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The impact of partner similarity on alliance management capability, stability and performance

Empirical evidence of horizontal logistics alliance in China

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Abstract

Purpose – The purpose of this paper is to investigate significant impact of partner similarity on the success of horizontal alliances in logistics service providers (LSPs) from China.
Design/methodology/approach – Primary data were collected via questionnaire distribution to 380 Chief Executive Officers and Managing Directors in 262 small and medium logistics enterprises in China. There are 316 valid questionnaires for further analysis with 83 percent accuracy in response rate. Structural equation modeling was used to test the impact of partner similarity on alliance management capability, stability and performance.
Findings – Partner similarity and logistics alliance management capability (LAMC) are positively correlated to alliance stability and performance in horizontal alliances among Chinese LSPs, especially competence similarity and cultural similarity. Moreover, alliance stability mediates the impact of partner similarity and LAMC on alliance performance.
Research limitations/implications – The basic limitation of this research is to collect data just from small and medium logistics enterprises that operate in China with sample size ($n = 316$). This research could further be extended to other regions in China or other countries.
Practical implications – This research verifies the positive relationship between partner fit and management capability. Besides, based on research findings, the research proposes guidelines for LSPs pursuing horizontal alliances
Originality/value – This research proposes an experimental model for Chinese LSPs to cooperate successfully and build horizontal alliances in order to increase their effective customer response capability.

Keywords Alliance management capability, Alliance performance, Alliance stability, Horizontal logistics alliance, Partner similarity

Paper type Research paper

Introduction

Alliances including upstream alliances, downstream alliances and horizontal alliances have been widespread in all sectors. All of them have been proven to improve the efficiency and competitiveness of participating partners (Gomes-Casseres, 2003; Ireland *et al.*, 2002), which is the same with horizontal alliances among logistics service providers (LSPs) (Verstrepen *et al.*, 2009). In order to achieve success in the competitive logistics market, LSPs have to cater to complex customer demand (Coltman *et al.*, 2011), such as acceptance of

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orders and their execution, the solution of problems, warehousing, transportation and value-added services (Meidutė-Kavaliauskienė *et al.*, 2014). However, these requirements are often not finished by one single LSPs. An effective way is to form an alliance with other LSPs, which is known as the horizontal alliance. Specifically, the horizontal alliance among LSPs refers to the cooperation with partners that operate at the same level of the market to engage in logistics services (European Union, 2001), which is commonly studied from the perspective of supply chains by previous scholars (Liu *et al.*, 2016). By combining core competencies with resources of competitors and non-competitors, LSPs are able to respond flexibly to demand fluctuations (Frankel *et al.*, 1996), increase the firm's productivity for core activities and reduce the cost of non-core activities, while at the same time their services are broadened, which enables individual LSP to tender with large shippers under larger contracts and help protect the firm's market share (Cruijssen *et al.*, 2007).

In line with the paramount interest in alliances, despite the growing practical relevance of horizontal cooperation, logistics service supply chain has received more and more attention, scholars follow to vertical relationships between LSPs, especially LSPs and customer, carriers and shippers (Schmoltzi and Wallenburg, 2012). Shipper and carrier firms in a supply chain tend to heavily rely on cooperation to survive in an uncertain business environment. These firms pursue growth mainly through effective cooperation and working jointly with partners in their logistics service supply chain (Yang *et al.*, 2008). Logistics service integrator (LSI) and functional logistics service provider (FLSP) as main members of logistics service supply chain coordinate and integrate service capability with each other to serve final customers timely. LSPs are said to improve performance partly because of their ability to cooperate both vertically with supply chain partners and horizontally with other LSPs (Fabbe-Costes *et al.*, 2008). However, most studies on logistics service supply chain cooperation have mainly analyzed the problem by focusing on large firms and adopting the perspective of buyer-supplier. FLSP were considered a source of competitive advantage for LSI who actually benefit from the cooperation. Less attention has been directed to the study of partner similarity in logistics service supply chain involving LSPs by adopting the perspective of horizontal alliance (Albino *et al.*, 2007) . Now, China's logistics is in a period of rapid development, the logistics and distribution speed is very fast in major cities, while it is a little slow in small cities. Due to the differences of culture and development process in China and developed countries, there are different pattern when entrepreneurs establish horizontal logistics alliances. According to China's situation, we are spurred into analyzing partner similarity and its effect on cooperation performance in horizontal logistics alliance among China's logistics enterprises.

Recently, horizontal logistics alliances researches have been gradually increased in a variety of aspects like the motives, structure and performance attributes among LSPs (Schmoltzi and Wallenburg, 2011), section of partners (Chao and Kao, 2015; Brekalo and Albers, 2016) and dynamic framework for managing horizontal cooperation in logistics (Verstrepen *et al.*, 2009) over the last decades. However, insights into how partners' characteristics that are determined at the partner selection stage affect alliance performance are still lacking. According to the explanation of partner selection from the point of view of resource-based and organizational learning, the right partners may own potential for making a real contribution, right capabilities and experience, which is not only in favor of reducing competition and opportunism, but also a critical factor for alliance success (Hitt *et al.*, 2000). The choice of an appropriate partner is crucial. According to Brouthers *et al.* (1995), the four Cs framework including complementary skills, cooperative cultures, compatible goals and commensurate risk levels was developed, which could assist firms in their efforts to avoid picking wrong alliance partners. Chung *et al.* (2000) explored the factors that drive alliance formation containing resource complementarity, status similarity, and social capital. It is found by previous studies that complementary contributions are

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positive to alliance performance. Likewise, Doz (1987) emphasized that players with similarities rather than complementary positions and skills is conducive to building a successful alliance. Kim and Parkhe (2009) revealed that cooperating similarity including societal culture, national context, corporate culture and management practice is positively related to alliance performance.

Partner characteristics for their better match have been studied extensively in the literature, such as vertical cooperation/integration between shippers and carriers/LSPs, and international business (Chung *et al.*, 2000; Holter *et al.*, 2008; Pansiri, 2008; Kim and Parkhe, 2009), however there are few studies in partner similarity for horizontal LSPs alliance to improve responsiveness. Especially, the development of the logistics industry in China is relatively backward compared with the developed countries. In recent years, China's logistics industry has got rapid increase with the development of electronic commerce, more and more weak-scattered-small functional logistics enterprises such as warehouse, transportation and distribution firms have entered the market to provide single service rapidly. They have not abilities to provide fast response, low cost, high efficiency services as integrated third-party logistics services providers before joint. So, many FLSPs begin to consider cooperating and changing the single operations model in order to improve efficiencies and form core competitiveness. The horizontal alliance among LSPs is an efficient way relatively. According to horizontal logistics alliance practice in China, partner characteristics relevant to partner similarity play a vital role in the establishment of alliance because of co-exist of competition and cooperation among LSPs. And these characteristics have a significant positive impact on the logistics alliance performance and could maintain the stability of alliance activities.

In fact, partner similarity is particularly important (Kale and Singh, 2009) considering that partner difference may lead to a lack of trust and higher transaction costs, thereby causing alliance instability. There is evidence which suggests that alliance partners are potentially vulnerable to the opportunistic behavior of their partners (Doz, 1987). The similarity between partners reduces opportunism behavior and contributes to coordination, but too much similarity may also limit alliance advantage (Saxton, 1997). According to Johnson *et al.* (2004), too many dimensions of similarity may lead to competition rather than cooperation of alliance partners. Competing similarity including geographical market coverage, product market coverage, technological expertise and overall strategic strengths is proven to be negatively related to alliance performance (Kim and Parkhe, 2009). Partner similarity has positive effects as well as negative effects on alliance success, which leads to the sharing of common needs and goals and favorable outcomes. However, how does similarity promote alliance success? How does partner similarity mitigate the impact of logistics alliance management capability (LAMC)? There is no adequate highlight in present articles, nor empirical researches are available (Kim and Parkhe, 2009).

Studies on inter-firm cooperation in different industries found positive as well as negative effects induced by the degree to which partners are similar along various dimensions. However, their studies focused on the analysis of enterprises operating in the USA and other developed countries and were not suitable for China's national conditions, which is a developing country and the logistics industry is in a situation of relative imbalance in development. Further, there are few studies focusing on the partner similarity of China's LSPs, let alone the study of the influence of partner similarity in context of China's LSPs on the stability and performance of partnerships using empirical method, especially the indirect effect of partner similarity on alliance performance through alliance stability. To close this research gap, the partner similarity of China's LSPs is proposed to be a multi-dimensional concept (competences, geographic markets and corporate culture). On the other aspect, the purpose of this study is also including to recognize relationships

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among partner similarity, alliance management capability, alliance stability and performance by empirical analysis under the horizontal logistics alliance background of China's LSPs.

In this paper, the hypothesized relationships are analyzed by using structural equation modeling with data collected from respondents via 380 survey questionnaires. The contributions of this study are threefold. First, the study proposes the framework of LSPs' similarity in horizontal logistics alliance, which provides us with a better understanding of the interactions and make a contribution to firms for selecting effective alliance partners. Second, we empirically test the framework and LAMC, and then explicitly address the role of alliance stability as a central mediating construct in a logistics horizontal alliance framework. This construct is critical in the effective formation and maintenance of strategic alliances between horizontal cooperation partners. Third, the results of the study can help managers identify factors that influence the success of horizontal logistics alliance and provide a proper direction to select partner and effective collaborative relationships between horizontal logistics alliance partners. These relationships can help reduce the failure rate of horizontal logistics alliances (Sambasivan *et al.*, 2013).

The paper is organized as follows. In second section, the concepts and theories of partner similarity, LAMC, alliance stability and performance are provided, and the hypothesized relationships are developed based on above statement, as presented below; in third section, a discussion about the methodology and the analysis of results are presented. Fourth section highlights the managerial implications and limitations, and suggests potential directions for future research in this field; in the final section, the conclusions are given.

Theory and hypotheses

Partner similarity

Partner similarity has been largely analyzed in the alliance and cooperation research (Rothaermel and Boeker, 2008; Shah and Swaminathan, 2008). In order to obtain expected synergies, the relationship among alliance partners, similarities of culture and strategic decision methods have been emphasized. From previous conceptual and empirical research, the definition of partner similarity, especially similarity dimensions are significantly relevant. The most cited definition of partner similarity is defined by Westney (1988), as the firm's capabilities and processes are similar or related to those of its alliance partner. Besides, partner similarity is critically important for the establishment and success of logistics horizontal alliances and similarity dimensions are constructed from different perspectives by previous studies which emphasized strategic similarity and organizational similarity (Saxton, 1997). These types of similarities resemble the distinction between strategic fit and organizational fit first discussed by Jemison and Sitkin (1986). Strategic similarity is defined as the degree in which the target firm augments or complements the parent's strategy and thus makes identifiable contributions to the financial and non-financial goals of the parent company (Jemison and Sitkin, 1986). Issues concerning strategic similarity focus on the strategic content of alliance organizations, such as products, technology, markets and customers (Zeng and Schoenecker, 2015). In contrast to strategic similarity, organizational similarity is defined as the match among administrative practices, cultural practices and personnel characteristics of the target and parent companies, which may directly affect how the firms can be integrated with respect to day-to-day operations, once an acquisition has been made (Jemison and Sitkin, 1986). Research on organizational similarity emphasizes the analysis of organizational processes which involves accounting and information systems, structure, human relations and relevant culture (Saxton, 1997).

Previous researches have proposed partner similarity from different dimensions and confirmed the effect of partner similarity on alliance stability and performance by adopting empirical research methods. According to Klint and Sjöberg (2003), the comprehensive

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design of inter-firm alliances is described as the number of companies, company size, cooperation area, formalities, product complexity, complementarity as well as social structure and the importance of the region/district. When it comes to the last three factors, the similarity of alliance partners is emphasized. Consequently, based on this alliance framework, Raue and Wallenburg (2013) made a conclusion that similarity dimensions of horizontal alliances among LSPs include competence similarity, geographic similarity and cultural similarity, which reveals that similarity dimensions show different effect concerning their influence on intermediate outcomes and cooperation performance. The alliance may have high likelihood of instability and failure because of various reasons. Both partners' similarities and differences are paramount to ensure the success of alliance, and one of the most often cited reasons is the incompatibility of partners (Brekalo and Albers, 2016). Scholars also found that the similarities between the partners such as cultural similarity are the significance factor of alliance success. Lin and Germain (1998) pointed out that the effect of culture similarity on alliance performance is positive, which is assessed empirically by using a sample of US and Chinese joint venture managers in China. Alliance partnerships are more likely to succeed, when partners possess similarity in culture, structure and the business process. Cobianchi (1994) demonstrated how partner similarity of geography, culture and environment correlates with alliance stability and performance. By comparison, it is more difficult for partners who compete in other different industries to garner the similar logistics service ability. Although colluding with competitors is a dead end, horizontal alliances such as the alliance between Fedex and Fritiz essentially represented cooperation among direct competitors (Verstrepen *et al.*, 2009). Besides, they clearly enhance the competitiveness and geographic coverage. Obviously, since partners with high similarity enjoy greater overlaps in their business, this enables the partners to take advantage of economies of scale more easily (Das and Teng, 2003). In addition, alliances of direct competitors serve de-escalating competition among them (Child *et al.*, 2005). The firms that have similar organization climate is more likely to have less conflict than more dissimilar firms (Raue and Wallenburg, 2013), and all of these are conducive to the stability of the horizontal alliance, which could improve alliance performance in the end.

Furthermore, there were also some scholars who have proved that partner similarity may have fostered common understanding and compatibility and culture fitness (Raue and Wallenburg, 2013), which has the potential to be beneficial for a horizontal LSP cooperation and helps overcome the challenges posed by their different corporate regions and cultures (Sarkar *et al.*, 2001). Compatibility covers an array of issues including broad historical, philosophical, strategic grounds, values and principles, and hopes for the future, cultural and organizational issues, and "the extent to which an alliance partner has complementary goals and shares similar orientations that facilitate coordination of alliance activities and execution of alliance strategies" (Pansiri, 2008). Following Elvi (2014), partner compatibility enables firms to adapt critical know-how from their partners more easily to improve own processes and services. Consequently, cultural fitness enhances partner compatibility and reduces conflicts between the LSPs. Compatible corporate cultures also provide the basis for shared norms and values and foster trust within the cooperation (Schreiner *et al.*, 2009), which reduces the tendency of opportunistic behavior and facilitates improved collaboration (Tubin and Rozalis, 2008). All of these are highly beneficial to the jointly performed operations, as delivering alliance logistics service is a rather complex task (Sarkar *et al.*, 2001).

Based on the discussions above, it is hypothesized that:

H1. Partner similarity will be positively related to alliance performance in horizontal logistics alliances.

H2. Partner similarity will be positively related to alliance stability in horizontal logistics alliances.

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LAMC

In the general strategic alliance field, alliance management capability has been broadly researched. While different industries have different features, including different alliance management capability. Previous alliance researches have underlined the importance of dimensions of alliance capability and the construct is specific to functional domains. For example, alliance management in high-technology ventures (Rothaermel and Deeds, 2006) and the R&D project (Hoang and Rothaermel, 2005) are identified and meanwhile, specific dimensions are constructed. Horizontal alliances among LSPs that operate at the parallel position of the market have proven to amend the competitiveness and performance of operational logistics processes, which encompass order processes, inventory management, transportation, warehousing and handling, facility network management and value-added services (Verstrepen *et al.*, 2009; Brekalo *et al.*, 2013). In order to yield more meaningful results for operational logistics alliance processes, there is a need for specific alliance management capability in the context of the logistics alliance. To focus on LAMC, which is most important for the success of logistics alliances, the research is based on the model of Brekalo *et al.* (2013), who developed a framework of logistics alliance management capabilities based on the general framework of Zollo and Winter (2002). The model comprises three layers, namely, operational logistics activities (micro-level), logistics alliance management routines (macro-level) and learning mechanisms (metal-level).

According to the literature concerning the dynamic capabilities and alliance management capability, various studies have suggested that organizations with a strong alliance management capability enable the alliance performance to be improved continuously. According to Schilke and Goerzen (2010), alliance management capability was developed by five underlying routines, including inter-organizational coordination, alliance portfolio coordination, inter-organization learning, alliance proactiveness and transformation, and then identified that alliance management capability had a positive impact on alliance portfolio performance. According to Kale *et al.* (2002), firms with superior alliance capability enjoyed significant alliance success, specifically, with a dedicated alliance function to realize greater abnormal stock market gains. Moreover, Schmoltzi and Wallenburg (2012) focused on the post-formation cooperation management phase and held that cooperation governance mechanisms had a substantial performance effect based on the cooperation of 226 LSPs. Zhao *et al.* (2001) tested the positive relationship of logistics management capabilities including customer-focused management capabilities, information-focused management capabilities and firm performance. The logistics alliance allows organizations to achieve customer satisfaction by evaluating operational logistics activities, such as inventory availability, timely delivery, value-added services and so on. At the same time, learning is a means of creating and sustaining competitive advantage via learning mechanisms, and organizations can absorb and internalize other firms' logistics leverage to maintain the competitive advantage of logistics (Esper *et al.*, 2007). All of these make contributions to the logistics alliance performance. Therefore, it is suggested that there is a direct positive relationship between LAMC and the logistics alliance performance. Besides, the following hypotheses are proposed:

H3. LAMC will be positively related to alliance performance in horizontal logistics alliances.

LAMC exerts influence not only on overall alliance performance, but also on the stability of alliance organizations. In this research, logistics alliance management as a process that is directed to help organizations learn, alliance design, coordination, relational governance, monitoring and logistics practices. Partners can exploit the resources from others through maintaining cooperation relationship. However, some key factors that are relevant in each process of alliance evolution determine the alliance success, especially the long-term alliance

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success (Kale *et al.*, 2002). For example, intangible assets such as marketing, technology (Nakamura, 2005), governance mechanisms and other management capabilities and skills are effective ways to avoid failure and enjoy huge and repeatable success in terms of long-term stability and goal achievement (Kale and Singh, 2009). Relational governance and coordination mechanisms across activities could reduce the extent of conflict and lead to the relatively stable relationship (Wallenburg and Raue, 2011). Cruijssen *et al.* (2007) argued that due to the existence of the partners' opportunism behavior, partner selection and finding a reliable party or dedicated function to lead the cooperation are the impediments that influence the success of horizontal cooperation of LSPs, especially the long-term stability. By investigating the impact of managerial and culture-related factors on the stability of joint ventures, Sim and Ali (2000) revealed that cooperation and physic distance between partners had significant impact on the cooperation stability. In addition, scholars have also found that effective management skills are conducive to relational stability and relationship longevity (Brekalo and Albers, 2016). In this case, based on the analysis above, it is hypothesized that:

H4. LAMC will be positively related to alliance stability in horizontal logistics alliances.

Alliance stability

Alliance stability refers to the degree in which an alliance can run and develop successfully based on an effectively collaborative relationship shared by all partners. This conceptualization indicates that stability is a dynamic, process-based and multi-dimensional construct (Jiang *et al.*, 2008). Alliance stages such as partner selection, alliance control and the evaluation of alliance performance are strongly related to alliance stability (Jiang *et al.*, 2008). Studies about logistics alliance stability focus on the basic viewpoint of alliance cooperation. Midoro and Pitto (2000) suggested that alliance stability may be achieved by reduction in the number of partners, differentiation in their roles and coordination of their activities. According to Das and Teng (2000), alliance partners would not share all of their own resources in order to avoid the resource predicament which is likely to cause alliance instability. Besides, changes in the environment may be passive or positive to partner cooperation, and therefore, stable alliances are not only featured with structural rigidity to evade unexpected risks, but also own strategic flexibility to adapt to environmental changes, which means that the alliance stability possesses the characteristics of external adaptability and internal control.

The relationship among enterprises is known as competition and cooperation. Specifically, a stable relationship between cooperation partners is featured with a better ability to outperform their competitors. However, alliance stability is only a transitional form and will not be a sustainable method to create competitive advantage. Although it makes major contributions to short-term as well as long-term corporate success, stability is not an ultimate outcome, but a determinant of alliance performance (Jiang *et al.*, 2008). According to Yang *et al.* (2008), relational stability in the supply chain positively affected the alliance performance based on the theories of social exchange and goal inter-dependence. While Von Krogh *et al.* (2001) held that relational stability provided the opportunity of learning, acquiring knowledge, sharing and innovation, which is beneficial to improving alliance performance. Stability is a condition to reap their cooperation arrangement such as the share of market, cooperation and R&D, the share of resources, competence enhancement, making quick response to customer needs and so on. The realization degree or the effect of these goals is the alliance performance. What's more, instability may be a sign of the partners' abilities to undertake necessary adaptations rather than an indication of poor performance (Yan and Zeng, 1999). Hence, a positive relationship between alliance stability and alliance performance can be proposed:

H5. Alliance stability will be positively related to alliance performance in horizontal logistics alliances.

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Interaction between partner similarity and LAMC

Managing various types of partners makes differential demands on alliance management capability. According to Rothaermel and Deeds (2006), different alliance types need different levels of the high-technology venture's alliance management capability with upstream alliances demanding the largest amount, downstream alliances demanding the least amount, and horizontal alliances demanding the moderate amount. Lane and Lubatkin (1998) took pharmaceutical-biotechnology R&D alliances as an example. And they found that the ability to learn from another firms was determined by the similarity of two partners' knowledge bases, dominant logics, organizational structures and compensation policies. The similarities of partners in these areas are positively related to inter-organizational learning ability. At the same time, cultural heritage also has a strong effect on alliance management capability. If the similarity of partners is high, which leads to fewer impediments and insurmountable problems, effective communication and the easier management of alliances, the alliance partners will devote less management capability. However, differences between partners in terms of culture, infrastructure, government policies and economic development increase the complexity of the alliance (Yan and Zeng, 1999). The greater the complexity of alliance is, the more difficult of the management is. In this case, firms need more effort and specific skills to enhance and redesign their learning ability and information-processing capability. Furthermore, the need of partners' similarities is paramount in ensuring the effectiveness of alliance management. For example, if partners have similarity in business, they can easily put more effort into business operations and it is unnecessary to use dedicate alliance function to guide business learning, correspondingly requiring the weaker alliance management capability. According to above arguments, it can be suggested that a horizontal alliance among LSPs may actually require less LAMC, since many LSPs have similarity in processes and devote considerable resources to facilitating alliances with other LSP partners:

H6. The similarity of partners who participate in horizontal logistics alliances leads to the low level of alliance management capability.

From the above analysis, an overview of the proposed hypotheses and their inter-relationship are shown in Figure 1.

Alliance performance

Alliance performance has been studied extensively in various domains such as supply chains and strategic alliance management (Li *et al.*, 2006; Pansiri, 2008). A number of prior studies define alliance performance as fulfillment of goals including initial and emergent

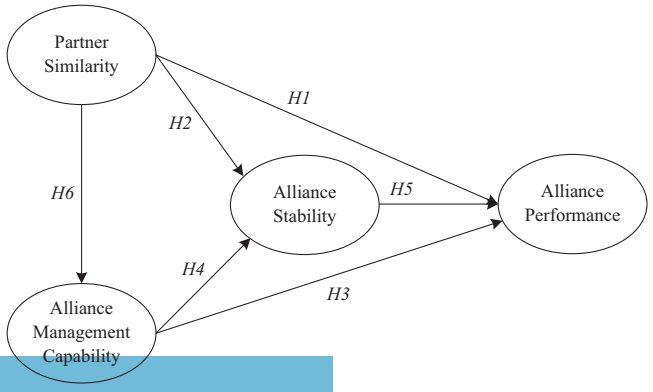

Figure 1.
Hypothesized model

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goals as well as common and private goals (Ariño, 2003). However, alliance performance is difficult to measure because of research barriers such as differences of the industry background, complexity of alliance partners and so on. Earlier studies measure alliance performance by partners' satisfaction with its goal accomplishment (Parkhe, 1993). Recently, a number of studies measure it by using market-oriented and financial-oriented goals. According to Jennings *et al.* (2000), alliance performance was measured by revenue growth, governance costs, profitability and market value. Sales level and return on investment were adopted to measure alliance performance by Luo (2002). There are other indexes such as the competitive position, the growth of market share and so on. Alliance performance measurement is of great important, especially to third party logistics alliances. Besides, alliance performance cannot be entirely measured by the traditional financial/market index. According to Van Hoek (2001), logistics performance indicators were categorized within the four hierarchical levels. To be specific, the first level is external performance indicators for customer service including product availability and reliability, order throughput time and lead time, flexibility of the distribution system, information, the quality of distribution and post-transaction support; the second level is internal performance of the distribution function including distribution costs, value density and country specificity; the third level comes to tactical performance and the fourth level is operational performance. In addition, it was found by Van Hoek (2001) that the measurement of performance made a significant contribution to the expansion of third party logistics alliances and described three kinds of performance measures, namely, integrated logistics measures, transportation measures and production and customization measures. Yet, some studies are inclined to adopt the objective and subjective method to measure alliance performance, such as profitability, sales growth (Mohr and Spekman, 1994), revenue, costs and perceived satisfaction (Luo, 2002). Pansiri (2008) viewed alliance performance from multiple perspectives and subdivided it into three categories including overall alliance performance, operational performance and market share profitability. According to Saxton (1997), three items were adopted to measure alliance performance, which reflects overall satisfaction with the alliance, the degree in which it has met the goals of the partner and alliance contributions to the partner's core competencies. Actually, there is no perfect item to measure alliance performance. Through the discussion above, the dimensions of logistics alliance performance used in this study are based on the established performance framework of Raue *et al.* and Pansiri (2008), as given in Table AI.

Methodologies

Data and sample

First, since the establishment of Low-Carbon Operation Base of Beijing by USTB (University of Science and Technology Beijing) in 2013, many related logistics enterprises have established a good cooperation relationship with our research group, which provided resources and survey for the interview. Second, the development modes of typical successful logistics alliance enterprises from domestic provided the reference for our study, such as HaiYuan logistics in Guangzhou and ZhongZhong logistics alliance in Zhengzhou. Finally, with the electronic commerce rapidly developing in recent years, the development of domestic logistics industry has ushered in the good time.

So our survey research focused on logistics firms about freight transportation by road, railway, aviation, water transportation and other logistics service in China. These enterprises were chosen from a database supported by China Federation of Logistics and Purchasing (www.chinawuliu.com.cn/). This database includes information of over 5,000 China logistics companies containing logistics service and equipment, packaging, transportation, warehousing/handling and so on. By using this database, the relevant information is sent to potential companies (300 enterprises). As a result, there are

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262 enterprises responding to our investigation. Then, these companies are engaged in at least one horizontal alliance with other LSPs and are willing to accept our interview. To be specific, these enterprises are classified into five categories, namely, state-operated enterprises, private enterprises, joint ventures, exclusively foreign-owned enterprises and others, as mentioned in Table I.

The investigation was carried on over six months from October 2015 to March 2016. Initially, respondents were interviewed to ensure that these companies really had horizontal alliance partners. Subsequently, data were collected through sending questionnaires to Chief Executive Officer and Managing Director by e-mail. Those people are familiar with the environment of firms, have access to strategic information and know about the key information of firms. This survey was conducted among 262 logistics enterprises. Because some companies may accept multiple questionnaires according to the number of partners, finally, 380 questionnaires were distributed in total, 316 valid pieces were found for further analysis, with 83 percent accuracy in response rate.

Measures

According to relevant studies, seven-point Likert scale was adopted to measure variables (e.g. 1 = strongly disagree, 7 = strongly agree) which were adopted from previous studies (Raue and Wallenburg, 2013). Partner similarity was drawn by Raue and Wallenburg (2013). It captures the degree of overlapping competence and business, geographic coverage, and cultural and operational management styles. The construct of LAMC was proposed by Brekalo *et al.* (2013). The scale identifies the learning mechanism, manages alliance organizations and operational logistics activities based on logistics context (Brekalo *et al.*, 2013). Alliance stability was captured by three items were given by Johnson *et al.* (2004). The attitude toward alliance stability, duration and security was identified. Alliance performance in logistics alliances relied on the established performance framework of Raue and Wallenburg (2013) and Pansiri (2008), which reflects the overall performance and satisfaction with alliances. They were showed in Table AI and were pretested by several logistics scholars to ensure content validity.

Results of the measurement model

In terms of data analysis, SPSS 21.0 and Amos 24.0 were used. Besides, the means and standard deviations of all variables were presented in Table AI. All Cronbach's α were above 0.70, which suggested the good evaluation for reliability and validity of these variables. It was found that most firms tended to select alliance partners who had a certain degree of competence similarity (mean = 4.67) and culture similarity (mean = 4.72), while their geographical regions were discrepant (mean = 3.99). Firms who participated in the survey were satisfied with the alliance performance, because it had improved the firms' market share and profitability (mean = 5.12). Moreover, logistics alliances also contributed much to overall performance of alliance partners, such as core competencies and competitive advantage (mean = 5.10).

Types	Sample size	Percentage
State-operated enterprises	63	19.93
Private enterprises	158	50.00
Joint ventures	43	13.61
Exclusively foreign-owned enterprises	29	9.18
Others	23	7.28

Table I. Type of surveyed companies in our research

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Initially, the analysis on all exogenous variables and endogenous variables was conducted. The confirmatory factor analysis was adopted to show model fit. Partner similarity was conducted by employing the five items that are used to measure the three dimensions. The fit criteria suggest a good model fit: $\chi^2/df = 1.042$, CFI = 0.963, GFI = 0.934, TLI = 0.982 and RMSEA = 0.035. All factor loadings are significant at $p < 0.01$. The proportion of variance extracted index for each construct in the measurement model is also calculated. The index is 89 percent which indicates that the large percentage of variation in the first-order factors can be explained by the second-order construct.

For LAMC, it was conceptualized as a second-order model composed of three dimensions. The fit indexes for the second-order model indicate the moderate model-data fit: $\chi^2/df = 1.010$, CFI = 0.912, GFI = 0.921, TLI = 0.910 and RMSEA = 0.044. The proportion-of-variance-extracted index is 87 percent. The loadings of the second-order construct on three respective dimensions are all significant at $p < 0.01$ (learning mechanisms with 0.83, logistics alliance management capabilities with 0.93, evolution of operational logistics activities with 0.80).

Mediating effect analysis

As we explained earlier, partner similarity, management capability and alliance stability are somewhat distinct in terms of how them impact alliance performance. At same time, partner similarity and management capability are commonly direct or indirect toward alliance performance. Hence according to the method of testing the mediation effect proposed by MacKinnon *et al.* (2002), the mediating effect of alliance stability in this paper is tested by SPSS21.0. Steps of the test as follows: First, centralize the data. Second, test the significant of coefficient C of $y = Cx + e^1$, if C is significance, carry out the next test. Third, test the significant of the coefficients A and B of $m = Ax + e^2$ and $y = C'x + Bm + e^3$. If A and B are significant, the significant test of C' is required, if C' is significant, which indicates m has the partial mediating effect between x and y; and if C' is not significant, there is complete mediating effect between x and y; if at least one of A and B is not significant, the Sobel test is required. If the result of the Sobel test is significant, which indicates m has partial mediating effect between x and y. If the result of Sobel test is not significant, the mediating effect of m between x and y is not significant. Table II shows the inspection process.

The mediating effect of alliance stability between partner similarity and alliance performance is found to be significant, and the same between LAMC and alliance performance.

Variable 1	Variable 2	Variable 3	Significant of C	Significant of A	Significant of B	Significant of C'
Partner similarity		Alliance performance	**			
Partner similarity		Alliance stability		***		
Partner similarity	Alliance stability	Alliance performance			***	***
Logistics alliance management capability		Alliance performance	***			
Logistics alliance management capability		Alliance stability		***		
Logistics alliance management capability	Alliance stability	Alliance performance			***	***

Notes: **,***Significant at $p < 0.05$; $p < 0.1$, respectively

Table II.
The mediating effect test of alliance stability

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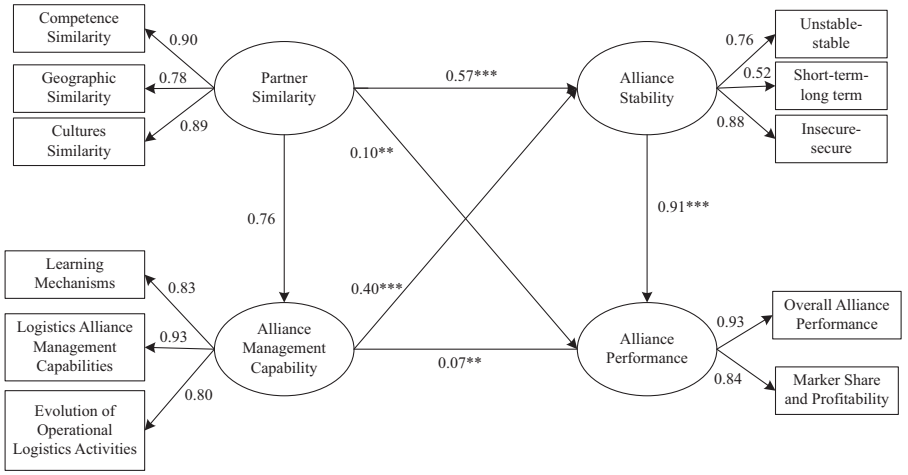
Results of hypotheses test

The structural model has six hypothesized relationships among partner similarity, LAMC, alliance stability and alliance performance. Figure 2 and Table III shows the results of the hypothesized relationships and the fit indices for the structural model. The fit measures indicate a satisfactory value with $\chi^2/df = 2.090$, GFI = 0.921, NFI = 0.929, CFI = 0.961 and RMSEA = 0.079.

As shown in Table III, all the hypotheses were supported. For *H1*, the results of the empirical model indicate that the coefficient of the path from partner similarity to alliance performance shows that the direct effect of partner similarity on alliance performance is positive and significant (0.10, $p < 0.05$). However, partner similarity may have a greater indirect impact (0.52, $p < 0.01$) on alliance performance than direct effects when alliance



Notes: **,***Significant at $p<0.05$; $p<0.1$, respectively

Figure 2.
Standardized solutions of the structural model

Proposed path	Expected sign	Total effects	Direct effects	Indirect effects	Hypothesis
H1: Partner similarity – Alliance performance	+	0.66***	0.10**	0.52***	Supported
H2: Partner similarity – Alliance stability	+	0.57***	0.57***		Supported
H3: Logistics alliance management capability – Alliance performance	+	0.47***	0.07**	0.36***	Supported
H4: Logistics alliance management capability – Alliance stability	+	0.40***	0.40***		Supported
H5: Alliance stability – Alliance performance	+	0.91***	0.91***		Supported
H6: Partner similarity – Logistics alliance management capability	–	0.76	0.76		Unsupported
Overall fit indices					
χ^2/df 2.090					
Goodness of fit index (GFI) 0.921					
Normed fit index (NFI) 0.929					
Comparative fit index (CFI) 0.961					
Root mean square error of approximation (RMSEA) 0.079					

Note: **,***Significant at $p < 0.05$; $p < 0.1$, respectively

Table III.
Results of model estimation

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stability is introduced. Besides, the total effect is 0.62 ($p < 0.01$) that confirms partner similarity has a positive relationship with alliance performance in horizontal alliances among LSPs. Thus, *H1* is fully supported.

H2 also being supported indicates that partner similarity has an impact on alliance stability. The standardized coefficient is 0.57, which is statistically significant at $p < 0.01$. Partner similarity, such as competence similarity, geographic similarity and cultural similarity may provide the alliance stability of LSPs featured with stability, long term and security.

The results also indicate that high-level LAMC may lead to the improvement of alliance performance, with total effects of 0.43, which is significant at 0.01 level, which provides support for *H3*. The implementation of various logistics alliance management capabilities, such as alliance knowledge management, dedicated alliance function, alliance design, coordination, relational governance, monitoring & adaptation and the evolution of operational logistics activities may have improved overall alliance performance, market share, sales level and profitability. Equally, the indirect impact (0.36, $p < 0.01$) of LAMC on alliance performance is also larger than the direct impact (0.07, $p < 0.05$) when alliance stability is included. The reason may be that alliance performance is usually influenced by many other factors, such as alliance stability.

As being hypothesized, LAMC has a positive effect on alliance stability. The standardized coefficient of the effect of LAMC on alliance performance is 0.40, which is significant at 0.01 level. What's more, LAMC, such as learning mechanisms, coordination, relational governance and evolution of logistics activities, will contribute to alliance stability. Thus, *H4* is supported.

H5 predicts a positive effect of alliance stability on alliance performance between LSPs, and the results support this hypothesis at significance level $p < 0.01$. The standardized coefficient is 0.91, which shows that alliance stability will dominantly determine the logistics alliance performance.

H6 shows that the similarity of partners who participate in the horizontal alliances among LSPs leads to the low level of alliance management capability. Unexpectedly, results suggest an insignificant relationship between these two measures (0.76, $p > 0.05$). This could be true, since due to opportunism behavior between similar partners, the risks will increase distrust and the difficulty of coordination and relational governance, which might provide greater management capability.

Discussion

The interpretation of results

Our study empirically tested six hypotheses concerning partner similarity, LAMC, and alliance stability and alliance performance. Although many enterprises have realized the importance of partner fit in the inter-firm alliance, they often fail to know exactly which partners of certain similar characteristics should be selected. Our research identifies the performance effect of partner similarity in the logistics industry based on the framework proposed by Raue and Wallenburg (2013). The multi-dimensional and operational measure of the construct of LAMC were also developed and validated based on the framework of Brekalo *et al.* (2013) by adopting 262 logistics enterprises. Recently, many alliances have faced failure, due to a lack of understanding of partner characteristics and even alliance management capability. The empirical results show that enterprises tend to select partners with competence similarity (0.61), cultural similarity (0.84), and difference in geographic coverage (0.003). Here, competence similarity and cultural similarity have strong positive impacts on alliance stability and alliance performance, which is consistent with Steinicke *et al.* (2012). However, geographic similarity has weakly positive effect on alliance performance, which is inconsistent with Raue and Wallenburg (2013).

The present study also provides logistics managers with a useful management tool for their logistics alliance practices. It has been tested that LAMC forms a second-order construct

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composed of learning mechanisms (0.77), logistics alliance management capabilities (0.91) and the evolution of operational logistics activities (0.83). Through the analysis of the relationship of LAMC with partner similarity (*H6*), alliance stability (*H4*) and alliance performance (*H3*), it is shown that LAMC may directly influence alliance stability and indirectly affect alliance performance. At the same time, partner similarity between horizontal alliances partners among LSPs may make them to enhance LAMC to avoid the friction and opportunistic behaviors between the partners. The findings of this study reveal the significance of LAMC to alliance organizations.

Managerial implications

In this study, certain managerial implications were proposed in order to understand the important issues and problems in logistics alliances. This research emphasizes on the characteristics of alliance partners from the similarity of competences, geographic markets and corporate culture, which can be used for enterprises in selecting alliance partners. The findings of current research are of great significant for managers of horizontal alliances and LSPs. Partner fit and LAMC are crucial to alliance success for logistics alliance participants. An interesting result is that similarities between partners including competence and culture are positively related to alliance stability and performance, and that geographic similarity has weaker effects. The findings would indicate that too much similarity could limit the development of the alliance such as the geographic coverage that is within a restricted scope. Here, different geographic coverage, similar competence and culture have a positive effect on the alliance, because they help reduce opportunistic behavior and competition, which is conducive to improving alliance success. It is possible that LSPs should identify potential partners who own similar competence and culture, when select alliance partners. However, in order to expend market share and geographic coverage, they may tend to choose partners in different geographical regions.

Likewise, the implications of this study reveal the fact that it is necessary for logistics alliances not only to select similarity partners, but also to raise the management level in all aspects of the alliance process, especially the process of logistics. Our empirical findings support the framework of LAMC conceptualized as a second-order, multi-dimensional construct proposed by Brekalo *et al.* (2013). These dimensions that represent different aspects are also highly interrelated. Three dimensions, learning mechanisms, logistics alliance management capabilities and evolution of operational activities, play a significant role in alliance success. Specifically, LAMC managing joint activities between alliance partners by learning mechanisms to improve the execution of logistics activities and adequate adaptation relative to the context of the logistics alliance, by coordination and relational governance routines to meet the logistics market peculiarities, by controlling and monitoring mechanisms to steer the effective execution of the operational processes (Brekalo *et al.*, 2013). As it is previously proposed by previous researchers that a dedicated alliance function/manager is able to govern overall alliance activities, the alliance knowledge management process could exploit and explore best practices in different phases of an alliance (Kale and Singh, 2007). In our research, it is suggested that firms not only build up the learning process, but also develop management skills such as alliance design, coordination, relational governance & monitoring and behaviors to effectively operate logistics activities after the alliance is set up and runs. Besides, it is necessary for firms to have knowledge and skills to help partners create a good environment for alliance cooperation, which is in favor of reducing uncertainty and opportunistic behaviors to help partners cooperate openly and directly and create stable and durable partnerships (Yang *et al.*, 2008).

Furthermore, the results show that alliance stability is a mediating variable in explaining alliance performance, and besides, alliance stability has a positively effect on alliance

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performance as it is hypothesized before. This reaffirmed the idea that alliance stability is an implicit form among alliance processes from the perspective of social exchange. From the point of view of the research, managers are advised to foster alliance stability in cooperation relationship to improve alliance performance. In addition, managers should be aware that LAMC makes the great contribution to alliance stability in horizontal alliances between LSPs. The findings also show that managers who aim to enhance alliance stability should not only focus on selecting competence partners who possess similar cultural, but also foster significant managerial skills, such as coordination and relational governance routines.

Regarding the value of this study to managers, they also can use our research framework to evaluate the extent to which they have developed adequate LAMC and alliance stability, which are essential for achieving better performance in horizontal logistics alliances. It may make sense for firms in their horizontal logistics alliances to reinforce these elements. In particular, managers are advised to foster stability in the partner relationship to improve alliance performance. In addition, managers should be aware that partner similarity provides limited value in maintaining a stable relationship in horizontal logistics alliances. The findings of this study also suggest that managers, who aim to enhance their relational stability with their horizontal logistics alliances, should focus on developing LAMC to make the alliance relationship stable and sustainable in performance improvement.

The other key premise of our study is specific sample in terms of providing sources of experience and reference of logistics alliance. A commercial company database which contains most Chinese logistics firms, China Federation of Logistics and Purchasing, was used for sampling. There is the latest information on the development of China's logistics industry, and include many cases of logistics alliance, such as Zhongzhong logistics alliance, Lingdan logistics alliance and Sumeng logistics alliance, which provide the reference for hypotheses and indicated how alliance managers can benefit from the practical insights based on alliance modes of cases. The Chinese database of logistics firms provides a useful starting point for a more comprehensive treatment of alliance analysis.

Limitations and future research

From a managerial perspective, the analysis provides insights into which kinds of partners should be selected and how firms should manage alliances to improve their alliance performance. However, the basic limitation of this research is that empirical data were just collected from small and medium logistics enterprises in China. Whether such kind of behavior is only peculiar to the logistics service industry could be further extended to research covering different industries or countries. Second, partner similarity or diversity can be "managed" during the partner selection process, but once an alliance is formed, it becomes a given part (Kim and Parkhe, 2009). Moreover, this analysis was limited to alliances that have been already found. Previous studies show that some firms tend to select partners with complementary resources (Pansiri, 2008).

Furthermore, to investigate the partner selection process, having a better understanding of alliance success could be a part of future research. In particular, it might be worthwhile to find other dimensional constructs of partner similarity which have significant effect on alliance success. In addition, the investigation questionnaires in this research were only filled by respondents from the leading enterprises of alliances, and it failed to take participants into consideration to finish survey, which may be a cause of possible response bias. In this case, it would be appropriate to seek multiple pairs of participants from alliance partners to increase accuracy of the research findings, which will be of interest for alliance partners to assess these variables together.

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Conclusion

This paper makes certain contributions to horizontal logistics alliance research and provides a reference for the development of the large enterprises in China. First, it identifies that alliances among LSPs will achieve better performance if alliance partners have similar characteristics on certain dimensions and different characteristics on other dimensions. This conclusion for Chinese logistics is similar with Raue and Wallenburg (2013). This paper further makes a contribution to logistics alliances by showing which similarity of partners leads to significant and overall logistics alliance success, such as similarities of competence and culture or the difference in geographic coverage. These could help us to better understand the antecedent factors affecting alliance stability and the consequent outcome in the performance of horizontal logistics alliance. Cultural and competences similarity could facilitate the coordination of cooperation activities and, at the same time, reduce the risk of opportunistic behavior. Differing geographic coverage has a positive effect as it helps to reduce competition, and thus improve cooperation outcome. Therefore, knowledge about how similar cooperation partners should be of substantial value for managers, as partner similarity is a major aspect of match between partners. Our research shows that LSPs should consider three main similarity dimensions if they would like to establish and maintain horizontal cooperation. Cooperation managers need to be aware of the aspect of similarity before defining partner similarity preferences. The results of this study reveal how it is important to manage relationships in horizontal logistics alliance to ensure alliance stability and performance.

Moreover, it shows that LAMC may play a vital role, since it helps firms manage different alliance cooperation. Besides, this paper explores how firms design and manage their relationship in horizontal logistics alliances (Kale and Singh, 2009), and it also suggests that in fact, alliance stability may mediate the impact of partner similarity and LAMC on alliance performance, or in other words, partner similarity, as one of the partner selection criteria and logistics alliance management capabilities, acts as one of the main mechanisms, through which the alliance stability leads to alliance success. By empirically validating and testing, the evidence is given in this study to support prescriptive statements regarding the importance of partner similarity and management for alliance success.

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Appendix

Measurement scales		Mean	SD	Cronbach's α
Partner similarity (Raue *et al.*)				
Competence similarity				0.80
X1	We offer the same services with our alliance partner(s)	4.75	1.19	
X2	We have the same core competencies (the main processing business is same or similar) with our alliance partner(s)	4.58	1.11	
Geographic similarity				
X3	We operate in the same geographical regions with our alliance partner(s)	3.99	1.75	
Cultural similarity				0.85
X4	We have the same organizational culture with our alliance partner(s)	4.70	0.96	
X5	We have the same management and operating style with our alliance partner(s)	4.74	0.99	
Logistics alliance management capability (Brekalo *et al.*)				
Learning mechanisms				0.94
X6	We have the processes to manage alliance knowledge from prior alliance experience	4.65	0.85	
X7	We have dedicated alliance function/manager to systematically guidance alliance organizations across partners	4.78	0.88	
Logistics alliance management capabilities				0.92
In relation to our alliance partner(s) […]				
X8	We have the adequate adaption and implementation of alliance designs to different alliance situations	4.80	0.83	
X9	We systematically well coordinate our activities across different alliances	4.89	0.78	
X10	We have established relationship governance routines that are individually adjusted the comprehensive operational process and behavior adaptation of firms and alliances partners to broad range of logistics activities and maintain an effective working atmosphere	4.89	0.84	
X11	We have the monitoring and adaptation routines which are needed to incorporate the high reliance on quality and the degree of data and information exchange to steer the effective execution of the operational processes	4.61	0.92	
Evolution of operational logistics activities				0.93
We realize ongoing improvements of operational logistics activities including […] […]				
X12	Order processes	4.95	0.82	
X13	Warehousing/handling	4.72	0.89	
X14	Inventory management	4.73	0.83	
X15	Facility network management	4.83	0.86	
X16	Transportation	4.90	0.79	
X17	Value-added services	4.47	0.81	

(*continued*)

Table AI. Measurement scales

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Measurement scales		Mean	SD	Cronbach's α
Alliance stability (Yang *et al.*)				
The relationship between our firm and alliance partners is				
X18	Unstable-stable	4.85	0.79	
X19	Short-term – long-term	4.90	0.89	
X20	Insecure-secure	4.83	0.85	
Alliance performance (Raue *et al.* and Pansiri)				
Overall alliance performance				0.84
X21	Overall, we are very satisfied with the performance of this alliance	5.08	0.70	
X22	The alliance has realized the goals we set out to achieve	5.19	0.74	
X23	The alliance has contributed to our core competencies and competitive advantage	5.10	0.67	
Market share and profitability				
During the period of alliance, the current performance vs its performance before joining the horizontal logistics alliance, which is ranging from (1)"worse" to (7) "better", how well did our company perform in terms of […]				
X24	The market share of current company achieves increasing vs its market share before joining the horizontal logistics alliance?	5.03	0.68	
X25	The sales level of current company achieves increasing vs its sales level before joining the horizontal logistics alliance?	5.02	0.72	
X26	The profitability of current company achieves increasing vs its profitability before joining the horizontal logistics alliance?	5.32	0.69	

Table AI.

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