

HORIZONTAL COLLABORATION IN LOGISTICS: A COMPREHENSIVE FRAMEWORK

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Abstract Cooperation in logistics is widely recognised as one of the core challenges for the next future. In this context, horizontal collaboration is believed to be one of the innovative solutions to effectively tackle the growing logistic challenges from both, environmental and economic points of view. This innovative topic is quickly gaining momentum but the literature in the field is still in its infancy. As a consequence, a methodological tool to support project and implementation of successful horizontal partnership is still not available. In this paper, we propose a comprehensive framework based on an extensive literature review of both, scholars and practitioners. The proposed tool is based on an incremental perspective, according to which mutual trust among partners is developed through continuous collaboration. More specifically, three steps are proposed: operational, tactical and strategic. For each of them a coherent couple of aims and shared assets is defined.

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1. INTRODUCTION

According to the World Economic Forum (2009), 24% of the vehicles transporting goods in the EU travel empty and the average loading factor is as little as 57%. At the same time, there are increasing concerns at worldwide level for climate change and environmental hazards related to CO₂ emissions. Logistic activities are among the major contributors to this phenomenon, especially road transports – which account for about 20% of the total EU emissions and increased by around 23% between 1990 and 2010 (European Commission, 2012).

Furthermore, market globalisation - and consequent increased competition – should induce Logistic Service Providers (LSPs) to enlarge their critical mass in terms of shipped volumes. However, in many EU countries LSPs are still micro or small companies, often family-owned (Crujssen, 2006).

Based on such circumstances, it is not surprising that cooperation in logistics is widely recognised as one of the core challenges for the next future (see, among others, Mason, Lalwani & Boughton, 2007). At the same time, it is widely recognized that collaborative logistics among LSPs increase effectiveness (see, among others, Stefansson, 2006; Crujssen, Dullaert & Joro, 2010). However, benefits deriving from logistic cooperation are not limited to such economic actors. Recent surveys (Transport Intelligence, 2011); (Hammant, 2011) have in effect shown that more than 90% of the surveyed manufacturing companies would implement collaborative initiatives in the very next future. With this respect, Christopher (2005) notes that, for many companies, logistic costs are a significant part of the total product cost, therefore companies try to better manage them. The author also points out that major advantages derive from re-engineering of logistics processes, rather than through scale and volume economies.

Synergies deriving from cooperation are consequently the main reasons for logistic collaboration (Simatupang & Sridharan, 2005). However, «gains from collaborative initiatives are often disappointing» (Fawcett, Fawcett, Watson & Magnan, 2012, p.44) because it is difficult «to grasp the dynamism and intricacies that delimit the processes within the collaboration box» (Fawcett et al., 2012, p.45). This becomes even more relevant in the case of horizontal collaboration that is so called when it takes place among two or more firms at the same level of the supply chain, regardless of their nature – LSPs or manufacturers (Crujssen, 2012).

Notwithstanding the relevance of the topic, the available literature on such a topic is still limited and quite recent (Leitner et al., Meizer, Prochazka & Sihn, 2011). Moreover, Naesens, et al. point out the lack of a strategic decisional framework for the implementation of horizontal cooperation and perceive it as «a major theoretical and practical shortcoming» (2009, p. 550). The present study critically reviews available literature in order to propose a comprehensive framework for projecting and implementing effective horizontal collaborations in logistics. More specifically, we

propose to correlate partners' aims with the different types of assets they must share, according to an incremental approach based on incremental trust-building.

The remainder of the paper is organized as follows. Section two includes a literature review which aims at showing benefits, impediments and existing models for horizontal collaborations. Section 3 presents the comprehensive framework as a tool to aid and successfully set up the stages of horizontal cooperations. Section 4 concludes, highlighting the main findings and the needs for future research.

2. LITERATURE REVIEW

The topic of collaboration in logistic has been thoroughly studied and widely discussed from both, scholars and practitioners (see, among others, Caputo & Minnino, 1996); (Schmoltzi & Wallenburg, 2012). Moreover, it has been referred to as a "critical factor" (Naesens et al., 2009) for firms' competitiveness. Among the possible forms of cooperation in logistics, horizontal collaboration is still a neglected topic and related literature is still in its infancy (Leitner et al., 2011).

In this respect, one of the first definition of collaboration in logistics was proposed by Lambert, et al., according to whom it is «a tailored business relationship based on mutual trust, openness, shared risk and shared reward that yields a competitive advantage resulting in business performance greater than would be achieved by the firms individually» (1999, p. 166). At the same time, horizontal collaboration is defined by European Union (2001) as a concerted practice between companies operating at the same level(s) in the value system. This is consistent with Cruijssen, who qualifies such a type of partnership as an «active collaboration between two or more firms that operate on the same level of the supply chain and perform a comparable logistics function on the landside» (2006, p. 12). To sum up, horizontal cooperation projects aim to identify and achieve win-win situations among two or more firms operating at the same level of the supply chain, notwithstanding they are competitors or not, similar or different in terms of size. In other words, such a collaboration permits involved companies to reach superior performances with respect to those they would achieve individually. These companies can be manufacturers or suppliers, retailers or LSPs, therefore we assume they are – in general – Flow Controlling Entities (FCEs).

In this section, we conduct a deep literature review in order to characterize the horizontal collaboration phenomenon and to define elements useful to support the definition of a comprehensive framework. In so doing, we examined 24 papers and identified the following three main topics:

- objectives pursued by horizontal collaboration programmes in logistics;
- criticalities;
- proposed classification models.

2.1. Aims

With respect to the objectives pursued by collaboration in logistics, the idea that cost reduction is the most relevant aim is widely accepted. However, nowadays, «collaboration should result in creation of new and unique value propositions based on a unified approach to value creation» (Bititci, et al., Martinez, Albores & Parung, 2004). Therefore, service level, service quality and customer satisfaction are also considered essential objectives for collaboration in logistics (Ho, Xu & Dey, 2010).

More specifically, Cruijissen, et al., (2007) point out that more than half of their surveyed companies consider horizontal collaboration in logistics useful for improving cost, productivity, customer service and market position. These results derive from increases in carriers' load factor, reduction of goods' and services' costs, additional frequency of deliveries and the possibility to tender on larger contracts. Quite similarly, Mason et al., (2007) put in evidence that cooperating companies generally aim to reduce their logistics costs on the base of a more effective management of their (organizational and physical) resources. Cost reduction, increased responsiveness, and improved service level are identified as relevant benefits also from Lehoux et al., (2009) and Leitner et al., (2011).

A thorough study about horizontal collaborations has been conducted by Cruijissen (2006), who identifies five different objectives for such a firm strategy: cost reduction, growth, innovation, quick response and social relevance. It is worthy underlining that different objectives may be reached adopting different typologies of cooperation. For instance, quick response is defined as an essential aim for the "knowledge centre" type while for the "freight sharing" one cost reduction and social relevance are the most important objectives.

Horizontal cooperation in specific contexts has been investigated, such as in the case of Canadian furniture industry (Audy et al., 2011) and group purchasing (Ghaderi, et al., 2012). With this respect, it is interesting to note that the application of horizontal collaboration in logistics may conduct to differentiated results, even within the same industry. For instance, Leitner et al., (2011) noted that Romanian automotive suppliers reached an overall 15% cost reduction (which includes an impressive 50% of fuel cost decrease) and a CO₂ decrement as high as 40%. However, they doubled lead times due to the need of consolidating loads. On the contrary, Spain-based competitors reached a 14% reduction of the number of journeys and a 17% reduction of CO₂ emissions with no negative impact on the lead time (Leitner et al., 2011).

Lastly, a study on the manufacturing industry identifies benefits as «lower prices due to aggregated manufacturing/purchasing quantities, reduced supply risk, reduced administration cost due to centralized purchasing activities, and networking benefits as group members communicate and interact with each other» (Bahinipati, et al., 2009, p. 880).

In Table 1, main findings of the revised literature are synthesised.

Table 1 Aims of logistic horizontal collaboration

Authors\Aims	1	2	3	4	5	6	7	8	9	10	11	12	Total
Bititci <i>et al.</i> 2004	X				X								2
Cruijssen 2006	X		X	X			X	X					5
Mason <i>et al.</i> 2007	X									X			2
Cruijssen <i>et al.</i> 2007	X	X				X			X				4
Lehoux <i>et al.</i> 2009	X	X	X										3
Bahinipati <i>et al.</i> 2009	X										X	X	3
Leitner <i>et al.</i> 2011	X	X	X	X									4
Total	7	3	3	2	1	1	1	1	1	1	1	1	

Legend: 1= Cost Reduction; 2 = Customer Service; 3 = Increased responsiveness; 4 = Social relevance (especially environmental issues); 5 = Value Creation; 6 = Improved productivity; 7 = Growth; 8 = Innovation; 9 = Improved Market Position; 10 = Better resource management; 11 = Reduced Supply Risk; 12 = Networking

2.2. Criticalities

With respect to the criticalities belonging to horizontal collaboration in logistics, major concerns involve the trust between cooperating firms, since its lack might jeopardise the pursued objectives and destroy companies' efforts to collaborate. As a consequence, Naesens *et al.* (2009) propose to verify the 'strategic fit' among partners before starting the collaboration. Wilhelm (2011) notes that trust is extremely relevant when partners are also competitors, which is in the case of co-opetition. Finally, it is interesting to note that even in post-disaster relief logistics, Schulz & Blecken (2010) verified the main impediments to a cooperative approach are mutual mistrust and lack of transparency.

Horizontal collaborations also involve key information and knowledge sharing, which may represent another major criticality (Leitner *et al.*, 2011). Hingley *et al.* (2011) recently noted, in a study focused on grocery retailers, that the lack of such an element might inhibit horizontal collaboration.

With a specific focus on LSPs, Wallenburg & Raue (2011) and Schmoltzi & Wallenburg (2012) have studied the core issue of conflict in horizontal cooperation. Due to the high complexity of such a phenomenon, in fact, the potential for conflicts' impacts on the outcomes and the effectiveness of the cooperation is extremely high (Wallenburg & Raue, 2011). With specific respect to competing companies, co-opetition facilitates the risk for opportunism and conflict to arise, thus increasing the risk of relationships failure (Schmoltzi & Wallenburg, 2011). Both studies have shown that adequate governance mechanisms provide a basis to avoid failure, improve cooperation performance and innovation, and drive its success.

A pilot project study identified other impediments related to the hurdles of implementing a cost allocation method agreed by all partners. At the same time,

the authors point out that benefit belonging to cost savings are quite difficult to equally distribute among partners (Audy et al., 2011).

To sum up, partners' selection and management of negotiation phase are generally recognised as the most critical (see, among others, Cruijssen et al., 2007, Audy et al., 2012).

2.3. Existing Models for Horizontal Collaboration

Whilst the literature on horizontal cooperation in logistics is still in its infancy (Leitner et al., 2011), several authors proposed models to describe typologies of such a type of collaboration, independently of the specific value chain activity. Such models are often developed on the base of earlier proposed frameworks on alliances and cooperations in a broad sense (see, for instance, Zinn & Parasuraman, 1997).

The earliest taxonomy was proposed by Lambert et al. (1999), who take explicitly into account the time horizon. Although their model was originally designed for vertical supply chain, it can be easily transferred to horizontal cooperation (Cruijssen, 2012). More specifically, according to the authors, the degree of collaboration among partners evolves, along the time, in three different types of collaboration. Type I involves a limited degree of shared activities, it is short-term oriented, and focused only on operations. Type II involves business planning integration among partners. Type III takes the form of an explicit long-term contractual agreement, that is a horizontal strategic alliance.

A broad approach to understand the key elements of horizontal collaborative initiatives can be found in Cruijssen (2006). He identifies 13 different typologies of horizontal cooperation in logistic activities, ranging from a mere "lobbying group" to a "warehouse/freight sharing". For each of them, the following dimensions are investigated in order to characterize proposed alternatives: decision level (operational, tactical, strategic), competition among partners (presence/absence), combined assets (orders, logistic facilities, rolling stock, market power, supporting processes and expertise) and objectives (cost reduction, growth, innovation, quick response and social relevance).

Among practitioners, McKinsey (2010) adopts a leadership-based approach to define different types of horizontal partnerships and to characterize them in terms of advantages and disadvantages. The more hierarchical one is simpler but offers potentially limited gains and issues about transparency. Alternatively, the peer-partners type shows higher potentialities in achieving significant gains; however, it requires full transparency calling for the disclosure of confidential information. As a consequence, partners need a high level of expertise on bundling and implementing collaborations, and substantial resources to build up proper governance. Obviously, the higher the number of confidential information disclosed, the greater the risk for opportunism to arise. The middle option includes a clear leader in charge for the collaboration and offers potentially larger gains. However, it also

still presents little opportunities for smaller shippers to influence the collaboration and to capture the full benefit.

Leitner et al. (2011) propose a framework based on two main dimensions: the level of cooperation – which ranges from total absence to intense – and the potential of flows consolidation in terms of logistic activities – which varies from low (individual transport planning) to high (lateral supply chain cooperation).

Lastly, Moutaoukil, et al., (2012) identify three levels of collaboration: strategic, tactical and operational. However, in this case the three terms are not related to the cooperation's time horizon, as in the models of Lambert et al. (1999) and Cruijssen (2006). Instead, they belong to the sequence of activities that are to be realised to successfully design and implement the horizontal collaboration. The first level is related to the engagement process (which ranges from the identification of compatible partners to the pooled network design), the second to the management of interdependencies (from the localization of joint warehouse to the information sharing), and the third to the effective implementation of operations (from execution of operating specifications to definition of protocols for disputes' resolution) (Moutaoukil et al., 2012).

3. INTRODUCTION

The earlier conducted literature review puts in evidence some concluding remarks:

- first of all, due to the infancy of the investigated literature (Leitner et al., 2011), it does not offer a comprehensive framework for projecting and implementing a horizontal collaboration in logistics and transports. Notwithstanding the indubitable relevance of Cruijssen (2006) contribution, it must be noted that proposed variables (decision level, competition among partners, combined assets and objectives) are used only to classify the different alternatives and not for designing them;
- trust amongst partners is of a paramount importance to establish successful cooperations; therefore adequate governance mechanisms must be implemented to cope with conflicts among partners and to prevent opportunism (see among others, Cruijssen, 2006; Wallenburg & Raue, 2011; Schmoltzi & Wallenburg, 2012);
- it is widely recognised that horizontal collaboration may pursue different aims, even if cost reduction is the most cited;
- the number and nature of assets to be shared among partners may significantly vary according to the specific context;
- finally, horizontal collaborations may evolve on a time horizon basis, from merely operative towards more strategic partnerships.

Based on such findings, we propose a comprehensive framework which permits to take into account different variables to be considered when projecting and im-

plementing a horizontal collaboration. It also puts in evidence interdependencies among such variables.

As already noted, trust among partners is considered a critical element for effective horizontal collaborations in logistics (Wilhelm, 2011). At the same time, it is widely recognised that trust is developed through continuous interaction and reciprocal knowledge (see, among others, Sasaki & Marsh, 2012). As a consequence, the partnership may evolve only on a time step basis; in other words, firms need to accumulate a relevant experience in collaboration in order to increase the mutual trust. Based on it, broader and deeper activities' sharing may be reached and more ambitious objectives achieved.

The proposed framework identifies three incremental steps in the collaboration development inspired as in the Lambert et al. (1999) contribution (operational, tactical and strategic). As a consequence, it is impossible for two or more companies to implement tactical or strategic partnership without a previous adequate experience with the operational stage. At the same time, it is not mandatory for companies, which had already implemented the operational phase, to evolve along the former ones. As a consequence, two (or more) firms could also remain at the former level of collaboration for a long-term time horizon. Moreover, a company could even implement a network of differentiated (in terms of phase) horizontal collaborations with several partners, based on the specific context that characterize each of the relationships.

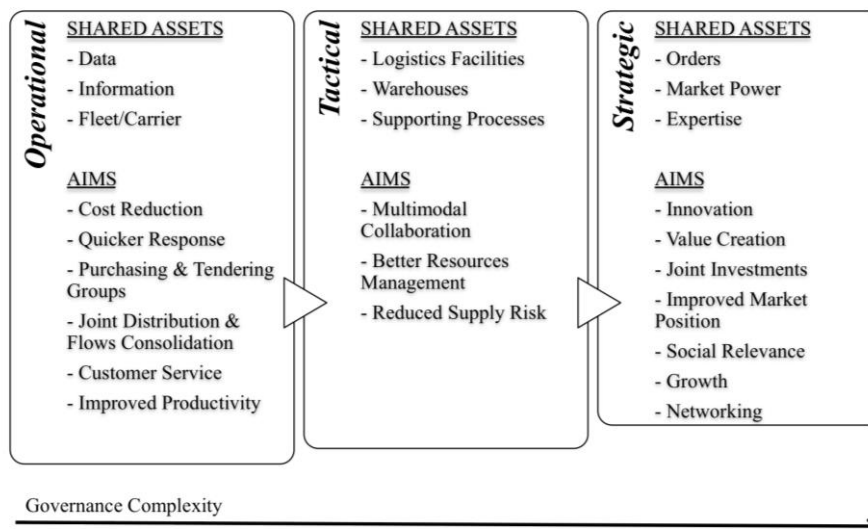


Fig. 1 The Comprehensive Framework proposed for Horizontal Cooperations

Each of the three identified stages is characterised by a specific combination of aims and shared assets. With this respect, it must be noted that, in the case of hori-

zontal collaborations involving competitors, we need to add the common objective of developing a shared cooperative perspective.

In Fig. 1, the couple of coherent aims and assets are summarized.

As already noted, evolving from operational towards strategic collaborations implies more complex governance architectures and, then, an incremental level of managerial involvement. More specifically, while operational and tactical phases may be managed at the Supply Chain Manager level, the strategic one needs a direct involvement of the top management, since pursued aims involve the company as a whole.

4. CONCLUSIONS

Horizontal collaboration in logistics is a relatively new topic (Leitner et al., 2011) which is increasingly gaining momentum (Audy et al., 2012). The earlier conducted review of the available literature demonstrated that several attempts have been made to point out core elements within horizontal collaborative initiatives. However, these approaches lacked in proposing of a comprehensive scheme which supports the design and implementation of effective horizontal collaborations.

The proposed framework assumes an incremental perspective, according to which mutual trust among partners is developed through increasing collaboration. More specifically, three steps are proposed: operational, tactical and strategic. For each of them a coherent couple of aims and shared assets is then defined.

The proposed framework represents a step forward to the deeper understanding of horizontal collaboration among companies. The actual main limitation of this study is to be theory based, even if the referred literature takes into account specific empirical circumstances. Therefore, it would be necessary to verify the real possibility of its implementation in managerial decision context. With this respect, we suggest that future research address the problem adopting a semi-quantitative methodology to validate its effectiveness. A Delphi study, for instance, would represent a proper tool to check the framework and encompass contributions from both the practitioners' and the academics' fields.

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