

Performance measurement in horizontal LSP cooperation as a field of conflict: the preventive role of collaborative processes

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Abstract Engaging in horizontal cooperation is a prevalent strategy of logistics service providers (LSPs) to deal with the challenges they are confronted with by today's supply chain environment (e.g., complex and global supply chains, increased competition). These horizontal LSP alliances, for example, for providing a national less-than-truck-load network, are complex in nature and characterized by cooptation. This situation provides a fertile soil for conflict. The literature outlines that conflict, the experience that goals or interests are in opposition, emerges in areas of essential activities and that performance measurement is such an area. Yet, when these differences meet, they also become apparent and can potentially be eased. Against this background, we develop a theoretical model and test it with survey data from 193 horizontal LSP alliances. The results show that, in general, applying collaborative processes in the performance measurement reduces overall conflict in horizontal LSP cooperations. Further, based on resource dependency theory and social contract theory, this research identifies the power structure of the alliance as a relevant contingency factor and shows that joint action in PM is effective in reducing conflict in symmetrical power cooperations, while information sharing as less intense form of collaboration is effective in reducing conflict in asymmetrical power cooperations.

Keywords Alliance management · Logistics service provider · Performance measurement · Conflict · Collaborative processes

1 Introduction

Horizontal cooperation is a prevalent strategy for logistics service providers (LSPs) to deal with the extensive challenges of today's supply chain environment (e.g., complex and global supply chains, increased competition, rising requirements by customers) [1, 2]. Examples are multi-company networks for less-than-truck-load transportation. Today, more than half of all small, medium, and large LSPs are engaged in at least one such horizontal alliance with one or multiple other LSPs [3]. This allows them to strengthen their competitive position through improved service scope and quality, increased productivity, and access to new markets [1, 3, 4].

Horizontal LSP alliances are complex in nature [5] and entail various strategically relevant decisions on which opinions will widely differ. Examples include the question how to develop the scope of activities or in which way to support common activities with IT systems (e.g., whether to offer joint mobile apps at the customer interfaces). In addition, the alliances are influenced by the ambiguity of cooperation and competition often referred to as cooptation [6, 7], where members are simultaneously partners and potential competitors in the marketplace. Overall, this provides fertile ground for conflicts to emerge with the tendency to reduce performance [8].

In this respect, prior research has focused on differing conflict types and their outcomes (e.g., [9]), and on post-manifestation topics such as conflict management and resolution strategies (e.g., [10, 11]). It is clear that conflicts

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arise due to very different reasons (for example, “from incompatible goals, resource allocation disagreements, opportunistic behavior, knowledge imitation, and competition in downstream markets” [12, p. 291]), at different hierarchical levels and in different areas of the cooperation [13]. To complement this, our research views the areas of activities as possible source of and/or possible remedy to conflict, a domain that has been neglected in prior research. We concentrate on performance measurement (PM) as one key area of any organization and as such also of a horizontal alliance [14], and will show that the way PM is conducted strongly influences the level of conflict in a horizontal alliance.

While the first impulse may be to regard PM as a subordinate, operational activity within a horizontal alliance, PM also has a truly strategic nature in communicating and implementing strategies [15]. Consequently, Melnyk et al. [15] argue that PM needs to be co-created simultaneously with the strategy. Besides the operational measurement, PM not only entails the definition of metrics and targets for the cooperation [15, 16], but also establishing—and over time adapting [15]—what performance is (i.e., the objectives of the alliance) and how these objectives are going to be reached (i.e., the underlying performance drivers). All of these are fields where the potentially different goals and objectives, but also the different management approaches of the alliance members meet and clash [17]. As such, PM is an area prone to conflict, both relating to the question *what* to measure (e.g., speed vs. punctuality of delivery) and *how* to measure [18].

When such differences in opinion or interest meet in PM, they also become apparent and can potentially be eased, which, in turn, substantially lowers overall potential for tension and conflict within the alliance. In this respect, we build on the collaborative processes of joint action and information sharing, which, in general, have been identified as methods for effectively preventing the manifestation of conflicts [19, 20]. We show that in the context of horizontal LSP alliances collaborative activities in PM can effectively offset the conflict potentials inherent to the alliance.

At the same time, extant literature emphasizes that the emergence and resolution of conflicts also relate to the specific context in which the conflicts develop [21, 22]. Here, the power structure has been identified to influence actions and perceptions in cooperating [23] and to be decisive in influencing whether conflict potential manifests itself into actual conflict [24].

This research extends prior research by outlining how the choice of the specific collaborative approach in PM needs to account for the alliance context it is going to be applied in. In order to do so, we draw upon resource dependency theory (RDT) [25] and social contract theory (SCT) [26]. Based on SCT, we conclude that collaborative

processes in PM will shape the expectations of the alliance members and, through this, will—according to SCT—create implicit social contracts [27]. Depending on the alliance context—we follow Dant and Schul [28] in distinguishing symmetrical and asymmetrical power relations—these mechanisms have the potential to create tension by running counter to the pursuit of autonomy that companies exhibit according to RDT.

Overall, this research addresses two research questions: (RQ 1) “How effective are joint action in PM and information sharing in PM as collaborative processes in reducing conflict in horizontal LSP alliances?” and (RQ 2) “To what extent does the effectiveness of these two collaborative processes in PM depend on the power structure inherent to the alliance?” Besides developing a conceptual model based on RDT and SCT, the contribution of this research lies in testing the corresponding hypotheses using structural equation modeling based on survey data from 193 logistics service providers (LSPs) engaged in a horizontal alliance.

2 Conceptual framework

2.1 Conflict types and their outcomes

According to the established understanding, conflicts are viewed in this research as “the experience between or among parties that their goals or interest are incompatible or in opposition” [19, p. 1224]. Inter-organizational relationships, where parties with different corporate cultures, different regions, different mindsets, and different ways of doing things interact intensively, provide fertile ground for such conflicts [18, 29]—a situation typical for horizontal LSP alliances [3]. Further factors that create tension and almost inevitably lead to conflicts are mutual dependencies that require continuous interactions [30], different viewpoints concerning temporal aspects (i.e., short-term vs. long-term) [31], diverging goals, and, in the specific case of horizontal cooperation, competitive tension [31, 32] among members.

Viewing conflict from one perspective only “can obscure important differences among different types of [...] conflict” [10, p. 213]. We agree and focus on the two most prominent established dimensions of conflict, cognitive and affective conflicts [33], as dependent variables in our research as these have been found to have differing implications [33, 34].¹

¹ Going back to [35], the literature sometimes views process conflict as an additional third type of conflict. Here, some authors argue that process conflict is not sufficiently distinct as it entails both task-related elements and person-related aspects. Further, Jehn et al. [36] show that task conflict and process conflict are highly correlated.

Cognitive conflict, alternatively termed task conflict by [35], refers to disagreements between alliance members around task-related issues [19, 37] that revolve around the question of “how best to accomplish an organization’s objectives” [33, p. 127]. *Affective conflict*, alternatively termed relationship conflict by [35], in contrast, focuses on personal elements and, therefore, tends to be more emotional in nature [38].

Conflict can both be functional and dysfunctional [39], and while research agrees about the dysfunctional nature of affective conflict (e.g., [9]), research on cognitive conflict has produced differing results. While most researchers suggest that cognitive conflict is generally harmful to cooperation (e.g., [34, 40]), some view the effect as contingent to the routineness of the task [10, 41]. Here, the argumentation is that in complex tasks such as innovation and strategic decision-making that require out-of-the-box thinking, cognitive conflict is positive as disagreements and the associated friction create new ideas and trigger improvement of the task [10, 21, 41]. In contrast, in routine tasks that are characterized by a low level of variability and high repetitiveness [42], dissent is counterproductive as its management is time consuming and frustrating [41]. This is consistent with the empirical findings for horizontal LSP alliances, where [43] show that conflict only can be positive in the non-routine field of innovation generation, provided that functionality of conflict is high, and otherwise is negative. Knowing that conflicts heavily influence key outcomes of horizontal cooperation, it is important to understand the formation of conflicts and how they can be counteracted before they manifest themselves and show their negative sides.

2.2 Power structure in horizontal alliances

The literature has shown that the way in which conflict emerges and manifests itself depends on the business context of the cooperation [21, 22] as this context determines how “a firm’s practices, procedures and processes are shaped and constrained” [44]. One central contextual variable that affects conflict is the power structure specific to the relationship [21, 24, 28].

Within RDT, power is viewed as the complement to dependency following the rationale that a party A has power over a party B to the degree that B depends on A [45]. Correspondingly, the literature distinguishes symmetrical power relations and asymmetrical power relations [28].

Also from a SCT perspective symmetrical power relations and asymmetrical power relations differ substantially. SCT provides a legitimacy perspective where legitimization of activities within a relationship is provided or denied via social contracts [26, 46]. These contracts are “norms,

assumptions, and beliefs that [alliance members] conceive as fair and appropriate [i.e., legitimate] for parties involved in [alliance] relationships” [47, p. 67] and are embedded in any inter-firm relationship. Whenever any activities in the alliance run counter to the social contracts, this will create tension and evoke reactance by alliance members [26].

In a *symmetrical power relation*, the individual company depends on the cooperation to the same degree to which the cooperation depends on this individual company and its contributions [48]. In such a balanced power situation, the alliance members meet as equals [49, 50] and the degree of mutuality can be expected to be high as the members need each other to reach their individual as well as their joint goals [12]. With respect to RDT, this is a situation where every LSP gives up some autonomy, or as [51] put it, its “freedom to make its own decisions [...] without [...] regard to the demands or expectations of [...] partners,” in order to secure resources necessary for its own success via alliance membership.

An *asymmetrical power relation*, in contrast, signifies imbalance regarding the individual company dependence on the cooperation. From the RDT perspective, it implies that some LSPs (the ones with high dependence) gave up much autonomy by entering the alliance, while other (the ones with low dependence) gave up less autonomy. This asymmetrical setup enables some parties to exert power over the other members [32, 50], and a more hierarchical and authoritarian behavior can be expected, reflected in aspects like unilateral decision-making [52].

2.3 Performance measurement as a field of conflict

One key area in an alliance, in which conflicts may arise due to its importance [12], is performance measurement (PM) [14]. While PM involves many operational aspects and may be disregarded from a strategical perspective, because it is thought to merely measure how the performance was, its true nature is fundamentally more far reaching.

First, in the process of PM, it is necessary to establish what performance is (i.e., the objectives of the alliance) and how these objectives are going to be reached (i.e., the underlying performance drivers). Here, potentially different goals and objectives of individual LSPs, but also different management approaches will meet and clash [17]. Second, PM needs to be changed over time as the internal context of cooperation changes (e.g., member companies entering or leaving the alliance), but also the external context of cooperation changes. Third, PM has a coordinating function across different functional units and helps to deal with complex and multiple institutional performance logics [53], which are likely to exist, by reducing the tension within and across the performance logics [53].

Fourth, through its different steps, it is an instrument to guide and control an organization [54, 55], in our case, a horizontal LSP cooperation, by prioritizing and by setting definite targets. This is not only reflected in the old saying “what gets measured gets done,” but also in the corresponding research results, which emphasize that what actually is measured shapes what managers focus on and how they try to improve performance [15].

PM in an alliance has various attributes that makes it a likely source of conflicts. On a formal level, the questions about the *what* and *how* (i.e., *what* will be measured *how*) are origins of possible disagreements [18]. With respect to the *what*, disputes can arise when members discuss what the decisive aspects of the cooperation are (i.e., goals, objectives, and ambitions) and how they should be prioritized [56]. Subsequently, coordination is needed on target values for the corresponding performance indicators [17]. Yet, the multitude of opinions in a horizontal alliance may impede a consistent approach to PM resulting in the use of individual key performance indicators (KPIs) by the individual firms [57]. That, in turn, sows the seed for conflict as even using the same terminology for KPIs does not ensure that the alliance members actually measure and report the same things since the exact procedures to come up with values for the indicators may still vary [16, 58]. This potentially leads to situations in which members think that they are discussing the same things, but in reality talk about different things, not realizing that slight or even big differences between their understandings are present [17, 59]. A good example for this is service level, where even a seemingly straightforward indicator like OTIF (on-time-in-full) may be measured differently by each involved LSP, for example, by measuring time of arrival in different manners: One may measure arrival when the truck reaches the site of the consignee, while another may measure it when the truck docks to the unloading dock at the consignee, while a third may only measure once the goods are unloaded and scanned.

Concerning the *how* to measure, members need to find a compatible way of actually conducting PM. Here, without a coordinated approach to measurement each company may pursue individual PM processes [59, 60]. However, splitting up actually interdependent processes creates interface problems that can lead to conflicts [21] as addressed by the decoupling principle of [61], which states that interdependent activities should be carried out “under the same authority” (p. 70). One reason is that already small deviations in measurement processes can lead to a differing basis of results which potentially triggers conflict as in subsequent steps the alliance members discuss performance results that are actually not comparable.

Both aspects mentioned (the *what* and the *how*) easily lead to dissent among the alliance members, as ultimately, PM reflects the operation model, and thus, the priorities and goals as well as the processes of the horizontal alliance [57]. PM has a central role in steering the cooperation and in understanding its context [60]. Consequently, it is focal to all members and a field of conflict where differing opinions and interests clash.

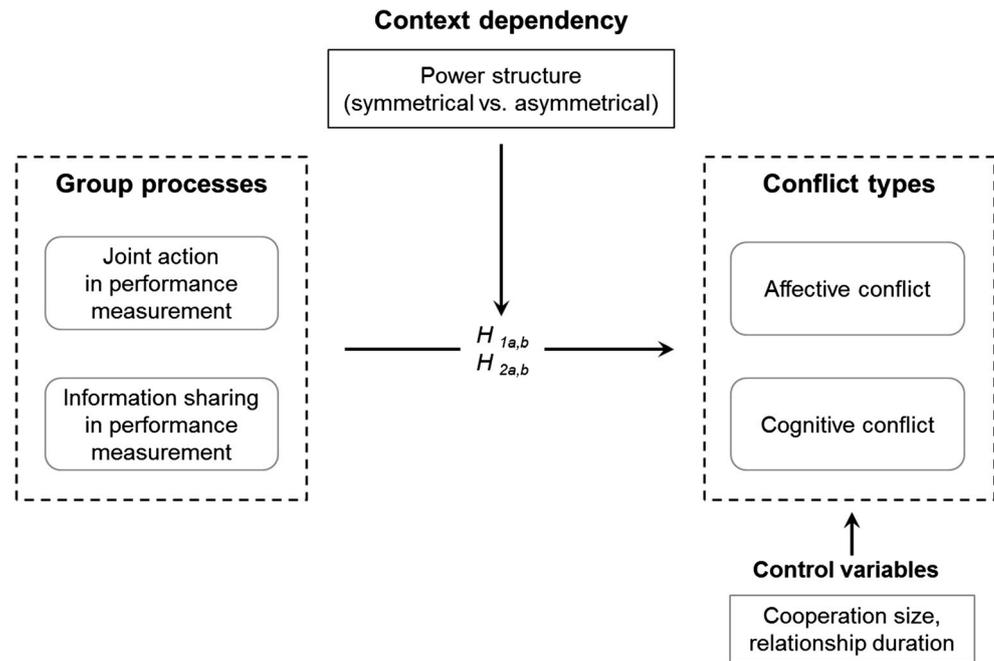
2.4 Collaborative processes in PM for conflict prevention and reduction

Prior conflict literature has mainly focused on post-manifestation issues of conflict, covering topics such as which conflict management techniques exist and how conflicts can be resolved or minimized (e.g., [10, 62]). Yet, this neglects that alliance members can also act much earlier. Once conflict is present, it is rather difficult to control [63] and requires considerable effort to manage and resolve [10, 43, 62]. Therefore, attention should also be put on actively countering conflict already before and during its emergence by promoting preventive instead of only reactive means [11, 40].

Conflict stems from tension, manifests itself because of “the failure of alliance partners to coordinate” [37, p. 157], and is triggered when interaction takes place [19]. Therefore, efforts to limit the emergence of conflict via preventive measures need to focus on points of interaction. Here, from the general conflict avoidance perspective two collaborative processes have shown to offer substantial potential [19, 20]: joint action and information sharing. Joint action in PM is an extensive form of collaboration and refers to alliance members actively coordinating their PM activities [64]. It is consistent with Kozłowski and Bell’s [65] call for more collaborative mechanisms in preventing conflict, compared to merely exchanging information. Information sharing with respect to PM as a less intense form of collaboration [20] refers to sharing important information regarding the process as well as the results of PM (i.e., values attained for the performance indicators).

The pre-existing notion in the literature is that how conflict emerges and manifests itself depends on the business context of the cooperation and that collaborative processes in PM are effective in reducing conflict. Based on this general understanding, we develop a specific theoretical model that outlines that this effect is contingent on the (a)symmetry of power within the cooperation, and that joint action is an effective approach in symmetrical power relations, while information sharing is effective in asymmetrical power relations. The corresponding conceptual model is displayed in Fig. 1.

Fig. 1 Conceptual model



2.5 Context-dependent effectiveness of joint action in PM

Joint action can be understood as interpenetration of organizational boundaries by carrying out important activities (as in this case PM) in a cooperative or coordinated way and is a key element of relational governance [51]. It aims at involving all alliance members in the PM and for them to share their needs, concerns, and expectations [66] so that they effectively become “business partners” [51, 67]. The approach promotes an atmosphere of forbearance, mutual respect, and balanced reciprocity, and reduces ex-post transaction costs [5]. Joint action in PM reflects the argument of [22] that elements which “increase the strength of the ties between groups” (p. 522) help to prevent conflicts.

2.5.1 Symmetrical power alliances

In symmetrical power alliances, members are reciprocally dependent and must give and take to achieve individual and mutual benefit. From the RDT perspective, this implies that all of them have given up comparable levels of autonomy. Consequently, increasing the strength of ties via joint action and extending the coordination within the alliance does not impose additional constraints to them.

Following SCT, these alliances are shaped by expectations that are reflected in “norms based in informal social contracts,” which “essentially frame their relationship” [26, p. 29]. One such key expectation in symmetrical power alliances is that members have equal say in terms of

decisions made and processes conducted. The involvement in PM processes creates a platform to pursue this claim as it provides the opportunity to express possible concerns that can be resolved while collaborating with other members. Therefore, joint action in PM is well suited for symmetrical power alliances and reduces conflict in three ways:

First, being reciprocally dependent, the members are required to contribute to the success of the cooperation, but are also more willing to do so, implying that they will open up and establishing a mutual understanding about individual member’s motives, opinions, and know-how [20, 21]. By this, misunderstandings and “mutual feelings of frustration” [68, p. 65] are avoided already early on. The members are enabled to put other members’ behavior and actions into context and effectively transmit their own actions [69]. This creates the conditions to clear up possible task-related contradictions [20, 21].

Second, joint action leads to relational norms and mutual trust among members [70]. These act as a safeguard against partner misbehavior, improve coordination and reduce exchange hazards [71]. Here, exchanges in an alliance are embedded within a system of relational norms and social interactions which create mutual confidence that no party will exploit others’ vulnerabilities even if there is such opportunity [72]. Further, member involvement and the corresponding collaboration increase commitment and ownership. As the companies feel that their voice and contribution to directly address points of concern at a rather early stage is valued, their motivation is increased, helping minimize the risk that dissent manifests into conflicts [22, 69].

Third, acting jointly in PM strengthens interpersonal relations [22, 73] that leads to a benevolent atmosphere and helps establishing pride for being a member of the alliance [74, 75]. Strong interpersonal ties and pride in the alliance will facilitate internal cohesion (i.e., an *esprit de corps*), a sense of belonging together, and maintaining their belief into the alliance even when exposed to internal or external challenges. Especially in settings of cooperation, this reduces the risk that the different members will be aggressive toward each other [76], which in turn, reduces potentials for affective conflicts.

2.5.2 Asymmetrical power alliances

In general, according to RDT, companies should choose the least constraining device to govern relations with their exchange partners that will secure resource access and maximize autonomy [45]. Here, asymmetrical power alliances assemble a heterogeneous set of LSPs in the sense that LSPs with a stronger dependence on the alliance, which have given up more autonomy, are combined with others with a weaker dependence that have given up less autonomy to secure their desired resources via the alliance. For the LSPs with more autonomy (and more power), joint action in PM, which implies stronger ties and more coordination, would result in added constraints and reduce both their autonomy and their power advantage over the other members. This would run counter to them striving to keep both their power advantage and their autonomy [25], and creates tension.

As they do not have the same reliance on the alliance, they are more likely to pursue their own agenda [48] and will not be interested in incorporating processes that allow weaker parties detailed insights into the stronger parties' management [48, 49]. Further, they tend to consider themselves to be in power, try "calling the shots" and in that sense dominate processes in the cooperation [50]—also PM processes. Applying joint action in PM in this setting would create tension from the RDT perspective between their striving for autonomy and how their autonomy would tend to be restraint by the joint action.

Applying joint action in PM in this setting would also create severe tension from the SCT perspective between the actual power situation and the expectations that would be created for the less powerful members via joint action. As outlined before, joint action entails close collaboration and mutuality, and promotes an atmosphere of forbearance, mutual respect, and balanced reciprocity. Further, it implies interacting on equal footing, where all members contribute to and influence the outcome to similar degrees. As a consequence, joint action in PM would create a social contract of mutual influence that is in contradiction to how the parties view and approach the alliance. Hence, strong

collaboration via joint action in a context in which, due to the imbalanced distribution of power, the alliance members are not acting fully on par is not effective and creates tension. Instead, this is likely to be a source of conflict in itself.

Overall, aggregating the negative effects of joint action in PM in an asymmetrical setting and its positive effects in a symmetrical setting, it can be concluded that joint action in PM is effective in reducing conflict in symmetrical power settings and that it will be less effective the more asymmetrical the alliance is. This will be the case for both affective and cognitive conflicts because joint action addresses both levels of these conflicts: the task-related level of cognitive conflict as well as the personal level of affective conflict. Thus, we hypothesize:

H_{1a,b} Joint action in PM is more effective in reducing a) affective and b) cognitive conflict in horizontal alliances with symmetrical power relation than in ones with asymmetrical power relation.

2.6 Context-dependent effectiveness of information sharing in PM

Information sharing with respect to PM refers to sharing important information regarding the process as well as the results of PM (i.e., values attained for the performance indicators). Such information sharing has been found to be vital [19, 20] as it facilitates transparency with regard to performance. Through "communication [...] task details, task progress, and reasoning for task decisions" [20, p. 384] are clarified. The alliance members are better able to understand other members' way of thinking, minimizing animosities and misinterpretations that could lead to both affective and cognitive conflicts. This helps reducing the level of uncertainty [77] and creating a common understanding [59], which improves coordination [78] and reduces the level of conflict [20]. Additionally, problems can proactively be prevented as more thorough decisions can be made [79]. This reduces the risk of errors, which, in turn, is associated with less conflict about task-related issues [20].

Yet, in comparison to joint action in PM, the extent and intensity of exchange is substantially smaller as information sharing focuses on informing alliance members about issues and results of PM and not integrating them into PM. It is less comprehensive in providing insights and a common understanding. Moreover, members merely receiving information from other members cannot rule out that the information provided is filtered or even falsified [80]. In the case of joint action, this situation is different as close collaboration increases the ability for verification and reduces risks of misinformation. Thus, information sharing

is not as effective as joint action in establishing relational norms and trust and in serving as effective means for coordination and mitigating exchange hazards. Consequently, information sharing can be considered a “light” version of collaboration compared to joint action.

Thus, in alliances with symmetrical power relation, information sharing has only little or even nothing to add to the potentials created via joint action in PM, and thus, joint action will be substantially more effective in mitigating conflict in this context.

In contrast, when power is unevenly distributed, the less dependent members are less interested in giving up autonomy by establishing extensive collaborative processes as “constant coordination and mutual adjustment among group members is not necessary for the group to function successfully” [20, p. 390]. Because joint action in PM is not in the interest of the less dependent members, these alliances can instead only rely on information sharing in PM, which constitutes a less pronounced form of collaboration to mitigate conflict. From the SCT perspective, this approach entails social contracts that differ from those of joint action in the sense that it allows for one or a few parties to dominate decisions on what and how much information is exchanged. In that sense, information sharing is compatible with companies wanting to dominate, while still providing potential to prevent conflict from manifesting itself.

Consequently, information sharing in PM is an effective approach to reduce affective and cognitive conflicts in alliances with asymmetrical power relations, whereas in symmetrical power relations this is not the case:

H_{2a,b} Information sharing in PM is more effective in reducing a) affective and b) cognitive conflict in horizontal alliances with asymmetrical power relation than in ones with symmetrical power relation.

3 Methodology

3.1 Sampling and data collection

For testing the hypotheses, primary data from LSPs were collected. We employed a key informant approach [81] and targeted senior managers of the LSPs to provide information regarding one horizontal LSP alliance they were active in (here relationships with a subcontracting nature where explicitly highlighted to be out of the scope of the survey). The executive management level was chosen as appropriate point of contact due to the rather small company size in the industry and in the sample (50 % of the surveyed LSPs have less than 100 employees—see Table 1) and the fact that the executive managers at LSPs are still involved even

Table 1 Demographics of responding companies

Annual turnover (in €)	<i>N</i>	%
1–5 million	51	26
>5–25 million	57	30
>25–100 million	37	19
>100–500 million	22	11
>500 million–5 billion	9	5
>5 billion	2	1
Not specified	15	8
Total	193	100
Number of employees	<i>N</i>	%
1–50	64	33
51–100	31	16
101–500	44	23
501–1000	20	10
>1000	22	12
Not specified	12	6
Total	193	100

at the day-to-day level of cooperating with other LSPs in a horizontal alliance.

We derived the sample from two commercial databases that provide company data of German LSPs with annual revenue of more than €1 million. The executive managers received an email invitation with a personalized link to our web-based survey in German language. Overall, a response rate of 11.7 % was achieved. After discarding 18 responses due to incomplete data and four responses because they represented outliers as identified based on Mahalanobis distance, 193 usable responses remained for the analyses (see Table 1).

We followed established practices for testing non-response bias. First, answers of early and late responders were compared [82]. Second, a follow-up study was conducted with 18 randomly chosen non-respondents, who received a questionnaire with 12 items of the original survey [83]. Their responses were compared to the ones of the participants that completed the questionnaire in the first place. Neither method indicated significant differences in the data.

3.2 Measurement scales

For the constructs of the present hypothesized model, we used previously established measurement scales and adapted them to the current study. A qualitative pretest with ten logistics researchers and seven CEOs of LSPs was carried out to ensure face validity. In this process, few minor alterations were made iteratively to the construct

measurements until no further changes were suggested. The measurement of the constructs relied on multi-item, 7-point Likert-type scales presented in the Appendix 1 and described in the following.

Joint action in PM was measured based on [64] and refers to the extent to which PM activities are integrated via coordination across alliance members. *Information sharing in PM* was captured based on the scale of [84] and refers to the extent to which the alliance members keep each other informed about critical and proprietary information concerning PM. *Cognitive conflict* and *affective conflict* were measured based on [33]. The construct for cognitive conflict measures the extent to which task oriented conflicts were experienced, whereas the construct for affective conflict identifies the extent to which emotional and personal incompatibilities or disputes were experienced.

To capture the power structure, we used two scales of [85]. The firms' dependence on the alliance was assessed by measuring to what extent the alliance was important to them. The alliance's dependency on the individual firm was measured by asking for the extent to which the respondent's company is important for the alliance. For the multi-group analysis, the sample was divided into two groups based on the power structure that was calculated as the absolute difference between the average score of the items of the first construct and the average score of the items of the second construct. Values up to 0.75 were considered as symmetrical power relation ($N = 72$) as the respondents' company depends on the cooperation to a similar degree to that the cooperation depends on it. Values above 0.75 were considered as asymmetrical power relation ($N = 121$). The rationale behind this cutoff was that if the majority of items differed by at least one between the two constructs, the relation would be considered asymmetrical. To ensure robustness, we also tested a cutoff of 1.0 with two groups of $N = 84$ and $N = 109$; the results of this model were consistent with those of the 0.75 cutoff that will be reported below in the Results section.

To validate the measurement scales, we conducted an exploratory factor analysis using SPSS, extracting four factors equivalent to our four focal constructs (see Appendix 2). Subsequently, we conducted a confirmatory factor analysis with AMOS to assess the reliability and validity of the measurement model, which revealed adequate fit ($\chi^2 = 173.0$ with $df = 81$; $\chi^2/df = 2.14$; CFI = 0.96; RMSEA = 0.077). All factor loadings were significant at $p < 0.001$, supporting convergent validity for the constructs. Item reliability exceeded 0.4 for all items. The lowest Cronbach's alpha and the lowest composite reliability for the latent constructs are 0.86 (see Appendix

1). Additionally, [86] procedure to test discriminant validity was used. The squared correlations between any pair of the four constructs used were lower than the average variance extracted of the corresponding constructs (see Appendix 3).

3.3 Control variables

We aimed to control for cooperation size [87] and relationship duration [88]. The first variable captures the number of companies engaged in the alliance, whereas the second variable captures the number of years the alliance exists. This is intended to account for any influence that the two variables may have on affective and cognitive conflicts. During normality tests, these two variables exhibited a relatively strong positive skew. Therefore, a square-root-transformation on the original data was performed and, subsequently, the square root of cooperation size and of relationship duration was used as control variables.

3.4 Results

The structural equations model was tested by conducting a multi-group analysis using AMOS to identify the moderating effects of the power structure. The fit indices showed adequate model fit for the hypothesized model ($\chi^2 = 323.0$ with $df = 210$; $\chi^2/df = 1.54$; CFI = 0.95; RMSEA = 0.05). Table 2 presents the results of the hypothesized relationships.

Hypotheses H_{1a,b}, which postulate that joint action in PM is more effective in reducing both forms of conflict in symmetrical power relations than in asymmetrical ones, are supported. In symmetrical power relations, joint action has a significant negative effect on affective conflict (-0.372 ; $p < 0.05$) and on cognitive conflict (-0.533 ; $p < 0.01$). In contrast, it has no significant effect in asymmetrical power relations, neither on affective conflict (0.178; n.s.), nor on cognitive conflict (-0.122 ; n.s.). The differences between symmetrical and asymmetrical power structures are significant for both paths.

Hypotheses H_{2a,b} posit that information sharing in PM is more effective in reducing conflict in asymmetrical power relations than in symmetrical ones. Our results fully support hypothesis H_{2a}: Information sharing in PM has a significant negative effect on affective conflict in asymmetrical power relations (-0.455 ; $p < 0.01$), whereas the effect in a symmetrical power relation is nonsignificant ($+0.078$; n.s.). Furthermore, the structural paths are significantly different ($p < 0.01$). At the same time, the effect of information sharing in PM on cognitive conflict in

Table 2 Results of multi-group analysis with respect to power structure (unstandardized path coefficients)

	Power structure						Hypothesis
	Symmetrical		Asymmetrical		Difference		
	Estimate	<i>p</i>	Estimate	<i>p</i>	<i>z</i> -score	<i>p</i>	
Joint action → affective conflict (H1a)	-0.372	0.045	0.178	0.334	2.091	0.018	Support
Joint action → cognitive conflict (H1b)	-0.533	0.003	-0.122	0.525	1.599	0.055	Support
Information sharing → affective conflict (H2a)	0.078	0.620	-0.455	0.002	-2.471	0.007	Support
Information sharing → cognitive conflict (H2b)	0.082	0.554	-0.225	0.134	-1.499	0.067	Weak support
R^2 affective conflict	12.6 %		20.8 %				
R^2 cognitive conflict	29.6 %		12.2 %				

Bold values indicate significant relationships

symmetrical power relations is also negative, but above the significance threshold (-0.225 ; $p = 0.134$). But again, the moderation follows the hypothesized pattern (i.e., information sharing is more effective in asymmetrical power relations), and this difference is significant ($p = 0.067$), so that weak support for H_{2b} can be concluded.

Further, our results show that the explanatory power of the two collaborative processes is substantial for symmetrical power relations; the R^2 is 12.6 % for affective conflict and 29.6 % for cognitive conflict. In asymmetrical power relations, collaborative processes in PM account for a little lower but still substantial percentage of variance in conflict ($R^2 = 20.8$ % for affective conflict and $R^2 = 12.2$ % for cognitive conflict) (see Table 2). With regards to our control variables, we find that neither the square root of cooperation size, nor of relationship duration has a significant effect on affective and cognitive conflicts (all p values are above 0.4).

4 Discussion and implications

4.1 Theoretical implications

The results of this study present several important theoretical implications with respect to conflict in horizontal alliances. Even though conflict has been studied extensively in prior research (e.g., [10, 11, 33]), the focus, so far, was mainly on post-manifestation topics such as conflict management, neglecting that conflict could be prevented before emerging in the first place. The major drawback of the prior research that actually was concerned with conflict prevention is that it mostly builds on antecedents of conflict that are not really actionable, for example, the similarity of organizational climate [62] or goal uncertainty [38]. Exceptions are the studies of [20], who tested the effect of

information sharing in student groups and its effect on conflict and performance, and [18] who presented a model of proactive approaches for handling conflicts such as selecting partner fit, partnership negotiation, and the build up of relational quality among members in international joint ventures. Here, our research provides one additional step by focussing on actionable collaborative processes (i.e., joint action and information sharing) in a concrete environment (i.e., PM) that can be applied to contribute to a reduction of the overall levels of affective and cognitive conflicts within a horizontal cooperation. This, at the same time, underscores that collaboration is an approach to improve the performance of supply chain relationships [89], and that PM is of key importance to horizontal alliances in that it not only is an area prone to conflict, but also one with the potential to mitigate conflict.

To further refine our assertions, we applied a context-specific view based on RDT and SCT focussing on autonomy of the involved LSPs and the social contracts embedded in the alliance. Here, our findings first underscore the prior assumption that how conflict emerges and manifests itself depends on the context [21, 22] and that the power structure within the cooperation is a relevant contextual variable [21, 24, 28].

Second, prior findings are expanded in showing that the effectiveness of collaboration is not equal for symmetrical and asymmetrical power relations. Overall, collaborative processes in PM are effective in preventing conflict in both setups. Yet, joint action is most effective in symmetrical power relations, while information sharing is most effective in asymmetrical power relations. Conducting a mutual approach such as joint action usually is based on alliance members that all give up autonomy in the alliance and are reciprocally dependent and hence interested in maintaining or even intensifying a close relationship [48]. Otherwise they would not be willing to both give and take in the

relationship as well as provide insights into their motives, opinions, and know-how [48, 49]. Prior expectations were that information sharing is rather effective in mitigating the risk of conflict manifestation in asymmetrical power relations as in such a situation, the more powerful members are less interested in reducing their autonomy and altering social contracts by establishing processes that are involving in nature [20]. In this case, stronger members rather prefer information sharing where they can better steer which information is disclosed. Our results were able to support this. Thus, we show with our research that the suitability as well as the effectiveness of collaborative processes is very much dependent on the context (in this case, the power structure) in which they are applied.

4.2 Managerial implications

The results of our study are of importance to practice in that they provide guidance to managing horizontal alliances in particular. Our research provides managers with insights on how to prevent conflict potential to manifest itself in actual conflict.

The first important aspect is that managers need to shift their focus of attention from post-manifestation issues of conflict (i.e., conflict management techniques after the conflict has already emerged) to the question of how conflict can proactively be prevented. If conflict has already emerged, it is difficult to control [63] and necessitates considerable effort to manage and resolve it [10, 43, 62]. In this respect, the present research found that PM is an area where conflicts can emerge, because within this area different viewpoints and approaches meet and clash.

Building on this, the results show that PM, besides being a potential source of conflict, can also be utilized to remedy this issue and to reduce the overall level of conflict—both cognitive and affective—in an alliance. Keys to this are processes such as joint action and information sharing in PM, and such collaborative process can already be initiated at the start of the alliance via contractual provisions [90]. However, their effectiveness to proactively prevent the manifestation of conflict is highly dependent on the specific context of the cooperation and specifically the inherent power structure. In symmetrical power relations, where members are cooperating on equal footing, managers should focus on high participation and involvement during the PM. This does not further impede the autonomy of the alliance members and is consistent with the underlying social contracts of the cooperation. This situation is very different in asymmetrical power relation settings. Here, where dependency and autonomy across alliance members are unequally distributed, instead increased transparency through information sharing is effective while joint action of the alliance members is not effective in mitigating

conflict as it reduces member autonomy and runs counter to the implicit social contracts of the alliance.

Thus, managers should be aware of the fact that, first, their focus should be on proactive rather than reactive measures and, second, that when taking measures these have to be chosen depending on the contextual situation they find themselves in.

5 Limitations and further research

In sum, this article provides sound results regarding conflict prevention in horizontal alliances in general and of LSPs in particular. However, the qualification of our conclusions necessitates an acknowledgment of limitations inherent to this study.

First, the study focus was on horizontal cooperation. Compared to vertical relationships, the mode of collaboration in horizontal alliances differs due to their often multilateral setup [3]. This complicates collaborative processes as more than two companies are to be included. Thus, due to the more straightforward arrangement of a buyer–supplier relationship in vertical settings, the effectiveness of the different collaborative processes in PM may be even more pronounced. In order to examine potential differences in the effectiveness, we encourage the replication of our study for vertical relationships. Second, this study used data from the logistics industry. This is an industry in which fear of competition is high while at the same time utilizing horizontal cooperation is very common. Therefore, we expect the conflict-reducing potential of collaborative process to be higher than in other industries, while we do not expect any differences in the underlying general mechanisms of conflict prevention. To investigate potential differences to other service industries, corresponding research is encouraged. Last, we limit our consideration to PM. We also suggest testing the role of joint action and information sharing in other areas of horizontal cooperation. Here, it could be promising to also view less central activities to view how conflict in peripheral areas may also infect collaboration in central activities.²

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² We thank one anonymous reviewer for providing the idea for this promising future research.

Appendix 1

See Table 3.

Table 3 Constructs and questionnaire scale items

Measurement scales	Mean	SD
Joint action in PM^a [64]		
Cronbach's alpha = 0.87; Composite reliability = 0.86; AVE = 0.61		
Joint action 1: Our performance measurement activities across the cooperation are well coordinated	4.46	1.86
Joint action 2: We systematically coordinate our performance measurement strategies with our cooperation partners	4.12	1.91
Joint action 3: We have processes to systematically transfer performance measurement knowledge across the cooperation partners	4.63	1.75
Joint action 4: Managers from different cooperation members meet periodically to examine how we can create synergies with respect to performance measurement across our cooperation	4.44	1.80
Information sharing in PM^a [84]		
Cronbach's alpha = 0.92; Composite reliability = 0.91; AVE = 0.73		
Inf. sharing 1: We share our results of the cooperation performance measurement with our cooperation partners	4.31	2.16
Inf. sharing 2: Our cooperation partners share proprietary performance measurement results with us	4.10	2.06
Inf. sharing 3: We inform our cooperation partners in advance of changing needs concerning the cooperation performance measurement	4.35	2.11
Inf. sharing 4: In our cooperation it is common that partners are informed concerning occurrences and changes with respect to performance measurement	4.89	1.93
<i>The cooperation partners keep us fully informed about performance measurement issues (e.g., goal deviations) (eliminated in scale refinement process)</i>		
Affective conflict^a [33]		
Cronbach's alpha = 0.86; composite reliability = 0.86; AVE = 0.68		
When taking joint decisions ...		
Affec. conflict 1: ... there is tension in the cooperation decision-making process	2.35	1.45
Affec. conflict 1: ... we and our cooperation partners often come into conflict due to different personalities	2.41	1.40
Affec. conflict 3: ... personal dislikes transform objective discussions into emotional conflicts.	2.13	1.32
<i>... there often is disagreement in the cooperation concerning the results (eliminated in scale refinement process)</i>		
Cognitive conflict^a [33]		
Cronbach's alpha = 0.92; composite reliability = 0.91; AVE = 0.72		
The cooperation is characterized that we and our cooperation partners ...		
Cogn. conflict 1: ... have often disagreements over questions of content	2.57	1.37
Cogn. conflict 2: ... have often to work through differences about the content of tasks	2.66	1.45
Cogn. conflict 3: ... have often differences in opinions	2.81	1.41
Cogn. conflict 4: ... have often different opinions concerning methods for problem resolution (new item)	2.97	1.44
Dependence of focal firm on alliance^a [85]		
Cronbach's alpha = 0.90		
If our relationship was discontinued with this cooperation, we would have difficulty in keeping up our current business	4.32	2.25
This cooperation is crucial to our future performance	5.30	1.58
We are dependent on this cooperation	3.42	2.02
This cooperation is essential to round out our service offering	4.17	2.09
If our relationship was discontinued, we would have difficulty in replacing this cooperation	4.39	2.00
Dependence of alliance on focal firm^a [85]		
Cronbach's alpha = 0.88		
If we discontinued being a member of this cooperation, this cooperation would have difficulty in keeping up business	4.43	2.08
We are important to this cooperation	5.39	1.55
We play a major role in contributing to the success of this cooperation	5.26	1.54
We are difficult to replace in this cooperation (new item)	4.34	2.02

Table 3 continued

Control variables	Mean	SD
Relationship duration [88] Since how many years does this cooperation exist?	11.44	8.96
Alliance size [87] How many companies are engaged in the cooperation?	<i>N</i>	%
2	35	18
3–10	60	31
11–20	23	12
21–50	19	10
51–100	29	15
>100	23	12
Not specified	4	2

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

Appendix 2

See Table 4.

Table 4 Exploratory factor analysis

Items ^a	Joint action	Inf. sharing	Affec. conflict	Cogn. conflict
Joint action 1	0.825	0.058	0.082	−0.006
Joint action 2	0.819	0.135	0.121	−0.003
Joint action 3	0.862	0.008	−0.102	0.076
Joint action 4	0.849	−0.110	−0.033	−0.033
Inf. sharing 1	−0.023	0.961	0.071	0.025
Inf. sharing 2	−0.046	0.959	0.028	−0.008
Inf. sharing 3	0.043	0.852	−0.074	−0.023
Inf. sharing 4	0.109	0.723	−0.112	−0.027
Affec. conflict 1	−0.120	0.082	0.618	0.326
Affec. conflict 2	0.056	0.020	0.948	−0.011
Affec. conflict 3	0.034	−0.086	0.925	−0.071
Cogn. conflict 1	0.037	−0.039	0.081	0.833
Cogn. conflict 2	−0.088	0.030	−0.001	0.875
Cogn. conflict 3	0.040	−0.045	−0.071	0.963
Cogn. conflict 4	0.049	0.017	−0.046	0.933
AVE	0.61	0.73	0.68	0.72
CR	0.86	0.91	0.86	0.91

Standardized factor loadings, average variance extracted, and composite reliabilities of the latent variables
Standardized factor loadings above 0.6 are denoted in bold

^a Joint action = joint action in PM; inf. sharing = information sharing in PM; affec. conflict = affective conflict; cogn. conflict = cognitive conflict

Appendix 3

See Table 5.

Table 5 Comparison of AVE and squared correlations (Fornell-Larcker criterion)

	(1)	(2)	(3)	(4)
(1) Joint action in PM	0.61			
(2) Information sharing in PM	0.43	0.73		
(3) Affective conflict	0.07	0.06	0.68	
(4) Cognitive conflict	0.12	0.06	0.55	0.72

Values on the diagonal are estimates of average variance extracted (AVE), and values below the diagonal are the squared correlations between the constructs

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