The Supply Chain Improvement Through Primary Collaboration. An Action Research Experience

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Abstract. Collaboration among companies arises as one of the key factors that could increase the supply chain performance. This collaboration is more difficult if these companies have the same status in the supply chain and they are small and medium sized companies. In this context, the aim of this paper is to propose and validate a methodology for achieving confidence for primary collaboration throughout the food supply chain and as a previous step for developing "collaboration networks". In the paper, the authors have adopted the "Action research" approach, leading and coordinating a Collaboration Project among 10 food companies and 5 agricultural cooperatives.

Keywords: Supply Chain, Logistics; Collaboration; Cluster.

1 Introduction

In global markets, companies should face the constant innovation of new products, decreasing life cycles, and product variety; they also should deal with the demand for lower prices, and higher quality and service standards. This happens in increasingly turbulent and volatile markets, which has forced many companies to improve processes along the supply chain, as a mean to achieve competitive advantages (Gonzalez-Loureiro et al., 2014; García-Arca et al., 2016).

In this context, the organizational redesign contributes to the search for more effective and sustainable alternatives in managing the supply chain (Huo, 2012). Going into further detail in this organizational redesign, collaboration among companies (suppliers, retailers, third party logistics,…) arises as one of the key factors that could ease the competitiveness´ improvement (Wiengarten and Longoni, 2015; Pérez-Mesa and Galdeano-Gómez, 2015).

The traditional collaboration among companies could be analyzed from two different perspectives (Barrat, 2004; Wilhelm, 2011): on one hand, from a vertical perspective (different companies up and down throughout the supply chain; for example, supplier-retailer); on the other hand, from a horizontal perspective (between different companies that act at the same level in the supply chain; for example, different suppliers). If we compare both perspectives, we could state that the horizontal collaboration has a worst analysis in recent literature (Choi and Wu, 2009; Pérez-Mesa and Galdeano-Gómez, 2015) as it could be considered more complex and

dynamic (Wilhelm, 2011). Thus, in a vertical collaboration, the retailer often used to be the leader and the promotor, but in a horizontal collaboration, it is not so clear who is the company that plays this role. In this sense, researchers could play the role of promotors and coordinators of this potential collaboration, but also associations or clusters. Likewise, this uncertainty in the horizontal collaboration is higher when the type of company is small and medium sized, as it is not so evident the advantages and the goals of this collaboration (Wu et al., 2010).

Going beyond, Camarinha-Matos and Afsarmanesh (2005) propose and structure the concept of "Collaboration Networks" as "a variety of heterogeneous autonomous entities, geographically distributed, in which participants collaborate to achieve a common goal and base their interactions through computer networks".

Before developing and deploying these systematic computer networks it is important to achieve both a common goal and a suitable level of confidence among "actors" for easing any kind of basic collaboration (we name it primary collaboration), especially when companies are small and medium sized companies and some information resources are not always available (Matopoulos et al., 2007; Andres and Poler, 2014; Andres et al., 2016).

2 Objectives

In the context commented in the previous section, the aim of this paper is to propose and validate a methodology to achieve confidence for primary collaboration through the identification and implementation of improvements in the food supply chain, especially from the perspective of small and medium sized companies and as a previous step for developing future "collaboration networks".

The gap and methodology deals with the need of generating confidence among different companies or suppliers involved at a similar level in a food supply chain, so pays special attention to organizational issues more than technological issues. Thus, the main research question is to explore the effect on confidence when sharing and discussing improvement actions from an early collaborative perspective.

In this paper, the authors have adopted the "Action research" approach, leading and coordinating the Collaboration Project, designing its methodology, as well as participating in follow-up meetings not only in each company, but also in the coordination sessions as it will be commented later. As the authors have a long-standing experience improving logistics processes in other advanced supply chains (such as, automotive or fashion), some of these improvements can be adapted for being considered in the food supply chain.

According to Rapoport (1970) "…Action research aims to contribute to the practical concerns of people in an immediate problematic situation and to the goals of social science by joint collaboration within a mutually acceptable ethical framework". Thus, theory could be applied directly to practice using a collaborative perspective combining researchers and practitioners (Raelin and Coghlan 2006).

Thanks to this involvement, the researchers had the opportunity to witness the process, not only as simple watchers, but also as real "agents of change" in participation and learning processes (Middel et al., 2006). The knowledge compiled

by researchers after these projects can be discussed and shared with other companies and researchers (Alvesson, 1996; Coughlan and Coghlan, 2002), especially in the field of supply chain management (Näslund et al., 2010).

The collaboration project, led by the authors of this paper, has been carried out in the region of Galicia (Northwest Spain) and has been supported by the Food Cluster of Galicia (CLUSAGA; www.clusteralimentariodegalicia.org). The food sector is one of the strategic sectors in Galicia both for its size and for its economic and social significance.

Ten food companies participated in this project (4 dairy companies, 2 meat companies, 2 fruits and vegetables companies, 1 wine company and 1 dough company). Likewise, an association representing five small agriculture cooperatives participates in the project. The geographical location of these companies is presented in Figure 1. Almost all companies are small or medium sized companies.

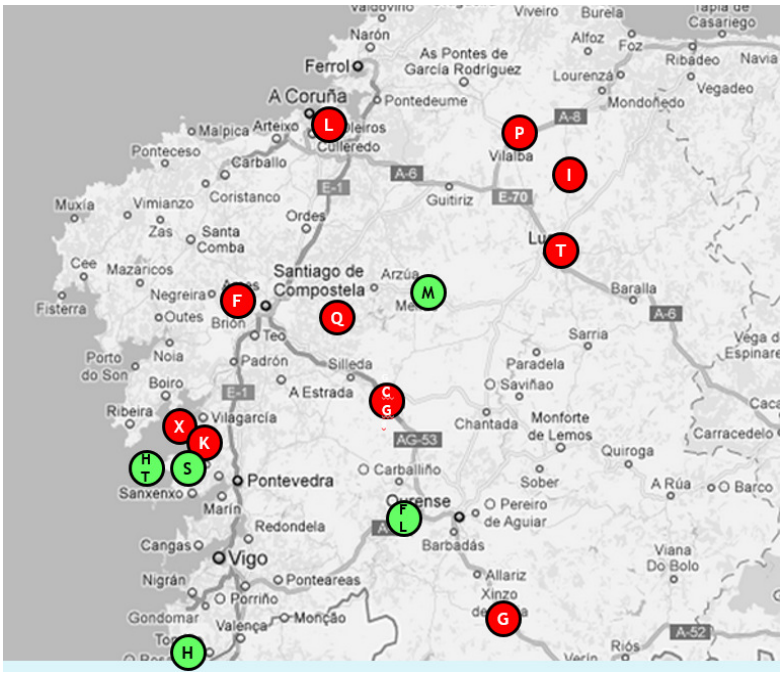

Fig. 1. Geographical location of companies (red) and agriculture cooperatives (green) in the project (Galicia; Northwest Spain)

Although some companies develop their activities in the same type of food subsector, only some companies of dairy and agricultural subsectors could be considered as competitors.

3 The Methodology and the Project

The collaboration process began with a visit of the authors to each company and cooperative in order to know and understand their logistics and productive problems. Then, three sessions of work were developed on the premises of each company and cooperative to deepen the analysis and diagnosis. The purpose of this phase was not only to identify and to classify potential improvements in the supply chain management, but also to implement some of them. A summary of this individual diagnosis was shared electronically among all companies of the project.

Simultaneously, three specific sessions of joint work with all companies and cooperatives were developed in order, not only to exchange and share examples of individual improvements in each company (to encourage similar changes in other companies), but also to explore joint collaboration actions. The project was developed during four months.

The members of the project team were the authors of the paper (the coordinators and leaders) and those responsible for logistics and/or production management in each company. As some of the companies are small companies, in some cases, the CEOs participated directly in the project. The involvement of main directors and some CEOs reinforces their commitment with the project.

Likewise, between meetings, the authors coordinated the development of proposed actions by telephone and e-mail. In each company, the authors identified opportunities for improvements and implemented them after. These individual improvements could be grouped into three big areas:

- The packaging rationalization from a logistics point of view. For example, in one meat company, thanks to the redesign of one box has been possible the reduction of its cost (the amount of paperboard used is reduced a 12%, but also it is reduced the amount of waste). Additionally, this improvement increases the number of boxes per EUR pallet (from 80 to 120; a 50% without increasing the height of the pallet), so the logistics costs are lower.
- The improvement of warehouse management. For example, changing the warehouses layout, the procedures of warehouses processes (receiving, putaway, storage, picking, replenishment or shipping), the definition of requirements for WMS (Warehouse Management Systems) implementation or the adoption of EAN 128 labels in unit loads and boxes.
- The improvement of transport management. For example, redesigning the internal transport routes, implementing KPIs for measuring efficiency in transport, analyzing the suitability of adopting internal o outsourced transport.

As it was commented previously, the individual actions in each company were presented at the joint meetings as an example for other companies in the project. These sessions were important in order, not only to share and discuss results and experiences of improvement, but also to achieve confidence between participants. The common type of individual improvements adopted seems to confirm this last statement. Likewise, it was important to understand the problems and conditions of each company for identifying feasible actions in collaboration. Additionally, this

confidence was critic for developing the stage of joint improvements and going beyond to establish the basics of potential “collaboration networks” in the future.

So, also in these meetings, different improvement in logistics management alternatives were explored from a collaborative perspective. Thus, thanks to this primary collaborative analysis, three main areas for improvement were identified:

- The combined transport between companies to reach markets and common retailers. In this regard, two options were selected: one with three routes in the Galicia area; another with three routes to deliver products from Galicia to other areas of Spain.
- The placement of a joint warehouse in the area of Madrid for delivery products to central, south and east markets in Spain. In this regard, four companies initially had outsourced small stores in the surroundings of Madrid. Likewise, 10 companies delivered their products via Madrid, so the use of one joint warehouse as a crossdocking point was also a potential improvement for companies.
- The joint purchase and negotiation of products and logistics services, particularly, packaging material, labels, fuel, parcel services and the "pool" of reusable packaging. For example, the yearly number of cardboard boxes used by 10 companies exceeds the 2.4 million units. Likewise, in these 10 companies the yearly consumption of labels and plastic film for pallets exceeds, respectively, the 15 million of units and the 1.2 million of meters.

These areas of improvement have currently different levels of implementation. Four of the six proposed transport routes are running today (including the example of the next section). Regarding Madrid Warehouse, three of the companies are sharing the same premise. Finally, five companies are purchasing some logistics products and components together. Clusaga and the authors are working to include in this process new companies.

In the assessment of the interest of implementing each of these joint improvements three major groups of difficulties were found (especially at transport and storage):

- The retailers and customers´ requirements. For example, the time of loading/unloading or the combination of internal and outsourced transport resources.
- The legal requirements; for example, the temperature range of products, the incompatibilities between products, the restrictions on driving hours, or the limitations in the capacity of trucks (weight and volume; all companies distribute their products in pallets).
- The quality of the available information (the lack of information, the lack of structured information, the lack of reliability of the information or the variability of information).

Regarding this last point, further efforts to align and structure the information are still needed to make an electronic platform that eases central purchases and sharing transport and storage resources. Anyway, the first steps to develop a "collaboration network" in the future have been established.

4 An Example of Joint Transport Improvement

To illustrate an example of joint action among companies, the analysis of a transport route (from the South to the North of Galicia) for the distribution of products at a controlled temperature is presented (see figure 2). The ultimate goal of this shared route was to improve standards of quality, service and cost associated with the transport of distribution to customers in northern Galicia (therefore compatible with the schedules of loading and unloading of each supplier and retailer).

Specifically, after considering six different options, a system of joint transport arises from the companies "C", "G", "K" and "F" (main flow) to the warehouses of three retailers in northern Galicia (retailers: "1", "2" and "3"). Likewise, in some periods of the year, the main flow is supplemented with flows coming from the cooperatives "M" and "H" (secondary flows).

To implement this proposal, two coordinate daily routes have been adopted. On the one hand, a model "milk run" product collection from Santiago de Compostela (center of Galicia) following the "K", "G", "C" and "F" sequence (this sequence eases the availability of the goods in each company). On the other hand, a circuit from Santiago de Compostela to the three retailers´ stores.

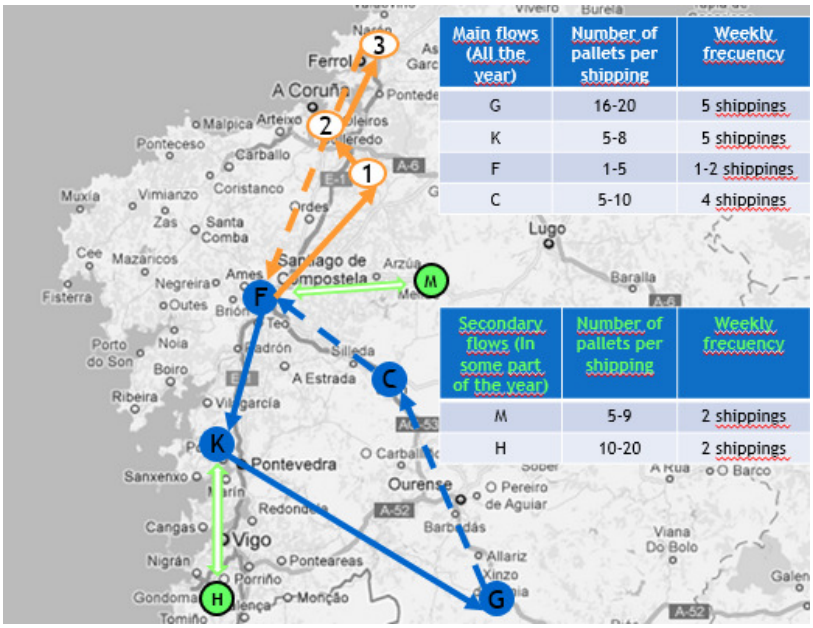

Fig. 2. Description of one joint route proposed by companies

The authors of this paper play the role of negotiators with retailers. Thanks to this proposal, the retailers can reduce the number of trucks received in their warehouses, without compromising agreed delivery times.

In this sense, to make possible the proposal, the company "F" (located in the surroundings of Santiago de Compostela) is used as a “crossdocking” point for the other companies. Likewise, this “crossdocking” point ("F") is used to integrate the secondary flow that comes from the cooperative "M" (the cooperative itself moves their goods to "F" with their own transport resources).

Something similar has been adopted with the company "K" used as "crossdocking" point to integrate the flow from the cooperative "H".

The first of the trucks (pallet collection from suppliers) spends 9.5 hours (5.75 hours of transport (402 kilometers); 45 minutes per stop and 45 minutes of legal break). On the other hand, the second of the trucks (distribution to retailers), the route spends 9.45 hours (3.45 hours driving (241.4 kilometers), 45 minutes of pick-up at the “crossdocking” point "F", a legal break of 45 minutes and 4.5 hours of stops at retailers´ warehouses).

The implementation of this route implies a 20 to 50% reduction of the cost of delivery of each pallet. The extra cost of handling the products in the crossdocking point is included in these estimated savings.

5 Conclusions

Nowadays in a very competitive world, companies have to propose alternatives in order to improve their competitiveness. This need affects to all areas of management in companies, including the supply chain management.

This paper has aimed to contribute to a better understanding of primary collaboration when companies are small and medium sized without a clear visibility of the interest of this collaboration in the field of supply chain management (“the common goal”) and when no many structured information resources are available. In this context, the adoption of this methodology for deploying individual and joint improvement is especially significant in order to achieve confidence between companies and as a previous step for adopting “collaboration networks”.

Going beyond, the role of the authors acting as “agent of change” in this methodology, according to the Action Research approach should be highlighted. This involvement allows the identification of potential joint improvements, easing the achievement of confidence among companies. Likewise, the authors supply the vision of changes and improvements adopted successfully in other supply chains. These efforts could allow the foundation of the pillars of future collaborative networks.

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