

5th Forest Engineering Conference – 47th FORMEC  
“Forest engineering: propelling the forest value chain”  
23-26 September 2014 – Gerardmer (France)  
[www.fec2014.fcba.fr](http://www.fec2014.fcba.fr)

Collaborative logistics:  
Improving business relationships and supply chain visibility to propel the forest value chain

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### Summary

Considering the growing complexity of value chains and of their environment (in particular fierce competition, market dynamicity, sourcing uncertainties, regulation and compliance pressures, and increasing environmental risks), it is acknowledged that local optimisations and isolated efforts cannot succeed in improving value chains performance and success.

Considering the structural changes of value chains in most industries, competition has shifted from “company vs. company” to “supply chain vs. supply chain”. Therefore, a supply chain management (SCM) approach is needed to improve operational performance of value chains, as well as their responsiveness, flexibility, agility, robustness and resilience.

It is thus necessary to switch from a single intra-organisational approach to a more holistic (systemic) inter-organisational perspective to (re)design logistics (a core strategic SCM process) innovatively and efficiently. Most research works and practical experiences highlight the need to improve logistics collaboration among supply chain partners. However, they also report that achieving “collaborative logistics” is not easy!

Our purpose is to make a synthesis of previous research and business experiences to provide a comprehensive framework of collaborative logistics, antecedents and outcomes. The objective is particularly to clarify the meaning of logistics collaboration, to highlight the importance of business relationships and supply chain visibility, and to provide a structured list of factors that facilitate or inhibit collaborative logistics in value chains.

Collaborative logistics is sometimes considered as mythic, and its achievement as an endless journey. Consequently, we also want to identify practices and principles that could help the forest sector to developing realistic and successful collaborative logistics.

### Keywords

Logistics, supply chain management, collaboration, framework

## **Introduction and purpose**

In most industries, value chains are becoming more complex: they include a lot of very diverse actors; their operations are spread all over the world; their governance results from a set of complex relationships among participants. Value chains are also facing the growing complexity of their environment. The key factors that most influence value chains evolution are: fierce competition in industries (price war, differentiation strategies, high rate of innovation...), market dynamicity (demand is difficult to predict and is rapidly changing), sourcing uncertainties (both considering availability and quality), regulation and compliance pressures (with respect to many public and private bodies), demands for more corporate social responsibility (from many stakeholders), and increasing environmental risks (natural hazards, political crises, terrorist attacks, wars, etc.). In such a complex world, in line with a systemic view of business, it is acknowledged that local logistics optimisations and isolated efforts in this domain cannot succeed in improving value chains performance and success (Stank et al., 2011).

Most companies today balance between being more integrated (to control operations) and outsourcing operations they consider not being part of their core business. Some companies even chose to be “virtual” ones. As a consequence, many value chains are not internal to a single company (intra-organisational), but inter-organisational, which is challenge from an operations and logistics management point of view (Fabbe-Costes, 2005). Considering the structural changes of value chains in most industries, competition has shifted from “company vs. company” to “supply chain vs. supply chain” (Christopher, 1992). Therefore, a supply chain management (SCM) approach and a supply chain orientation (SCO) (Mentzer et al., 2001) is needed not only to improve operational performance of value chains (including eco-efficiency), but also to develop their responsiveness, flexibility, agility, robustness and resilience.

In nowadays value chains, logistics and supply chain management are not only support functions but they are indeed becoming strategic distinctive competencies and dynamic capabilities that can give sustainable competitive advantages (Christopher and Holweg, 2011; Fabbe-Costes and Nollet, 2014). Governance of value chains and interdependencies among partners foster collaborative logistics initiatives. It means companies should switch from a single intra-organisational approach to a more holistic (systemic) inter-organisational perspective to (re)design logistics (considered as a core strategic SCM process and capability) innovatively and efficiently.

If most research works and practical experiences highlight the need to improve logistics collaboration among supply chain partners, they also report that achieving “collaborative logistics” in value chains is not easy!

Since many works has been done on collaborative logistics, our purpose is to make a synthesis of previous research and business experiences to provide a comprehensive framework of collaborative logistics, antecedents and outcomes. The objective is particularly to clarify the meaning of collaborative logistics (§.1), to justify why such effort is needed in a value chain (§.2) and to provide a structured list of factors that facilitate or inhibit collaborative logistics in value chains (§.3). In the conclusion, we will discuss the transferability and adoption of collaborative logistics in real-life business contexts (e.g. the forest sector). We will highlight the complexity and the dynamic of the phenomena, its embeddedness in business relationships and interaction with strategic objectives of partners. We will point out that collaborative logistics improvements rely more on organizational factors than technological tools.

## 1. What does collaborative logistics means?

Collaborative logistics is related to other buzzwords such as supply chain cooperation (Simatupang and Sridharan, 2005a,b), supply chain partnership (Lambert et al., 2004), information sharing in supply chains (Kaipia and Hartiala, 2006), supply chain visibility (Bartlett et al., 2007, Caridi et al., 2010), transparency in supply relationships (Lamming et al., 2001), supply chain integration (Fabbe-Costes and Jahre, 2008)... Considering the overlaps between these notions, we clarify what collaborative logistics can mean in value chains through a structured synthesis of all these works. Figure 1 summarizes the inter-related dimension of collaborative logistics.

Collaboration in the context of a supply chain is often defined as two or more companies (suppliers, industrial partners, logistics service providers (LSPs) and customers) *working jointly* on an activity or project related to logistics. Collaborative logistics describes the close cooperation among autonomous business partners or units in a supply chain engaging in *joint logistics efforts* to create a competitive advantage and higher profits than can be achieved by acting alone. This means that, for this activity or project, partners build common forecasts and planning, have common goals and shared objectives, define jointly logistics processes, pool some logistics resources, measure logistics performance and analyse risks transparently, and share rewards and benefits of common efforts. This vision of a so-called win-win collaborative logistics is often considered as mythic and few value chains work so “collaboratively”.

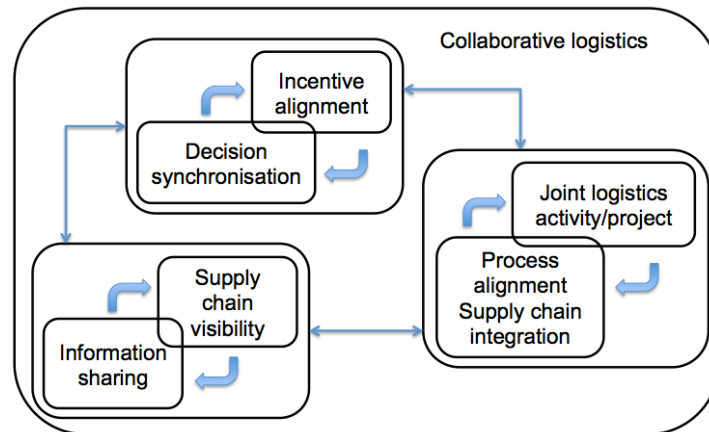
Lower degrees of collaborative logistics exist in value chain and more and more companies make efforts to develop collaboration in logistics (e.g. transport pooling to improve eco-efficiency). Analysis of collaborative logistics initiatives shows that they all rely on the *sharing of information* concerning demand forecast, operations planning (e.g. for production, transport), inventory levels in the chain, operations execution and disruption (through tracking and tracing systems), and performance achievement (e.g. customer service quality, logistics costs). Having information about what is forecast, planned, executed and achieved in the value chain helps companies to improve their own performance and the overall performance of the chain. Collaborative logistics cannot develop without *information sharing* and improved *supply chain visibility*. The quantity and the quality of shared information (in particular its relevance for operational and tactical decision-making) determine the *degree of supply chain visibility* (also called *transparency*), which is considered as a relevant indicator of collaborative logistics. Supply chain visibility requires *accurate* and *timely* information related to events and transactions (e.g. orders, shipping notice), status information (e.g. stock level, order status), master data (e.g. technical features of products) and operational plan (e.g. production/transportation plans, sales forecast), *useful* and *usable* for decision-making which means *trustable fresh* information.

Capturing and disseminating timely and relevant information for decision-makers to plan and control supply chain operations is the first step to go further and develop more collaborative logistics. Next step is to practice *decision synchronisation* (and even *joint decision-making*) for operational day-to-day activity and more importantly in forecasting and planning contexts. The extent to which the chain members are able to *orchestrate critical decisions* at planning and execution levels for optimizing supply chain profitability in return transforms how information is shared between companies.

Since firms collaborate in the sense of leveraging benefits to achieve common goals, logistics collaboration also means discussions about what are the common objectives of collaborative logistics. Designing and measuring appropriate performance metrics can lead the chain members to chase the correct direction and thereby contribute to better performance. Thus, designing and implementing co-performance metrics is a main concern of collaboration leading to *incentive alignment* which refers to the degree to which chain members share costs, risks, and benefits.

Shared decision-making to reach common objectives motivates the members to act in a manner consistent with their mutual strategic objectives, driving change to the underlying business processes leading to joint efforts to redesign supply chain operations and streamlining cross-company logistics processes. Collaborative logistics ends with joint efforts to build seamless processes and achieve *supply chain integration* supposed in turn to improve supply chain performance. The redesign of processes sometimes suggests to pool or to invest in *shared resources*.

Figure 1: The inter-related dimensions of collaborative logistics



## 2. Why is it worth developing collaborative logistics? (outcomes)

Collaborative logistics demands efforts from partners and can be considered as risky, in particular because more supply chain integration increases dependence and calls for the sharing of sensitive information. Why should companies make such efforts? What are the benefits?

Most collaborative logistics initiatives report that it is a crucial means by which companies were able to enhance their operational efficiency and effectiveness and, thereby, maintain a competitive edge. Most cases mention *improved operational logistics performance* such as:

- responsiveness to customer needs (e.g. through time compression initiatives on the whole processes, shorter lead-times)
- service quality (e.g. reliability of deliveries, increased service level)
- operational flexibility (to cope more easily with demand uncertainty)
- information quality (with a significant reduction of the bullwhip effect avoiding information distortion along the chain)
- logistics cost reduction and control (e.g. by reducing duplication efforts, inventory levels).

But collaborative logistics also improve *strategic performance* of the companies and of the value chain. The most cited strategic outcomes are:

- revenue enhancement
- efficient differentiation with impact on competitiveness
- better adaptation to environment changes and increased agility (aligning time-based strategies of partners)
- faster innovation processes (through joint innovation processes and early involvement of partners in particular suppliers and LSPs)
- increased robustness and resilience (thanks to better risk management and mitigation at the chain level).

All joint efforts change business relationships both inside companies and among them. Most companies engaged in collaborative logistics also assess significant evolution concerning inter-organisational learning and knowledge management (Fabbe-Costes and Lancini, 2009), ending with clearer vision of the future that helps facing uncertainties. Thus is worth considering:

- gains in terms of logistics expertise and knowledge
- increased accuracy of logistics decisions and choices (e.g. better alignment with forecasts)
- improved scanning and prospective capability to understand the dynamic of value chain environment and better forecast and screen future changes.

It is clear that all these benefits cannot be obtained at the same time and that the partners need to define what their common/aligned priorities are (or could be) through incentive alignment (as mentioned before). In turn, the measure of effective improvements reinforces collaboration and help developing or intensifying joint initiatives.

However, companies must never be so naive as to close their eyes to the difficulties to overcome to make logistics collaboration a success. Many case studies mention drawbacks and pitfalls such as opportunistic attitude (e.g. free riding), lack of information or poor quality of available information, etc. That is why so many studies analyse factors and issues affecting (enabling or inhibiting) the success of collaborative logistics.

### **3. What are the factors that help developing collaborative logistics? (antecedents)**

Building collaborative relationships, whatever the concerned activity/project in logistics is a long journey, in particular because long-lasting routines have to change and individual and organisational reluctance to share sensitive data with partners must be overcome.

Combining available results of what could be the key-points that determine collaborative logistics success ends with a long list of enabling factors that can be assembled in 3 mains groups.

Since the basis of logistics collaboration is information sharing and supply chain visibility, the first group concerns:

- information in companies (quantity, availability and more importantly quality – i.e. accuracy, freshness, accessibility, availability, timeliness –)
- information technologies and information systems both in companies (ex: ERP, WMS, TMS, POS...) but more importantly for inter-organisational sharing and decision-making i.e. inter-organisational technologies and systems (IOS) (ex: EDI, extranet platforms, VMI or CPFR systems),
- supply chain monitoring systems, tracking and tracing systems (TTS) that could provide a total traceability of the chain (Lazzeri and Fabbe-Costes, 2014).

Since collaborative logistics is working jointly, the second important group of factors concerns business relationships and in particular:

- atmosphere of relationships among partners (existing mutual trust and/or conflicts, rivalry, commitment to cooperation)
- bargaining power or domination of partners and dependency issues (linked to industry fragmentation, differentiation among partners, substitutability/essentiality of partners, switching costs)
- history and duration of relationships, existing inter-personal and inter-organisational routines, social networking in the value chain, conflict/cooperation culture.

Many case studies and companies testimonials drive to the conclusion that few companies really know what is their value chain, who the suppliers' suppliers and customers' customers are, how the processes all along the value chain really work, and who are the partners with whom they should collaborate with. Consequently, the following enabling factors can be considered:

- process mapping and supply chain mapping approaches (Gardner and Cooper, 2003) to identify partners, understand supply chain structure, diagnosis processes (in particular to detect traditional routines and activities that are unnecessary and wasteful) and prepare for business process reengineering (if needed)
- competence in analysing physical flows (volumes, characteristics of products) and operational tempo (seasonality, growth trends, unexpected events), planning capability
- cost and risk analysis in the chain.

A fourth group of factors are generally also considered related to the structure and complexity of the industry and of the value chain, the product/service characteristics (e.g. value, complexity), size of companies in the value chain, etc.

All these factors are not necessarily required to launch collaborative logistics initiatives. Depending on the selected logistics activity or project some factors will be more or less critical. However, this list can be considered as a tool to make diagnostic and to analyse dominant features of potential collaborative initiatives.

In line with Fabbe-Costes et al. (2011) model, these groups of factors can be analysed at the six following levels: people, function, firms, chain, network and societal (for diagnosis purposes companies could use a matrix). Here are some examples of enabling factors at each level:

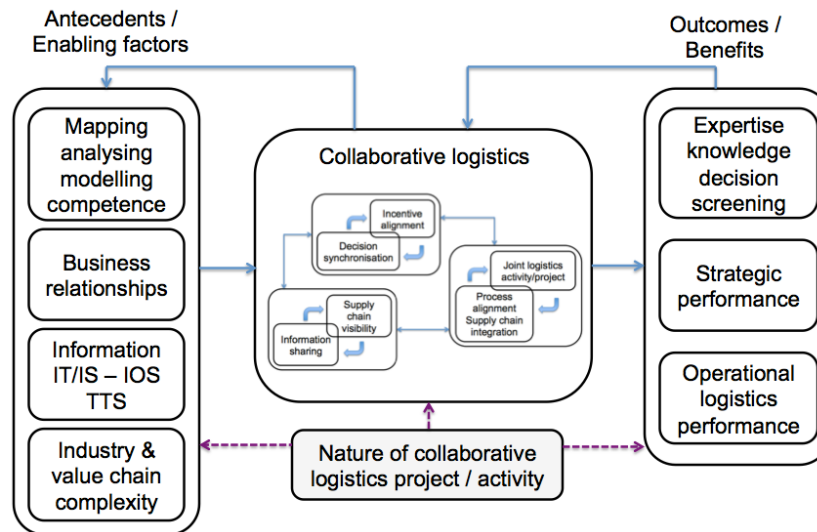
- willingness of *people* to collaborate with partners, ability to be good gatekeepers and work effectively at the interfaces, reciprocal and friendly interpersonal relationships between logistics managers
- position of the logistics *function* in companies (is it recognized as a "strategic function"?), available logistics resources, logistics competences and capabilities
- openness of *companies*, logistics strategy of firms and perception of the importance of logistics and supply chain management in their overall strategy
- nature, structure and governance of the *supply chain* (number of echelons, complexity of relationships, existence of a leader, a dominant or a powerful focal firm)
- opportunities in the *networks* in which the supply chain is embedded (web of chains), existence of companies (e.g. LSPs) that could take the leadership (e.g. in pooling logistics activities)
- culture and history of the *sector / industry*, collaborative or conflicting traditions among partners, existence of stakeholders that could be facilitators (leader, intermediary), existence of available inter-organisational standards or IT platforms, requisite (by legal regulation or quality labels) supply chain visibility (Klueber and O'Keefe, 2013).

## Conclusion

Logistics and supply chain management has gain importance in many sectors and more and more consider that developing collaborative logistics is a good thing. At the same time, they also attest that it is difficult and a bit idealistic. One could ask: how to bridge the gap between dream and reality? Win-win and transparent collaborative logistics in a value chain is probably a myth (i.e. an unreachable ideal that help to target efforts). However, developing a *realistic collaboration* in a value chain is possible and beneficial, even in industries or sectors that can be considered as far from the ideal presented in the academic literature.

Our article provides a synthesis of previous research works and managerial practices that can help to design practical way of achieving collaborative logistics organized in a framework (see figure 2).

Figure 2: Collaborative logistics framework



A better understanding of what is collaborative logistics can help to make diagnosis and identify points that can be improved. The set of potential benefits facilitates the definition of the desired and reachable objectives with collaborative logistics. The structured lists of enabling factors helps to make a check of what the current situation is and where improvements can be done.

A key point is that the relationships are customized. A partnership is a tailored business relationship. Even if we can identify enabling factors, there is no standard recipes or “ready-made” prescriptions that can be applied. Developing collaborative logistics is a complex, and often lengthy, process for which there is no simple and single way of achieving it and no designated path to follow.

Another point must be mentioned. In line with results from research studying supply chain integration and transparency in supply relationships, collaboration should not be viewed as a monolithic and uniform practice in a value chain. A realistic approach is to identify partners with whom it is easier and/or more important to begin with and to develop collaborative logistics initiatives. There are different degrees of collaboration in value chains, nature of collaboration in varies and evolves (it is a dynamic). Collaborative logistics is a concept that managers can bring into play in a variety of ways for specific purposes.

In line with this, potential partners should acknowledge the need to discuss common/compatible objectives with related KPIs to measure, acceptable/reachable level of supply chain visibility, the acceptable level of control to exert on joint activities/projects.

It is often posit that technological factors are key factors for change in value chains, in particular to foster collaboration among logistics partners. However, most works in collaborative logistics demonstrate that technology alone is not sufficient. The main point is about improved business relationships and improved supply chain visibility, which call for cultural change, evolution of routines and mutual trust.

Our paper open avenues for further research to better understand collaborative logistics phenomena and implementation. Case studies in specific value chains such as in the forest sector will help refining the framework.

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