li and Ogunmokun, 2001; Story *et al.*, 2009; Karia *et al.*, 2015). This addresses the key role of the firm's relationships with its external partners, such as suppliers and customers (Karia *et al.*, 2015). Resources based on these relationships are difficult for the firm's rivals to imitate, and thus lead to competitive advantages and superior performance of the firm (Morgan and Hunt, 1999). Some logistics literature examined the effect of relational resources on firm performance of 3PL providers (Wong and Karia, 2010; Karia *et al.*, 2015). However, little attention has been paid to the mechanism through which relational resources influence firm performance. This study focuses on the way that relational resources impact firm performance through the mediation mechanism of innovation capability, and provides more insight into the 3PL industry.

### *Innovation capability*

Innovation capability refers to the firm's ability to adopt or implement new ideas, processes, products or services (Hurley and Hult, 1998; Lawson and Samson, 2001). An innovation can be a new product or service, a new production process, a new structure or administrative system, or a new plan or program pertaining to organizational members (Damanpour, 1991). It is possible for innovation to occur in various aspects of the organization. According to Damanpour (1991), innovations within an organization include technological and administrative ones. Technological innovations involve products, services and production process technology, and are usually realized through the adoption of new tools, techniques, devices or systems. Administrative innovations focus on the organization's structure and administrative processes. It is indirectly related to the basic work activities but directly related to the management of an organization. For example, the adoption of new procedures and policies is regarded as administrative innovations.

Logistics services are at the very core of the activities of 3PL providers and therefore logistics innovation is an important aspect of innovation in these firms. Logistics innovation refers to any logistics-related service that is considered as new and helpful to a particular focal company (Flint *et al.*, 2005). For example, the implementation of logistics technologies (e.g. EDI, RFID) and logistics programs (e.g. vendor-managed inventory, cross-docking) is part of logistics innovation. Innovations of 3PL providers may occur to logistics operations as well as other parts of the organization, such as the organizational structure. Wagner (2008) classified the innovation of 3PL providers into two categories: product/service innovation and process innovation. Product/service innovation takes place when the customer is offered new or improved services by 3PL providers, through which new performance promises are realized (Wagner, 2008). As an example of product/service innovation, 3PL providers can offer some new or value-added services to the customers, such as financial and consulting services. Process innovation means the implementation of new or enhanced techniques, methods or procedures to improve service quality. Examples of this include introduction of new management systems (e.g. balanced score-card or TQM), as well as implementation of new IT systems (e.g. an electronic track and trace system) (Wagner, 2008).

## **Research hypotheses**

### *Relational resources and innovation capability*

The RBV argues that resources can be used as inputs to develop capabilities and thus are the source of firm capabilities (Grant, 1991). Specifically, relational resources are long-term and strategic relationships that the firm builds with its suppliers and customers. These relationships are characterized by a high degree of cooperation and communication and involve open exchanges of information. These collaborative inter-organizational relationships are regarded as an important source of innovation (Pennings and Harianto, 1992). It is argued that elements of inter-organizational relationships, such as collaboration and communication, have an impact on the firm's capacity for innovation (Hurley and Hult, 1998). Relational resources therefore are critical inputs of the firm in the development of innovation capability.

For 3PL providers, relational resources facilitate information collection and the development of deep insight on customers, and this builds the foundation of the generation of innovative ideas. By reviewing and interpreting the information of customers, 3PL providers can clearly understand what is needed by the customers and make changes to their current offers and operations (Flint *et al.*, 2005). For example, customers' feedback provides 3PL firms with new ideas or solutions to improve their current services. Many novel ideas may derive from direct customer appraisals or complaints (Busse and Wallenburg, 2011). Moreover, through intensive interactions with customers, 3PL providers are able to anticipate future needs of customers (Flint *et al.*, 2008; Grawe, 2009). This serves as an opportunity for these firms to develop new services, technologies and processes.

In addition, close inter-organizational relationships facilitate the implementation of cooperative innovation activities between 3PL providers and their customers. Wagner and Sutter (2012) stated that 3PL providers implement innovation projects jointly with their customers. Such projects require a high level of collaboration and communication, as team members come from two different organizations and thus such teams tend to be more diverse. Customers play a critical role in the successful implementation of such joint innovation projects. These projects, such as

system development, adoption of new logistics technologies and new service development, are essential to 3PL providers' innovations (Wagner and Sutter, 2012). Based on the discussions in this section, we propose the first hypothesis:

*H1. Relational resources are positively related to innovation capability of 3PL providers.*

#### *Innovation capability and firm performance*

The RBV suggests a positive relationship between organizational capabilities and firm performance (Grant, 1991; Makadok, 2001). More specifically, innovation capability, the ability to engage in innovations, has been regarded as the firm's critical organizational capability in value creation (Hult *et al.*, 2004; Yang *et al.*, 2009). Shou *et al.* (2013) indicated that innovation capability is critical for the firm as it creates power in supply chain control. Firms with great capabilities of innovation are able to develop competitive advantages and achieve superior firm performance (Hurley and Hult, 1998; Calantone *et al.*, 2002). Some existing studies emphasized that innovation is critical to the success of 3PL providers (Flint *et al.*, 2005; Wagner, 2008).

Innovation capability enables 3PL providers to improve internal operations and administrative efficiency, and therefore contributes to firm performance. For 3PL providers, innovation in logistics technologies is an important aspect of innovation activities (Lin, 2007), as such innovation enhances operational effectiveness. For instance, the technologies of bar-coding and radio frequency identification (RFID) are useful for capturing logistics-related data. They therefore increase the operational efficiency and reliability of 3PL providers. Warehousing technologies, such as automated storage, retrieval system (AS/RS), and automatic sorting system, offer quick and efficient search and movement of storages (Lin, 2007). Besides, the use of transportation management system (TMS) helps 3PL providers to plan, optimize, and execute transportation operations (Autry *et al.*, 2005). By improving operational efficiency, 3PL providers reduce operation cost and thus enhance profitability. Moreover, administrative innovations, such as the adoption of new management systems, promote the administrative efficiency of 3PL providers. Han *et al.* (1998) argued that administrative innovations contribute to firm performance by promoting net income growth and return on assets.

In addition, innovation capability helps 3PL providers to better serve customers and thus improves firm performance. Many 3PL providers are innovative at developing new services for their customers, such as financial and consulting services. These new services enable the firm to enter new market segments and gain additional market shares. Some 3PL providers also invest in advanced technologies or systems, e.g. electronic data interchange (EDI) and electronic ordering system (EOS), which help establish wide connectivity and strategic links with their customers. Such links enable 3PL providers to transmit and receive information efficiently. This provides 3PL firms with great potential to speed up transaction processes, fulfill promises to customers and improve quality of services (Stefansson, 2002). Moreover, 3PL providers with high innovation capability are able to effectively devise solutions to the problems raised by customers and therefore offer satisfactory services to them. Customer satisfaction and loyalty then lead to superior profitability of 3PL providers.

Prior research shows that firms with a high degree of innovation are able to achieve superior performance despite the significant investments required (Birla, 2005; Wagner, 2008). Many innovations in logistics are initiated through new technologies or systems (Chapman *et al.*, 2003), and this means that innovation usually happens with a cost. Wagner (2008) investigated the



German transportation industry and identified five types of innovation activities. These include internal research and development, external research and development, investment in infrastructure and capital goods, acquisition of knowledge, and training and further education. While all these innovation activities will induce costs, it is important to notice that more benefits are generated from the innovations. For example, FedEx has made significant investments in service and process innovations but gained substantial benefits from them (Birla, 2005). Based on case studies of 3PL firms in Taiwan, Hong Kong and Mainland China, Cui *et al.* (2012) stated that logistics innovation can lead to positive operational and financial performance. A recent industry study conducted by Boston Consulting Group (BCG) emphasized that innovation capability is a critical factor for 3PL providers to be successful in the market, because innovation allows 3PL firms to develop new offerings that add value to the firms while maintaining the price levels (Riedl *et al.*, 2016). Therefore, we argue that the effect of innovation capability on firm performance of 3PL providers is positive. Based on the discussions in this section, we propose the second hypothesis:

*H2. Innovation capability is positively related to firm performance of 3PL providers.*

#### *The mediating effect of innovation capability*

In this paper, innovation capability is proposed as a mediator of the link between relational resources and firm performance. The RBV supplies the rationale for this claim. Within this view, Amit and Schoemaker (1993) pointed out that resources are the inputs into a firm's value chain and capabilities are regarded as complex processes that enable the firm to deploy its resources. While possessing resources is important, it is not sufficient for the firm to attain superior performance. The potential value of resources is realized through resource deployment capabilities, i.e. the abilities of the firms to capitalize on resources to affect performance (Ketchen *et al.*, 2007). Capabilities play a critical role in transforming inputs (i.e. resources) into outputs (i.e. performance). Penrose (1959) emphasized that the possession of resources alone can not create competitive advantages and superior performance unless the firm can deploy the resources effectively. Consequently, the impact of resources on firm performance is not direct, but transmitted through the firm's internal processes and routines, i.e. its capabilities. The RBV therefore suggests the resource-capability-performance relationship.

In this study, we particularly argue that relational resources of 3PL providers affect firm performance through innovation capability. This means that relational resources enhance 3PL providers' innovation capability, which in turn improves 3PL providers' performance. Specifically, relational resources enable 3PL providers to maintain a close connection with customers, through which 3PL providers obtain valuable information on customer needs. The information exchanged through the interactions enables 3PL providers to generate innovation ideas, technologies and services. 3PL providers with a strong innovation capability are able to develop new solutions to satisfy customers' current and future needs. In addition, service innovations allow 3PL providers to break into new markets and reach new customers, which help 3PL firms to gain additional revenues. Therefore, those 3PL providers who possess relational resources are more likely to develop innovation capability to achieve superior performance. Innovation capability functions as a critical mediator by transmitting the effect of relational resources to firm performance. Concluding from the discussions in this section, we propose the third hypothesis:

*H3. Innovation capability mediates the relationship between relational resources and firm*

performance of 3PL providers.

## Research methodology

### *Questionnaire design and measures*

In this study, the identification of construct measures of relational resource, innovation capability and firm performance was grounded in the existing literature. All the constructs were measured by existing multi-item scales. Drawing upon Karia and Wong (2013) and Karia *et al.* (2015), we measured relational resources with three items. Innovation capability was measured with the scale commonly adopted in prior studies (Keskin, 2006; Panayides, 2006; Lin, 2007). Firm performance was measured by five financial indicators which were commonly used in previous studies (Calantone *et al.*, 2002; Yang *et al.*, 2009; Liu and Lyons, 2011). Relational resources and innovation capability were measured using a seven-point Likert scale with “1” indicating “strongly disagree” and “7” indicating “strongly agree.” Respondents were also requested to evaluate their firms’ performance relative to the major competitors by using a seven-point Likert scale. In this scale, “1” means “much worse than competitors” and “7” means “much better than competitors.” Details on scales are provided in Table 1.

**Table 1.** Survey items

Construct and items	Mean	S.D.
<i>Relational resources (RR)</i>		
RR1. Our company establishes close coordination/collaboration with business partners	5.50	1.02
RR2. Our company commits to share information among business partners	5.47	1.14
RR3. Our company inclines to recruit staff with good communication skill	5.60	1.12
<i>Innovation capability (IC)</i>		
IC1. Our company frequently tries out new ideas	5.05	1.16
IC2. Our company seeks out new ways to do things	5.01	1.15
IC3. Our company is creative in its methods of operation	5.09	1.08
IC4. Our company is often the first to market with new products and services	5.11	1.17
IC5. Our new product/service introduction has increased over the last 5 years <sup>a</sup>	5.26	1.02
<i>Firm performance (FP)</i>		
FP1. Return on assets	4.92	1.02
FP2. Return on investment	4.97	1.06
FP3. Profit rate	4.81	1.08
FP4. Market share	4.75	1.14
FP5. Sales’ growth rate	4.90	0.94
<b>Note:</b> <sup>a</sup> The item (IC5) was dropped during exploratory factor analysis		

In this paper, we also adopted firm size as a control variable in our model. Besides relational resources and innovation capability, firm size may also influence firm performance. Compared to

small firms, large firms are generally in an advantageous position in terms of resource acquisition. They are therefore more likely to achieve superior performance than small firms. Following Vanpoucke *et al.* (2014), we measured firm size with the natural logarithmic transformation of the number of full-time employees.

Following the literature of the scales, we designed the initial questionnaire in English. The questionnaire was then translated into Chinese by one author of this paper. The Chinese version was then translated back into English by another author. The translated English version was checked against the original English version for discrepancies, and adjustments were made to reflect the original meaning of the questions in English. We used the Chinese version of the questionnaire for data collection, as the sampled firms were 3PL providers in China.

### *Sampling and data collection*

The data were collected from 3PL firms in China. Our choice of China as the research context was based on several considerations. Firstly, as a result of the rapid growth of the Chinese economy, especially in the e-commerce sector, the 3PL industry in China has expanded robustly in recent years (Tan *et al.*, 2014). The emerging logistics industry presents rich materials as well as a unique context for the examination of 3PL providers. Secondly, the Chinese culture is characterized by high power distance, collectivism and long-term orientation, where business activities are significantly based on *guanxi* (i.e. strong personal relationship) networks (Zhao *et al.*, 2008; Huo *et al.*, 2015). The Chinese context therefore provides an interesting background for the study of relational resources' impact on firm performance in the 3PL industry.

The collection of data was contracted to a professional survey company. Approximately 1000 3PL providers were randomly selected. Considering the geographic and economic diversity among different regions in China (Flynn *et al.*, 2010), data were collected from six regions, including Northern China, Northeastern China, Eastern China, Southern China, Southwestern China and Northwestern China (Hong *et al.*, 2007). These regions cover a broad range of provinces and cities in China. Therefore, investigating the six regions provides a comprehensive analysis of the Chinese 3PL industry. To strengthen data reliability, questionnaire respondents were required to be middle and senior managers. Finally, 203 valid questionnaires were returned, resulting in a usable response rate of 20.3%.

The profile of respondents and their companies is presented in Table 2. Among all the respondents, 4.4% are vice presidents, 56.2% are managers or assistant managers, and 39.4% are directors or vice directors. Over 80% of these respondents have more than 5 years of experience working in the company. Their position and experience in the firm therefore serve as a solid base of the reliability of information collected in the survey. As regards firm ownership, Table 2 shows that the vast majority (82.3%) are private firms. Among the rest, 3.4% are state-owned firms, 9.4% joint ventures and 4.9% foreign-owned firms. In terms of firm size, more than 60% of the firms have a total amount of employees between 101 and 500, while around 25% have more than 500. Table 2 also shows the regional distribution of the sample companies. About 50% are based in Eastern China and about 20% from Southern China. The remaining firms are from Northern China (18.7%) and other regions (8.4%). This sample distribution is relatively reasonable, because 3PL firms in China are concentrated in Eastern China, Southern China and Northern China, due to the rapid economic development of these regions. The main logistics services provided by the firms include land freight (85.2%), distribution (77.3%), warehousing (73.4%), and air freight (46.8%).

**Table 2.** Profile of respondents and their companies

	Frequency	Percentage (%)
Job title		
Vice president or above	9	4.4
Manager/assistant manager	114	56.2
Director/vice director	80	39.4
Working experiences (years)		
1-5	36	17.7
6-10	109	53.7
11-15	49	24.1
Above 15	9	4.4
Ownership		
State-owned	7	3.4
Private	167	82.3
Joint venture	19	9.4
Foreign-owned	10	4.9
Number of full-time employees		
1-100	30	14.8
101-500	134	66.0
501-1000	29	14.3
Above 1000	10	4.9
Regional distribution		
Northern China	38	18.7
Northeastern China	4	2.0
Eastern China	104	51.2
Southern China	44	21.7
Southwestern China	9	4.4
Northwestern China	4	2.0
Types of logistics services <sup>a</sup>		
Air freight	91	46.8
Sea freight	62	30.5
Land freight	173	85.2
Warehousing	149	73.4
Distribution	157	77.3
Inventory replenishment and control	39	19.2
Packaging/repackaging	90	44.3
Purchasing/procurement	65	32.0
Logistics system design	70	34.5
Assembly/production	39	19.2
On-site repair/installation	18	8.9
Supply chain finance	19	9.4
Others	1	0.5

**Note:** <sup>a</sup>Multiple categories are permitted

This indicates that 3PL providers generally offer basic transportation and warehousing services. Some non-traditional services are also provided, such as packaging/repackaging (44.3%), purchasing/procurement (32%), assembly/production (19.2%), and supply chain finance (9.4%).

To test for non-response bias, we conducted t-tests of early and late responses to all the items (Zhao *et al.*, 2011; Huo *et al.*, 2015). The results show no significant difference for any of the items, and this suggests that non-response bias is not a concern in this study. Since we used one informant to answer the self-reported questionnaire in this study, we tested for common method bias. This was realized through Harman's single-factor test (Podsakoff *et al.*, 2003). In the unrotated factor structure, the results reveal three distinct factors with eigenvalues above 1.0, explaining 63.8% total variance in the data. The first factor explains 35.6% of the variance, which does not account for the majority of the total variance. To further assess common method bias, we conducted confirmatory factor analysis (CFA) to test Harman's single-factor model (Kim, 2014). The model fit indices ( $\chi^2/df=368.33/54=6.82$ ; RMSEA=0.17; NNFI=0.534; CFI=0.618; standardized RMR=0.13) are unacceptable and significantly worse than those of the measurement model. Thus, common method bias is not a major issue in this study.

#### *Reliability and validity*

We followed the two-step method as in Zhao *et al.* (2008) to test construct reliability. Firstly, we conducted exploratory factor analysis (EFA) with principle component analysis and varimax rotation with Kaiser normalization to assess the unidimensionality of each construct. One item (IC5) was dropped after comparing its factor loading on the construct that it was intended to measure to its factor loadings on other constructs. All the factor loadings shown in Table 3 are acceptable, and this demonstrates the unidimensionality of all the constructs. Then, we calculated the Cronbach's alpha for each construct in order to test internal consistency. The Cronbach's  $\alpha$  values are 0.743 for relational resources, 0.816 for innovation capability and 0.833 for firm performance. All the Cronbach's  $\alpha$  values are above the threshold of 0.70 (Lance *et al.*, 2006), indicating that all the constructs are reliable for this study.

We conducted CFA to assess convergent and discriminant validity, as suggested by O'Leary-Kelly and Vokurka (1998). In the CFA model, the model fit indices are  $\chi^2=69.402$  with degrees of freedom=51, RMSEA=0.042, NNFI=0.971, CFI=0.978 and standardized RMR=0.050. Thus, the model is acceptable, indicating convergent validity (Zhao *et al.*, 2008). In addition, as shown in Table 4, all the standardized factor loadings are greater than 0.50, and the t-values exceed the threshold value of 1.96 (Kim, 2014). Table 4 also indicates that each item's coefficient is greater than twice its standard error (Flynn *et al.*, 2010). This further demonstrates convergent validity. The average variance extracted (AVE) values of relational resources, innovation capability, and firm performance are 0.50, 0.54, and 0.50 respectively. All the AVE values are higher than the recommended benchmark of 0.50 (Zhao *et al.*, 2011), and this provides a strong evidence of convergent validity. Therefore, convergent validity is ensured.

In order to assess discriminant validity for all of the constructs, we built a constrained CFA model for every possible pair of latent variables, and set 1.0 as the correlation between the paired constructs. We compared this constrained model to the original unconstrained model where the correlations among constructs were freely estimated. The significant difference of the  $\chi^2$  statistics between the unconstrained and constrained model demonstrates high discriminant validity (Paulraj *et al.*, 2008).

**Table 3.** EFA of all constructs

	Factor loadings		
	Firm performance	Innovation capability	Relational resources
FP1	<i>0.797</i>	0.139	0.081
FP3	<i>0.756</i>	0.078	0.106
FP4	<i>0.756</i>	0.137	0.064
FP2	<i>0.738</i>	0.207	0.094
FP5	<i>0.738</i>	0.213	-0.068
IC1	0.154	<i>0.850</i>	0.161
IC3	0.065	<i>0.828</i>	0.058
IC4	0.231	<i>0.713</i>	0.110
IC2	0.255	<i>0.701</i>	0.133
RR3	-0.034	0.047	<i>0.815</i>
RR1	0.088	0.167	<i>0.805</i>
RR2	0.151	0.155	<i>0.781</i>
Eigenvalue	3.047	2.596	2.016
Total variance explained		63.823%	

**Table 4.** Results of CFA

	Factor loading	Standardized loading	Standard error	t-value
RR1	1.000	0.755	—	—
RR2	1.057	0.716	0.144	7.358
RR3	0.942	0.640	0.132	7.103
IC1	1.000	0.864	—	—
IC2	0.772	0.670	0.080	9.615
IC3	0.779	0.720	0.075	10.395
IC4	0.782	0.666	0.082	9.544
FP1	1.000	0.759	—	—
FP2	0.977	0.716	0.103	9.486
FP3	0.942	0.678	0.105	8.984
FP4	1.026	0.700	0.111	9.277
FP5	0.835	0.693	0.091	9.188

**Table 5.** Means, standard deviations, and correlations

	Mean	S.D.	RR	IC	FP
Relational resources (RR)	5.52	0.89	1.00		
Innovation capability (IC)	5.07	0.91	0.40*	1.00	
Firm performance (FP)	4.87	0.81	0.25*	0.47*	1.00

**Note:** \* $p < 0.01$

Furthermore, comparing the correlation coefficients given in Table 5 with the AVE values, we

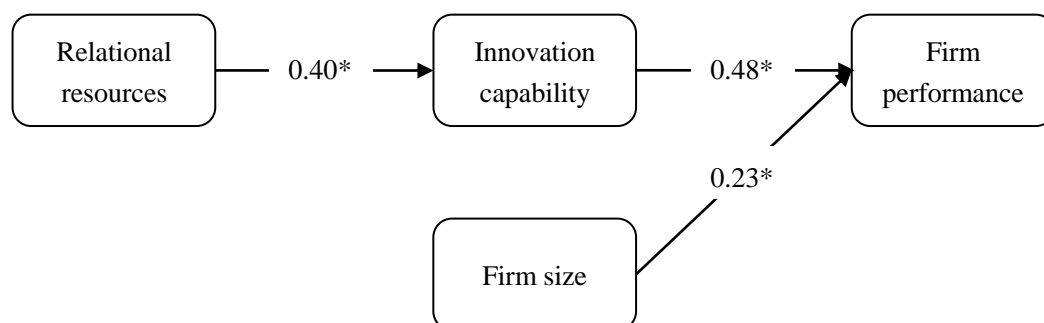
can conclude that the AVE for each construct is higher than the squared correlation between that construct and the other constructs. This provides evidence for discriminant validity (Paulraj *et al.*, 2008; Flynn *et al.*, 2010). Table 5 shows the mean, standard deviations of the constructs and their correlations.

## Results

### *Hypotheses testing*

In this study, we used the method of structural equation modeling (SEM) to estimate the relationships among different constructs and to test the three research hypotheses. SEM estimates were generated using AMOS 17.0 with the maximum likelihood estimation method. The fit indices for our model (see Figure 1) are  $\chi^2 = 87.506$  with degrees of freedom = 62, RMSEA = 0.045, NNFI = 0.96, IFI = 0.97, CFI = 0.97, Standardized RMR = 0.05, NFI = 0.91, RFI = 0.88, PNFI = 0.72, GFI = 0.94, AGFI = 0.91, and PGFI = 0.64. These indices are better than the commonly accepted threshold values (Zhao *et al.*, 2011; Huo *et al.*, 2015), which indicates that our model is acceptable.

Figure 1 presents the structural equation model with standardized coefficients. The standardized coefficients are significant at the 0.01 level. We find that relational resources have a positive influence on innovation capability, and this supports *H1*. As expected, innovation capability has a positive effect on firm performance, and this supports *H2*. The results also indicate that innovation capability mediates the relationship between relational resources and firm performance, and this supports *H3*. Firm size, as a control variable, appears to have a positive influence on performance.



**Note:** \* $p < 0.01$

**Figure 1.** Estimated structural equation model

### *Rival models*

To further examine the mediating effect of innovation capability, we compared our proposed model with three rival models. As suggested by Bollen and Long (1992) and Paulraj *et al.* (2008), when using structural equation method, it is a common practice to make comparisons between the proposed model and rival or alternative models to clearly ascertain which model fits the data the best. In our proposed model (Model 1), innovation capability fully mediates the relationship between relational resources and firm performance, i.e. relational resources do not have a direct impact on firm performance. The first rival model assumes that innovation capability and relational resources are both directly linked to firm performance while there is no link between relational resources and innovation capability (Model 2). The logic of this model may be that

relational resources and innovation capability are antecedents that directly contribute to firm performance. Furthermore, since relational resources might have a direct as well as indirect effect on firm performance, a partial mediation model is posited. In this rival model, we added a direct path from relational resources to firm performance in addition to the paths in the proposed model (Model 3). The final rival model treats innovation capability as an antecedent to relational resources, and this means that relational resources function as a mediator between innovation capability and firm performance (Model 4). A possible explanation of this model is that innovation capability enables the firm to gain more relational resources, which in turn improve firm performance.

Following Paulraj *et al.* (2008) and Zacharia *et al.* (2011), we compared our proposed model with the rival models according to the following criteria: (1) overall model fit, measured by NNFI, CFI and RMSEA; (2) percentage of statistically significant parameters; (3) the explained variance in the outcome variables, measured by squared multiple correlations (SMCs); (4) parsimony, measured by RMSEA and PNFI; (5) Akaike's information criterion (AIC) and Consistent Akaike's Information Criterion (CAIC) (where a smaller value represents a better model fit).

**Table 6.** SEM results of proposed model and rival models

	Model 1	Model 2	Model 3	Model 4
<b>Structural paths</b>				
Relational resources → Innovation capability	0.40*		0.40*	
Innovation capability → Firm performance	0.48*	0.45*	0.45*	
Relational resources → Firm performance		0.06	0.06	
Innovation capability → Relational resources				0.43*
Relational resources → Firm performance				0.30*
Firm size → Firm performance	0.23*	0.23*	0.23*	0.22*
<b>Model fit statistics</b>				
$\chi^2$	87.506	86.750	87.007	112.826
d.f.	62	60	61	62
CFI	0.970	0.968	0.969	0.940
NNFI	0.962	0.959	0.960	0.924
RMSEA	0.045	0.047	0.046	0.064
PNFI	0.719	0.697	0.708	0.697
AIC	145.506	148.750	147.007	170.826
CAIC	270.588	282.459	276.403	295.909
SMC	0.282	0.277	0.281	0.136
<b>Note:</b> * $p < 0.01$				

Table 6 presents the SEM results of our proposed model and three rival models. The results suggest that the proposed model (Model 1) fits the data better than the three rival models (Model 2, Model 3 and Model 4). Specifically, the model fit indices (CFI and NNFI) of the proposed model are higher than the rival models, and this indicates that the proposed model provides the best model fit. Furthermore, in the proposed model, all the hypothesized relationships are significant at the 0.01 level, while in Models 2 and 3 the path from relational resources to firm performance is non-significant. Moreover, comparing the PNFI and RMSEA, we can conclude that the proposed



model achieves an improvement in parsimony. Additionally, the AIC and CAIC of the proposed model are the smallest among the four models, indicating that the proposed model is better than the three rival models. The explanatory power of the outcome variable (SMC) also provides a strong evidence for the superiority of the proposed model.

The above analysis suggests that our proposed model fits the data the best among the four models. In addition, the path coefficients of the partial mediation model (Model 3) confirm that the path from relational resources to firm performance is non-significant. Therefore, the results support our claim that innovation capability fully mediates the relationship between relational resources and firm performance.

## **Discussion and implications**

### *Theoretical contributions*

The results of this study reveal that relational resources have a positive effect on innovation capability of 3PL providers. It indicates that innovation capability may originate and develop from the relationships between 3PL providers and their clients. Many innovations in logistics service provision of 3PL providers occur during their interactions with customers. These interactions help 3PL providers to better understand their customers' unmet and latent needs and generate innovative ideas and services. Cui *et al.* (2010) also stated that inter-organizational interactions are essential to the innovation process of logistics firms. While a number of previous studies have linked innovation capability to learning orientation (Calantone *et al.*, 2002), market orientation (Rhee *et al.*, 2010; Ngo and O'Cass, 2012), and entrepreneurial orientation (Hult *et al.*, 2004), the relationship between relational resources and innovation capability has not been examined empirically to date. Our study therefore complements the extant research. In addition, our study particularly focuses on logistics innovation of 3PL providers, in response to the call for studies to explore innovation management in the logistics industry (Wagner, 2008; Busse and Wallenburg, 2011).

The empirical findings in this paper indicate that innovation capability is positively related to firm performance of 3PL providers. This implies that innovation capability contributes to the development of competitive advantages of 3PL providers. When 3PL providers frequently try new ideas, seek new ways to provide services, be creative in operations and develop new product, they achieve improvement in profitability, market share and growth rate. Our empirical finding confirms the study of Cui *et al.* (2012), whose case studies implied that logistics innovation leads to improved financial performance of 3PL firms. It also provides evidence to support the view of Cui *et al.* (2009) that offering innovative solutions to customers enables 3PL providers to successfully differentiate themselves in the market. Our finding is consistent with the arguments of some previous empirical studies (Calantone *et al.*, 2002; Hult *et al.*, 2004; Keskin, 2006). In addition, this study extends these findings by focusing on logistics service industry in an emerging market. As argued by Grawe (2009), very little empirical testing has been conducted on the topic of logistics innovation of 3PL providers. Rhee *et al.* (2010) also indicated that the majority of empirical studies concerning innovation capability ignore firms in developing countries.

The most important finding of this study is that innovation capability fully mediates the relationship between relational resources and firm performance of 3PL providers. It is observed that relational resources have an indirect impact on firm performance and this is realized through the mediation effect of innovation capability. This result extends the finding of Karia and Wong

(2013), who found the impact of relational resources on firm's logistics performance. The results of our study suggest that relational resources do not operate in isolation from other sources of competitive advantages, and innovation capability appears to be a necessary mediator of the link between relational resources and firm performance. Innovation capability is therefore an essential factor for relational resources to influence firm performance. This result corresponds to the core idea of the RBV, which argues that firms deploy strategic resources through capabilities in order to achieve competitive advantages and superior performance.

Based on the data of 3PL providers in China, this study particularly extends the extant understanding of Chinese logistics industry. The 3PL industry in China has experienced a rapid growth in recent years and logistics services have grown tremendously (Tan *et al.*, 2014). Meanwhile, Chinese 3PL firms are faced with intense competition in the logistics market, and such competition has forced many 3PL firms to reconsider their competitive advantages from a resource-and-capability point of view (Lai *et al.*, 2008). While previous studies have demonstrated that IT capability (Lai *et al.*, 2008) and operations management capability (Liu *et al.*, 2010) positively influence Chinese 3PL firms' competitive advantage, little is known about the effect of relational resources on firm performance in the Chinese logistics industry. Our results indicate that relational resources influence firm performance through the mediation effect of innovation capability. Building innovation capability is especially crucial for 3PL providers in China where logistics users' satisfaction with 3PL providers is lower than the level of developed countries (Chen *et al.*, 2010), and the range of service provisions is much narrower (Tian *et al.*, 2010). As argued by Cui *et al.* (2012), most 3PL providers in China tend to focus on traditional offerings such as transportation and warehousing, and this limitation in service offerings has caused customer dissatisfaction. Through service and process innovations, 3PL firms in China can effectively confront with the prevalent challenges in the current Chinese 3PL market, such as the low levels of service variety and service quality. As a result, they can differentiate themselves in the logistics market and achieve competitive advantages. Daugherty *et al.* (2011) also stated that there is an imperative need for Chinese 3PL firms to develop innovative services in order to achieve improved performance. The existing literature shows that innovation is essential for 3PL providers in China. However, research on logistics innovation in the Chinese context is almost nonexistent (Cui *et al.*, 2012). Hence our study, as one of the early attempts in this particular field, serves as a meaningful platform for future research of logistics innovation of 3PL providers in China. This paper therefore makes a valuable and timely contribution to the understanding of Chinese logistics industry.

China is a typical example of emerging markets, with the characteristics of fast-growing economy, unique institutional environments and increasing economic liberalization (Liu *et al.*, 2009; Wang *et al.*, 2016). Our research reveals that innovation capability plays a critical mediating role in the linkage between relational resources and firm performance of 3PL providers in the Chinese context. The findings of this study therefore shed light on research of 3PL industries in other emerging markets, where similar institutional or cultural characteristics to those of China can be observed (Zhou *et al.*, 2016). Specifically, some existing studies argued that 3PL providers are generally not active in innovation activities (Oke, 2007; Wagner, 2008; Busse, 2010). These studies are based on evidence in developed countries, where the logistics industry has been identified as a mature market. A more recent multi-case study, however, found that leading 3PL providers in China strongly emphasize innovation (Shou *et al.*, 2016), which provides an

interesting counter example of previous studies. Our empirical findings provide further evidence to show that innovation capability can improve firm performance of 3PL providers in an emerging market. In addition, since 3PL providers in such markets face increasing competitions, innovation is especially critical for them to achieve competitive advantages. Therefore, our study draws further attention to the value of emerging markets as the context of research on logistics innovation of 3PL providers.

### *Managerial implications*

This study offers several managerial implications to 3PL managers. Firstly, our findings show that innovation capability can lead to enhanced performance of 3PL providers. This indicates the importance for 3PL managers to develop innovation capability for the firm with a strategic purpose. Operating in a highly competitive market, 3PL firms face increasing competition. Innovation can be an effective and efficient strategic weapon for them to develop and maintain competitive advantages. 3PL providers need to emphasize innovations of internal operations, which facilitate cost reduction on service delivery. The realization of innovation-induced cost reduction helps 3PL providers to stay competitive. Meanwhile, it is important for 3PL firms to provide new or improved services for customers. By offering these innovative services, 3PL providers are able to better satisfy customer demands and increase customer loyalty. This helps 3PL firms to differentiate themselves from their rivals and achieve revenue growth in the market.

Secondly, 3PL managers should strongly emphasize the important role of relational resources in the building of innovation capability. As revealed by the findings of this study, relational resources can improve 3PL providers' innovation capability. 3PL managers are therefore recommended to dedicate themselves to the development of relational resources. Close relationships with customers serve as important sources of innovation for 3PL providers. 3PL providers should pay special attention to the acquisition of innovation ideas during their interaction with customers. For example, they can meet with the top managers of customers for discussions of potential improvements in the offered services. More importantly, they should develop a dynamic view on services that customers are likely to value in the future. This helps 3PL providers to identify the logistics innovation needs and generate innovation ideas. It is also essential for 3PL providers to establish intense innovation collaborations with their customers. For example, they can work together for the design of innovation plans, the test of these plans as well as continuous improvement on them. This facilitates the successful implementation of logistics innovation.

### **Conclusions and future research**

Drawing on the resource-based view of the firm, this paper investigates the relationships among relational resources, innovation capability and firm performance. Specifically, it focuses on 3PL providers and highlights the mediation effect of innovation capability. Our findings reveal that relational resources exert a positive effect on firm performance via innovation capability. This study contributes to the extant literature on the mechanism through which relational resources affect firm performance in the 3PL industry. It also provides managerial implications for 3PL providers, in terms of using relational resources to improve innovation capability and subsequently firm performance.

This final section of our paper discusses the limitations of this study and suggests potential

directions for future research. Firstly, the empirical findings are based on Chinese 3PL firm data and hence country-specific factors may limit the external validity of these findings. A simple generalization of this study might not apply to other countries. As a follow-up of this study, a comparison between China and other countries has the potential of further developing the understanding of relational resources, innovation capability and firm performance of 3PL providers. Secondly, future research will possibly benefit from the method of longitudinal study, in further analyzing the evolution of relational resources as well as their impact on the firm's innovation capability. Thirdly, this study focuses on innovation capability as the mediator between relational resources and firm performance. Future research could address other capabilities, e.g. marketing capability and operational capability. Investigating the mediation effect of the interaction between innovation capability, marketing capability and operational capability will also be of interest.

## References

- Amit, R. and Schoemaker, P. J. (1993), "Strategic assets and organizational rent", *Strategic Management Journal*, Vol. 14 No. 1, pp. 33-46.
- Autry, C. W., Griffis, S. E., Goldsby, T. J. and Bobbitt, L. M. (2005), "Warehouse management systems: resource commitment, capabilities, and organizational performance", *Journal of Business Logistics*, Vol. 26 No. 2, pp. 165-183.
- Barney, J. (1991), "Firm resources and sustained competitive advantage", *Journal of Management*, Vol. 17 No. 1, pp. 99-120.
- Berglund, M., Van Laarhoven, P., Sharman, G. and Wandel, S. (1999), "Third-party logistics: is there a future?", *The International Journal of Logistics Management*, Vol. 10 No. 1, pp. 59-70.
- Birla, M. (2005), *FedEx Delivers: How the World's Leading Shipping Company Keeps Innovating and Outperforming the Competition*, John Wiley & Sons, Hoboken, NJ.
- Bollen, K. A. and Long, J. S. (1992), "Tests for structural equation models: introduction", *Sociological Methods & Research*, Vol. 21 No. 2, pp. 123-131.
- Busse, C. (2010), "A Procedure for secondary data analysis: innovation by logistics service providers", *Journal of Supply Chain Management*, Vol. 46 No. 4, pp. 44-58.
- Busse, C. and Wallenburg, C. M. (2011), "Innovation management of logistics service providers: foundations, review, and research agenda", *International Journal of Physical Distribution & Logistics Management*, Vol. 41 No. 2, pp. 187-218.
- Calantone, R. J., Cavusgil, S. T. and Zhao, Y. (2002), "Learning orientation, firm innovation capability, and firm performance", *Industrial Marketing Management*, Vol. 31 No. 6, pp. 515-524.
- Chapman, R. L., Soosay, C. and Kandampully, J. (2003), "Innovation in logistic services and the new business model: a conceptual framework", *International Journal of Physical Distribution & Logistics Management*, Vol. 33 No. 7, pp. 630-650.
- Chen, H., Tian, Y., Ellinger, A. E. and Daugherty, P. J. (2010), "Managing logistics outsourcing relationships: An empirical investigation in China", *Journal of Business Logistics*, Vol. 31 No. 2, pp. 279-299.
- Cui, L., Hertz, S. and Su, S. I. I. (2010), "Innovation in an international third party logistics firm: a strategy-as-practice perspective", *Journal of Transport and Supply Chain Management*, Vol.

4 No. 1, pp. 69-88.

- Cui, L., Su, S. I. I. and Hertz, S. (2009), "How do regional third-party logistics firms innovate? A cross-regional study", *Transportation Journal*, Vol. 48 No.3, pp. 44-50.
- Cui, L., Su, S. I. I. and Hertz, S. (2012), "Logistics innovation in China", *Transportation Journal*, Vol. 51 No. 1, pp. 98-117.
- Damanpour, F. (1991), "Organizational innovation: A meta-analysis of effects of determinants and moderators", *Academy of Management Journal*, Vol. 34 No. 3, pp. 555-590.
- Darkow, I. L., Weidmann, M. and Lorentz, H. (2015), "Adaptation of foreign logistics service providers' resources and capabilities to a new institutional environment", *Journal of Supply Chain Management*, Vol. 51 No. 1, pp. 27-51.
- Daugherty, P. J., Chen, H. and Ferrin, B. G. (2011), "Organizational structure and logistics service innovation", *The International Journal of Logistics Management*, Vol. 22 No. 1, pp. 26-51.
- Delfmann, W., Albers, S. and Gehring, M. (2002), "The impact of electronic commerce on logistics service providers", *International Journal of Physical Distribution & Logistics Management*, Vol. 32 No. 3, pp. 203-222.
- Dierickx, I. and Cool, K. (1989), "Asset stock accumulation and sustainability of competitive advantage", *Management Science*, Vol. 35 No. 12, pp. 1504-1511.
- Flint, D. J., Larsson, E. and Gammelgaard, B. (2008), "Exploring processes for customer value insights, supply chain learning and innovation: an international study", *Journal of Business Logistics*, Vol. 29 No. 1, pp. 257-281.
- Flint, D. J., Larsson, E., Gammelgaard, B. and Mentzer, J. T. (2005), "Logistics innovation: a customer value-oriented social process", *Journal of Business Logistics*, Vol. 26 No. 1, pp. 113-147.
- Flynn, B. B., Huo, B. and Zhao, X. (2010), "The impact of supply chain integration on performance: A contingency and configuration approach", *Journal of Operations Management*, Vol. 28 No. 1, pp. 58-71.
- Grant, R. M. (1991), "The resource-based theory of competitive advantage: implications for strategy formulation", *California Management Review*, Vol. 33 No. 3, pp. 114-135.
- Grawe, S. J. (2009), "Logistics innovation: a literature-based conceptual framework", *The International Journal of Logistics Management*, Vol. 20 No. 3, pp. 360-377.
- Gretzinger, S. and Royer, S. (2014), "Relational resources in value adding webs: The case of a Southern Danish firm cluster", *European Management Journal*, Vol. 32 No. 1, pp. 117-131.
- Han, J. K., Kim, N. and Srivastava, R. K. (1998), "Market orientation and organizational performance: is innovation a missing link?", *Journal of Marketing*, Vol. 62 No. 4, pp. 30-45.
- Hong, J., Chin, A. T. and Liu, B. (2004), "Logistics outsourcing by manufacturers in China: a survey of the industry", *Transportation Journal*, Vol. 43 No. 1, pp. 17-25.
- Hong, J., Chin, A. T. and Liu, B. (2007), "Logistics service providers in China: Current status and future prospects", *Asia Pacific Journal of Marketing and Logistics*, Vol. 19 No. 2, pp. 168-181.
- Hult, G. T. M., Hurley, R. F. and Knight, G. A. (2004), "Innovativeness: its antecedents and impact on business performance", *Industrial Marketing Management*, Vol. 33 No. 5, pp. 429-438.
- Hunt, S. D. (1997), "Competing through relationships: grounding relationship marketing in resource-advantage theory", *Journal of Marketing Management*, Vol. 13 No. 5, pp. 431-445.
- Hunt, S. D. and Morgan, R. M. (1995), "The comparative advantage theory of competition",

- Journal of Marketing*, Vol. 59 No. 2, pp. 1-15.
- Huo, B., Liu, C., Kang, M. and Zhao, X. (2015), "The impact of dependence and relationship commitment on logistics outsourcing: Empirical evidence from Greater China", *International Journal of Physical Distribution & Logistics Management*, Vol.45 No. 9/10, pp. 887-912.
- Hurley, R. F. and Hult, G. T. M. (1998), "Innovation, market orientation, and organizational learning: an integration and empirical examination", *Journal of Marketing*, Vol. 32 No. 3, pp. 42-54.
- Karia, N. and Wong, C. Y. (2013), "The impact of logistics resources on the performance of Malaysian logistics service providers", *Production Planning & Control*, Vol. 24 No. 7, pp. 589-606.
- Karia, N., Wong, C. Y., Asaari, M. H. A. H. and Lai, K. H. (2015), "The effects of resource bundling on third-party logistics providers' performance", *International Journal of Engineering Business Management*, Vol. 7 No. 9, pp. 1-14.
- Keskin, H. (2006), "Market orientation, learning orientation, and innovation capabilities in SMEs: An extended model", *European Journal of Innovation Management*, Vol. 9 No. 4, pp. 396-417.
- Ketchen, D. J., Hult, G. T. M. and Slater, S. F. (2007), "Toward greater understanding of market orientation and the resource-based view", *Strategic Management Journal*, Vol. 28 No. 9, pp. 961-964.
- Kim, D. Y. (2014), "Understanding supplier structural embeddedness: A social network perspective", *Journal of Operations Management*, Vol. 32 No. 5, pp. 219-231.
- Lai, F., Li, D., Wang, Q. and Zhao, X. (2008), "The information technology capability of third-party logistics providers: a resource-based view and empirical evidence from China", *Journal of Supply Chain Management*, Vol. 44 No. 3, pp. 22-38.
- Lai, K. (2004), "Service capability and performance of logistics service providers", *Transportation Research Part E: Logistics and Transportation Review*, Vol. 40 No. 5, pp. 385-399.
- Lambert, D. M., Emmelhainz, M. A. and Gardner, J. T. (1999), "Building successful logistics partnerships", *Journal of Business Logistics*, Vol. 20 No. 1, pp. 165-181.
- Lance, C. E., Butts, M. M. and Michels, L. C. (2006), "The sources of four commonly reported cutoff criteria what did they really say?", *Organizational Research Methods*, Vol. 9 No. 2, pp. 202-220.
- Lawson, B. and Samson, D. (2001), "Developing innovation capability in organisations: a dynamic capabilities approach", *International Journal of Innovation Management*, Vol. 5 No. 3, pp. 377-400.
- Li, L. and Ogunmokun, G. O. (2001), "The influence of interfirm relational capabilities on export advantage and performance: an empirical analysis", *International Business Review*, Vol. 10 No. 4, pp. 399-420.
- Lin, C. Y. (2007), "Factors affecting innovation in logistics technologies for logistics service providers in china", *Journal of Technology Management in China*, Vol. 2 No. 1, pp. 22-37.
- Lin, H. F. (2007), "Knowledge sharing and firm innovation capability: an empirical study", *International Journal of Manpower*, Vol. 28 No. 3/4, pp. 315-332.
- Liu, C. L. and Lyons, A. C. (2011), "An analysis of third-party logistics performance and service provision", *Transportation Research Part E: Logistics and Transportation Review*, Vol. 47

No. 4, pp. 547-570.

- Liu, X., Grant, D. B., McKinnon, A. C. and Feng, Y. (2010), "An empirical examination of the contribution of capabilities to the competitiveness of logistics service providers: A perspective from China", *International Journal of Physical Distribution & Logistics Management*, Vol. 40 No. 10, pp. 847-866.
- Liu, Y., Luo, Y. and Liu, T. (2009), "Governing buyer-supplier relationships through transactional and relational mechanisms: evidence from china", *Journal of Operations Management*, Vol. 27 No. 4, pp. 294-309.
- Makadok, R. (2001), "Toward a synthesis of the resource-based and dynamic-capability views of rent creation", *Strategic Management Journal*, Vol. 22 No. 5, pp. 387-401.
- Moore, C. B., Autry, C. W. and Macy, B. A. (2007), "Interpreneurship: How the process of combining relational resources and entrepreneurial resources drives competitive advantage", *Entrepreneurial Strategic Processes*, Vol. 10, pp. 65-102.
- Morgan, R. M. and Hunt, S. (1999), "Relationship-based competitive advantage: the role of relationship marketing in marketing strategy", *Journal of Business Research*, Vol. 46 No. 3, pp. 281-290.
- Nahapiet, J. and Ghoshal, S. (1998), "Social capital, intellectual capital, and the organizational advantage", *Academy of Management Review*, Vol. 23 No. 2, pp. 242-266.
- Ngo, L. V. and O'Cass, A. (2012), "In search of innovation and customer-related performance superiority: The role of market orientation, marketing capability, and innovation capability interactions", *Journal of Product Innovation Management*, Vol. 29 No. 5, pp. 861-877.
- O'Leary-Kelly, S. W. and Vokurka, R. J. (1998), "The empirical assessment of construct validity", *Journal of Operations Management*, Vol. 16 No. 4, pp. 387-405.
- Oke, A. (2007), "Innovation types and innovation management practices in service companies", *International Journal of Operations & Production Management*, Vol. 27 No. 6, pp. 564-587.
- Olavarrieta, S. and Ellinger, A. E. (1997), "Resource-based theory and strategic logistics research", *International Journal of Physical Distribution & Logistics Management*, Vol. 27 No. 9/10, pp. 559-587.
- Panayides, P. (2006), "Enhancing innovation capability through relationship management and implications for performance", *European Journal of Innovation Management*, Vol. 9 No. 4, pp. 466-483.
- Paulraj, A., Lado, A. A. and Chen, I. J. (2008), "Inter-organizational communication as a relational competency: Antecedents and performance outcomes in collaborative buyer-supplier relationships", *Journal of Operations Management*, Vol. 26 No. 1, pp. 45-64.
- Pennings, J. M. and Harianto, F. (1992), "Technological networking and innovation management", *California Management Review*, Vol. 30 No. 1, pp. 356-82.
- Penrose, E. T. (1959), *The theory of the growth of the firm*, Wiley, New York, NY.
- Peteraf, M. A. (1993), "The cornerstones of competitive advantage: a resource-based view", *Strategic Management Journal*, Vol. 14 No. 3, pp. 179-191.
- Podsakoff, P. M., Mackenzie, S. B., Lee, J. Y. and Podsakoff, N. P. (2003), "Common method biases in behavioral research: a critical review of the literature and recommended remedies", *Journal of Applied Psychology*, Vol. 88 No. 5, pp. 879-903.
- Rhee, J., Park, T. And Lee, D. H. (2010), "Drivers of innovativeness and performance for innovative SMEs in South Korea: Mediation of learning orientation", *Technovation*, Vol. 30

No. 1, pp. 65-75.

- Riedl, J., Farag, H. and Korenkiewicz, D. (2016), "Transportation and Logistics in a Changing World: The Journey Back to Profitable Growth", available at: <https://www.bcgperspectives.com/content/articles/transportation-travel-tourism-transportation-logistics-changing-world/> (accessed 18 October 2016).
- Sanders, N. R., Locke, A., Moore, C. B. and Autry, C. W. (2007), "A multidimensional framework for understanding outsourcing arrangements", *Journal of Supply Chain Management*, Vol. 43 No. 4, pp. 3-15.
- Shou, Y., Che, W. and Dai, J. (2016), "Develop a competitive cold chain in emerging markets: insights from case studies in China", The 21st International Symposium on Logistics Conference, pp. 599-607.
- Shou, Y., Feng, Y., Zheng, J., Wang, G. and Yeboah, N. E. (2013), "Power source and its effect on customer-supplier relationships: An empirical study in Yangtze River Delta", *International Journal of Production Economics*, Vol. 146 No. 1, pp. 118-128.
- Sink, H. L., Langley, Jr. C. J. and Gibson, B. J. (1996), "Buyer observations of the US third-party logistics market", *International Journal of Physical Distribution & Logistics Management*, Vol. 26 No. 3, pp. 38-46.
- Stefansson, G. (2002), "Business-to-business data sharing: a source for integration of supply chains", *International Journal of Production Economics*, Vol. 75 No. 1, pp. 135-146.
- Story, V., Hart, S. and O'Malley, L. (2009), "Relational resources and competences for radical product innovation", *Journal of Marketing Management*, Vol. 25 No. 5, pp. 461-481.
- Tan, A. W. K., Zhao, Y., Zhang, D. and Hilmola, O. P. (2014), "State of third party logistics providers in china", *Industrial Management & Data Systems*, Vol. 114 No. 9, pp. 1322-1343.
- Tian, Y., Ellinger, A. E. and Chen, H. (2010), "Third-party logistics provider customer orientation and customer firm logistics improvement in China", *International Journal of Physical Distribution & Logistics Management*, Vol. 40 No. 5, pp. 356-376.
- Vanpoucke, E., Vereecke, A. and Wetzels, M. (2014), "Developing supplier integration capabilities for sustainable competitive advantage: a dynamic capabilities approach", *Journal of Operations Management*, Vol. 32 No. 7, pp. 446-461.
- Wagner, S. M. (2008), "Innovation management in the German transportation industry", *Journal of Business Logistics*, Vol. 29 No. 2, pp. 215-231.
- Wagner, S. M. and Sutter, R. (2012), "A qualitative investigation of innovation between third-party logistics providers and customers", *International Journal of Production Economics*, Vol. 140 No. 2, pp. 944-958.
- Wang, J. J., Li, J. J. and Chang, J. (2016), "Product co-development in an emerging market: the role of buyer-supplier compatibility and institutional environment", *Journal of Operations Management*, Vol. 46, pp. 69-83.
- Wernerfelt, B. (1984), "A resource-based view of the firm", *Strategic Management Journal*, Vol. 5 No. 2, pp. 171-180.
- Wong, C. Y. and Karia, N. (2010), "Explaining the competitive advantage of logistics service providers: A resource-based view approach", *International Journal of Production Economics*, Vol. 128 No. 1, pp. 51-67.
- Yang, C. C., Marlow, P. B. and Lu, C. S. (2009), "Assessing resources, logistics service capabilities, innovation capabilities and the performance of container shipping services in



- Taiwan”, *International Journal of Production Economics*, Vol. 122 No. 1, pp. 4-20.
- Zacharia, Z. G., Nix, N. W. and Lusch, R. F. (2011), “Capabilities that enhance outcomes of an episodic supply chain collaboration”, *Journal of Operations Management*, Vol. 29 No. 6, pp. 591-603.
- Zhao, X., Huo, B., Flynn, B. B. and Yeung, J. H. Y. (2008), “The impact of power and relationship commitment on the integration between manufacturers and customers in a supply chain”, *Journal of Operations Management*, Vol. 26 No. 3, pp. 368-388.
- Zhao, X., Huo, B., Selen, W. and Yeung, J. H. Y. (2011), “The impact of internal integration and relationship commitment on external integration”, *Journal of Operations Management*, Vol. 29 No. 1, pp. 17-32.
- Zhou, K. Z., Su, C., Yeung, A. and Viswanathan, S. (2016), “Supply chain management in emerging markets”, *Journal of Operations Management*, Vol. 46 No. 1, pp. 1-4.