

IJPDLM
41,6

552

Received 9 March 2010
Reviewed 2 July 2010
Revised 13 September 2010
Accepted 23 September 2010

Horizontal cooperations between logistics service providers: motives, structure, performance

Christina Schmoltzi

*WHU – Otto Beisheim School of Management,
Kuehne-Center for Logistics Management, Vallendar, Germany, and**Carl Marcus Wallenburg
Technische Universität Berlin, Berlin, Germany*

Abstract

Purpose – This paper aims to provide a comprehensive overview of the motives, structure and performance attributes of horizontal cooperations between logistics service providers (LSPs). Based on an analytical classification model, distinctive types of logistics cooperation that characterize the logistics landscape are identified.

Design/methodology/approach – Empirical data were collected on horizontal LSP cooperations from managers of German LSPs. Different uni- and multi-variate statistical methods including ANOVA and cluster analysis were applied to the dataset of 226 cooperations for a total of 6,081 involved parties.

Findings – Horizontal cooperations with other LSPs are an organizational form used by 57 percent of LSPs. Cooperation decisions are substantially driven by external market objectives. Six distinctive types of cooperation are identified. They reveal the dominance of multi-lateral and international networks that are mainly based on contractual agreements. There is a clear preference for partners with similar market competencies and for strong functional integration. Despite its inherent complexity, performance of these cooperations is high – its less than 19 percent failure rate makes these cooperations substantially more stable than cooperations within manufacturing industries.

Research limitations/implications – This study is limited to an exploratory, descriptive approach in providing a sound understanding of the cooperation landscape.

Practical implications – The findings contribute transparency to horizontal LSP cooperations and a common understanding of their idiosyncrasies. The conclusions help logistics managers to position themselves better within the cooperation landscape. Further, the analyses offer managers a conceptual classification of horizontal LSP cooperations and some guidance on how to structure their individual LSP cooperations more successfully.

Originality/value – This paper is the first empirical study that defines the types of cooperation that comprise the logistics cooperation landscape. The analysis integrates a holistic perspective of their contractual, organizational, functional, geographical, service and resource scope and matches them with underlying motives and performance attributes.

Keywords Horizontal cooperation, Logistics service provider, Cooperation types, Service delivery, Germany

Paper type Research paper

International Journal of Physical
Distribution & Logistics Management
Vol. 41 No. 6, 2011
pp. 552-576
© Emerald Group Publishing Limited
0960-0035
DOI 10.1108/09600031111147817

1. Introduction

The rise of complex and global supply chains and the growing intensity of competition continuously increase the challenges for logistics service providers (LSPs). A viable way of reaction is to cooperate – either vertically with customers or horizontally

with other LSPs that are proximate or distant competitors. Over the last decade, horizontal cooperation has vastly increased and become an important organizational form for LSPs. The trade press can only provide a glimpse of this dynamic development, when it reports that FedEx just established a partnership with an LSP from Israel to offer expanded international freight forwarding services (*The Wall Street Journal*, 2010) that APL Logistics announced a cooperation with an LSP from Japan to market global supply chain services (*Transportweekly*, 2010), and that US Postal Service just entered into an international agreement with an LSP from China to improve service quality for American consumers ordering from merchants in China (Bloomberg, 2010). Our study shows that today almost 60 percent of LSPs engage in at least one horizontal partnership. Despite this fact, researchers and managers of LSPs have only limited insights into the diverse patterns and opportunities of such cooperation.

While vertical cooperations between LSPs and shippers have already been covered by an abundant body of literature that investigates, for instance, the typology of partners and their relationships (Stefansson, 2006; Knemeyer *et al.*, 2003; Lambert *et al.*, 1996), success factors of vertical logistics cooperations (Deepen *et al.*, 2008; Lambert *et al.*, 1999; Moore, 1998; Tate, 1996), or attributes of partnership performance (Stank *et al.*, 2003; Gibson *et al.*, 2002), research on horizontal cooperations between LSPs is still at an early stage and has mainly been limited to case studies that focus on specific modes of transport (e.g. road: Lemoine and Dagnæs, 2003; Ludvigsen, 2000/rail: Ohnell and Woxenius, 2003; Nijkamp, 1995/sea: Slack *et al.*, 2002; Midoro and Pitto, 2000/air: Oum *et al.*, 2004; Fan *et al.*, 2001; Glisson and Cunningham, 1996). As a notable exception, the latest work in this research area by Cruijssen *et al.* provides an extensive literature review (Cruijssen *et al.*, 2007a) and first survey-based findings on opportunities and impediments for horizontal cooperations in logistics (Cruijssen *et al.*, 2007b).

Following Kale *et al.* (2000), there have been three research streams on strategic cooperation management. The first investigates motives that drive cooperation formation decisions; the second focuses on underlying governance structures; and the third stresses the performance outcomes of cooperation activities. This paper extends this body of knowledge on horizontal LSP cooperations in all three domains.

First, we analyze the motives of LSPs to establish a horizontal cooperation. Second, we explore the structure of these cooperations. For this purpose, we develop a specific framework based on the analytical model of Klint and Sjöberg (2003). Our findings on the cooperation structure allow us to identify distinct cooperation types that characterize the logistics landscape. Third, we investigate cooperation outcomes based on established performance measures provided by Pangarkar (2009), Schreiner *et al.* (2009) and Saxton (1997). By doing so, we explicitly address the research gap outlined by Cruijssen *et al.* (2007b, p. 36) who indicate the lack of “a general conceptual classification” for horizontal LSP cooperations and advance knowledge on how cooperations are structured and operated. These are important aspects of cooperation management that still merit further empirical insights (Mayer and Teece, 2008).

The next sections begin with an overview of our research framework and the research methodology. Subsequently, the empirical results are presented and discussed in order to derive research and management implications and give directions for further research.

2. Conceptual framework

In this paper, we focus on horizontal cooperations between two or more LSPs who strive for mutual benefits and positive relational rents (Dyer and Singh, 1998; Lavie, 2006; Taylor, 2005). The parties jointly contribute resources in a certain area for a potentially limited time, while preserving their strategic autonomy (Dussauge and Garrette, 1997; Glaister and Buckley, 1996). This definition incorporates the dichotomy of cooperation and competition (Bengtsson and Kock, 2000) and explicitly excludes sub-contracting partnerships.

2.1 Cooperation motives

Firms establish horizontal cooperations for several reasons. These reasons depend on individual resource endowments and industries (Glaister and Buckley, 1996; Tsang, 1998). For the logistics service industry, Cruijssen *et al.* (2007a) conducted in-depth interviews and survey research to identify idiosyncratic cooperation opportunities. They show that LSPs mainly associate productivity increase, service portfolio extension and cost reduction with horizontal LSP cooperations. Further opportunities can arise from better market positioning and improvements in service quality (Cruijssen *et al.*, 2007a). In addition, horizontal cooperations provide access to additional knowledge, financial resources (Sakakibara, 1997; Deeds and Hill, 1996) or new markets (Glaister and Buckley, 1996; Gulati and Singh, 1998).

2.2 Cooperation structure

Besides motives, the structural design of strategic cooperations has attracted researchers' interest for a long time. Starting in the early 1990s, scholars have attempted to develop typologies and classify the extensive variety of cooperations.

Three prominent typologies with a rather narrow focus are the two-level typology of Parkhe (1991), which builds on the similarity of resource endowments, the three-category typology of Dussauge and Garrette (1997), which uses partnership-specific attributes like geographic coverage and functional scope, and the 13-level typology of Todeva and Knoke (2005), which is based on the cooperative governance structure. Further, a comprehensive model was introduced by Klint and Sjöberg (2003) for a more holistic analysis. This model focuses on the eight most relevant factors for the structural design of cooperations in general.

In order to derive an idiosyncratic framework for the analysis of horizontal LSP cooperations, these eight factors were aggregated and translated into six distinctive dimensions (Table I), each of which will be outlined by the following section:

- (1) Our first dimension, "contractual scope", refers to the factor "formality" of the Klint and Sjöberg (2003) model. While most studies of inter-firm cooperations only distinguish equity-based and non-equity-based setups (García-Canal *et al.*, 2003; Dussauge and Garrette, 1997; Lunnan and Haugland, 2008), there is a consensus that the full range from near arm's-length agreements to joint venture contracts is used in practice (Gulati and Singh, 1998; Todeva and Knoke, 2005). Within this range, four types of agreement can be distinguished: verbal arrangements, written contracts without equity involvement, minority stake agreements and joint venture agreements (Frankel *et al.*, 1996; Teng and Das, 2008).

Structural dimensions of idiosyncratic analytical framework	Corresponding factors in the general cooperation model of Klint and Sjöberg (2003)
Contractual scope (type of agreements used)	Formality (focuses on type of agreement the cooperation is based on)
Organizational scope (number of partners involved)	Number of companies (focuses on number of companies involved in the cooperation)
Functional scope (value contribution by functional areas)	Area of cooperation (focuses on functional area the cooperation takes place in)
Geographical scope (market coverage)	Product complexity (focuses on complexity of the products/services the cooperation offers)
Service scope (services provided)	Complementarity (focuses on competences of partners)
Resource scope (degree of resource overlaps/ similarity in three categories: MC, MP and CS)	Importance of the region/district (focuses on geographical proximity of partners)
	Company size (focuses on relative size of partners)
	Social structure (focuses on social cultures and habits of partners)

Table I.
Analytical framework for horizontal LSP cooperations

- (2) “Organizational scope” reflects the “number of companies” involved in the cooperation. In this respect, a relevant distinction exists between bilateral cooperations with two parties and multi-lateral ones with three or more (Rubin de Celis and Lipinski, 2007). Several studies have demonstrated that the organizational scope of a partnership has a strong impact on its effectiveness (Griffith *et al.*, 1998; Park and Russo, 1996). From a resource-based perspective, an increased number of partners offer the opportunity to pool more resources and to benefit from greater resource complementarity (Gong *et al.*, 2007; García-Canal *et al.*, 2003). From a transaction cost perspective, however, more parties lead to higher coordination and communication efforts (Gulati and Singh, 1998; Parkhe, 1993).
- (3) “Functional scope”, a third dimension, reflects the factor “area of cooperation” from Klint and Sjöberg (2003) and specifies the functional focus of a cooperation in terms of value creation. Following the concept of Porter (1985), value-creating areas can be divided into primary and secondary activities. In providing value to partnering companies, cooperations may address both primary and secondary activities and may either be focused on one specific function or rather be broadly organized by addressing several functions (Dussauge and Garrette, 1997). Despite many analytical approaches to the functional scope of partnerships (Hoang and Rothaermel, 2005; Anand and Khanna, 2000; Murray *et al.*, 2005), so far no empirical study exists that reveals the relative role of each functional area in the overall value creation.
- (4) “Service scope” and (5) “geographical scope” both reflect “product complexity”. We transfer the notion of “product complexity” into two dimensions to capture the complexity of logistics services:
- the type of logistics services offered; and
 - the geographical coverage underlying these service offerings. Both dimensions are undeniably interrelated – not only because services are characterized by the simultaneity of production and use of the services

(Wagner, 2008), but also because LSPs belong to a network industry where geographical presence is an important aspect of a firm's competitive edge (Oum *et al.*, 2004). Therefore, both aspects induce the service complexity that cooperating LSPs have to handle (Colombo, 2003; García-Canal *et al.*, 2003).

- (6) "Resource scope", the sixth and last dimension of our framework, integrates the remaining structural factors of Klint and Sjöberg ("complementarity", "importance of the region/district", "company size", and "social structure"), all of which draw on the complementarity or similarity of resources that determine the partnership setup. A first category of resource scope refers to the "market competence (MC) profile" of cooperations by capturing overlapping business activities and core competencies (Kale *et al.*, 2000; Van de Ven and Walker, 1984). The second category refers to the "market penetration (MP) profile" of cooperations by capturing the degree of overlapping geographical coverage and customer portfolios (Saxton, 1997; Oxley and Sampson, 2004; Van de Ven and Walker, 1984). The third and last category of the resource scope refers to the "corporate structure (CS) profile" and analyzes the similarity of company size and social structure (Murray and Kotabe, 2005; Kale *et al.*, 2000).

2.3 Performance

Not all cooperations have lived up to their expectations. In many industries, the failure rate of horizontal cooperations is alarming and ranges from 50 to 70 percent (Das and Teng, 2000; Kogut, 1989; Park and Russo, 1996; Porter, 1987; Park and Ungson, 2001). Therefore, it is not surprising that cooperation performance has gained much attention from researchers (Saxton, 1997; Ariño, 2003; Lunnan and Haugland, 2008).

In the search for a valid cooperation performance assessment, various measures – both objective and subjective – have been developed. Ariño (2003) classifies them as follows: financial performance measures that either rely on accounting data (e.g. return on investment: Luo, 2002) or on financial data (e.g. abnormal stock market gains: Anand and Khanna, 2000), operational measures (e.g. cooperation membership duration: Harrigan, 1988), and subjective effectiveness measures based on perceptual performance evaluation. Still today, there is no consensus on the optimal measurement of cooperation performance (Das and Teng, 2003; Lunnan and Haugland, 2008).

3. Methodology

To identify characteristics and patterns of LSP cooperations, we applied an empirical approach that consisted of both qualitative and quantitative elements. In a first research phase, 12 in-depth interviews with logistics practitioners and researchers were conducted to explore the general domain of horizontal LSP cooperations. Based on these findings and extensive literature review, a survey instrument for large-scale data collection was designed in the German language. To ensure reliability and validity, we used – wherever possible – established constructs and measurement scales stemming from the strategic management literature. With respect to face validity, the final questionnaire was pre-tested with logistics researchers and nine CEOs of LSPs who were asked to identify ambiguities in structure and wording.

3.1 Sample

For our sampling we used the Hoppenstedt database, which contains corporate information on German firms with an annual turnover of more than €1 million. Based on 27 logistics-specific NACE codes (i.e. “Nomenclature Statistique des Activités Économiques dans la Communauté Européenne”) we identified 6,641 LSPs with legal entities in Germany as potential respondents. Drawing on the key informant approach (Kumar *et al.*, 1993), managers at the executive level were targeted which were supposed to be the most knowledgeable with respect to firm-specific cooperation activities. Valid e-mail addresses for invitations to our online survey could be attained for 3,686 LSPs. In order to increase the response rate, we followed the recommendation of Larson and Poist (2004) and used incentives and reminder e-mails. Finally, we received 426 responses, providing a satisfactory response rate of 11.6 percent. Of these, 26 had to be deleted because of missing data. The remaining 400 responses consisted of two groups: 226 (56.5 percent) responses originate from LSPs that at that time belonged to at least one horizontal LSP cooperation, while 174 responses originate from LSPs that did not cooperate horizontally. Corresponding to our research aim, our analyses focus on the 226 cooperating LSPs. These 226 respondents were invited to select one horizontal partnership as a reference point when answering our questions. Most respondents (72 percent) referred their answers to the strategically most important one.

Descriptive statistics on our final dataset reveal that 53 percent of the respondents were CEOs, 9 percent other members of the executive board and 36 percent held other leading management positions. In addition, the statistics show that respondents have an average professional experience within their company of more than 16 years which indicates their familiarity with firm-specific strategies and processes. Additional descriptive statistics are presented in Table II.

We used a variety of methods to test for potential non-response bias. It was assessed by comparing:

- early and late respondents with respect to survey variables (Armstrong and Overton, 1977); and
- respondents and non-respondents with respect to available company demographics from the company database.

Further, we conducted a follow-up study with 250 randomly selected companies from the initial sample for investigating cooperation propensity and company demographics and compared these responses to those of our 226 respondents. Neither method indicated significant differences between sampled and target population.

3.2 Measurement

3.2.1 Cooperation motivation. To identify the main motives behind the formation of horizontal cooperations, respondents were presented a list of motives and asked to indicate on a seven-point scale the importance of each of them for making the cooperation decision. The list included six cooperation opportunities suggested by Crijssen *et al.* (2007a) and was complemented by three additional motives often discussed in literature: access to financial resources, access to new markets (Deeds and Hill, 1996; Glaister and Buckley, 1996; Gulati and Singh, 1998) and access to additional knowledge (Sakakibara, 1997).

Table II.
Characteristics
of respondents

	<i>n</i>	%
<i>Sales revenue (€)</i>		
1-5 million	38	16.9
> 5-25 million	89	39.6
> 25-100 million	48	21.3
> 100-500 million	30	13.3
> 500 million-5 billion	15	6.7
> 5 billion	5	2.2
Total	225	100
<i>Number of employees</i>		
1-50	76	34.1
51-100	40	17.9
101-500	64	28.7
501-1,000	15	6.7
> 1,000	28	12.6
Total	223	100
<i>Mode of transport that is generating most revenue</i>		
Road-based logistics segment	138	62.7
Sea-based logistics segment	14	6.4
Rail-based logistics segment	10	4.5
Air-based logistics segment	8	3.6
Intermodal logistics segment	32	14.5
Value-added segment	18	8.2
Total	220	100

3.2.2 Cooperation structure. The architecture of the cooperation landscape was examined via the six dimensions of our cooperation structure framework. To capture “contractual scope”, we used a categorical variable that distinguishes four types of contract (Frankel *et al.*, 1996; Teng and Das, 2008; Reuer and Ariño, 2007): verbal agreements, contractual agreements that involve no equity stakes, minority equity agreements and joint venture agreements. “Organizational scope” was measured through the total number of LSPs involved in the cooperation (Gong *et al.*, 2007; Colombo, 2003). “Functional scope” was operationalized by asking the respondents to distribute a total of 100 points to a list of seven functional areas according to the importance each functional area accounts for value creation. The functions were selected following Porter and Fuller (1986) and comprise production, marketing and sales, procurement, human resources, research and product development, IT and administration and finance and accounting. “Geographical scope” was measured via a categorical variable which distinguishes a national scope, subsuming regional and nationwide reach, and an international scope, subsuming continental and intercontinental reach (Glaister and Buckley, 1996). For the “service scope” we used a categorical variable that denotes the mode of transport (road, rail, sea, air and intermodal transport as well value-added services) with which the cooperation generates most revenue. “Resource scope” describes the extent to which the cooperating parties contribute either complementary or similar resources in terms of type and amount (Das and Teng, 2003). Respondents were asked to indicate the degree of resource overlap characterizing their partnership concerning business activities and core competencies (MC), geographical network and customer portfolio (MP), financial strength, managerial strength, management style and corporate culture (CS). All eight resource items were

measured on a seven-point scale, ranging from full complementarity (1) to full similarity (7). Since MC, MP and CS represent indices of items that were drawn from the Klint and Sjöberg model and from extensive literature review (Van de Ven and Walker, 1984; Oxley and Sampson, 2004; Kale *et al.*, 2000; Murray and Kotabe, 2005; Mitsuhashi and Greve, 2009), they were calculated as average scores of the corresponding items.

3.3 Cooperation performance

To provide a valid overview of cooperation performance, we followed the approach of Lunnan and Haugland (2008) and relied on a combination of established scales. We employed the failure rate to assess performance at the industry level and used relationship duration and cooperation effectiveness to assess performance at the individual cooperation level.

“Failure rate” serves as an overall measure of performance. In order to calculate a reliable failure rate, we first identified the total number of horizontal cooperations each respondent had already terminated due to failure. We explicitly excluded past cooperations that were terminated for other reasons like goal achievement. Second, we identified the total number of cooperations in which each respondent was engaged when the survey was conducted, and calculated the failure rate by dividing the number of failed cooperations by the sum of cooperations that were still running and those that failed. This measurement approach follows Pangarkar (2009) and Park and Russo (1996). It assumes that experience with cooperation failure can be counted and set in relation to the overall cooperation experience. Since we neglected past cooperations that had been terminated for other reasons than failure, our measurement presents an upper bound of the industry-specific failure rate[1].

“Relationship duration” is regarded a reasonable proxy for cooperation success and stability (Pangarkar, 2003; Harrigan, 1988). To capture relationship duration, we followed Schreiner *et al.* (2009) and employed a single item asking for the number of consecutive years the company had been maintaining the cooperation.

Given the fact that executive managers establish inter-firm partnerships for specific reasons, their individual perception of “cooperation effectiveness” has shown to be an accurate means to evaluate cooperation performance (Kale *et al.*, 2002; Lin and Germain, 1998; Geringer and Herbert, 1991). For its measurement we used the well-established performance scale of Saxton (1997). It captures whether the partnership has achieved its primary goals, whether it has given a boost to the competitive advantage and core competencies of the parent firm, and whether the parent firm is satisfied with the cooperation’s overall performance.

4. Empirical results

4.1 Cooperation motives

The empirical data show that the three most important motives for cooperation formation (displayed in Table III and assessed via mean scores on a seven-point scale) are the opportunity to improve service quality (5.86), the opportunity to accrue positive market share benefits (5.78) and – with a significant decline – the opportunity to specialize while extending service offerings (5.20). Motives that are related to increased productivity of core activities only rank fourth place (5.07), to reduce costs of non-core activities only eighth place (3.14) and to gain access to financial resources even tenth place (2.15). This shows that in general external, market-oriented motives outweigh internal, cost-oriented motives.

Rank	Strategic cooperation motive	Mean	SD	Missing (%)	Cooperations of highest strategic importance (n = 162)	Other cooperations (n = 64)
1	To improve service quality (e.g. speed, delivery reliability, geographical coverage)	5.86	1.49	0.9	5.94 (1)	5.66 (2)
2	To protect or enhance market share	5.78	1.40	1.3	5.81 (2)	5.71 (1)
3	To specialize while broadening service offerings	5.20	1.79	1.3	5.13 (4)	5.39 (3)
4	To increase productivity of core activities	5.07	1.91	0.9	5.23 (3)	4.67 (5)
5	To gain access to new markets	4.96	1.82	0.4	4.99 (6)	4.91 (4)
6	To tender with large shippers or on larger contracts	4.90	1.91	1.3	5.08 (5)	4.45 (6)
7	To gain access to additional knowledge	4.33	1.82	2.2	4.33 (7)	4.35 (7)
8	To reduce costs of non-core activities	3.14	1.86	1.8	3.02 (8)	3.45 (8)
9	Other motives	2.87	1.93	30.5	2.67 (9)	3.37 (9)
10	To gain access to financial resources	2.15	1.58	2.2	2.19 (10)	2.06 (10)

Table III.
Overview of cooperation motives

Note: Group-specific rank order is shown in parentheses

However, with increasing strategic importance of cooperations the productivity motive gains in relevance. In the group of strategically most important cooperations, this motive obtains the third rank with a mean score of 5.23, while it only ranks fifth at 4.67 in the group of other cooperations. The latter group of cooperations instead put more emphasis on broadening their service profile (third rank at 5.39) and on gaining access to new markets (fourth rank at 4.91).

Our results contribute new insights to cooperation motives and thus extend the findings of Cruijssen *et al.* (2007a), who assessed the opportunities with which LSPs associate horizontal partnerships. They found that significant cost reductions and productivity increases are seen as the most important opportunities. In comparison, we investigated the motivational factors driving the actual cooperation decision and found that service quality improvement and market share enhancement are the most important decision-driving motives. Thus, we assert that when it comes to actual decision making, the relevance of cost-oriented motives decreases, while that of market-oriented motives increases.

4.2 Cooperation structure

Referring to the “contractual scope”, our results reveal that horizontal LSP cooperations are predominantly based on written agreements. Of the cases, 49 percent use contractual agreements, 32 percent of the cases employ written contracts with minority stakes and 6 percent joint ventures agreements. Only the remaining 13 percent of cooperations use verbal agreements.

In the context of strategic cooperations, equity involvement serves as a valuable mechanism to control for opportunism and align partners’ interests (Gulati and Singh, 1998). Although equity involvement is not the most prevalent governance mechanism

for horizontal LSP cooperations, its relevance significantly grows with increased strategic importance ($p < 0.05$). Of the strategically most important cooperations, 43 percent are based on equity stakes, while the share is only 25 percent for other cooperations.

In terms of organizational scope, 31 percent of the cooperations are bilateral, while 69 percent are multi-lateral and span a wide range of constellations: 28 percent of the cooperations involve three to ten LSPs, 24 percent involve 11-50 LSPs, 12 percent include 51-100 LSPs and 5 percent consist of more than 100 independent LSPs. On average logistics, cooperations involve 27.0 LSPs with a median of five[2]. These numbers are substantially higher than in other industries (Friese, 1998). For example, Park and Russo (1996) and Gong *et al.* (2007) identify joint ventures of manufacturing companies to have on average 2.3 parent companies in the USA and 2.4 in China, while the corresponding figure in our study is 10.5. Further, Li *et al.* (2010) analyzed secondary data on marketing cooperations in 48 industries across 164 countries between 1992 and 2008 and found that most cooperations only involved two parties, while marketing and sales cooperations in our study include a minimum number of five parties and an average of 25.2 parties.

Based on the findings of Cruijssen *et al.* (2007a), we expected the “functional scope” of logistics cooperations to focus on primary activities – in particular service production. This was confirmed by our empirical results. On average, 39.9 percent of the cooperation’s value creation is contributed by production, 25.4 percent by marketing and sales. Concerning the secondary activities, procurement attributes most with 13.1 percent, while the other functions contribute the remaining 21.6 percent: IT and administration account for 6.6 percent, human resources for 6.2 percent, research and development for 5.6 percent and finance and accounting for 3.2 percent.

To deepen the understanding and possibly identify patterns of functional scope, we also conducted an agglomerative hierarchical cluster analysis. Based on the average linkage algorithm with squared Euclidean distance, four functional clusters were identified. Three of them have an idiosyncratic functional focus, while one exhibits broad functional integration. Table IV shows the average value creation by function for each cluster identified:

- Functional Cluster 1 has a production focus where, on average, the production function contributes 70 percent of the cooperation’s value creation. This functional cluster is common, representing 88 of the 226 cooperations (39 percent).

	Functional cluster			
	Cluster 1	Cluster 2	Cluster 3	Cluster 4
<i>n</i> (%)	88 (39)	25 (11)	11 (5)	102 (45)
<i>Relative contribution to the cooperation’s value creation by function (%)</i>				
Production	70.3	9.0	7.1	23.5
Marketing and sales	8.8	74.2	8.1	29.9
Procurement	4.4	3.4	80.5	16.3
Human resources	4.6	6.0	0.0	8.5
Research and development	3.7	3.5	0.0	8.4
IT and administration	5.6	2.5	3.4	8.9
Finance and accounting	2.6	1.3	0.9	4.5

Table IV.
Value creation by
function for identified
functional clusters

- Functional Cluster 2 is focused on marketing and sales activities. These functions account for 74 percent of the cooperation's value creation. Of cooperations, 11 percent belong to this cluster.
- Functional Cluster 3 has a procurement focus. Here on average, 81 percent of the cooperation's value creation is attributed to procurement. This cluster is rare and represents only 5 percent of the cooperations.
- Functional Cluster 4 is characterized by broad functional integration. Marketing and sales (30 percent), production (24 percent) and procurement (16 percent) are the main value-creating areas. Still, the remaining functions contribute over 30 percent of the cooperation's value in nearly equal parts. This cluster is most common and comprises 45 percent of all horizontal LSP cooperations.

Our findings relate to the typology presented by Dussauge and Garrette (1997) who distinguish between cooperations of "shared marketing and sales" (corresponds to Functional Cluster 2), "shared supply" (corresponds to Functional Cluster 3) and "quasi-concentration" (corresponds to Functional Cluster 4). In comparison to their classification, the logistics service industry exhibits one additional cooperation type, which is "shared production" (Functional Cluster 1).

It is interesting to note that the most prevalent cooperation type (Functional Cluster 4 – quasi-concentration) involves multiple important functions and consequently has to build on high levels of functional integration. The more functions are involved, the more processes have to be integrated and aligned, and the more resources of a focal partner are affected by the partnership. Thus, we propose that broad functional integration adds a substantial level of complexity to LSP cooperations that requires special coordination efforts.

With regards to the "geographical scope", our results show that 33 percent of logistics cooperations operate nationally, with either a regional (9 percent) or a nationwide reach (24 percent), while the majority (67 percent) of cooperations has an international scope, with either continental (53 percent) or intercontinental (14 percent) coverage. Geographic coverage seems to be an important aspect of sustainable competitiveness for horizontal LSP cooperations regardless of strategic relevance.

Results concerning "service scope" point out that the majority of cooperations (69 percent) are active in the road-based service segment, while only 4 percent focus on air freight, 7 percent on rail freight, 4 percent on water transport and 12 percent on intermodal logistics services. The remaining 5 percent jointly offer value-added services. The dominance of the road-based segment is not surprising due to the large number of truckload firms that shape the logistics industry.

Our findings provide further evidence that the "resource scope" of cooperating LSPs is not *per se* symmetrical or complementary. Cooperations, rather, build on a viable resource similarity-complementarity mix. Mean scores of the resource indices indicate that horizontal LSP partnerships are characterized by rather similar MC profiles (4.46), rather complementary MP profiles (3.25) and highly complementary CS profiles (2.81).

Interestingly, the strategically most important cooperations build on even more similar MC profiles (4.70) and even more complementary MP profiles (3.17) than other cooperations ($p < 0.05$ for both resource indices). These findings emphasize the strategic importance of overlapping business competencies in horizontal LSP cooperations.

Since horizontal partnerships must cope with the phenomenon of cooptation, direct competition is best avoided by some degree of complementarity (Bengtsson and Kock, 2000). Further analyses show that those LSP partnerships with highly similar MC profiles (MC index > 5.0; $n = 93$) unify partners with highly complementary MP profiles (3.12). In contrast, those with highly similar MP profiles (MP index > 5.0; $n = 25$) unify partners with complementary MC profiles (3.68).

In order to provide an aggregated overview of the cooperation architecture, Figure 1 shows the prevailing characteristics along all six dimensions of our structural framework. The dark-shaded areas refer to the most dominant characteristics, while the light-shaded areas refer to the second most dominant characteristics.

4.3 Performance

This study indicates that horizontal LSP cooperations are rather stable and successful partnerships. More than 50 percent of respondents have had no experience with any kind of cooperation failure. In addition, the upper bound for the industry-specific failure rate is a low 18.9 percent. This can be inferred from the fact that our respondents were engaged in 1,602 horizontal LSP cooperations when the survey was conducted (i.e. an average of 7.1 cooperations per LSP), while having experienced 373 failed partnerships (i.e. 1.7 cooperation failures per LSP). We used our follow-up study with 250 randomly selected LSPs for validation. Since this study reported an even lower failure ratio (just 14.7 percent), our assumption is supported that the initial result of 18.9 percent represents an upper bound. The true value can be expected to be even lower – probably around 15 percent. Comparing these failure rates to those reported for manufacturing industries that range from 50 to 70 percent (Park and Ungson, 2001; Bleeke and Ernst, 1991), cooperations in the logistics industry can be assessed as both stable and successful.

In line with these findings, our study shows that most horizontal LSP cooperations are long term with an average cooperation duration of 7.6 years and with 15 percent of LSPs that were participating for 15 years or more. In addition, the average cooperation effectiveness is high with a score of 5.45 on a seven-point scale and with a standard deviation of 1.08. This latter aspect reflects that very few cooperations exhibit truly poor performance.

Contractual scope	Unwritten agreement	Contractual agreement		Minority stake agreement	Joint venture agreement	
Organizational scope	Bilateral			Multilateral		
Functional scope	Shared production	Shared marketing and sales		Shared supply	Quasi-concentration	
Geographical scope	Regional		Nationwide	Continental		Intercontinental
Service scope	Road services	Rail services	Sea services	Air services	Intermodal services	Value-added services
Resource scope	No resource similarity	Similar market competence	Similar market penetration	Similar corporate structure	Extended resource similarity	

Figure 1.
Overview of dominating structural characteristics of logistics cooperation landscape

4.4 Cooperation types

Following previous research (Dussauge and Garrette, 1997), we used cluster analysis to identify distinctive cooperation types based on their structural characteristics. For this purpose, we translated the structural dimensions into categorical variables and integrated them as binary data into hierarchical cluster analysis. Based on the agglomerative algorithm of average linkage and the squared Euclidean distance, results suggested that a six-cluster solution best suits the data. Table V shows the major characteristics of the six types of cooperation, and Figure 2 shows a graphical representation.

Cooperation Type 1: dense road-based networks with shared production focus. Cooperation Type 1 ($n = 67$; 30 percent) provides road-based transport services in large international route networks. For this purpose, Type 1 cooperations integrate up to 130 members that share highly complementary MP profiles. The aim is to improve service quality and protect market share, while also increasing productivity of core activities. As a consequence, cooperation partners have highly similar MC profiles which facilitate the realization of economies of scale. Given the high degree of competence similarity and a high strategic importance characterizing Type 1 cooperations, it is not surprising that agreements with equity involvement are the preferred type of contract. This helps to avoid opportunistic interest seeking, fosters stability (Teng and Das, 2008), and leads to an average duration of 12.1 years and an above average cooperation effectiveness score of 5.59[3].

Cooperation Type 2: customized road transport networks with broad functional integration. Cooperation Type 2 ($n = 104$; 46 percent) can be considered as a counterpart to Type 1 since it is characterized by comparable service concepts, resource profiles and organizational structures. It also focuses on road transport services – but to a lesser extent – integrates partners with similar MC profiles and tries to establish international route networks by involving multiple partners. However, the median number of parties is just five and, thus, considerably smaller than with Type 1. Further, Cooperation Type 2 is distinguished by a certain degree of customization and by a higher degree of functional integration that provides idiosyncratic market strengths. While some of the Type 2 cooperations try to differentiate by providing intermodal services in combining road transport with other modes of transport (e.g. rail and sea freight), others limit their geographical focus to smaller areas. The idiosyncratic combination of structural factors results in average performance with a cooperation effectiveness score of 5.38 and a relationship duration of 6.0 years.

Cooperation Type 3: situational road transport networks with shared production focus. Cooperation Type 3 ($n = 21$; 9 percent) is also specialized in road-based transport, but with a distinctive focus on shared production. In comparison to the first two clusters, Cooperation Type 3 differs by including a small number of parties and by a stronger national focus. Further, this partnership type relies only on verbal agreements, where trust and integrity replace formal authorities (Frankel *et al.*, 1996). We assume that trust and integrity are grounded on personal relationships that probably evolved more easily since LSPs of this type not only have similar market competencies, and similar MP capabilities, but even have similar company cultures (4.33). The similarity between company cultures is intended to serve as a necessary foundation for cooperations that are based on verbal arrangements.

Our initial expert interviews indicate that this cooperation type follows situational business patterns. They are, for instance, activated when one partner is facing demand

Type	Motives ^a	Structure ^b	Performance ^c
1: (<i>n</i> = 67; 30%)	<p>Improve service quality: 6.16* (5.73)</p> <p>Protect/enhance market share: 6.06 (5.67)</p> <p>Increase productivity of core activities: 5.46* (4.90)</p>	<p>93% equity-based agreements</p> <p>Partners – avg.: 39/median: 16</p> <p>Production focus: 46% by production function</p> <p>66% international scope</p> <p>96% road services (66% LTL/LCL)</p> <p>MC: 5.20***, MP: 2.58***, CS: 2.90</p> <p>89% contractual agreements</p> <p>Partners: avg.: 31/median: 5</p> <p>Broad functional integration: 35% by production function, 24% by marketing and sales, 17% by procurement</p> <p>74% international scope</p> <p>65% road services; 16% intermodal services including road (47% LTL/LCL, 32% FTL/FCL)</p> <p>MC: 4.30, MP: 3.23, CS: 2.65</p> <p>Partners: avg.: 5/median: 2</p> <p>Partners: avg.: 5/median: 2</p> <p>Production focus: 45% by production function</p> <p>52% international scope</p> <p>76% road; 19% intermodal: mainly road and rail (40% LTL/LCL, 52% FTL/FCL)</p> <p>MC: 4.26, MP: 4.36***, CS: 3.49*</p> <p>82% non-equity based agreements</p> <p>Partners: avg.: 9/median: 2</p> <p>Marketing and sales focus: 74% by marketing and sales function</p> <p>91% international scope</p> <p>27% sea; 27% air; 27% intermodal: mainly sea and air (42% LTL/LCL, 25% FTL/FCL)</p> <p>MC: 4.45, MP: 4.23*, CS: 3.57*</p>	<p>Duration: 12.1 years</p> <p>Effectiveness: 5.59</p> <p>Duration: 6.0 years</p> <p>Effectiveness: 5.38</p> <p>Duration: 6.0 years: maximum 20 years</p> <p>Effectiveness: 5.05</p> <p>Duration: 4.2 years</p> <p>Effectiveness: 5.58</p>
2: (<i>n</i> = 104; 46%)	<p>Improve service quality: 5.87 (5.85)</p> <p>Protect/enhance market share: 5.72 (5.84)</p> <p>Specialize and extend service portfolio: 5.28 (5.13)</p>		
3: (<i>n</i> = 21; 9%)	<p>Improve service quality: 5.62 (5.89)</p> <p>Protect/enhance market share: 5.50 (5.81)</p> <p>Specialize and extend service portfolio: 4.95 (5.23)</p>		
4: (<i>n</i> = 11; 5%)	<p>Protect/enhance market share: 6.09 (5.77)</p> <p>Improve service quality: 5.55 (5.88)</p> <p>Specialize and extend service portfolio: 5.10 (5.21)</p>		

(continued)

Table V.

Type	Motives ^a	Structure ^b	Performance ^c
5: (<i>n</i> = 11; 5%)	Access additional knowledge 5.00 (4.30) Specialize and extend service portfolio: 5.00 (5.21) Improve service quality: 4.73** (5.92)	73% equity-based agreements Partners: avg.: 3/median: 2 Broad functional integration: 31% by production function, 21% by marketing and sales, 26% by procurement 91% national scope 55% value-added services, 27% intermodal MC: 3.68, MP: 3.73, CS: 2.68	Duration: 3.5 years Effectiveness: 5.21
6: (<i>n</i> = 12; 5%)	Protect/enhance market share: 6.08 (5.77) Specialize and extend service portfolio: 6.00 (5.16) Improve service quality: 5.83 (5.86)	75% contractual agreements Partners: avg.: 2/median: 2 Production focus: 74% by production function 58% international scope 50% rail; 33% value-added services (17% LTL/LCL, 58% FTL/FCL) MC: 3.17***, MP: 4.25*, CS: 2.19	Duration: 5.8 years Effectiveness: 6.06*

Notes: Significance of difference from overall sample mean (*t*-test), * $p < 0.05$; ** $p < 0.01$; *** $p < 0.001$; ^amean scores for the three most important cooperation motives (mean scores for rest of sample); ^bmean scores are presented if not stated otherwise; ^cmean scores for performance measures (mean scores for rest of sample)

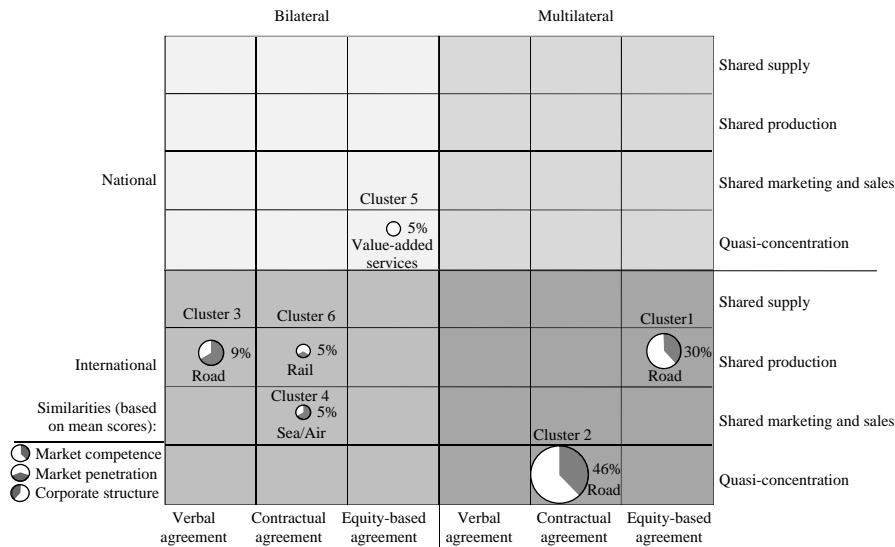


Figure 2.
Key findings on
cooperation clusters

fluctuations and needs additional haulage or warehouse capacity. Consequently, Cooperation Type 3 resembles neighborly help activities and is, thus, assumed to be the oldest form of horizontal partnering between LSPs. The occasional nature of these cooperations explains their somewhat limited overall performance impact and the lowest effectiveness scores of all six types (5.05 compared to an average of 5.49 for all other cooperation types).

Cooperation Type 4: sea and air freight cooperations with marketing and sales focus. In contrast to the first three cooperation types, the fourth one ($n = 11$; 5 percent) is made up of sea and air freight carriers. They established bilateral partnerships with an international market coverage to promote products and services. In contrast to joint production networks, shared marketing and sales networks can reduce interdependencies and coordination efforts. This might explain why Type 4 cooperations rely on the use of non-equity agreements.

If partners decide to market products and services, these offerings should be compatible and comply with identical quality standards. This requires some partner similarity. Type 4 partnerships are characterized by a significantly higher ($p < 0.05$) similarity of management style (4.60), financial strength (3.70) and customers portfolio (5.09) than other cooperation types, where the corresponding values are only 3.33, 2.31 and 3.59. Therefore, we assume that the similarity of these resources allows the establishment of a common understanding about service quality and thus helps to promote products and services on behalf of the other partner. Based on this structural set up, Type 4 cooperations exhibit high cooperation effectiveness (5.58).

Cooperation Type 5: national value-added service cooperations with broad functional integration. In contrast to most of the other cooperation types, Type 5 ($n = 11$; 5 percent) does not focus on traditional freight business. Instead, it is specialized in value-added, non-transport services like packaging, warehousing, contract logistics or reverse logistics and determined by a broad functional integration across service production, marketing

and sales and procurement. Further, this cooperation type is the only one with a very strong national focus. Based on these aspects, it can be inferred that transport-oriented cooperations utilize international networks to enhance competitiveness, while non-transport-oriented cooperations profit less from internationalizing.

Moreover, Type 5 partnerships are unique in that they are driven by the intention to gain additional knowledge and extend service offerings, while access to additional markets (4.09) or increase of profitability in core activities (3.55) are only of minor importance. In line with the motivation to foster knowledge exchange – mainly on a bilateral level – Type 5 cooperations are formed between highly complementary partners, with low resource similarity in all three resource categories (MC = 3.68, MP = 3.73, CS = 2.68). To cope with both, resource complementarity and functional quasi-concentration, these cooperations mostly employ equity-based contracts. This helps to align diversified cooperation incentives of heterogeneous partners and counteract exchange hazards. We suppose Type 5 to be at an early stage of development since the average duration is just 3.5 years. This might also explain why the cooperation effectiveness score is below average (5.21).

Cooperation Type 6: bilateral hinterland cooperations with shared production focus. Cooperations of type 6 ($n = 12$; 5 percent) represent hinterland logistics partnerships that focus on shared production and often are confined to very specific regions. They specialize in rail transport that is combined with value-added services like warehousing, terminal operations and customs clearance or with other modes of transport. Since rail logistics require a considerable amount of assets, the LSPs involved tend to be rather large. Companies that are active in these partnerships focus on core competencies and complement them by establishing bilateral cooperations, especially with LSPs that can contribute complementary MC profiles (3.17). Owing to the focus on a particular hinterland region, it is not surprising that these cooperations, more so than others, have highly similar MP profiles (4.25). This allows them to offer the full range of services required for efficient hinterland logistics. For governance, they employ contractual agreements. From a performance standpoint, they can be considered as very successful – not only because of the highest average effectiveness score (6.06) of all clusters, but also because of their very narrow performance spread (SD = 0.47).

5. Conclusion

Given the market relevance of horizontal LSP cooperations, a thorough understanding of their major characteristics and of the cooperation landscape is crucial. In this regard, our paper contributes the first comprehensive overview of cooperation motives, structures and performance outcomes while capturing the full diversity of the logistics service industry. Our analysis thus extends previous work that was more focused on individual elements and facets of the picture.

Academic implications

Our study is the first to provide an explicit ranking of motives for LSPs to engage in horizontal cooperations. This not only helps to understand the dynamics that shape the industry. It also shows that opportunities generally associated with these cooperations (as identified by Cruijssen *et al.*, 2007a) differ from the motives for the actual decision. Empirical evidence is found that cooperation decisions are primarily driven by an external market perspective rather than an internal productivity and cost perspective.

In fact, a special focus is on the improvement of service quality and market share protection which is consistent with the fact that in mature industries it is very often service quality and not costs that “makes the difference” between market participants (Bell *et al.*, 2005).

Based on an analytical framework derived from Klint and Sjöberg (2003), this study systematically captured the full range of structural characteristics that determines the architecture of LSP cooperations. Consistent with the structure-conduct-performance paradigm (Klint and Sjöberg, 2003), each of these structural dimensions shapes cooperative behavior and the partnership outcome. Thus, a profound understanding of the cooperation structure adds substance to the interpretations of cooperation performance. With respect to the functional focus of the cooperations, we were able to confirm the three basic functional patterns identified by Dussauge and Garrette (1997) and extend their classification by adding shared production as a fourth functional pattern. Overall, we identified six distinct cooperation types that describe today’s logistics cooperation landscape.

Further, our study contributes new insights to the discussion of cooperation success. Many researchers (Park and Ungson, 2001; Kale *et al.*, 2002; Hoang and Rothaermel, 2005) refer to cooperation failure rates of 50-70 percent that initially have been reported by scholars like Porter (1987), Kogut (1989) or Bleeke and Ernst (1991). In contrast to these results, we found that horizontal LSP cooperations are substantially more stable. Their failure rate is well below 19 percent, along with an average partnership duration of eight years and high scores in performance effectiveness. These findings highlight that success rates can vary enormously between industries and that industry-specific success evaluations are more appropriate than industry-independent ones.

Managerial implications

The cooperation landscape that has been derived from our empirical results contributes transparency and a common understanding of market characteristics. This transparency will help logistics managers to position themselves better within the cooperation landscape. It also facilitates the identification and development of innovative cooperation concepts which in turn can foster differentiation from industry peers. In this respect, our work responds to the call by Cruijssen *et al.* (2007b) to develop a conceptual framework that allows the classification of horizontal LSP cooperations and supports practitioners in setting up such partnerships.

Moreover, the transparency on the facets of structural complexities – for instance driven by the very large number of partners or by the broad geographical scope – helps to direct management attention to the setup of appropriate governance structures and management capabilities. In order to keep cooperation structures manageable over the lifecycle of the partnership, logistics managers are recommended to pay special attention to the structural aspects outlined. In particular, the high complexity driven by strong functional integrations and complementary resource setups requires logistics managers to strike the right balance between the independence of their individual company and the interdependence within the cooperation.

Although many LSPs already cooperate, our initial expert interviews confirmed that a common understanding about the scope and market potential of horizontal LSP cooperations is still missing and that misconceptions about its actual predominance prevail. Therefore, our study helps to establish more profound cooperation knowledge. Our findings show that horizontal cooperations are not only used for highly

standardized services like road-based transport, but also for more complex or individualized services (e.g. intermodal transport, contract logistics and value-added service offerings). Further, our results bring to attention that production cooperations with joint operations in interlinked physical networks do not dominate the landscape. In fact, cooperations with highly integrated functions along the continuum of primary and secondary functions play an even bigger role, while cooperations in the fields of marketing and sales and procurement should not be neglected.

Finally, the study outlines a substantial potential for future partnerships referring to the number of LSPs that are still preserving an independent market position (43 percent) or that are just involved in one partnership (18 percent). Since our findings reveal that LSP cooperations are highly stable and successful, these industry participants might be encouraged to be more receptive to this organizational form. Others are already very confident about horizontal partnerships. This can be inferred from the fact that only 3.1 percent of the LSPs interviewed in the follow-up study of 250 LSPs indicated that they plan to reduce their cooperation activities, while 27.6 percent expect to expand them, recognizing globalization as a major driver. We, therefore, conclude that globalizing fortifies the relevance of external, customer-oriented market motives within the logistics industry and that LSPs continue using horizontal partnerships to strengthen competitiveness and resist market consolidation tendencies.

Limitations and further research

This research is marked by certain limitations. First, we have focused on cooperations that were running when we conducted our study and excluded those that had already been terminated. However, in our view, it would be valuable to extend the scope of analysis by also investigating terminated horizontal LSP cooperations. In particular, investigations of key characteristics that distinguish cooperations that failed from those that had been terminated for other reasons in addition to investigations of key antecedents for cooperation failure would be quite valuable.

Second, our results only refer to LSPs with legal entities in Germany. Although Germany is Europe's largest economy, we recommend that future work extend the scope of research to other regions and analyze whether or not cooperation motives, architectural structure and performance attributes differ by geographical setting.

Despite these limitations, our analyses provide some important insights to horizontal LSP cooperations. We consider our work as part of an emerging research stream that will refine our understanding of these highly relevant partnerships. In this respect, it would be worthwhile to complement this explorative study as a basis for the analysis of causal relationships. We encourage future studies to examine the question how the complexity dimensions that have been outlined by our study affect cooperation governance, management capabilities and thus cooperation performance. The complexity dimensions will most likely also impact the effectiveness of crucial partnership characteristics like communication behaviour and conflict resolution techniques that Mohr and Spekman (1994) have investigated. Including these aspects in future studies will be of great value.

Notes

1. The actual failure rate is the number of failed cooperations divided by the sum of cooperations still running, cooperations failed, and cooperations terminated for other reasons.

2. The largest numbers of partners are typical for international cooperations in the “less than truck load” segment, where many LSPs are required to provide full coverage of large geographic areas.
3. Failure rates were calculated with relations to LSPs. As each LSP on average is engaged in seven cooperations it is most likely that not all of them are of the same type. Therefore, no failure rate can be concluded for specific cooperation types.

References

- Anand, B.N. and Khanna, T. (2000), “Do firms learn to create value? The case of alliances”, *Strategic Management Journal*, Vol. 21 No. 3, pp. 295-316.
- Ariño, A. (2003), “Measures of strategic alliance performance: an analysis of construct validity”, *Journal of International Business Studies*, Vol. 34 No. 1, pp. 66-79.
- Armstrong, J.S. and Overton, T.S. (1977), “Estimating nonresponse bias in mail surveys”, *Journal of Marketing Research*, Vol. 14 No. 3, pp. 396-402.
- Bell, S.J., Auh, S. and Smalley, K. (2005), “Customer relationship dynamics: service quality and customer loyalty in the context of varying levels of customer expertise and switching costs”, *Journal of the Academy of Marketing Science*, Vol. 33 No. 2, pp. 169-83.
- Bengtsson, M. and Kock, S. (2000), “‘Cooperation’ in business networks – to cooperate and compete simultaneously”, *Industrial Marketing Management*, Vol. 29 No. 5, pp. 411-27.
- Bleeke, J. and Ernst, D. (1991), “The way to win in cross-border alliances”, *Harvard Business Review*, Vol. 69 No. 6, pp. 127-35.
- Bloomberg (2010), “Tri-lateral shipping alliance signed with eBay GC and China Post”, available at: www.bloomberg.com/apps/news?pid=conewsstory&tkr=EBAY:US&sid=aojHua5B0QHo (accessed 23 July 2010).
- Colombo, M.G. (2003), “Alliance form: a test of the contractual and competence perspectives”, *Strategic Management Journal*, Vol. 24 No. 12, pp. 1209-29.
- Cruijssen, F., Cools, M. and Dullaert, W. (2007a), “Horizontal cooperation in logistics: opportunities and impediments”, *Transportation Research: Part E*, Vol. 43 No. 2, pp. 129-42.
- Cruijssen, F., Dullaert, W. and Fleuren, H. (2007b), “Horizontal cooperation in transport and logistics: a literature review”, *Transportation Journal*, Vol. 46 No. 3, pp. 22-39.
- Das, T.K. and Teng, B.-S. (2000), “Instabilities of strategic alliances: an internal tensions perspective”, *Organization Science*, Vol. 11 No. 1, pp. 77-101.
- Das, T.K. and Teng, B.-S. (2003), “Partner analysis and alliance performance”, *Scandinavian Journal of Management*, Vol. 19 No. 3, pp. 279-308.
- Deeds, D.L. and Hill, C.W.L. (1996), “Strategic alliances and the rate of new product development: an empirical study of entrepreneurial biotechnology firms”, *Journal of Business Venturing*, Vol. 11 No. 1, pp. 41-55.
- Deepen, J.M., Goldsby, T.J., Knemeyer, A.M. and Wallenburg, C.M. (2008), “Beyond expectations: an examination of logistics outsourcing goal achievement and goal exceedance”, *Journal of Business Logistics*, Vol. 29 No. 2, pp. 75-105.
- Dussauge, P. and Garrette, B. (1997), “Anticipating the evolutions and outcomes of strategic alliances between rival firms”, *International Studies of Management & Organization*, Vol. 27 No. 4, pp. 104-26.

- Dyer, J.H. and Singh, H. (1998), "The relational view: cooperative strategy and sources of interorganizational competitive advantage", *Academy of Management Review*, Vol. 23 No. 4, pp. 660-79.
- Fan, T., Vigeant-Langlois, L., Geissler, C., Bosler, B. and Wilmking, J. (2001), "Evolution of global airline strategic alliance and consolidation in the twenty-first century", *Journal of Air Transport Management*, Vol. 7 No. 6, pp. 349-60.
- Frankel, R., Whipple, J.S. and Frayer, D.J. (1996), "Formal versus informal contracts: achieving alliance success", *International Journal of Physical Distribution & Logistics Management*, Vol. 26 No. 3, pp. 47-63.
- Friese, M. (1998), *Kooperation als Wettbewerbsstrategie für Dienstleistungsunternehmen*, Deutscher Universitäts-Verlag, Wiesbaden.
- García-Canal, E., Valdés-Llaneza, A. and Ariño, A. (2003), "Effectiveness of dyadic and multi-party joint ventures", *Organization Studies*, Vol. 24 No. 5, pp. 743-70.
- Geringer, J.M. and Herbert, L. (1991), "Measuring performance of international joint ventures", *Journal of International Business Studies*, Vol. 22 No. 2, pp. 249-64.
- Gibson, B.J., Rutner, S.M. and Keller, S.B. (2002), "Shipper-carrier partnership issues, rankings, and satisfaction", *International Journal of Physical Distribution & Logistics Management*, Vol. 32 No. 8, pp. 669-81.
- Glaister, K.W. and Buckley, P.J. (1996), "Strategic motives for international alliance formation", *Journal of Management Studies*, Vol. 33 No. 3, pp. 301-32.
- Glisson, L.M. and Cunningham, W.A. (1996), "Airline industry strategic alliances: marketing and policy implications", *International Journal of Physical Distribution & Logistics Management*, Vol. 26 No. 3, pp. 26-34.
- Gong, Y., Shenkar, O., Luo, Y. and Nyaw, M.-K. (2007), "Do multiple parents help or hinder international joint venture performance? The mediating roles of contract completeness and partner cooperation", *Strategic Management Journal*, Vol. 28 No. 10, pp. 1021-34.
- Griffith, D.A., Hu, M.Y. and Chen, H. (1998), "Formation and performance of multi-partner joint ventures: a Sino-foreign illustration", *International Marketing Review*, Vol. 15 No. 3, pp. 171-87.
- Gulati, R. and Singh, H. (1998), "The architecture of cooperation: managing coordination costs and appropriation concerns in strategic alliances", *Administrative Science Quarterly*, Vol. 43 No. 4, pp. 781-814.
- Harrigan, K.R. (1988), "Joint ventures and competitive strategy", *Strategic Management Journal*, Vol. 9 No. 2, pp. 141-58.
- Hoang, H. and Rothaermel, F. (2005), "The effect of general and partner-specific alliance experience on joint R&D project performance", *Academy of Management Journal*, Vol. 48 No. 2, pp. 332-45.
- Kale, P., Dyer, J.H. and Singh, H. (2002), "Alliance capability, stock market response, and long-term alliance success: the role of the alliance function", *Strategic Management Journal*, Vol. 23 No. 8, pp. 747-67.
- Kale, P., Singh, H. and Perlmutter, H. (2000), "Learning and protection of proprietary assets in strategic alliances: building relational capital", *Strategic Management Journal*, Vol. 21 No. 3, pp. 217-37.
- Klint, M.B. and Sjöberg, U. (2003), "Towards a comprehensive SCP-model for analysing strategic networks/alliances", *International Journal of Physical Distribution & Logistics Management*, Vol. 33 No. 5, pp. 408-26.

- Knemeyer, A.M., Corsi, T.M. and Murphy, P.R. (2003), "Logistics outsourcing relationships: customer perspectives", *Journal of Business Logistics*, Vol. 24 No. 1, pp. 77-109.
- Kogut, B. (1989), "The stability of joint ventures: reciprocity and competitive rivalry", *Journal of Industrial Economics*, Vol. 38 No. 2, pp. 183-98.
- Kumar, N., Stern, L.W. and Anderson, J.C. (1993), "Conducting interorganizational research using key informants", *Academy of Management Journal*, Vol. 36 No. 6, pp. 1633-51.
- Lambert, D.M., Emmelhainz, M.A. and Gardner, J.T. (1996), "So you think you want a partner?", *Marketing Management*, Vol. 5 No. 2, pp. 24-41.
- Lambert, D.M., Emmelhainz, M.A. and Gardner, J.T. (1999), "Building successful logistics partnerships", *Journal of Business Logistics*, Vol. 20 No. 1, pp. 165-81.
- Larson, P.D. and Poist, R.F. (2004), "Improving response rates to mail surveys: a research note", *Transportation Journal*, Vol. 43 No. 4, pp. 67-74.
- Lavie, D. (2006), "The competitive advantage of interconnected firms: an extension of the resource-based view", *Academy of Management Review*, Vol. 31 No. 3, pp. 638-58.
- Lemoine, W. and Dagnæs, L. (2003), "Globalisation strategies and business organisation of a network of logistics service providers", *International Journal of Physical Distribution & Logistics Management*, Vol. 33 No. 3, pp. 209-28.
- Li, N., Boulding, W. and Staelin, R. (2010), "General alliance experience, uncertainty, and marketing alliance governance mode choice", *Journal of the Academy of Marketing Science*, Vol. 38 No. 2, pp. 141-58.
- Lin, X. and Germain, R. (1998), "Sustaining satisfactory joint venture relationships: the role of conflict resolution strategy", *Journal of International Business Studies*, Vol. 29 No. 1, pp. 179-96.
- Ludvigsen, J. (2000), *The International Networking between European Logistical Operators*, Economic Research Institute, Stockholm.
- Lunnan, R. and Haugland, S.A. (2008), "Predicting and measuring alliance performance: a multidimensional analysis", *Strategic Management Journal*, Vol. 29 No. 5, pp. 545-56.
- Luo, Y. (2002), "Contract, cooperation, and performance in international joint ventures", *Strategic Management Journal*, Vol. 23 No. 10, pp. 903-19.
- Mayer, K.J. and Teece, D.J. (2008), "Unpacking strategic alliances: the structure and purpose of alliance versus supplier relationships", *Journal of Economic Behavior & Organization*, Vol. 66 No. 1, pp. 106-27.
- Midoro, R. and Pitto, A. (2000), "A critical evaluation of strategic alliances in liner shipping", *Maritime Policy & Management*, Vol. 27 No. 1, pp. 31-40.
- Mitsubishi, H. and Greve, H.R. (2009), "A matching theory of alliance formation and organizational success: complementarity and compatibility", *Academy of Management Journal*, Vol. 52 No. 5, pp. 975-95.
- Mohr, J. and Spekman, R. (1994), "Characteristics of partnership success: partnership attributes, communication behavior, and conflict resolution techniques", *Strategic Management Journal*, Vol. 15 No. 2, pp. 135-52.
- Moore, K.R. (1998), "Trust and relationship commitment in logistics alliances: a buyer perspective", *International Journal of Purchasing & Materials Management*, Vol. 34 No. 1, pp. 24-37.

- Murray, J.Y. and Kotabe, M. (2005), "Performance implications of strategic fit between alliance attributes and alliance forms", *Journal of Business Research*, Vol. 58 No. 11, pp. 1525-33.
- Murray, J.Y., Kotabe, M. and Zhou, J.N. (2005), "Strategic alliance-based sourcing and market performance: evidence from foreign firms operating in China", *Journal of International Business Studies*, Vol. 36 No. 2, pp. 187-208.
- Nijkamp, P. (1995), "From missing networks to interoperable networks: the need for European cooperation in the railway sector", *Transport Policy*, Vol. 2 No. 3, pp. 159-67.
- Ohnell, S. and Woxenius, J. (2003), "An industry analysis of express freight from a European railway perspective", *International Journal of Physical Distribution & Logistics Management*, Vol. 33 No. 8, pp. 735-51.
- Oum, T.H., Park, J.-H., Kim, K. and Yu, C. (2004), "The effect of horizontal alliances on firm productivity and profitability: evidence from the global airline industry", *Journal of Business Research*, Vol. 57 No. 8, pp. 844-53.
- Oxley, J.E. and Sampson, R.C. (2004), "The scope and governance of international R&D alliances", *Strategic Management Journal*, Vol. 25 Nos 8/9, pp. 723-49.
- Pangarkar, N. (2003), "Determinants of alliance duration in uncertain environments: the case of the biotechnology sector", *Long Range Planning*, Vol. 36 No. 3, pp. 269-84.
- Pangarkar, N. (2009), "Do firms learn from alliance terminations? An empirical examination", *Journal of Management Studies*, Vol. 46 No. 6, pp. 982-1004.
- Park, S.H. and Russo, M.V. (1996), "When competition eclipses cooperation: an event history analysis of joint venture failure", *Management Science*, Vol. 42 No. 6, pp. 875-90.
- Park, S.H. and Ungson, G.R. (2001), "Interfirm rivalry and managerial complexity: a conceptual framework of alliance failure", *Organization Science*, Vol. 12 No. 1, pp. 37-53.
- Parkhe, A. (1991), "Interfirm diversity, organizational learning, and longevity in global strategic alliances", *Journal of International Business Studies*, Vol. 22 No. 4, pp. 579-601.
- Parkhe, A. (1993), "Strategic alliance structuring: a game theoretic and transaction cost examination of inter-firm cooperation", *Academy of Management Journal*, Vol. 36 No. 4, pp. 794-829.
- Porter, M.E. (1985), *Competitive Advantage: Creating and Sustaining Superior Performance*, The Free Press, New York, NY.
- Porter, M.E. (1987), "From competitive advantage to corporate strategy", *Harvard Business Review*, Vol. 65 No. 3, pp. 43-59.
- Porter, M.E. and Fuller, M.B. (1986), "Coalitions and global strategy", in Porter, M.E. (Ed.), *Competition in Global Industries*, Harvard Business School Press, Boston, MA, pp. 315-43.
- Reuer, J.J. and Ariño, A. (2007), "Strategic alliance contracts: dimensions and determinants of contractual complexity", *Strategic Management Journal*, Vol. 28 No. 3, pp. 313-30.
- Rubin de Celis, J.C. and Lipinski, J. (2007), "R&D alliances and the effect of experience on innovation: a focus on the semiconductor industry", *Journal of Leadership & Organizational Studies*, Vol. 14 No. 1, pp. 26-37.
- Sakakibara, M. (1997), "Heterogeneity of firm capabilities and cooperative research and development: an empirical examination of motives", *Strategic Management Journal*, Vol. 18, pp. 143-64 (special issue).
- Saxton, T. (1997), "The effects of partner and relationship characteristics on alliance outcomes", *Academy of Management Journal*, Vol. 40 No. 2, pp. 443-61.

- Schreiner, M., Kale, P. and Corsten, D. (2009), "What really is alliance management capability and how does it impact alliance outcomes and success?", *Strategic Management Journal*, Vol. 30 No. 13, pp. 1395-419.
- Slack, B., Comtois, C. and McCalla, R. (2002), "Strategic alliances in the container shipping industry: a global perspective", *Maritime Policy & Management*, Vol. 29 No. 1, pp. 65-76.
- Stank, T.P., Goldsby, T.J., Vickery, S.K. and Savitskie, K. (2003), "Logistics service performance: estimating its influence on market share", *Journal of Business Logistics*, Vol. 24 No. 1, pp. 27-55.
- Stefansson, G. (2006), "Collaborative logistics management and the role of third-party service providers", *International Journal of Physical Distribution & Logistics Management*, Vol. 36 No. 2, pp. 76-92.
- Tate, K. (1996), "The elements of a successful partnership", *International Journal of Physical Distribution & Logistics Management*, Vol. 26 No. 3, pp. 7-13.
- Taylor, A. (2005), "An operations perspective on strategic alliance success factors", *International Journal of Operations & Production Management*, Vol. 25 No. 5, pp. 469-90.
- Teng, B.-S. and Das, T.K. (2008), "Governance structure choice in strategic alliances: the roles of alliance objectives, alliance management experience, and international partners", *Management Decision*, Vol. 46 No. 5, pp. 725-42.
- Todeva, E. and Knoke, D. (2005), "Strategic alliances and models of collaboration", *Management Decision*, Vol. 43 No. 1, pp. 123-48.
- Transportweekly* (2010), "APL Logistics, Sumitomo Warehouse Co., form alliance", available at: www.transportweekly.com/pages/en/news/articles/73401/ (accessed 23 July 2010).
- Tsang, E.W.K. (1998), "Motives for strategic alliance: a resource-based perspective", *Scandinavian Journal of Management*, Vol. 14 No. 3, pp. 207-21.
- Van de Ven, A.H. and Walker, G. (1984), "The dynamics of interorganizational coordination", *Administrative Science Quarterly*, Vol. 29 No. 4, pp. 598-621.
- Wagner, S.M. (2008), "Innovation management in the German transportation industry", *Journal of Business Logistics*, Vol. 29 No. 2, pp. 215-31.
- (*The Wall Street Journal*) (2010), "FedEx Trade Networks announces new alliance with Fritz Companies Israel", available at: <http://online.wsj.com/article/PR-CO-20100706-903345.html> (accessed 23 July 2010).

Further reading

- Darr, E.D. and Kurtzberg, T.R. (2000), "An investigation of partner similarity dimensions on knowledge transfer", *Organizational Behavior & Human Decision Processes*, Vol. 82 No. 1, pp. 28-44.

About the authors

Christina Schmoltzi (Dipl.-Kffr., European Business School) is a PhD candidate and Research Associate in Logistics at the Kuehne-Center for Logistics Management at WHU – Otto Beisheim School of Management, Vallendar, Germany. Her research interests include strategic alliances and horizontal cooperations of LSPs and corresponding cooperation management capabilities. Her research has been published in one management study and has been presented at several international conferences.

IJPDLM
41,6

576

Carl Marcus Wallenburg (PhD, WHU – Otto Beisheim School of Management) is Professor of Logistics and the Kuehne-Foundation Chair of International Logistics Networks at the Technische Universität Berlin, Germany. His research focuses on third-party logistics, relationship management and international SCM. He frequently speaks at conferences and company meetings and is the author of four books and over 50 articles. His work has been accepted to various journals including *European Journal of Marketing*, *International Journal of Logistics Management*, *Journal of Business Logistics*, *Journal of Supply Chain Management* and *Transportation Journal*. Carl Marcus Wallenburg is the corresponding author and can be contacted at: wallenburg@tu-berlin.de

To purchase reprints of this article please e-mail: reprints@emeraldinsight.com
Or visit our web site for further details: www.emeraldinsight.com/reprints

This article has been cited by:

1. GaoHuijie, Huijie Gao, YangJianhua, Jianhua Yang, YinHuanwu, Huanwu Yin, MaZhiChao, ZhiChao Ma. 2017. The impact of partner similarity on alliance management capability, stability and performance. *International Journal of Physical Distribution & Logistics Management* 47:9, 906-926. [[Abstract](#)] [[Full Text](#)] [[PDF](#)]
2. Margaretha Gansterer, Richard F. Hartl. 2017. Collaborative vehicle routing: a survey. *European Journal of Operational Research* . [[Crossref](#)]
3. Weihua Liu, Xuan Zhao, Ou Tang, Haitao Xu. 2017. Impacts of demand and supply factors on the capacity scheduling performance of logistics service supply chain with mass customisation service modes: an empirical study from China. *Production Planning & Control* 28:9, 727-743. [[Crossref](#)]
4. . 9 Intermodal logistics 169-191. [[Crossref](#)]
5. Nikolai Kramer. Die Dynamische Beschaffungsfähigkeit von Kontraktlogistikunternehmen 35-54. [[Crossref](#)]
6. Michael Dirksen, Gaelle Magnin. 2017. Evaluation of synergy potentials in transportation networks managed by a fourth party logistics provider. *Transportation Research Procedia* 25, 824-841. [[Crossref](#)]
7. Carl Marcus Wallenburg, Thorsten Schäffler. 2016. Performance measurement in horizontal LSP cooperation as a field of conflict: the preventive role of collaborative processes. *Logistics Research* 9:1. . [[Crossref](#)]
8. Feng Yang, Mingming Yang, Qiong Xia, Liang Liang. 2016. Collaborative distribution between two logistics service providers. *International Transactions in Operational Research* 23:6, 1025-1050. [[Crossref](#)]
9. Per J. Agrell, Johan Lundin, Andreas Norrman. 2016. Horizontal carrier coordination through cooperative governance structures. *International Journal of Production Economics* . [[Crossref](#)]
10. Stefanie Dorn, Bastian Schweiger, Sascha Albers. 2016. Levels, phases and themes of cooptition: A systematic literature review and research agenda. *European Management Journal* 34:5, 484-500. [[Crossref](#)]
11. H. Mirzahosseini, R. De Souza, J. Ang. Urban logistics using performance based metrics 105-109. [[Crossref](#)]
12. Jason Monios, Rickard Bergqvist. 2016. Drivers for vertical integration in the rail sector – using wagons as “relationship specific assets”. *The International Journal of Logistics Management* 27:2, 533-551. [[Abstract](#)] [[Full Text](#)] [[PDF](#)]
13. Frank van den Heuvel, Karel van Donselaar, Peter de Langen, Jan Fransoo. 2016. Co-Location Synergies: Specialised Versus Diverse Logistics Concentration Areas. *Tijdschrift voor economische en sociale geografie* 107:3, 331-346. [[Crossref](#)]
14. Lotte Verdonck, Patrick Beullens, An Caris, Katrien Ramaekers, Gerrit K Janssens. 2016. Analysis of collaborative savings and cost allocation techniques for the cooperative carrier facility location problem. *Journal of the Operational Research Society* 67:6, 853-871. [[Crossref](#)]
15. E. David Zepeda, Gilbert N. Nyaga, Gary J. Young. 2016. Supply chain risk management and hospital inventory: Effects of system affiliation. *Journal of Operations Management* 44, 30-47. [[Crossref](#)]
16. Lisa Brekalo, Sascha Albers. 2016. Effective logistics alliance design and management. *International Journal of Physical Distribution & Logistics Management* 46:2, 212-240. [[Abstract](#)] [[Full Text](#)] [[PDF](#)]
17. Jason Monios. 2015. Identifying Governance Relationships Between Intermodal Terminals and Logistics Platforms. *Transport Reviews* 35:6, 767-791. [[Crossref](#)]

18. Vasco Sanchez Rodrigues, Irina Harris, Robert Mason. 2015. Horizontal logistics collaboration for enhanced supply chain performance: an international retail perspective. *Supply Chain Management: An International Journal* **20**:6, 631-647. [[Abstract](#)] [[Full Text](#)] [[PDF](#)]
19. Jason Monios, Rickard Bergqvist. 2015. Using a “virtual joint venture” to facilitate the adoption of intermodal transport. *Supply Chain Management: An International Journal* **20**:5, 534-548. [[Abstract](#)] [[Full Text](#)] [[PDF](#)]
20. Jan Simon Raue, Andreas Wieland. 2015. The interplay of different types of governance in horizontal cooperations. *The International Journal of Logistics Management* **26**:2, 401-423. [[Abstract](#)] [[Full Text](#)] [[PDF](#)]
21. Silvia Bellingkrodt, Carl Marcus Wallenburg. 2015. The role of customer relations for innovativeness and customer satisfaction. *The International Journal of Logistics Management* **26**:2, 254-274. [[Abstract](#)] [[Full Text](#)] [[PDF](#)]
22. Renuka Garg, Manish Sidhpuria. 2015. Strategic interventions to enhance competitiveness: a case of Surat zari industry in India. *AI & SOCIETY* **30**:2, 235-249. [[Crossref](#)]
23. Elena Pérez-Bernabeu, Angel A. Juan, Javier Faulin, Barry B. Barrios. 2015. Horizontal cooperation in road transportation: a case illustrating savings in distances and greenhouse gas emissions. *International Transactions in Operational Research* **22**:3, 585-606. [[Crossref](#)]
24. Jason Monios. 2015. Integrating intermodal transport with logistics: a case study of the UK retail sector. *Transportation Planning and Technology* **38**:3, 347-374. [[Crossref](#)]
25. Lamis E. Amer, Amr B. Eltawil. Analysis of quantitative models of horizontal collaboration in supply chain network design: Towards green collaborative; strategies 1-10. [[Crossref](#)]
26. Jeff Shockley, Gary Fetter. 2015. Distribution co-opetition and multi-level inventory management performance: An industry analysis and simulation. *Journal of Purchasing and Supply Management* **21**:1, 51-63. [[Crossref](#)]
27. Francesco Pomponi, Luciano Fratocchi, Silvia Rossi Tafuri. 2015. Trust development and horizontal collaboration in logistics: a theory based evolutionary framework. *Supply Chain Management: An International Journal* **20**:1, 83-97. [[Abstract](#)] [[Full Text](#)] [[PDF](#)]
28. B. Adenso-Díaz, S. Lozano, S. Garcia-Carbajal, K. Smith-Miles. 2014. Assessing partnership savings in horizontal cooperation by planning linked deliveries. *Transportation Research Part A: Policy and Practice* **66**, 268-279. [[Crossref](#)]
29. Eugen Truschkin, Ralf Elbert, Armin Günter. 2014. Is transport subcontracting a barrier to modal shift? Empirical evidence from Germany in the context of horizontal transshipment technologies. *Business Research* **7**:1, 77-103. [[Crossref](#)]
30. Carl Marcus Wallenburg, Thorsten Schäffler. 2014. The Interplay of Relational Governance and Formal Control in Horizontal Alliances: A Social Contract Perspective. *Journal of Supply Chain Management* **50**:2, 41-58. [[Crossref](#)]
31. Paul Buijs, J.C. (“Hans”) Wortmann. 2014. Joint operational decision-making in collaborative transportation networks: the role of IT. *Supply Chain Management: An International Journal* **19**:2, 200-210. [[Abstract](#)] [[Full Text](#)] [[PDF](#)]
32. Jan Simon Raue, Carl Marcus Wallenburg. 2013. Alike or not? Partner similarity and its outcome in horizontal cooperations between logistics service providers. *Logistics Research* **6**:4, 217-230. [[Crossref](#)]

33. Henrik Sternberg, Tim Germann, Thorsten Klaas-Wissing. 2013. Who controls the fleet? Initial insights into road freight transport planning and control from an industrial network perspective. *International Journal of Logistics Research and Applications* 16:6, 493-505. [[Crossref](#)]
34. Silvia Bellingkrodt, Carl Marcus Wallenburg. 2013. The Role of External Relationships for LSP Innovativeness: A Contingency Approach. *Journal of Business Logistics* 34:3, 209-221. [[Crossref](#)]
35. ###. 2012. The relationship between service oriented alliance motivation, partner selection, alliance performance and market performance on logistics MNEs in China. *Journal of Korea Service Management Society* 13:5, 255-277. [[Crossref](#)]
36. Qin Zhu, Richard Y.K. Fung. Design and analysis of optimal incentive contracts between fourth-party and third-party logistics providers 84-89. [[Crossref](#)]
37. Sascha Albers, Thorsten Klaas-Wissing. 2012. Organisation of multilateral LTL alliances. *International Journal of Logistics Research and Applications* 15:3, 181-198. [[Crossref](#)]
38. Christina Schmolzi, Carl Marcus Wallenburg. 2012. Operational Governance in Horizontal Cooperations of Logistics Service Providers: Performance Effects and the Moderating Role of Cooperation Complexity. *Journal of Supply Chain Management* 48:2, 53-74. [[Crossref](#)]
39. R. Glenn Richey, Frank G. Adams, Vivek Dalela. 2012. Technology and Flexibility: Enablers of Collaboration and Time-Based Logistics Quality. *Journal of Business Logistics* 33:1, 34-49. [[Crossref](#)]