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Alike or not? Partner similarity and its outcome in horizontal cooperations between logistics service providers

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Abstract Despite the increasing importance of horizontal cooperations between logistics service providers (LSPs), little research has been conducted on the optimal set up and management of these cooperations. As their performance depends significantly on the partner fit between cooperating LSPs, this research outlines and tests the impact of partner similarity on the outcome of horizontal LSP cooperations. In doing so, transaction cost economics is combined with a conceptual framework based on the two opposing forces inherent in horizontal cooperations, namely (1) competition and (2) common understanding and compatibility. A theoretically derived model is examined based on data from 220 LSP cooperations using structural equation modeling. It turns out that the similarity dimensions considered (competences, geographic markets, and corporate cultures) vary in their influence on the two intermediate outcomes (cooperation innovativeness and cooperation commitment) and the ultimate outcome of LSP cooperations (overall cooperation performance). The strength of these influences depends on the scope of the cooperation, i.e., the breath of business functions involved into cooperation activities. The findings help managers of LSPs in choosing partners and achieving horizontal LSP cooperations among more adequately fitting LSPs.

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1 Introduction

To successfully compete on today's logistics market, logistics service providers (LSPs) need to meet complex customer requirements [13], such as offering global solutions resulting from globally outspread manufacturing and distribution structures [40, 51]. While customers typically select LSPs, which offer high service quality and flexibility [1, 43], many customers also expect LSPs to be innovative and to develop new solutions [3]. Furthermore, customers demand superior efficiency from their LSPs, since efficiency is a major driver for logistics performance [24]. An effective way for LSPs to meet these demands is horizontal cooperation with other, possibly competing LSPs. By combining resources and competences of potential competitors, LSPs are able to offer larger service packages, reach more customers, use facilities more efficiently, and develop and provide innovative solutions [9, 14, 39, 70].

However, insights into which LSPs fit well together when forming a horizontal cooperation are still lacking. In contrast to vertical cooperations between shippers and LSPs, where partner characteristics relevant for a good partner fit have been studied widely (e.g., [31, 42, 82, 84]), the corresponding partner fit for horizontal LSP cooperations has so far been neglected. Nevertheless, the criteria determining good partner fit are likely to differ substantially between vertical and horizontal logistics cooperations, as horizontal cooperations are affected by the ambiguity of being potential competitors and, at the same time, having to maintain a certain degree of common

understanding and compatibility to carry out joint activities [5, 59].

Regarding partner fit in horizontal cooperations, in particular, the degree of similarity between the parties is of particular importance [33]. Following the rationales of Norman [53] and Reuer et al. [64], similarity between cooperating LSPs affects opportunism and coordination as two important elements of transaction cost economics via the strength of the two opposing forces inherent in horizontal cooperation: competition as well as the need for common understanding and compatibility. For a good partner fit, cooperations require partners with similar characteristics on certain dimensions and different characteristics on other dimensions [38, 68]. Correspondingly, studies on inter-firm cooperations in different industries find positive as well as negative effects induced by the degree to which partners are similar along various dimensions [46, 67, 68, 73]. However, in spite of the high relevance of horizontal LSP cooperations—about 60 % of LSPs are engaged in them [70]—there is no empirical research on the influence of partner similarity on the outcome of these LSP partnerships.

Further, little is known about the context dependency of the effects of partner similarity. In particular, the cooperation scope, i.e., the breath of business functions involved into cooperation activities, as one of the most important cooperation characteristics [37] is likely to influence the outcome effects of partner similarity through the two opposing forces. Nevertheless, no research exists about this context dependency.

To close this research gap, we analyze horizontal LSP partnerships and hypothesize the outcome effects of three dimensions of partner similarity that are particularly relevant to the structural set up of cooperations (competences, geographic markets, and corporate cultures). Furthermore, we investigate how these outcome effects are affected by the cooperation scope. Complementing the theoretical deliberations, a confirmatory empirical approach is employed using structural equation modeling with data from 220 LSPs engaged in horizontal cooperations (explicitly excluding subcontracting and relationships between business units of the same company group or conglomerates).

2 Theoretical foundations

In this section, we introduce the focal constructs of this study and outline a conceptual basis. In particular, we first derive three dimensions of partner similarity relevant for the structural set up of cooperations. Next, three relevant outcome dimensions of horizontal cooperations between LSPs are introduced. Finally, a conceptual framework is developed based upon the transaction cost economics [83] and the theoretical framework of Park and Ungson [59], which builds on the two opposing forces of (1) competition and (2) common understanding and compatibility, which are inherent in all horizontal cooperations.

2.1 Dimensions of partner similarity

In cooperation and alliance research, different aspects of partner similarity have been analyzed [46, 67, 73]. Still, insights lack regarding which similarity dimensions are most relevant. To focus on the similarity dimensions most important for the set up of horizontal cooperations, we base our research on the comprehensive Klint and Sjöberg [41] model, which comprises eight structural factors for the general design of inter-firm cooperation. While five of the factors describe the general organizational set up, three factors ("complementarity," "importance of the region/district," and "social structure") specifically refer to the similarity of the involved parties. Consequently, based on this cooperation framework, we conclude three similarity dimensions of cooperating LSPs to be relevant and incorporate them in our model. The first *competence similarity* captures the degree of overlap in the business activities and core competencies between the cooperation partners [35, 79]. The second dimension *geographic similarity* captures the degree of overlapping geographical coverage between the cooperation partners [11]. The third dimension *cultural similarity* captures the similarity of corporate culture and operational management style [35].

2.2 Outcome of LSP cooperation

Assessing the success of a horizontal cooperation has proven elusive [59]. While for this purpose, a financial figure may be desired, the corresponding measurement is very difficult, as the financial effects of cooperation are not immediately observable and very complex to allocate [27, 69]. In addition, a pure financial measure cannot reflect the wide array of possible results LSPs expect from their horizontal cooperation activities as these range from increased operational efficiency to access to new markets and increases in service quality [14, 70]. Consequently, we use an established comprehensive perspective on ultimate performance [2] and include the *overall cooperation performance* as the degree to which the cooperation meets its goals and is beneficial for the cooperating firms [34, 61].

As previous research has shown, the ultimate performance of horizontal LSP cooperations is mainly driven by two intermediate outcome dimensions, namely cooperation innovativeness and cooperation commitment [71, 74]. Consequently, we include both (1) *cooperation innovativeness* and (2) *cooperation commitment* as key mediating

variables in our model. Not only for LSP cooperations [74], but also for the logistics context in general, empirical studies (e.g., [25] show innovativeness to positively impact firm success. Cooperation innovativeness describes the cooperation's capability of developing or adopting new services and business processes; in that sense, it comprises both the intent to be innovative and the actual innovation outcome [8].

Cooperation commitment is the second intermediate outcome dimension driving the ultimate performance of horizontal LSP cooperations [71]. Cooperation commitment is crucial to the success not only of horizontal LSP cooperations but also of vertical cooperations in the logistics context [48]. Commitment refers to the willingness of the partners to maintain the respective relationship [49] and is the basis for stable und successful inter-firm partnerships [52, 61].

2.3 The two opposing forces of competition and common understanding

With the aim to enhance the theoretical understanding of horizontal cooperations, we base our conceptual framework on transaction cost economics and the theoretical foundations of alliance failure developed by Park and Ungson [59]. Park and Ungson identify two main aspects to be especially relevant for cooperation success: competition, and common understanding and compatibility. While competition between the LSPs increases opportunism and hampers collaboration, common understanding and compatibility between the companies facilitates coordination and helps to overcome challenges posed by the managerial complexity typical for cooperations [59]. These two opposing forces are inherently present in all horizontal cooperations and constitute the foundation of our later hypotheses development.

Competition as the first force, which is potentially present between cooperating LSPs, fosters opportunistic behavior of firms involved in a horizontal cooperation [5, 57, 77] and increases transaction costs [59]. Therefore, it has negative cooperation outcomes. In particular, uncontrolled information disclosure constitutes a key problem [7, 57], because the protection of specific know-how proves to be difficult in horizontal relationships—and particularly in service settings [65]. Taking into account that (a) cooperating LSPs are likely to have the opportunity to gain access to the cooperation partner's customer data and that (b) an unauthorized usage of these data outside the cooperation can, in most cases, not be sanctioned effectively, the risk of opportunistic behavior poses a big challenge. Following Bresser [7], potentially competing LSPs within a horizontal cooperation will accordingly face a particularly strong temptation to behave opportunistically, as sensitive information (e.g., specific customer data) from the cooperation partner is of high value for them. Logistics services—like services in general—are characterized by close interaction between service consumption and service delivery as well as and high customer involvement into the value creation process [75]. Additionally, in the service sector, it is difficult to protect intellectual property [75] .

The value of this sensitive information as well as the resulting risk of opportunistic behavior among simultaneously cooperating and competing LSPs is particularly high, when they operate in similar submarkets and deliver similar services. Sharing detailed market knowledge and disposing of similar capabilities puts directly competing LSPs in an especially advantageous position to utilize competitor's information, i.e., to identify, appreciate, and assimilate the cooperation partner's know-how and technologies with particular ease [12, 57]. While not uncommon, such horizontal cooperations that entail directly competing LSPs, therefore, face a particularly strong risk of opportunistic behavior.

This increased risk of opportunistic behavior has a negative impact on the intermediate outcomes of horizontal LSP cooperations, as it hampers both innovativeness [74] and commitment [71]. Innovative outputs of cooperations in the service sector require trustful inter-personal and inter-firm relationships [65]. Opportunism, however, destroys the basis for innovative developments, leading cooperation partners to expropriate proprietary technology, to withhold or distort information, and to misrepresent one's abilities and competences [86].

In terms of cooperation commitment and the corresponding alignment of the cooperation partners' strategic interests, competing LSPs will have less interest in the longevity of the cooperation and more interest in what they themselves can get out of the cooperation on the short term [86]. Consequently, competitive tensions and opportunism between cooperating parties will lead to a decrease in cooperation innovativeness and cooperation commitment.

Contrasting these negative effects of competition, the second force *common understanding and compatibility* has a positive functionality. It reduces transaction costs by helping to cope with managerial complexity inherent in inter-firm cooperation, as it facilitates coordination of cooperation activities [59], which, in turn, has a positive effect on cooperation outcome.

Managerial complexity and the resulting coordination problems may stem from three different sources: the complexity of the activities themselves, information processing impediments caused by incompatible organizational structures and processes, and cultural differences between the cooperating organizations [17, 28, 59]. In the logistics service context, all three aspects are particularly relevant in horizontal cooperations: First, LSPs

cooperations involve, for example, challenging information processing as cooperating LSPs need to manage intensive inter-firm flows of information [15] with respect to operational data (e.g., information regarding transport and warehousing operations) as well as data concerning supporting activities (e.g., clearance information or invoices). Second, LSP cooperations typically involve both central and decentral decision-making authorities that result in incongruent structures and processes. Third, LSP cooperations comprise a large cultural variety, as cooperation partners may originate from different regions and differ in their corporate cultures. These corresponding coordination problems can be overcome by common understanding and high compatibility among the cooperating LSPs—especially with respect to procedural capabilities and to shared norms and values [68].

In horizontal cooperations, common understanding and compatibility positively influence both intermediate outcome variables: innovativeness [74] and commitment [76]. Innovativeness is improved, as common understanding and compatibility provide interoperability, help to find a common ground, and ensure a pragmatic understanding of the business needs of each party, which are particularly important for developing new services [65]. Furthermore, common understanding ensures knowledge mobility by motivating partnering firms "to participate and openly share valuable knowledge (while preventing undesirable spillovers to competitors)" [22]. Thus, the distributed resources within the cooperation can be mobilized and efficiently deployed toward innovation activities.

Also, cooperation commitment in horizontal cooperations is facilitated by common understanding and compatibility and the resulting better coordination. Using data from a different service industry, Theron et al. [76] support that having the same view on business practices and sharing the same business values increase relationship commitment in inter-firm relationships. In particular, common understanding facilitates coordination [74], as it ensures information sharing and communication between the cooperating parties. These, in turn, promote the realization of mutual benefits, reduce misunderstanding, conflict, and uncertainty [10, 47], and, therefore, drive cooperation commitment. Following the above argumentation, the positive outcome effects of common understanding and compatibility are particularly strong in cooperations with high managerial complexity, which is the case in LSP cooperations.

In sum, these two forces inherent to horizontal cooperations—competition on the one hand and common understanding and compatibility on the other hand—are crucial factors with respect to innovation and commitment within LSP cooperations and, in turn, also to overall performance. While competition has a negative effect on cooperation outcomes, common understanding and compatibility have a positive effect.

3 Hypotheses development

3.1 Outcome effects of partner similarity

Transaction cost economics on the one hand and the outlined two opposing forces of competition and common understanding and compatibility on the other hand are the theoretical foundations that link partner similarity to cooperation outcome. As partner similarity may have both effects: (1) increased competition and (2) fostered common understanding and compatibility, it has the potential to be both detrimental and beneficial for a horizontal LSP cooperation.

Which of the two opposing forces prevail, depends on the context. And therefore, following contingency theory [19], the outcome of the cooperation will be superior when the partner similarity fits the specific cooperation context. One especially relevant contextual factor in this respect is the cooperation scope.

While cooperation scope may refer to different dimensions, we view its most accessible and also relevant dimension, the functional scope. Functional scope refers to the breath of business functions involved in cooperation activities [54]. The different business functions involved into cooperation are a major characteristic of every cooperation, and, accordingly, cooperation research has dealt with its implications. Here, in particular, the concentration of business functions within cooperation activities (i.e., how many functions are involved in the cooperation) has received attention from cooperation research in general [20] as well as from research dealing with horizontal LSP cooperations [70]. Cooperations with a focused scope involve only very few business functions into the cooperation activities and often concentrate on one clearly dominating field of collaboration, e.g., joint service production. At the other end of the spectrum, cooperations with a broad scope are characterized by a substantial involvement of multiple business functions (e.g., service production, marketing and sales, and procurement) and correspond to the "quasi-concentration cooperation" introduced by Dussauge and Garrette [20] and confirmed by Schmoltzi and Wallenburg [70].

In cooperations with a focused scope, the force of competition is of greater influence, because—as outlined by Norman [53]—companies cooperating only in one business function are more likely to compete outside the cooperation activities than those cooperating in various different functions. For example, it is more likely that companies only maintaining joint purchasing activities are

stronger competitors on the market place than those that also share joint operations and joint marketing activities. In this respect, horizontal cooperations with a focused scope provide the basis for more private benefits (outside the cooperations) and less common benefits (inside the cooperation), from which cooperations partners are benefitting jointly. This pattern has been shown by Khanna [37] for learning cooperations. Further, Norman [53] shows that high-tech firms in focused cooperations behave more protectively concerning their knowledge.

Regarding the second force, common understanding and compatibility, we conclude a different pattern. While competition is of greater influence in focused cooperations, broad cooperations have a more pronounced need for common understanding and compatibility, as they are more complex to manage [64]. These cooperations involve more functions and, with that, more different professional backgrounds that have to be accounted for. Furthermore, the information processing needs are more extensive and more frequent due to the broad involvement of multiple business functions. Here, common understanding and compatibility are vital to facilitate coordination.

From the above argumentation, it can be concluded that in focused cooperations, the competition-related effect of each similarity dimension will be enhanced and dominating, while the coordination-related effect of common understanding only plays a minor role. In contrast, for broad cooperations, it can be concluded that the coordination-related effect will be dominating, while the aspect of competition only plays a subordinate role.

Consequently, in focused cooperations, the effect of partner similarity on innovativeness and commitment will depend on the degree to which the specific similarity dimensions increase or reduce competition, while in broad cooperations, the effect will depend on the degree to which similarity increases or reduces common understanding. The conceptual model derived on this reasoning is displayed in Fig. 1.

Competence similarity, on the one hand, increases competition in a cooperation, as this similarity enables firms to adapt critical know-how from their partners more easily [12]. Furthermore, the know-how adapted is of higher value for these firms, as it can directly be applied to improve own processes and services. Accordingly, Dussauge et al. [21] suggest that firms can use cooperations with partners with a similar knowledge base to acquire know-how in areas where in which they have deficiencies.

On the other hand, competence similarity fosters common understanding and compatibility. First, it enables a common understanding of the jointly performed operations [68], which is highly beneficial, as delivering joint logistics services is a rather complex task. Second, competence similarity facilitates extensive exchange of information between the firms [15] through increased operational compatibility between the organizations. For example, IT interfaces to exchange operational information will be easier to manage when partnering LSPs deal with similar types of data.

Based on this reasoning that competition hampers innovativeness and commitment in LSP cooperations and that in focused cooperations competition will be the dominating issue, it can be concluded that competence similarity, which induces increased competition, will be detrimental for innovativeness and commitment. In contrast, in broad cooperations, where the aspect of coordination via common understanding and compatibility is stronger, competence similarity, which is also a driver of common understanding and compatibility, will be beneficial for innovativeness and commitment. Thus, we hypothesize:

H1 a/b: The effect of competence similarity on (a) innovativeness and (b) commitment is negative in LSP cooperations with a focused scope and is positive in LSP cooperations with a broad scope.

Geographic similarity, on the one hand, increases competition between cooperating parties. The risk of customer enticement through potential competitors increases when each of the cooperating parties already offers services in the same region. For LSPs already maintaining operations in regions close to potential future customers, new assignments are easier to serve as existent facilities can be used or extended. Thus, these assignments, and consequently their enticement, are much more attractive.

On the other hand, cooperating firms serving the same geographical regions are likely to have a common understanding and compatibility concerning local market knowledge and with respect to their regional cultural background. In the same vein, existent research suggests that cooperations between partners from same regions have less misunderstandings and more efficient communication [38, 58].

Geographic similarity drives competition and, therefore, potentially has negative outcome effects, while it also increases common understanding, and through this has potentially positive outcome effects. Consequently, the general pattern in focused versus broad cooperations is similar to that of the competence similarity dimension. The negative effects of competition will become more pronounced and will prevail in focused cooperations, while the positive effect of common understanding will be magnified and dominate in broad LSP cooperations:

H2 a/b: The effect of geographic similarity on (a) innovativeness and (b) commitment is negative in LSP cooperations with a focused scope and is positive in LSP cooperations with a broad scope.

Cultural similarity differs from the two aforementioned similarity dimensions, as it reduces competitive tendencies

and in that way fosters innovativeness [74] and commitment. Compatible corporate cultures provide the basis for shared norms and values and foster trust within the cooperation [78]. This reduces the tendency of opportunistic behavior [72] and facilitates improved collaboration.

Further, cultural similarity enhances common understanding and compatibility and reduces conflicts between the LSPs [81]. Studies in other industries have shown that similarity of organizational cultures positively influences the ability to realize synergetic potential [67, 68]. In particular, information transfer is facilitated by higher cultural similarity between partnering firms. Having the same cultural foundation opens communication channels and enhances communication and information exchange [44].

Consequently, as cultural similarity reduces competition and increases common understanding and compatibility, it will have positive outcome effects on innovativeness and commitment in both focused and broad LSP cooperations:

H3 a/b: The effect of cultural similarity on (a) innovativeness and (b) commitment is positive in LSP cooperations both with focused and with broad scope.

3.2 Drivers of cooperation performance

The performance of the cooperation as the ultimate outcome of cooperation activities in LSP cooperations is driven by two intermediate outcome dimensions, namely innovation and commitment as displayed in Fig. 1 and outlined in the following.

Innovation is a general driver for the success of organizations. The development of new products and services enables business units, single companies, and networks of autonomous organizations to gain competitive advantages necessary to compete in their markets [18, 36]. In particular, the ability to adapt to new economical challenges and changes in customer demand more easily and the access to new markets [25] are main success factors of innovative organizations. Also, in the logistics and LSP context, innovation is considered a major lever for organizational performance: Daugherty et al. [18] find a positive relationship between logistics service innovation capabilities and market performance on the firm level in the manufacturing industry. Moreover, for LSP inter-firm relationships, innovation is an antecedent of relationship performance as it drives performance in vertical cooperations between LSPs and their customers [55], and in horizontal cooperations between LSPs [74]. Thus, we assume innovativeness to positively affect overall cooperation performance.

This effect, however, is also contingent: As cooperations with broad scope are more complex and difficult to coordinate [64, 71], more managerial energy is absorbed to handle these challenges. Consequently, less energy can be dedicated toward commercializing innovations and, in that sense, turning innovativeness into tangible outcomes. Hitt et al. [32] find that the highest level of collaboration possible between organizations—horizontal integration through mergers and acquisition—is destructive for guiding innovations into commercial success, as managers have to dedicate their energy toward the coordination of this complex organizational form. Further, increased size and diversification of cooperation activities may affect manager's time and risk orientation toward championing innovations negatively [32]. In this sense, we argue that in focused cooperations, innovativeness will have a stronger positive effect on overall cooperation performance than in broad cooperations:

H4: Cooperation innovativeness has a positive impact on cooperation performance which is stronger in LSP

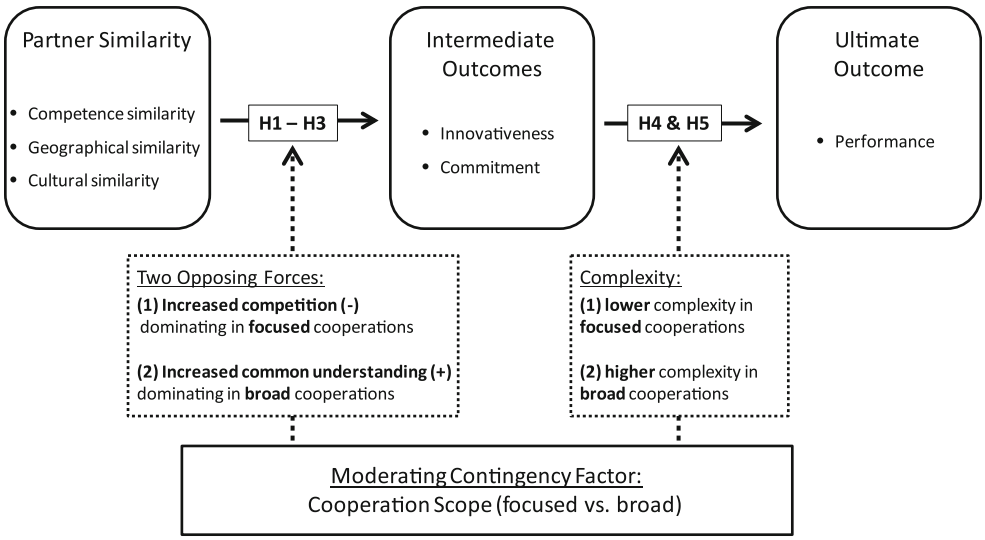

Fig. 1 Research model

cooperations with a focused scope than in ones with a broad scope.

Commitment as the second intermediate outcome dimension positively influences overall cooperation performance in different cooperation settings [61, 68]. Carbone and Stone [9] and Schmoltzi and Wallenburg [71] confirm the positive impact of cooperation commitment on performance also for the logistics industry. In particular, commitment facilitates coordination and communication with respect to cooperation activities [16, 50] for two main reasons. As outlined by Schmoltzi and Wallenburg [71], commitment evolving from repeated interactions over time provides a relational norm of mutual responsibility, and second, it engenders both benefits and liabilities [26] and, thus, strengthens relational ties of "allegiance and faithfulness" [45]. Apart from facilitating everyday cooperation activities, commitment also has a positive long-term effect, as it ensures relationship stability [85] and durability [50]. Perry et al. [61] argue that highly committed cooperation partners are willing to invest into relationship-specific assets, which increases the costs of terminating the cooperation and engaging in an alternative partnership. Consequently, these investments will motivate partners to take all measures necessary to foster cooperation success [61]. Accordingly, Schmoltzi and Wallenburg [71] have shown commitment to drive cooperation performance in horizontal LSP cooperations.

Cooperation commitment is especially helpful in broad cooperations, as it counters the management challenges present in these more complex settings. It facilitates coordination and allows for simpler and cheaper monitoring systems [68]. This conclusion has been shown by Shah and Swaminathan [73] who find evidence that commitment in general gains in importance in cooperations that are characterized by high levels of communication and coordination and specifically for the LSP cooperation context by Schmoltzi and Wallenburg [71]. Thus, it can be hypothesized:

H5: Cooperation commitment has a positive impact on cooperation performance which is weaker in LSP cooperations with a focused scope than in ones with a broad scope.

4 Methodology

4.1 Sampling and data collection

Data for hypotheses testing were collected through a web-based questionnaire sent to executive managers of LSPs, who are well qualified to answer, as, due to the small size of the LSPs (median company size in our sample is 100 employees), horizontal LSP cooperations mostly lay in the responsibility of the top management. For the sampling, a commercial company database was used which contains German firms with an annual revenue of more than 1 million Euro (approx. US$ 1.3 million). We identified LSPs with legal entities in Germany as potential respondents and obtained valid email addresses for 3,686 LSPs, which received an invitation to the survey.[1] We obtained 426 responses, which equates to a response rate of 11.6 %. This rate is common for comparable sample sizes [80]. A total of 32 responses were not used for the analyses because they were incomplete. From the remainder, 220 responses originate from LSPs engaged in at least one horizontal LSP cooperation, whereas 174 responses originate from LSPs that did not cooperate horizontally with other LSPs. Corresponding to our research aim, the latter responses were also not included in the following analyses.

To ensure that the responses are representative for the whole sample, we tested for a potential non-response bias via three methods [80]. First, company demographics of responding firms were compared to those of non-responding ones using available data from the company database. Second, survey data from early and late respondents were compared [4]. Third, a follow-up study with 250 randomly selected non-respondent companies was conducted to investigate cooperation propensity and company demographics and compare them to the primary participants. No method indicated significant differences.

If independent and dependent variables are collected via the same method (in our case a survey filled out by one key informant per company), this common method can inflate the effect sizes. To rule this out, we controlled for common method bias following several procedures [62]. First, we warranted respondent's anonymity and stressed out that there were no right or wrong answers. In addition, response formats varied across the questionnaire. Moreover, we conducted Harman's [29] single factor test as a statistical measure. As a second statistical measure, we used a marker variable which is theoretically uncorrelated to at least one variable of the conceptual model [62]. The lowest correlation of the marker variable to the items of the focal constructs was 0.001 ($p > 0.983$), representing the upper bound for a potential common method variance. Consequently, both statistical tests indicate that common method effects are not relevant in this research (Table 1).

[1] Underlying was a broad perception of LSP which includes all service offerings that range from basic logistics, like transportation services, to the provision of complex services bundles and logistics solutions.

Table 1 Firm demographics of respondents

Sales revenue (in €)	*N*	%
1–5 million	38	17.3
>5–25 million	85	38.6
>25–100 million	47	21.4
>100–500 million	30	13.6
>500 million–5 billion	15	6.8
>5 billion	5	2.3
Total	220	100

4.2 Measurement model

The measurement of the latent variables (constructs) relied upon multi-item 7-point scales derived from logistics and strategic management literature. They are displayed in the Appendix and were pretested with logistics researchers and nine CEOs of LSPs to ensure face validity. Respondents were asked to relate their answers through the whole questionnaire to the same particular cooperation. Overall cooperation performance was based on the established performance scale of Saxton [69]. It captures achievement of goals, whether the cooperation has contributed to competitive advantage, and satisfaction with the overall performance, which reflects whether expectations have been met. Cooperation commitment was captured based on Perry et al. [61]. The scale identifies the attitude toward long-term investments, resource dedication, and cooperation-specific sacrifices. Cooperation innovativeness was measured via a scale developed by Calantone et al. [8], which was adapted to the logistics context.

Due to the concreteness of the three similarity dimensions, we decided to apply two-item scales for competence and cultural similarity, and a single-item scale for geographic similarity. If objects of constructs are concrete in nature and consist only of one or few components, it is preferable to apply simple measures reflecting this low number of components [66]. Here, additional items would run the risk of tapping into other predictive attributes [6]. The competence similarity scale draws on Saxton [69], and Van de Ven and Walker [79] and captures the similarity concerning core competencies and service portfolios of the cooperating parties. Geographic similarity was captured by measuring to which extent the cooperation partners are operating in the same geographical regions [11]. For cultural similarity, a scale based on Kale et al. [35] was applied assessing the similarity of the management and operating styles and their organizational cultures.

Cooperation scope was measured by asking respondents to distribute 100 points to the business functions involved in the cooperation's value creation according to their respective value contribution based on a list of seven business functions. Corresponding to Porter and Fuller [63], these functions are production, marketing and sales, procurement, human resources, research and product development, IT and administration, and finance and accounting. The sample was divided into one subgroup with clear functional focus, where one business function (e.g., marketing and sales) accounts for more than 70 % of the cooperation's total value creation and a second subgroup with broad functional scope where no business functions accounts for more than 70 % of the cooperation's value creation.

To ensure reliability and validity of the measurement, we conducted different analyses using SPSS and Amos. All Cronbach's alpha values were well above the suggested 0.7. In addition, the confirmatory factor analysis showed good model fit as indicated by key fit indices ($\chi^2/df = 1.497$, CFI = 0.973, TLI = 0.963, and RMSEA = 0.047). All factor loadings are significant at $p < 0.001$, supporting convergent validity. In addition, the average variance extracted (AVE) for all constructs exceeded 0.5 and the composite reliabilities exceeded 0.7 and with that the recommended thresholds. Further, for all constructs, the Fornell and Larcker [23] criterion indicated discriminant validity as in all instances the AVE for any construct was substantially higher than the squared correlation of that construct and any other construct.

4.3 Controls

To control other relevant antecedents and rule out potential omitted variable bias, we added the two variables (formalization and mutual influence) that had been shown by Steinicke et al. [74] and by Schmoltzi and Wallenburg [71] to be strong drivers of innovativeness and commitment in horizontal LSP cooperations. Both variables were included in our structural model reported below.

4.4 Hypotheses test results

To evaluate that the structural model, which is used to test the hypotheses H1 to H5 and able to provide reliable results, also the fit of the structural model was assessed applying different indices. All values indicate adequate model fit ($\chi^2/df = 1.459$, CFI = 0.927, TLI = 0.908, RMSEA = 0.046).

As displayed in Table 2, the results of the empirical model indicate that, mostly consistent with *H1a* and *H1b*, competence similarity has a significant positive impact on cooperation innovativeness (0.39; $p < 0.01$) and on cooperation commitment (0.25, $p < 0.05$) when cooperation scope is broad, while for focused cooperations, the effects

Table 2 Results of moderation analyses for cooperation scope

Cooperation scope	Focused ($N = 55$) Standardized path coefficient	Broad ($N = 165$)	Significance of difference in path coefficient	Hypothesis
Competence Sim. → Innovativeness ($H1_a$)	−0.25	0.39***	$p < 0.001$	Support
Competence Sim. → Commitment ($H1_b$)	0.02	0.25**	$p < 0.001$	Partial support
Geographic Sim. → Innovativeness ($H2_a$)	−0.20	0.24***	$p < 0.001$	Support
Geographic Sim. → Commitment ($H2_b$)	−0.08	0.18**	$p < 0.001$	Support
Cultural Sim. → Innovativeness ($H3_a$)	0.23	0.18***	$p < 0.001$	Support
Cultural Sim. → Commitment ($H3_b$)	0.01	0.18**	$p < 0.001$	Partial support
Innovativeness → Performance (H4)	0.62***	0.29***	$p < 0.001$	Support
Commitment → Performance (H5)	0.14	0.41***	$p < 0.001$	Support
Controls				
Formalization→ Innovativeness	0.50*	0.34***		
Formalization → Commitment	0.16	0.51***		
Mutual Influence → Innovativeness	0.56**	0.24***		
Mutual Influence → Commitment	0.41**	0.31***		
Explained Variance (R^2)				
Innovativeness	46.4 %	37.5 %		
Commitment	16.1 %	44.7 %		
Performance	43.9 %	34.5 %		

*** Designates significance at 0.001 level, ** at 0.01 level, * at 0.1 level

are negative on innovativeness with −0.25 and close to zero on commitment 0.02 (the effect size differences between broad and focus cooperations are significant as indicated in Table 2).

Geographic similarity shows a similar—albeit not quite as pronounced—pattern: In broad cooperations, geographic similarity positively effects innovativeness (0.24, $p < 0.01$) and commitment (0.18, $p < 0.05$), whereas in focused cooperations, both effects are negative—on innovativeness (−0.20) and on commitment (−0.08). Again, the differences between both groups are significant ($p < 0.001$), providing support for both *H2a* and *H2b*.

Cultural similarity has—as hypothesized—a positive effect on innovativeness in both settings. In broad cooperations, the effect is 0.18 and in focused ones 0.23. The effect of cultural similarity on commitment in broad cooperations is also 0.18; in focused cooperations, the corresponding effect is close to zero (0.01) Thus, hypotheses *H3b* is fully supported and *H3b* partially.

Regarding the cooperation outcome and the intermediate roles of innovativeness and commitment, both *H4* and *H5* find support, as cooperation innovativeness is significantly stronger ($p < 0.001$) linked to overall cooperation performance in focused cooperations (0.62, $p < 0.001$) than in broad cooperations (0.29, $p < 0.001$), while the positive effect of cooperation commitment is much more pronounced in broad cooperations (0.41, $p < 0.001$) than in focused cooperations (0.14). For both interrelations innovation on performance and commitment on performance, differences between focused and broad cooperations are significant ($p < 0.001$).

For both types of cooperations, the model explains a substantial part of the variance of the dependent variables. As displayed in Table 2, the R^2 ranges between 16.1 and 46.4 % for the variables.

5 Discussion

5.1 Results interpretation

Previous research has shown the importance of partner fit in inter-firm cooperation: Already Sarkar et al. [68] point out that cooperations achieve better results when cooperation partners have similar characteristics on certain dimensions and different characteristics on other dimensions. Our research goes beyond identifying the outcome effects of partner similarity in just another industry. We rather build upon Transaction Cost Economics and the theoretical framework of Park and Ungson [59] in addressing the central roles of opportunism and coordination in horizontal LSP cooperations, which are particularly pronounced in the logistics industry where the danger of losing customers and innovations to potential competitors is high and business processes are rather complex [30].

Consistent with our theoretical model, the empirical results show that partner similarity has completely different effects in cooperations with a focused scope compared to cooperations with a broad scope, which supports Shah and Swaminathan [73] in that the context of the cooperation is decisive regarding how to achieve partner fit.

Consistent with our hypotheses, high similarity between LSPs with respect to competences and geographic set up with respect to innovativeness both are negative in focused cooperations. The impact of competence similarity on innovativeness is −0.30 and that of geographic similarity −0.23. Also, the effect of geographic similarity on commitment is negative (−0.08), while the corresponding effect of competence similarity is negligible at 0.02. The results indicate that, indeed, competitive tension is a managerial challenge in focused cooperations and with that are consistent with the finding Norman [53] did specifically for learning alliances. Contrasting this, in broad cooperations, the positive effects induced by increased common understanding and compatibility prevail: here competence similarity and geographic similarity have strong positive impacts on innovativeness (+0.39 respective +0.24) and on commitment (+0.25, respective +0.18).

Cultural similarity is—as hypothesized by us—never negative. This is consistent with Steinicke et al. [74], who used the same data set as we, but did not distinguish between focused and broad cooperations.

Innovativeness and commitment had already been shown by Steinicke et al. [74] and Schmoltzi and Wallenburg [71] to be strong drivers of cooperation performance in horizontal LSP cooperations. Here, our research expands these prior findings in showing that not only the performance effects of commitment are context dependent (see [71], butalso those of innovativeness. Our results support our argumentation that in focused LSP cooperations, less managerial energy is necessary for the coordination of the everyday cooperation activities. Therefore, more energy can be utilized for turning creativity and new ideas (i.e., innovativeness) into actual improvements in performance.

Summarizing, the developed model being tested for the first time is fully supported by the empirical data and is, thus, thoroughly developed and well grounded on the relevant theory.

5.2 Managerial implications

The results are relevant for managers of horizontal cooperations between LSPs. Cooperating with partners that fit to each other is crucial to cooperation success, and hence, guidance on what makes partners fit to each other is vital for managers. Thereby, knowledge about partner fit serves managers not only when selecting new cooperation partners, but also when managers have to cope with changing partner characteristics during the lifespan of cooperation. As the logistics industry is characterized by a large number of small- and medium-sized companies, many LSPs can neither dedicate extensive resources into the search for the optimal partner among a large number of possible candidates [14], nor afford cooperation failures due to lack of partner fit. Therefore, knowledge about how similar cooperation partners should be is of substantial value for managers, as partner similarity is a major aspect of partner fit [56]. Our research shows in which way LSPs should consider three main similarity dimensions when establishing and maintaining horizontal cooperations.

When defining their partner similarity preferences, cooperation managers need to be aware of the influence partner similarity has on the two opposing forces of competition (1) and common understanding and compatibility (2). While many managers of LSPs will already have considered the aspect of fit (Does a potential partner fit into the cooperation?), it often has been unclear what exactly to look for.

This study shows that the preferred degree of partner similarity should correspond to the cooperation scope as this scope plays a central role in determining the strength of the two opposing forces. On the one hand, the danger of competition and opportunistic behavior is high in focused cooperations. Here, differing geographic coverage and competences have a positive effect as they help to reduce competition, and thus improve cooperation outcome. The descriptive data show that *on average* competence similarity is at a lower level lower in focused than in broad cooperations. Still, in 43.6 % of focused cooperations, the level of competence similarity is high (5 or above on the scale from 1 to 7). Geographic similarity is even slightly

higher in focused than in broad cooperations, and in 29.6 % of focused cooperations, the level of geographic similarity is high also in absolute terms (5 or above on the scale from 1 to 7).

On the other hand, the preferential degree of cultural similarity does not depend on the cooperation scope. Cultural similarity is positive both in focused and broad cooperations as it facilitates the coordination of cooperation activities and, at the same time, reduces the risk of opportunistic behavior [44, 78]. Thus, cooperating LSPs should, in any case, strive for cultural similarity between them and their partners. In this respect, it can be observed that levels of cultural similarity overall in the cooperations are rather low (lower than 3 on a scale from 1 to 7). This is an indication that the value that cultural similarity brings to a LSP cooperation—both on the strategic and the operational level—is not fully understood in practice.

Our results also help to better interpret the role of innovativeness and commitment as drivers for overall cooperation performance. Focused cooperations in general have a lower managerial complexity. Therefore, it is much easier to turn innovativeness into performance. Consequently, emphasizing innovativeness as means to become successful is an especially favorable strategy in these cooperations. The picture in reality, however, is different. Our data show that focused cooperations on average are significantly less innovative than broad ones; the average mean values are 4.19 compared to 4.56 on a scale from 1 to 7.

In contrast, broad cooperations are characterized by additional managerial complexity which complicates the monitoring of cooperation activities. Here, cooperation commitment is strong in reducing the risk of opportunistic behavior and allows for cheaper monitoring systems. Thus, strengthening commitment is a promising strategy in broad cooperations that involve various business functions. In this respect, the current levels of commitment (4,65 in focused cooperations and 4,82 in broad ones) are a positive foundation.

5.3 Limitations and future research

This research is based on data from the logistics service industry collected in one country. To allow generalization of our findings and to find out the pronunciation of the two opposing forces in other environments, further research covering different industries or countries may be helpful.

Moreover, our analysis was limited to cooperations that have indeed been founded and are still active. To better understand the criticality of partner fit and partner similarity, also the partner selection process before the cooperation formation should be investigated. When seeking cooperation partners, LSPs might be likely to select partners with complementary resources (e.g., to complement the own service portfolio with services offered by cooperation partners) rather than considering the positive impact of similar resources through increased common understanding and compatibility. Also, the role of partner similarity in cooperations that have dissolved offers avenues for additional research. A wrong partner similarity set up might lead to the termination of horizontal cooperations between LSPs through the impact of both high competitive tensions and missing common understanding and compatibility. Knowledge how to deal with these two opposing forces in partnerships, which are facing the risk of being dissolved soon, will be valuable to both practitioners and researchers.

Additionally, a long-term study about the role and perception of partner similarity in horizontal cooperations would reveal new insights. On the one side, the role of cooperation experience is of interest: This relates to the question whether cooperation experienced firms are better in setting up and afterward managing horizontal cooperations regarding the respective degree of partner similarity and in accordance with the content and scope of the cooperation. On the other side, a longitudinal analysis could identify how to cope with changing dynamics of the two opposing forces of (1) competition and (2) common understanding and compatibility, when cooperation changes its scope (e.g., when the cooperation partners decide to cooperate more broadly in different areas than before, and therefore, to involve more business functions into cooperation activities).

Apart from partner similarity, other factors might influence the two opposing forces in horizontal cooperations. For example, the risk of competition and opportunism is likely to be reduced through cooperation governance mechanisms, like cooperation contracts. More research about cooperation governance in horizontal cooperations and its effects will deliver valuable insights. Also, the force of common understanding might be influenced by other factors. Here, in particular, the role of trust and relational capital between the partners offers further research opportunities.

There are also opportunities to probe more deeply into effects of the two opposing forces in horizontal cooperations. Competition and the lack of common understanding and compatibility bear potential for conflicts between cooperation partners. More research is needed about how to deal with this challenge and which conflict resolution strategies [60] to apply in horizontal cooperations.

We encourage further research in these and other directions to more deeply understand the design and management of horizontal cooperations as a still poorly investigated but already very common and important organizational form, which is expected to even further increase its importance in the future.

Appendix

See Table 3.

Table 3 Measurement scales

Measurement scales	Mean	SD
Cooperation innovativeness* [8]		
Cronbach's alpha = 0.85		
Together with our cooperation partner(s), we frequently try out new ideas	4.07	1.52
Together with our cooperation partner(s), we seek out new ways of doing things	4.26	1.64
Together with our cooperation partner(s), we are creative in our methods of operation	4.90	1.46
Together with our cooperation partner(s), we bring more innovative services to the marked as our competitors	4.65	1.53
Overall cooperation performance* [69]		
Cronbach's alpha = 0.84		
Overall, we are very satisfied with the performance of this cooperation.	5.43	1.20
The cooperation has contributed to our core competencies and competitive advantage	5.63	1.22
The cooperation has realized the goals we set out to achieve	5.27	1.33
Cooperation commitment* [61]		
Cronbach's alpha = 0.82		
Our company is willing to dedicate whatever people and resources are necessary to maintain this cooperation	4.80	1.51
Our company is willing to make long-term investment in this cooperation	4.85	1.72
Our company is willing to make sacrifices to help our cooperation partner	4.68	1.46
Competence similarity* [69, 79]		
Cronbach's alpha = 0.72		
In relation to our cooperation partner(s)…		
…we offer the same services	4.78	1.98
…we have the same core competencies	4.17	1.87
Geographic similarity* [11]		
In relation to our cooperation partner(s)…		
…we operate in the same geographical regions	2.92	1.98
Cultural Similarity* [35]		
Cronbach's alpha = 0.85		
In relation to our cooperation partner(s)…		
…we have the same organizational culture	3.56	1.79
…we have the same management and opera ting style	3.37	1.68

* Corresponding items are measured on a 7-point Likert scale where 1 = strongly disagree and 7 = strongly agree

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