

Collaborative Networks in the Portuguese Footwear Sector and the Cluster of Felgueiras

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Abstract: Globalization and the rapid market changes increased the perception in the Portuguese footwear industry that success in the value chain is closely tied to information sharing, the creation and development of collaborative networks, and the management of the knowledge of the various partners. Business to Business (B2B) and e-Commerce (eC) are a key opportunity, and at the same time, a challenge for contemporary companies. We believe that the insights provided in this paper allow theory and practice to better understand the reasons for the success of the Portuguese footwear industry and of its key cluster of Felgueiras. Based on the research conducted, we argue that there is a lack of B2B-eC initiatives in the footwear industry and the existing ones are still incipient. Furthermore, the existence of only one platform that to some extent addresses B2B-eC, also indicates that there is a need for greater research and development of approaches/technology allowing companies to explore opportunities to collaborate and negotiate among themselves.

1 INTRODUCTION

Globalization and the rapid market changes increased the perception in the Portuguese footwear industry that success in the value chain is closely tied to information sharing, the creation and development of collaborative networks, and the management of the knowledge of the various partners.

There are several definitions associated with information and knowledge (Stenmark, 2002; Rowley, 2007). The different definitions and concepts, among others, can be seen in the work of: Zeleny (1987), Ackoff (1989), Wiig (1993), Nonaka and Takeuchi (1995), Kock et al. (1997), Spek and Spijkervet (1997), Davenport (1997), Davenport and Prusak (1998), Quigley and Debons (1999), Choo et al. (2000), and Bellinger et al. (2004). Nevertheless, it is commonly accepted that global economics require collaboration, especially in competitive sectors, such as the footwear industry.

Regarding knowledge management, its importance has been widely recognized as industrialized economies shifted from natural resources to intellectual assets (Seokwoo and Teng, 2008). Dalkir (2005) defines knowledge management

as the deliberate and systematic coordination of an organization's people, technology, processes and organizational structure in order to add value through reuse and innovation. Other benefits are the: development of innovative ideas; organizations and teams have better results when dealing with changes and coping with crisis; dealing with coordination and complex tasks; better strategic planning and decision making (Davidson and Voss, 2002).

The dynamic and complex networks established in the footwear industry bring advantages for the different actors by making them part of a value system that contributes to their business development (Bastos, 2011). However, collaboration in the footwear industry is not an easy task, due to the many business needs to meet and technology to integrate.

Business to Business (B2B) and e-Commerce (eC) are also a key opportunity and, at the same time, a challenge for contemporary companies. For instance, eC is considered a strategic part of the supply chains, facilitating the communication among companies, reducing the time that the supply cycle takes to be completed and allowing collaborative work (Modrigais et al., 2015).

The goal of this paper is to contribute to the scientific domain and practice with an overview and analysis of the Portuguese footwear sector and its largest footwear exporting cluster - Felgueiras. We also address the collaborative networks established, as well as the B2B and eC initiatives. The insights provided in this paper allow theory and practice to better understand the reasons for the success of the Portuguese footwear sector and of its key cluster of Felgueiras. Based on the research conducted, we also argue that there is a shortage of B2B-eC initiatives in the Portuguese footwear sector. Furthermore, we submit to the reader that B2B-eC is an opportunity for the Portuguese footwear sector, especially the cluster of Felgueiras, to obtain a strategic advantage over its rivals.

In what regards the structure of this paper, the methodology is described in section two. The Portuguese footwear sector and the cluster of Felgueiras are presented in section three. Next in the fourth section, the collaborative networks in the footwear sector and the cluster of Felgueiras are addressed. Section five regards B2B and eC initiatives. The final section, sixth, will present a brief conclusion on the "state of the art" of the Portuguese footwear sector and the cluster of Felgueiras.

2 METHODOLOGY

For the development of the present paper, the authors conducted a literature review, which privileged the analysis of papers published over the last six years in scientific databases; such as the ones present in b-on (Portuguese Online Libraries Consortium) and IEEE (Institute of Electrical and Electronics Engineers) digital libraries. Due to the lack of sources on collaborative platforms for the footwear industry, the authors also analyzed papers older than six years showcasing earlier efforts on the domain at hand. Technical reports from professional institutions, namely associations operating in the footwear sector, were also gathered. Moreover, due to the specificity of the content and the topics addressed, where information is only often available online, institutional websites were also analyzed.

Finally, it is worthy of note that it was also over the last six years that the Portuguese footwear sector experienced an increased growth (APICCAPS, 2015; Portugueseshoes.pt, 2016b).

3 THE PORTUGUESE FOOTWEAR SECTOR AND THE CLUSTER OF FELGUEIRAS

In Portugal, the footwear production is distributed among two key regions: the most significant is in the north of the country, and the less significant is in the center. In the north, the production is concentrated in the cities of Felgueiras, Guimarães, Santa Maria da Feira, Oliveira de Azeméis and São João da Madeira (APICCAPS 2015). Together they account for more than a three quarters of the employment in this sector (Portugueseshoes.pt 2016b). In the center, Benedita also holds footwear production, however it is less significant (APICCAPS 2015).

In the fashion industry, the products/collection portfolio tends to change every 4 to 6 months. This short design/production cycle means that a company, on average, may have to manage, design and produce about 300 to 400 different models for the following collection (Shamsuzzoha et al. 2013). On the other hand, each model needs to go through the several "footwear lifecycle activities", which are: collection creation, samples production, sales campaign, production, stocking of finished products, sales monitoring and new orders (Chituc et al., 2007a; Chituc et al., 2007b). Consequently, there is a need for the models to be produced collaboratively because the production is dependent on stylists, components producers and suppliers of raw materials (Shamsuzzoha et al. 2013).

These aspects also contribute to the fact that the footwear industries and related enterprises are generally based in the same area; hence it is called the footwear cluster (APICCAPS 2015). The footwear cluster is recognized as one of the indisputable key clusters of the Portuguese economy (APICCAPS 2013), and it is considered the "model" cluster in Portugal (Portugueseshoes.pt 2016b).

For the purpose of this paper and following Catanho's (2014) approach, which is based on Porter and Rosenfeld; a cluster can be defined as a geographically delimited concentration of interdependent enterprises with privileged communication channels that facilitate commercial transactions and dialogue. They also collectively share opportunities and threats common to their business.

Innovation is based on interactions and knowledge flows among enterprises, organizations and public institutions. Clusters are thus important for the creation of these interactions, supporting the

sharing of knowledge and the promotion of collaborative innovation (Gebreyesus and Mohnen 2013). As mentioned by Bastos (2011), the Portuguese footwear sector moved “from an almost exclusively subcontracted production to the introduction of proprietary design, control of supply chains, and even the development of innovative state-of-the-art technologies and equipment.”

The application of innovative technologies in this sector has improved customer response time, decrease of costs, reduced time to market, and expansion to new markets (Chituc et al. 2007a). The success of the Portuguese footwear industry is noticeable in following statement: “*In 2014, the Italian shoes were the only ones with had a higher average out of the factory price than the Portuguese shoes*” (Sena-Dias et al., 2015).

In the north of Portugal, the footwear sector is mainly represented by small and medium-sized enterprises (SMEs), with an average number of: 26 workers in the footwear production industries; 18 workers in the components production industries; and 12 workers in the leather goods production industries (Portugueseshoes.pt, 2016b; APICCAPS, 2015).

In 2015, according to the Portuguese Ministry of Labor (Portugueseshoes.pt 2016b), the footwear sector reached 43,840 workers in its ranks. Also in 2015, the Portuguese footwear sector exported 79 million pairs of shoes and exceeded 1.865 million euros. As for 2016, the sector exceeded 2 billion euros. It registered a 49% growth in the foreign markets, with 81 million pairs of shoes exported, amounting to 1.923 million euros. Exports represent almost the entire production of the footwear sector (Portugueseshoes.pt 2016b). In the recent years there has been an expansion to more than 30 new markets, especially to the USA, China, Russia, Colombia, Canada and Angola (APICCAPS, 2014; APICCAPS, 2015).

The cluster of Felgueiras stands out clearly from the other regions of the country by accounting for more than 50% of the exports in the footwear sector (Ribeiro, 2016). Felgueiras is a city in the Tâmega sub-region, located in the heart of the Sousa Valley in the northern part of Portugal. It encompasses an area of 116 km² and is located 17 km away from the city of Guimarães, that also belongs to this cluster (CM Felgueiras, 2016; Leite, 2013; APICCAPS, 2015).

According to Lima (2011), the expansion of the footwear industry in Felgueiras takes place in the late 1970s. It benefited from the increase in the country's economic liberalization and the proximity of Guimarães, which is itself a heavily industrialized city.

The concentration of footwear industries in Felgueiras fostered the creation of associations and companies that offer products and services directed to the cluster's needs. There are three important associations (Lima, 2011; Felgueiras, 2016a): Professional School of Felgueiras, private institution, created in July, 1991, which offers among others the following courses: i) Footwear and leather goods design; ii) Vocational course of footwear; iii) Maintenance of footwear and leather goods machinery.

The Footwear Industry Professional Training Centre was created in December, 1965, with the aim of providing training and services to the footwear cluster (CFPIC 2016b). It provides such training courses as (CFPIC 2016a): i) Development of products/collections; ii) Computer Assisted Design (CAD/CAD-2D) for Footwear; iii) Tuning and maintenance of automatic sewing machines; iv) English courses geared towards professionals.

Finally, the Footwear Technological Centre of Portugal it's a non-profit association created in 1986 to provide technological support to the companies of the cluster, namely training courses and research related to footwear (CTCP 2016b). Among other training offers are: i) Language courses; ii) Stocks management; iii) Footwear quality control (GIALERN 2016).

It is also interesting to note that in the cities where the footwear cluster is present, Felgueiras and Guimarães, there are higher indicators of competitiveness, prosperity and social cohesion (Nuno and Alves 2014).

4 COLLABORATIVE NETWORKS AND PREVIOUS INITIATIVES

In the business context, a Collaborative Network (CN) is an alliance between geographically distributed organizations, autonomous and heterogeneous in terms of objectives, culture, operational environment and social capital, that collaborate to achieve their goals (Camarinha-Matos 2007).

Collaboration relies on elements that are common among partners. These factors can be shared interests, communication infrastructures, business practices, mutual trust, and policies, among others. These factors also allow enterprises to gain flexibility and agility in collaboration (Shamsuzzoha et al., 2010).

According to Bastos (2011), there is an innovation network with an interesting connection

between the scientific, technological and business world, where new products are developed, new enterprises are formed or even recreated. This innovation network results of the ability to create and follow a strategy that combines the interests of the several actors of the sector.

Amaral (2016) argues that in areas where clusters exist there are usually already collaborative efforts. However, in these areas a series of formal, but mainly informal, relations have been put into place driving the success of these companies. *“Often, because of proximity and even friendship and family relations, there is a great exchange of technical information, business contacts, projects, ideas for business expansion and all kinds of partnerships between footwear companies. This aspect is of paramount importance because it constitutes the basis of the entire footwear cluster, leveraging the growth of all the companies involved and not just some of them, as seen in other sectors”* (Amaral, 2016).

Such efforts are the result of innovation and technological development programs, such as *“Footwear Factory of the Future”*, *“ShoeInov”*, *“FootInov2020”* and *“Knowledge4Foot”* (CTCP, 2015; CTCP, 2016a).

The program *“Footwear Factory of the Future”* was responsible for the creation of the *“Technological Footwear Cluster”* (CTCP 2016a). The Technological Footwear Cluster currently comprises around 60 actors, including: i) about 20 technology-based companies producing materials, components and software for the footwear cluster; ii) around 20 institutions focused on advanced technology for footwear and components; iii) 20 scientific and research actors (CTCP 2016a).

The *“ShoeInov”* program succeeded the *“Shoe Factory of the Future”* and expanded the intervention to sectorial and multimedia areas. Among the several projects that resulted from it, the projects *“AGILPLAN”* and *“SHOEID”* can be highlighted. The *“AGILPLAN”* consisted of a system for streamlining network planning. The *“SHOEID”* consisted of the application of RFID technology to the value chain, from the producers to the stores.

“FootInov2020” aims to provide companies with new skills and competences, exploring the existing strategic and operational synergies in research and development, product and process engineering and marketing (CTCP 2016a).

“Knowledge4Foot” still in effect, aims to encourage collaboration between industries, research centers and universities, in order to assess the needs for skills for innovation and technology transfer (CTCP 2015).

In September, 2016, the cluster of Felgueiras was benefited by the *“New Course to the North”* project. This project promotes a series of workshops entitled *“Fostering of Entrepreneurship”*, whose main purpose is to strengthen collaborative networks at a regional scale (NORTE 2020 2016).

The important role that the collaborative networks have played and, particularly in the cluster of Felgueiras, are reiterated by Amaral (2016): *“In the case of the footwear sector, and especially in the Felgueiras region, it is clear the cooperation between industries that do not have the productive or technical capacity to produce a certain model, at a given moment. They designate their competitors, but at the same time partners, to produce that model/order. On other occasions, the roles are reversed and everyone benefits, concentrating in Felgueiras the production of all the orders requested. The region benefits and companies grow in a sustainable way, sharing the risks, but also the successes”*.

However, according to Chituc et al. (2007a), a European-wide survey has proved the lack of interoperability, information integration and the need for an infrastructure that addresses the needs of the enterprises operating in this sector. It was also pointed that enterprises were not used to work collaboratively and that there was a lack of solutions in the market that supported the challenges of collaboration in this sector (Bastos et al., 2012).

Collaboration in businesses also relies on the existence of tools, architectures, frameworks and platforms that support interoperability between heterogeneous and distributed enterprises. Furthermore, the nature of the collaborative activities is heavily influenced by technology (Shamsuzzoha et al. 2013).

Following this drive, prior initiatives related to the footwear industry will be presented next.

EFENET - *“European Footwear Network for Electronic Trading”*, aimed the construction of a communication infrastructure that ensured the sharing of information in the footwear supply chain (Chituc et al., 2007b; Chituc et al., 2007a; Chituc, et al., 2008).

SHOENET - was divided in two levels: (a) messaging platform that integrates with the ERPs of the various SMEs participating in the footwear supply chain, allowing the exchange of commercial documentation and follow-up on the operations carried out; and (b) a set of 17 XML-based documents specific for the footwear industry (Chituc et al., 2008; Chituc et al., 2007a; Chituc et al., 2007b).

CEC-made-shoe – the main objective was to address interoperability between companies in the

footwear sector; namely by encompassing the business processes, from the collaborative design to the delivery of the final products. This was a follow-up project to **SHOENET** and used the messaging platform and the 17 XML-based documents from **SHOENET** (Chituc et al., 2007a; Chituc et al., 2007b).

DBE approach - proposed by Chituc et al. (2007b), represents the application of a "*Digital Business Ecosystem*" to the footwear sector with the objective of achieving interoperability between enterprises in this sector.

ShoeBiz@PT - promotes a service-oriented architecture, relying on the concept of business facilitator (Chituc et al. 2007a).

EFENET and **SHOENET** projects take a supply chain management approach. On the other hand, **CEC-made-shoe**, **ShoeBiz@PT** and **DBE** take a collaborative network approach (Chituc et al., 2007b; Chituc et al., 2007a).

There has also been some work addressing collaborative planning in the footwear industry, such as the **CoReNet Framework** project (Bastos et al., 2012). The main goal of **CoReNet Framework** was the implementation of new models for the production of small quantities of textile and footwear products. Among other objectives, the project intended to: support the value chain by collecting data from consumers to understand their needs; involve potential consumers in the design and customization of products; management of the collaboration between the different partners; monitoring of products' quality; management of deliveries/supplies to customers (Bastos et al., 2012).

Finally, the majority of the existing approaches only focus on internal business issues and processes, and do not support strategic decisions of groups of companies aiming to collaborate to fulfil business opportunities (Bastos et al., 2012).

5 BUSINESS-TO-BUSINESS AND E-COMMERCE INITIATIVES

The B2B concept is used to define a commercial practice, i.e., a transaction between companies (Kuzmanovic 2012). B2B can also encompass complex relationships in the value chain, multifaceted sales processes, a reduced number of customers but higher volume of merchandise, and the need to offer highly personalized and differentiated solutions and services (Alexandra and Roxo 2014).

Innovation has also a positive influence on companies' performance, especially on SMEs and those that operate at B2B level (Alexandra and Roxo 2014). As mentioned earlier, the Portuguese footwear sector works mainly for exportation and is strongly oriented towards the B2B market (Alexandra and Roxo 2014).

The commercial practices between companies supported by information technology can be defined as Business-to-Business e-Commerce (B2B-eC). B2B-eC consists of the trading of goods and services between companies by electronic means (Alves 2008).

According to Nextopia (2015), "apparel and accessories" is one of the fastest growing e-Commerce categories. Within this category footwear is becoming increasingly popular and customers are now buying more footwear online. Along these lines, e-Commerce is and will continue to significantly contribute to the footwear sector growth (Nextopia 2015).

The implementation of good practices in B2B-eC is also a key factor for the companies. These practices are summarized by Oracle (2015): i) reach target customers by addressing their exact needs; ii) segmentation of customers by multiple criteria; iii) provide accurate recommendations for products; iv) provide easy access to products; v) provide detailed data/information about products; vi) searches based on the shopping/purchases history; vii) provide easy/simplified access to orders and budgets; viii) provide features for large-scale orders; ix) enable flexible prices; x) updated content and fast indexing of pages, especially those who contain dynamic content; xi) maintenance of catalogues, as well as the ability to quickly add, remove and edit items.

In Portugal, the landscape of B2B-eC platforms is quite limited, particularly in the footwear sector. There are some examples of e-Commerce platforms developed by footwear brands/manufacturers, such as: Luís Onofre, Onyme2, JJ Heitor, Guava, Eureka, Nobrand, Fly London, Ramalhoni and FlexandCo; which are directed towards individual customers (business to consumer) (APICCAPS 2014).

As per the research conducted by the authors, PortugalShoes.com is the only platform that somewhat addresses B2B-eC (PortugalShoes.com 2017). This platform enables the users and customers to choose the components and certain details involved in the shoes production process - from the design to the brand. It also allows companies to register themselves as a designer, brand, retailer or distributor, making them part of the collaborative network (PortugalShoes.com 2017). In addition,

companies benefit from the know-how obtained through the interaction between designers, brands and retailers keeping them in touch with the latest trends in the sector (PortugalShoes.com 2017).

6 CONCLUSIONS

The Portuguese footwear industry has achieved in the last decade the status of one of the most modern in the world, which was the result of the continued investment in state-of-the-art equipment and technology (Portugueseshoes.pt 2016a). Contributing to this outcome, was also the strong market orientation supported by the push on design, together with the reconversion of operations that allowed high-quality production and quick response to orders (APICCAPS 2015).

The qualification of the sector's human resources has also been achieved over the last two decades, with the number of skilled workers having increase by twofold (APICCAPS, 2015; Portugueseshoes.pt, 2016b). However, the shortage of human resources, especially skilled workers, continues to be a constraint for the industries (APICCAPS 2014).

The strategy adopted by the Portuguese footwear industry is similar to its Italian counterpart (Lopes 2014). Both the Portuguese and the Italian industries focus on the design and manufacturing of high-end shoes, based on such values as the excellent design and high quality. Lopes (2014) argues that in the same way as Portugal, the success of the Italian footwear industry, results of the sharing of skills through geographical close enterprises, which frequently belong to the same family for some generations.

We believe that the insights provided in this paper allow theory and practice to better understand the reasons for the success of the footwear sector and of its key cluster of Felgueiras. Based on the research conducted, we also argue that there is a lack of B2B-eC initiatives in the footwear sector and the existing ones are still incipient. Furthermore, the existence of only one platform (PortugalShoes.com) that to limited extent addresses B2B-eC, also indicates that there is a need for greater research and development of approaches/technology allowing companies to explore opportunities to collaborate and negotiate among themselves.

Finally, it is too argued by authors of this paper that B2B-eC could be one possible avenue for the Portuguese footwear sector, especially the cluster of Felgueiras, to differentiate itself and gain a strategic edge over the competitors, namely its main competitor – the Italian industry. This would also

allow the footwear sector to reach new markets and increase size, while at the same time enable a dynamic collaborative network based on information sharing and knowledge management.

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