

# **Integration in supply chains. Case study in Colombia and Ecuador.**

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## **Abstract**

At present, the integration between actors of a supply chain is a necessity, due to the globalization of markets and new forms of production. In this context, integration models are developed that fit the specific conditions of each country, in this study the application of an Integration Model is systematized and the level of integration is evaluated in two case studies. The first, in a blacksmith chain in Colombia and the second, in a textile chain in Ecuador. In both cases, the following was applied: checklist, definition of strategies and integration objectives, map of the chain, and identification of competitiveness indicators. As results, it was obtained that in both chains the level of integration is low, and that there are weaknesses in the global strategies and their derivation in the actors of the object of study. This work presents a methodological value, due to the application of a Model for integration in different contexts.

## **1. Introduction**

At a global level, changes are manifested in the way of managing and shaping business (Oppenheimer, 2016). Now the center is not to make a product but to make a profit by making some of its parts. From this is inferred the need for interconnection between several companies, entities, organizations (actors). In addition, the new production forms that are approaching: the development of new materials, based on the development and sale of customized projects to the needs of customers, as well as the three D technology (Bearzotti, 2018). This framed in the information technologies, the communications and the knowledge infer the necessity of the development of the chains of supply to international level.

Supply chains are conceptualized according to the spectrum where applied, the focus on the chain and the elements that are to be improved (Ivanov, 2017). The classic approaches of the chain show that there is a relationship between suppliers and customers (Herczeg, Akkerman, & Hauschild, 2018), sets of actors, which provide upstream and current flows to low (Balloud, 2004). These flows are divided into: material, informative and financial (Winkler, 2005), and in the last decades the knowledge is included (Bowersox, Closs, & Cooper, 2009).

On the other hand, the focus on the customer and the measure of performance level of service in the chain prevails (Martínez-Curbelo, Feitó-Cespón, & González-Hernández, 2018, Sharmila & Uthayakumar, 2018). Most current streams, this relationship to integration (collaboration, cooperation) between the actors (Singh, Garg, & Sachdeva, 2018, Ye, Li, & Yang, 2018, Zhang & Cao, 2018), and powers with companies virtual and computer programs. These enable connectivity in real time (Wu & Chiu, 2018, Yang et al., 2018).

In this tendency, this research work is developed. The objective is: to evaluate the level of integration in two supply chains in Ecuador and Colombia, for the determination of the integration strategies and their joint objectives respectively.

## **2. Materials and methods**

The Supply Chain Strategic Collaborative Planning Model (MPCECS), applied to textile chains in Ecuador and herrería in Colombia. The MPCECS purpose was to determine the Collaborative Planning Level (NPC) in the supply chain actors, in order to analyze the integration chain level, to design strategies types (interrelation Matrix between the NPC

of the proposed strategies) (Sablón Cossío et al., 2017). The matrix allows the strategy approach, depending on the NPC in which the chain take place. The NPC is calculated using a checklist of 91 questions (Sablón Cossio, Acevedo Urquiaga, Urquiaga Rodríguez, & Acevedo Suárez 2014).

For the development of the case studies, the structure proposed by the BestLog project of the European Commission for the study of reference cases is followed (Guerola Pérez, 2009). The proposed structure is:

- |                                |                 |
|--------------------------------|-----------------|
| 1. Description of the problema | 4. Benefits     |
| 2. Solutions                   | ✓ Economic      |
| 3. Challenges                  | ✓ Environmental |
| ✓ Lessons learned              | ✓ Social        |
| ✓ Success Factors              |                 |

### 3. Results

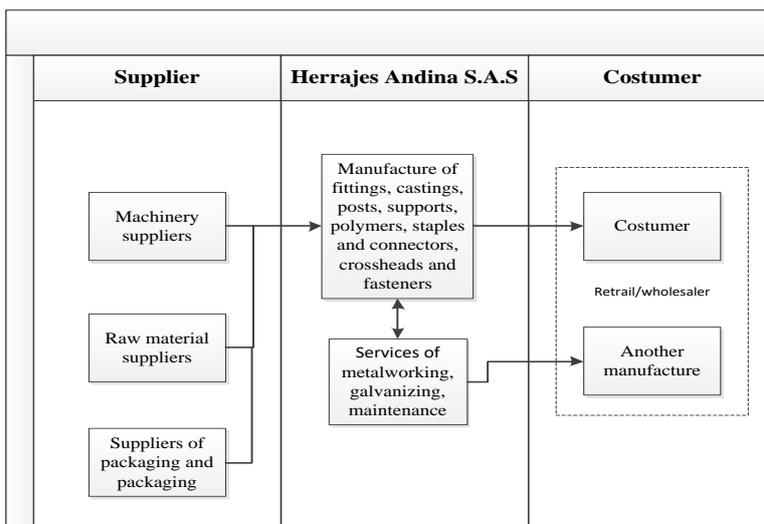
#### Description of the problema

The chain under study has weaknesses in the management of suppliers, due to the lack of collaboration between these and the chain of hardware processes in Colombia.

#### Characterization of the supply chain ironwork of Colombia.

The chain has three links, it is classified as: input suppliers, manufacture and service of Herrajes Andina, and customers, figure 1.

Figure 1 : Supply chain Herrajes Andina of Colombia.



The Colombian hardware chain provides services and offers products:

- ✓ Services: metalworking, galvanizing, maintenance

- ✓ Products: fittings, castings, posts, supports, polymers, staples and connectors, crossheads, fasteners
- ✓ Manufacture of metal products for structural use

## Solution

### Checklist results of the Strategic Collaborative Planning Model in Supply Chain

In the chain actors checking, results of low levels in the performance variables evaluation, in the company's average evaluation, in customers (1,15), in suppliers (1,75), in information (1,78), in the contracts (2,00), in the inventory management (2,09), in the demand forecast and in plans, were obtained (2,50), performance (2,56), in bought and in the merchandise distribution (2,67), in the organization circumstances formulation (3,00), in strategic objectives (3,04), in the company strategy (3,85), (figure 2).



Figure 2: Results of the integration variables of the Colombian chain.

The Supply chain ironwork presents a value of 2,6. It has a medium integration level, so it is in the association stage moving towards cooperation. The joint strategies focus on: long-term contracts and few suppliers.

The joint objectives focus on customer satisfaction:

- ✓ Raise the level of integration to 4 to improve the competitiveness of the chain.
- ✓ Improve the level of service by adjusting more bids with customer orders.
- ✓ Increase relationships with its suppliers, and develop a collaborative evaluation system to optimize performance indicators.

## Challenges

Lessons learned 1: The development of the integration of the ironworks supply chain is not encouraged based on suppliers.

### The textile supply chain of the Ecuador

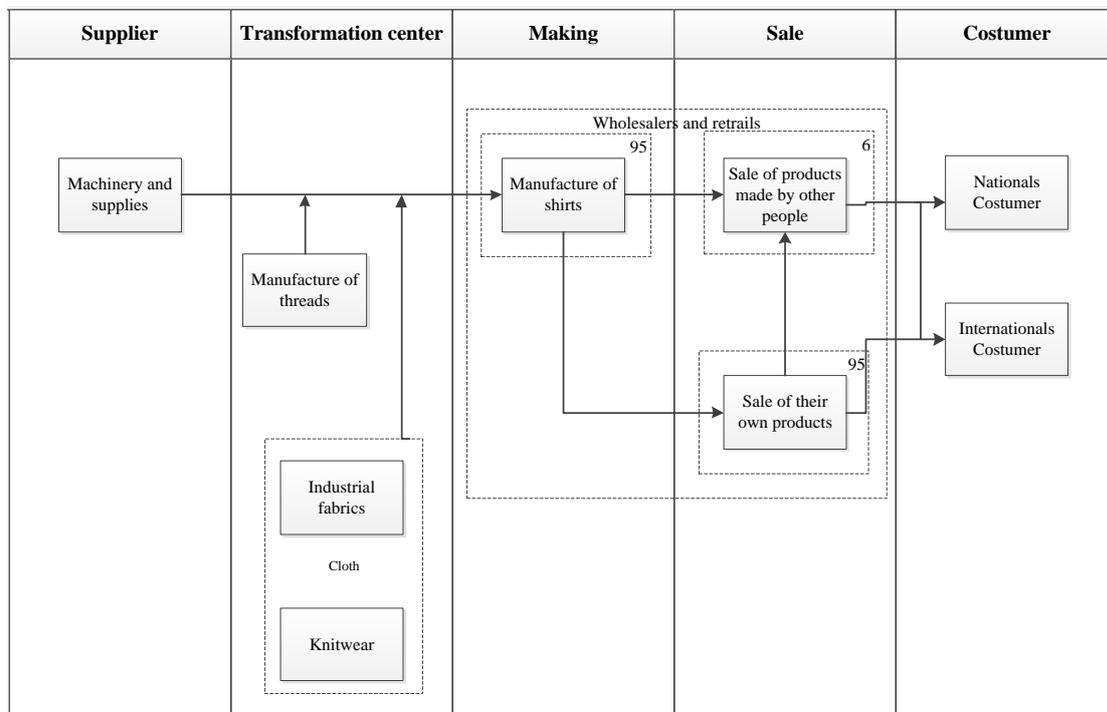
#### Description of the problema

The chain under study has weaknesses in terms of customer focus, due to the absence of this in the management of each stakeholder and therefore of the global chain.

#### Characterization of the textile supply chain of the Ecuador.

The chain has five links and 109 actors, it is classified as: input suppliers, raw material suppliers, transformation center, confection, distribution and customers, figure 3.

Figure 2 : Textile supply chain of Ecuador



Within the commercialization there are two classifications: that of wholesalers who sell their products in large volumes and supply other actors, on the other hand, we find the minorities that are the ones that come directly to the client and are dedicated to selling in small quantities. This can be at a national level and also at the international level, but there is little international sales due to the low collaboration between the chain's actors.

The suppliers of inputs supply machinery and raw materials, there is only one actor within the area under study. The fabric is the main raw material that is used for the manufacture of shirts, quality and easy access depends on the success of the actors who are dedicated to the transformation of this. These can be industrial fabrics or knitted fabrics. Within this

link is also the manufacture and yarns, these are used by the manufacturers for the confection. The center of transformation is of great importance within the chain, because you get the basic product, the shirts.

## Solution

### Checklist results of the Strategic Collaborative Planning Model in Supply Chain

In the chain actors checking, results of low levels in the performance variables evaluation, in the company's average evaluation, in the contracts (1,13), in information (1,48), performance (1,58), in the organization circumstances formulation (1,59), in bought (1,62), in suppliers (1,66), in the company strategy (1,75), in strategic objectives (1,80), in the inventory management (1,81), in the demand forecast (1,82), in the merchandise distribution (1,85), and in customers (1,93), in plans, were obtained (2,00), (figure 4).



Figure 4: Results of the integration variables of the Ecuador chain.

The Supply chain the T-shirt presents a value of 1,4. It has a low integration level, so it is located in the negotiations stage. Because of this result, strategies should be geared towards negotiation among actors. The joint strategies focus on: discussion focused on cost leadership; differentiation and approach or niche.

The joint objectives focus on customer satisfaction:

- ✓ Raise the level of integration to 3 to improve the competitiveness of the chain.
- ✓ Increase the variety of textile products to influence the level of service.

- ✓ Increase the value added to customer needs through more preferred fabrics by the customer and manufacturing methods with the goal of increasing the use value of the shirts.

### Challenges

- ✓ Lessons learned: If the supply chains are not institutionalized in Ecuador, it will depend on the needs, interests and willingness of the personnel, even if the existing culture is an impediment to their development. its improvement.

### Discussion

In relation to both chains, it is shown that the focus on clients is affected but in the case of Colombia this value is greater, Figure 5. In the variable suppliers, both cases of study show weaknesses. In the information in the same way. In the case of study 1, it shows greater weakness.



Figur3 3: Comparison between the results of the chains of Ecuador and Colombia.

In the strategies, objectives and scenarios the first chain approaches the optimum, an element that shows the size of the business and its annual profits.

In relation to the level of integration of the chains under study, it is evident that the case study of Colombia presents a deviation in relation to the maximum value of 2.4, in the case of Ecuador the value is 3.6. This shows that the second chain is farther from the optimal value, Figure 6.

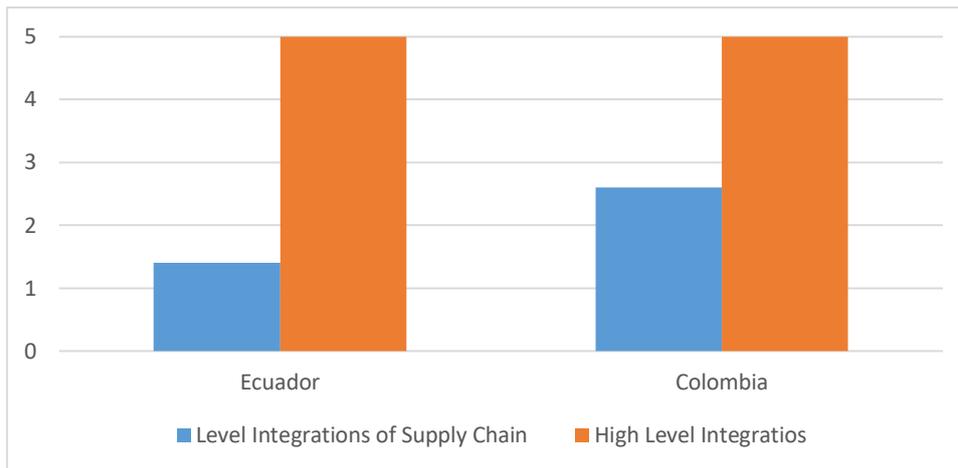


Figure 4: Results of the chains under study and the optimal value.

#### 4. Conclusions

The development of referential scientific literature shows the relevance of supply chains for Latin America and contributes to the adoption of appropriate global practices in the context of Ecuador and Colombia; These elements are necessary for the competitiveness of these countries. The research is based on the collaborative planning model of the strategic supply chain aimed at the textile supply chain and the other on a chain of hardware. The horizontal diagnosis of the chain is made through the evaluation of the level of integration between the actors of the strategic model of collaborative planning of the chains under study.

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