Supply chain structures in the Brazilian footwear industry: outcomes of a case study research

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Abstract: The present study represents the starting point of a project that analyses the supply chain structure of the footwear industry, the relationships among the involved actors, and how the type of relationship is related to the context variables that characterized the actors involved in the analysed relationships (e.g. size, position in the supply chain, market segment). A detailed case study in a Brazilian shoes manufacturer has been conducted in order to investigate (1) who are the main actors involved in the analysed footwear supply chain, and (2) what are the different relationships (i.e. transactional and collaborative) between the company and each of them. The sampled company has been chosen due to its relevance in the Brazilian scenario and to the complex supply chain to which it belongs. This complexity reflects the different types and levels of relationships, both upstream and downstream, that the company has to manage. Moreover, information and material flows among its production plants have to be coordinated, increasing the complexity to be managed.

Keywords: Footwear, Supply Chain Structure, Case Study.

1. Introduction

According to a recent market research report published by Transparency Market Research, the global footwear market is expected to grow at a compound annual growth rate of 1.9% during the period from 2012 to 2018, with its key players, such as Reebok, Adidas, Puma, Nike, and New Balance, holding together about 70% share in the overall market.

This positive trend is also confirmed in the Brazilian scenario, in which the footwear industry is increasing its relevance over the past few years, mainly driven by the domestic market, with Brazil representing the third largest shoes manufacturer in the world, in 2014, after China and India. It is responsible for 4.6% of the world’s production (i.e. almost 900 million shoes pairs in 2013), while China and India produce 13 and 1.2 billion pairs respectively. The sales volume in 2014 is increased by 10% from 2013 and the Brazilian shoes are exported to more than 150 countries, mainly the United States, Argentina and France.

The complexity of the supply chain is one of the main challenges that the companies belonged to the footwear industry has to face with. This complexity is related to the several components that constitutes the final products, the wide range of actors involved for their realization, the presence of labour-intensive production phases and the variety related to the market segmentation of the industry (Armstrong et al., 1978; Carpanzano & Ballarino, 2008; Chituc et al., 2008).

Due to increased relevance in the Brazilian scenario and the complexity related to this industry, the present study aims to analyse the footwear supply chain structure and the relationships among the involved actors conducting a case study in the Brazilian scenario. This single case study methodology has been used just as starting point of a wider research project that aims to collect evidences of several companies differently positioned along the footwear supply chain.

In details, in this work two research questions (RQs) have been investigated. First of all, the study has been focused on the identification of the main actors involved in the footwear supply chain along the new product development, sourcing, manufacturing and distribution processes, defining the supply chain structure (RQ1). Secondly, the different types of relationships among these actors (i.e. transactional and collaborative) have been analysed in order to investigate the link between each of them and the related supply chain configuration and strategy (RQ2).

The followed sections are structured as follows: firstly, the results of the literature review about the footwear supply chain structure, in terms of involved actors and processes, and the type of relationship among them will be shown; in the second section, the research methodology will be illustrated and the company profile described; in the section 3, the results of the in-depth interview will be analysed; finally, in the last two sections will be discussed the conclusions and highlighted the limitation and future research for the present study.
2. Literature review

The footwear industry has been analysed by several authors due to its relevance in different countries and the numerous criticalities and challenges that belonged companies have to face with, such as knowledge and information sharing (Fornasiero et al., 2009), lean approach (Fornasiero et al., 2009), sustainability (Yu, 2008), KPIs monitoring systems (Fornasiero et al., 2009) and collaborative networks (Bandinelli et al., 2014, Carpanzano & Ballarino, 2008; Chituc et al., 2008).

This literature review has been also conducted in order to define the main phases that characterise the fashion supply chain. The macro-processes that are generally identified are new product development, source, make and delivery (Caniato et al., 2011). For each one of them, a list of detailed sub-processes has been identified summarizing the literature evidences (Armstrong et al., 1978; Caniato et al., 2011; Carpanzano & Ballarino, 2008; Chituc et al., 2008; Fornasiero et al., 2009; Franchini et al., 2011; Mazzuto et al., 2012), as shown in Table 1.

Table 1. Footwear supply chain processes

<table>
<thead>
<tr>
<th>New Product Development</th>
<th>Source</th>
<th>Make</th>
<th>Delivery</th>
</tr>
</thead>
<tbody>
<tr>
<td>1) Design</td>
<td>1) Raw materials supply (leather, textile, others)</td>
<td>1) Cutting</td>
<td>1) Inbound distribution</td>
</tr>
<tr>
<td>2) Prototyping</td>
<td>2) Components supply (lasts, soles, heel, uppers, metallic accessories, others)</td>
<td>2) Stitching</td>
<td>2) Raw materials warehousing</td>
</tr>
<tr>
<td>3) Engineering</td>
<td>3) Components supply (lasts, soles, heel, uppers, metallic accessories, others)</td>
<td>3) Assembly</td>
<td>3) Components warehousing</td>
</tr>
<tr>
<td>4) Sampling</td>
<td>4) Components supply (lasts, soles, heel, uppers, metallic accessories, others)</td>
<td>4) Finishing</td>
<td>4) Outbound distribution</td>
</tr>
<tr>
<td></td>
<td></td>
<td>5) Finished products warehousing</td>
<td>5) Finished products warehousing</td>
</tr>
</tbody>
</table>

Several actors are involved in the footwear supply chain, such as designers, suppliers, manufacturers, logistics providers and brand owners. Sometimes, a single company can include more than one of the listed figures. For example, a manufacturer can be also a brand owner if it also produces a private label and can internally manage the design phase for its owned brand.

This wide range of actors are interfaced each other inside a network that is characterised by different types of relationship between the belonged companies, that can be distinguished between collaborative and transactional. The first ones are longer term and cooperative relationships, where companies share ideas, information, and resources to develop and achieve collective goals, for example conducting joint planning with suppliers or sustaining dedicated investments that become specific for the considered relationship (Whipple et al., 2010). On the other hand, transactional relationships often exhibit low levels of mutual interdependence (Whipple et al., 2010), both in terms of amount of allocated resources, that are difficulty replicable to another buyer-supplier relationship, and information, cost and revenue sharing.

3. Research methodology

Figure 1 shows the research methodology followed in this work in order to answer the two research questions.

This study has been conducted using the single case study methodology (Voss et al., 2002). In fact, the two RQs previously described are related to the evidences emerged from an in-depth interview conducted in the sampled Brazilian shoes manufacturer.

An empirical analysis through a single case study has been also used in the footwear industry’s context by other authors. For instance, Yu (2008) has analysed the impacts of corporate code of conduct on labour standards interviewing the main Rebook’s supplier, while Carpanzano & Ballarino (2008), Mazzuto et al. (2012) and Guimaraes et al. (2012) have conducted a pilot case study in the footwear industry for proving their models.

As mentioned before, a single company has been analysed just as starting point of this research project, which aims to cover the entire footwear value chain interviewing the several actors that belong to it.

The company, that will be called Company A, has been selected for its relevance in the Brazilian scenario and for the complexity of its supply chain, in order to identify and analyse a wide range of types of relationships between the company and several involved actors. Moreover, company’s headquarters is located in Rio Grande do Sul, that is one of the largest Brazilian footwear clusters, and two of its man production plants are located in the Northeastern region of the country (i.e. Ceará), where there are the largest Brazilian producers of shoes.

The interview protocol has been structured in the following way. The first section is focused on general information about the company, mainly related to its size (in terms of number of employees and turnover), its position on the supply chain (i.e. new product development, sourcing, manufacturing, and distribution processes), the processes that it manages internally and the others that it outsources, and the market segments that it serves (e.g. shoes for work, leisure, sport, safety). The
second section is related to the analysis of the supply chain network to which the company belongs. This section analyzes several aspects, such as the involved actors, the facilities locations (for both the sampled company and the other actors), the markets locations and the types of distribution channels. Finally, the last section investigates the relationships between the sampled company and both the upstream and downstream actors, analysing aspects such as the duration of the relationship and the bargaining power distribution between them.

3.1 Company description

Company A is a large-sized Brazilian shoes manufacturer with around 6,000 direct employees and more than 20 years of experience in the footwear market. It covers a wide range of footwear market segments, such as comfort, sports, injected and fashion shoes. Almost the entire core business moves around shoes, but there is also a little percentage of bags’ production just for its main owned brand Brand A. The company owns also another brand and has a wide range of licensed brand, which are Brand B and other seven.

The complexity that the company has to manage is not only related to the range of market segments and brands, but also to the high production volume (i.e. 40,000 shoes pairs/day) that characterizes the company’s business.

The main critical success factors (CSFs) for the company are flexibility, technology and excellence. Flexibility is related to the wide range of market segments that Company A covers. Technology is mainly in terms of high investment sustained by the company to provide a differentiated and outstanding development, constant research for machines and new ways of improvement. Finally, excellence as CSF has different meanings, such as quality, investment in technology and innovation, environmental and social responsibility.

In the following section, the company description moves towards the overview of its supply chain structure.

Company’s headquarter is located in Rio Grande do Sul and inside it are concentrated the activities related to the new product development processes for all the brands. Company A is a high-verticalized company and all the production activities are conducted in both owned and partnered plants. In details, two of the three owned production plants are located in Ceará, in the northeast of Brazil, and the third one in Argentina. Company A has established also a strong partnership with a shoes manufacturer in Nicaragua and is planning to replicate the relationship with another one located in the Dominican Republic.

The main supplied materials are leather and synthetics, with the second one that covers 60-65% of production volumes. The company’s leathers suppliers are mostly located in Brazil, in the case of the domestic market, and in Argentina, for the Nicaragua plant. For the synthetic materials, the supplied countries are Brazil and China, and the percentage of the supply base’s origin varies moving from a brand to another one.

Sampled quantity and quality control for main materials (i.e. leather, synthetics and metallic accessories) is made in the company’s headquarter, even if the suppliers are quite close to the company’s owned production plant (e.g. materials from northeastern Brazilian suppliers transit in the offices located in Rio Grande do Sul before moving back to the production plant in Ceará). Averagely, 2 or 3 trucks/week move materials from the headquarter to the Plant 1 in Ceará after the check. The quality control on production line is also made inside the plants.

The distribution process is completely outsourced to third-party logistics (3PL) providers for the licensed brands, while it is directly managed by Company A for the owned ones, even if they refer to a 3PL provider for the fleet.

Looking at the sales markets, only the 8% of the whole production is exported out of the Brazil.

The facilities’ characteristics are summarized in Table 2.

<table>
<thead>
<tr>
<th>Facilities location</th>
<th>Supply chain process</th>
<th>Size [Number of employees]</th>
<th>Production volume [shoes pairs/day]</th>
</tr>
</thead>
<tbody>
<tr>
<td>Rio Grande do Sul</td>
<td>New Product Development</td>
<td>40,000</td>
<td></td>
</tr>
<tr>
<td>Ceará (Plant 1)</td>
<td>Production</td>
<td>3,500</td>
<td>28,000</td>
</tr>
<tr>
<td>Ceará (Plant 2)</td>
<td>Production</td>
<td>50</td>
<td>10,000 (future)</td>
</tr>
<tr>
<td>Argentina</td>
<td>Production</td>
<td>250</td>
<td>3,000-4,000</td>
</tr>
<tr>
<td>Nicaragua (partnership)</td>
<td>Production</td>
<td>1,800</td>
<td>8,000</td>
</tr>
</tbody>
</table>

4. Results

In line with the work of Brun & Castelli (2008), the supply chain strategy adopted by the company depends on one of the three elements analysed by the authors: the brand. For this reason, in the following sub-sections, the two main brands of the sampled company will be in-depth analysed, in order to put in evidence their supply network’s structure considering the involved actors and the type of relationship between them and the company. This is in line with the definition of supply chain configuration in the work of Nassimbeni (1998) that can be described specifying the number, role and locations of the main supply chain actors who perform the different processes.

Therefore, the first expected result of the present study will be the definition of the supply chain framework for each of the two main brands of the analysed company. Moreover, the different types of relationships that the company has to manage will be identified.

4.1 Brand A

Brand A is the main owned brand for the company, covering 30% of the revenue with 10,000 shoes pairs/day.

The Company A’s supply chain network for the brand Brand A is illustrated in Figure 2.
As owned brand, all the new product development activities are conducted in the offices located in Rio Grande do Sul, including shoes designing, prototyping, engineering and sampling.

The whole production is centred on synthetic and injected shoes, so synthetics represent almost the 100% of supplied materials.

All synthetic materials are supplied from four Brazilian suppliers, that are selected by the company mainly based on price, lead time and quality criteria.

The relationship between Company A and the synthetics’ suppliers for the brand Brand A, even if it is not exclusive, is a long-term and collaborative one, due to the evidence that they often jointly develop innovative components or research new ways for improving the existents.

Despite the collaborative nature of this relationship, the supplied materials have to be transferred to the headquarter for the quantity and quality control before moving to the production plant.

Nowadays, all the production activities (i.e. cutting, stitching, assembly and finishing) are realized in the Plant 1 located in Ceará, but the company’s purpose is to transfer in its new plant (i.e. Plant 2) in Ceará the whole production of Brand A’s injected shoes and bags.

The logistics activities are directly managed by Company A, even if they refer to a 3PL provider for the fleet, and the finished products are mainly delivered from the company’s Distribution Centre in São Paulo to the retailers. The almost 3,500 stores are located both in Brazil and in the rest of the world (i.e. Europe, China, Hong Kong, Japan), with the domestic market that covers more than 90% of the production volumes.

4.2 Brand B

Brand B’s owner is a well-known American multinational corporation operating in the sportswear industry and is the first brand for the sampled company in terms of production volume and percentage on revenue, which are 13,000 shoes pairs/day and 50% respectively.

Looking at the Brand B’s owner-Company A relationship, Brand B’s owner is a Company A’s client from a long time and the relationship is not exclusive, because there are two shoes manufacturers that work for Brand B’s owner in Brazil.

The Company A’s supply chain network related to Brand B’s production is illustrated in Figure 3.
The new product development process starts when Company A, after receiving the shoes’ sketches from the Brand B’s office located in Novo Hamburgo, manages the technical developing process, that includes prototyping, engineering and sampling activities. All these activities are conducted inside the offices located in Rio Grande do Sul. About the sourcing process, the main supplied materials are synthetics (85%) and split leather (15%). The suppliers’ selection for Brand B’s Brazilian market is made by the company itself and the purchase price is pre-negotiated by Brand B’s owner. Moreover, the relationship with these suppliers is managed by Brand B’s owner even if some suppliers are the same of the Brand A’s ones.

For the synthetic materials, Brand B’s owner has decided to equally split the supply base between China and Brazil, with two suppliers for each country. Brand B’s leather suppliers are almost totally located in Brazil (90%) and the others in Argentina.

Due to the fact that Brand B’s owner directly selects and manages its suppliers, the relationships between Company A and they are just transactional or buyer-seller ones, even if they have been working together since a long time and the production volumes are quite high. The relationship between Company A and the suppliers for the Brand B’s Brazilian market is not exclusive both for leather and synthetics materials.

As highlighted in the previous section, components move from suppliers to the offices in Rio Grande do Sul for the sampled quality control and then to the production plants. The production process is realized in two plants, one in Brazil and the other in Argentina. Cutting and stitching are made just in the Brazilian plant, while the assembly and finishing phases are realized in both of them in relation to the final market (i.e. in the Plant 1 for the Brazilian one and in the Argentinian plant for the same-located market).

Brand B’s inspectors visit Company A’s plants for checking if the agreed quality standards are respected during the production activities.

When the finishing phase is concluded, shoes are delivered to the Brand B’s Distribution Centre in Sao Paolo for both the Brazilian market, and in that one in Buenos Aires for the Argentinian one. 8 trucks/week move shoes to the Brand B’s Distribution Centre of Sao Paolo.

5. Conclusions

The present work represents the starting point of an extended project related to the analysis of the supply chain network that characterises the footwear industry. In details, this study shows the outcomes of a case study conducted in the Brazilian scenario, focused on the description of the supply chain structure for the analysed Brazilian shoes manufacturer.

In order to answer to the two research questions, the main results of the present work are related to both the involved actors in the analysed supply chain (RQ1) and the relationship between the interviewed company and each of them (RQ2). These research questions are deeply answered considering each of the two main brands of the analysed company and the results are shown in Table 3.

<table>
<thead>
<tr>
<th>Table 3. Comparison between Brand A and Brand B</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Brand</strong></td>
</tr>
<tr>
<td><strong>Production volume</strong></td>
</tr>
<tr>
<td><strong>% on revenue</strong></td>
</tr>
<tr>
<td><strong>New Product Development</strong></td>
</tr>
<tr>
<td><strong>Source</strong></td>
</tr>
<tr>
<td><strong>Make</strong></td>
</tr>
<tr>
<td><strong>Deliver</strong></td>
</tr>
<tr>
<td><strong>Designers’ location</strong></td>
</tr>
<tr>
<td><strong>Suppliers’ location</strong></td>
</tr>
<tr>
<td><strong>Manufacturers’ location</strong></td>
</tr>
<tr>
<td><strong>Distribution Centres’ location</strong></td>
</tr>
<tr>
<td><strong>Relationship with designers</strong></td>
</tr>
<tr>
<td><strong>Relationship with suppliers</strong></td>
</tr>
<tr>
<td><strong>Relationship with logistics providers</strong></td>
</tr>
</tbody>
</table>

In terms of involved actors, the evidences show that for both the brands the main ones are the designers, the materials’ suppliers, the quality controllers, the company itself as shoes manufacturer and the logistics providers. Even if the categories of actors are the same from one brand to the other, they differ in term of where they are located and how their activities are managed. Following the processes’ flow, the new product development activities for the Brand A, that is the owned brand, are all managed internally by the company in its headquarter, while the same activities for the licensed Brand B are partially managed by the Brand B’s owner itself (i.e. the design phase), while the others (i.e. prototyping, engineering and sampling phases) are outsourced to the Company A. The materials suppliers also differ from Brand A to Brand B, because the first ones are all synthetics suppliers located in Brazil, while the others are both synthetics and leather suppliers located in Brazil and China and in Brazil and Argentina respectively. All the supplied materials are quality and quantity controlled in the offices in Rio Grande do Sul and the main production processes are conducted in the Plant 1 in Ceará. The only exceptions are the assembly and finishing processes for serving the Argentinian market of the Brand B that are conducted inside the Company A’s Argentinian plant. The main distribution centres are located in Sao Paolo for delivering both the brands, but for the Brand B it serves just the Brazilian market.
Moving toward the relationships between the Company A and the actors involved in the analysed supply chains, the present work shows different types of relationship considering the Brand A and Brand B. For instance, the relationship between the Company A and its synthetics suppliers for the Brand A is collaborative, while the relationship with, in some cases, the same suppliers is transactional if it is considered the Brand B.

The emerged differences between the analysed supply chain structures for the Brand A and Brand B are mainly related to the different type of brand, which is owned and licensed respectively. In the case of the Brand A, the Company A is the owner of the brand and for this reason all the managerial decisions are taken by the company itself and most of the processes are internally managed. On the other hand, Brand B is only partially managed by the Company A, because of the Brand B's owner is a multinational company that has to guarantee a standard level of shoes' quality and models in all the served market over the world. For this reason, the design phase is directly managed by the Brand B's owner, the quality inspectors visit the Company A's plants during the production activities and the suppliers selection is made by the Brand B's owner itself.

6. Limitation and future research

The present study has been conducted using the single case study methodology in order to analyse in detail several aspects related to the footwear supply chain structure and the different type of relationship between the involved actors.

As previously anticipated, this work represents just the starting point of a more extended research project that aims to investigate the entire footwear supply chain structure interviewing all the involved actors. This first future research allows the analysis of the point of view of different actors (e.g. supplier, brand owner, third part logistics).

In addition, future research can enlarge the sample dimension to other companies belonged to the footwear sector, in order to define some industry-specific evidences.

Another option is moving the focus from the footwear industry to another one, allowing the comparison between different sectors.

Lastly, the study can be conducted for the same industry referring to another country, in order to highlight how the cultural-related differences are reflected into the supply chain configuration and strategy.

7. References


