Product and Process Innovation in the Portuguese Footwear Industry

NELSON DUARTE1; ROLANDO VAZ2 FRANCISCO DINIZ3
1School of Management and Technology of Felgueiras – CIICESI – Polytechnic of Porto - CETRAD
Casa do Curral, Rua do Curral, Margaride, 4610-156 Felgueiras, PORTUGAL
2PhD Student at Vigo University, SPAIN
3Trás-os-Montes e Alto Douro University – DESG - CETRAD
Av. Almeida Lucena, N.º 1, 5000 Vila Real, PORTUGAL
1nduarte@eu.ipp.pt
2rolando.vaz@sapo.pt
3fdiniz@utad.pt

Abstract: - This paper addresses the issue of product and process innovation in the Portuguese footwear industry. The main goal is to analyse the product and process innovation, their relation and the relation with other types of innovation in firm’s daily management. The analyses were based in the results of the Community Innovation Survey (CIS). The main conclusions identified a low propensity to innovation and when it exists is mainly at the product and process level. It was also verified that when companies adopt an innovation strategy, it means that the company presents an innovative culture at all organizational levels.

Key-Words: - Innovation, Product and Process Innovation, Portuguese footwear Industry

1 Introduction
Innovation is a concept that everyone already knows. It is present in daily discussion both at the academic and entrepreneurial environment. At this respect many progresses have been made to analyse and better understand the results of innovation activities ([1], [2]). Research on innovation has grown significantly since the past century. The literature suggests that the concept of innovation while a research topic, was early identified by Schumpeter [3] but, it was adopted by the academic community during the Second World War [4]. Considering the actual dynamics at economic, social, political and cultural levels innovation remains a predominant and essential factor for the society development and progress. The business sector plays the most important role, because is in this sector that the majority of innovations are applied and tested. In fact, the adoption of innovation policies is considered as a prerequisite for business survival. On what regards, the business sector, innovation is a cross-factor, nevertheless, Craig, Jackson, & Thomson [5] , argue that there is a widespread perception about small businesses and that they operate as a growth incubator. Small businesses are the nest for innovation, and where new ideas transform into viable businesses. Taking the role of small businesses into consideration, one can argue, that innovation must be present in daily management of these businesses. Focusing in the footwear industry, innovation is essential for growth and development of this sector. In order to analyse the behaviour of these firms on what regards innovation we intend to do an analysis to product and process innovation in the Portuguese footwear industry, as well as the relations with other types of innovation. This industry has faced numerous changes and is characterized by aggressive levels of competition and high demand volatility [6]. In Portugal, and in particular in the footwear industry, according to the Portuguese Association of Footwear Industry, Leather Components and Articles and their Substitutes (APICCAPS) the situation is similar [7]. This competition is registered both at internal and external level ([8], [9]). This industry when facing economic difficulties seeks to strengthen its image through its creative capacities on design and fashion issues. The continuous search for competitive advantages has been a constant feature of this industry. Production costs reduction is no longer the key to success in this industry. Nowadays the focus is on product quality and marketing (namely targeting niche markets with higher value added). The interest and justification for this work comes in a crucial moment of affirmation of the Portuguese footwear industry, where innovation is the key and the main factor for firms competitiveness ([10], [11]). A more recent sectorial study for the Portuguese footwear industry (strategic plan) [12], once again, innovation
is presented as a priority for firms competitiveness. According to the mentioned report, in a competitive and aggressive environment, the key to success remains in a continuous renewing process. Another aspect that is mentioned in the quoted report is the level of competitive aggressiveness already identified in previous studies. Innovation is the central issue for business prosperity and is the key for differentiation and competition in global markets.

2 Literature Review

The discussion about economic issues of innovation is not recent and it is widespread in the theoretical and empirical literature. It is possible to find references to the issue of innovation in most schools of economic thought. Research on innovation has been a great contribution and a mastery of traditional neoclassical school until the first half of the twentieth century. Karl Marx and Joseph Schumpeter scholars of the capitalist school also proposed their versions.

The principle of innovation in the social sciences, and particularly in economic and business sciences, results in particular to the theoretical framework proposed by Joseph Schumpeter ([13], [14], [15]). It was through Schumpeter that the word innovation was introduced in the economic speech. It was done in the book “The Theory of Economic Development” [3]. In this work, Schumpeter considered innovation as the setting up of a new production function including the emergence of new commodities, new form of organization, new products, processes or new markets. Still Schumpeter, in 1942 introduced the term creative destruction which argues that from the constant emergence of innovations and economic changes, there are two aspects to be noted: (1) the strongest economic sectors tend to centralize the innovation activities; (2) businesses with greater ability to innovation (types and processes) tend to lead as regards the technological progress. The innovative firm differentiates from its competitors, enjoying a temporary monopoly. According to Schumpeter the process of creative destruction is the process of change and constant emergence of new technological developments in the economic structure [14].

Schumpeter [16], presented a simpler and comprehensive definition for innovation, “any way of doing things differently”. After this Schumpeterian approach, several scholars presented and classified innovation according to different standards and dimensions. Overall, summarizing the research of several studies: an innovation is a new idea that can arise from recombination of old ideas, and perceived as something new [17].

According to the Portuguese Standard [18], innovation corresponds to the implementation of a new or significantly improved solution for the company, a new product, process, organizational method or marketing activity, in order to strengthen its competitive position, increase performance or knowledge. A definition proposed by Kopalinski [19], innovation means introducing something new, a newly input in the economic system or the reformulation of something that already exists. According to Peter Drucker [20], innovation is a special tool for entrepreneurs. It can turn any change into an opportunity to start a new activity or to offer new services. Based on the progresses of the innovation activity, Apaydin [21] defines innovation as: production or adoption, assimilation, and exploitation of a value-added novelty in economic and social spheres; renewal and enlargement of products, services, and markets; development of new methods of production; and establishment of new management systems. It is both a process and an outcome. This definition as presented by the authors is based in the European Commission Green Paper on Innovation [22].

As it was mentioned, it is possible to find in the literature, different classifications of innovation, showing different types and levels.

The Oslo Manual [23] identified four types of innovation that encompass a wide range of changes in firms’ activities. These four types still remain as a reference for several studies. According to this manual the main types of innovation are:

- Product Innovation (Goods and Services) – Involve significant changes in the capabilities of goods or services. Both entirely new goods and services and significant improvements to existing products are included.
- Process Innovation – Represent significant changes in production and delivery methods.
- Organizational Innovation – Refer to the implementation of new organizational methods. These can be changes in business practices, in workplace organization or in the firm’s external relations.
- Marketing Innovation – These can include changes in product design and packaging, in product
promotion and placement, and in methods for pricing goods and services.

Innovation is presented today as a key for differentiation, economic growth and development. It also plays an important role in the society transformation. According to Lema [24] innovation enables companies to achieve sustainable competitive advantages and is a key element in economic growth.

Moreover, it should be noted that no innovation develops independently, as, for example, a new source of supply of raw materials can lead to a new product or even a new production process [23].

Kim, Kumar & Kumar [25] argue that there are several types of innovation varying from author to author. Comparing several definitions, Goffin & Mitchell [26], identified a set of common elements:

• What can be changed (products, services, business processes and production processes);
• The degree of change (a completely new product or some modifications were made to a new version of the product);

For this purpose innovation are classified as radical and or incremental. Radical innovations are those that are new and are completely different from existing products and services. Incremental innovations involve a reformulation or an amendment to existing products/services [27]. In the early stages, radical innovations create a high degree of uncertainty, while the level of uncertainty is much lower in incremental innovations [28].

As presented up to now, it is difficult to find and agree on a single definition, however, we can say that innovation means:

• Introduction of goods/services or new processes that lead firms to a better performance;
• Introduction of new production methods;
• Opening up new markets;
• New sources of raw materials, that might lead to sustainable production increases;
• New forms of organization.

According to Tudor, Zahaire & Osoian [29] innovation cannot be considered as an extra or optional factor. The process of innovation is vital for business survival. Innovation has been considered essential for firms to remain competitive [30], and firms’ competitiveness promotes the emergence of new products and processes, enabling like this profits maximization.

In this paper, the analysis of innovation in the Portuguese footwear industry will be based on the Oslo Manual, because it was clear that there are several authors adopting and scientifically revalidating the definitions suggested by this document ([31]–[34]). The manual, developed jointly by Eurostat and the OECD has become a reference for researchers and for various studies that analyzed the nature and impacts of innovation in the industrial sector, providing guidelines for data interpretation in order to get results that allow national and international comparisons.

3 Methodology
The main goal for this research is the analysis of product and process innovation in the Portuguese Footwear Industry.

The study population is the companies of this activity sector. Considering that it was found the existence and availability of a Community Innovation Survey (Community Innovation Survey - CIS). Thus, the preparation of a questionnaire for data collection is not required. However the use of the results from this survey is limited to the sample inquired by the organizers (Statistics Portugal). As advantages of using this survey we have:

• Data availability at the micro level. The information comes directly from companies.
• Inclusion of all innovative activity (successful or failure). Thus, CIS produces a broad set of indicators on innovation activities.
• Comparability, CIS is the main survey on innovation at European level, is a community survey that must be held in all member states of the European Union (EU), according to Eurostat guidelines.

This survey leads to a statistical report of innovation activities in European firms under the supervision and methodological recommendation of Eurostat, according to the conceptual framework provided in the Oslo Manual. It aims to measure and characterize innovation in all member states. In Portugal, CIS is under the responsibility of the Planning, Evaluation, Strategy and International Relations Office (GPEARI) jointly with the Minister of Education and Science (MCTES) and the Portuguese Statistics (INE).

This paper sample observed secondary data from the CIS, covering 80 companies analyzed in the period 2008 to 2010. The exploratory analysis of data will be performed through the Statistical Package for Social Sciences (SPSS).

4 Results
In this section we will present the main results obtained through the analysis of the survey (CIS),
making a descriptive analysis of the innovation culture in the Portuguese footwear industry. The results provide and disseminate panel results for the period 2008-2010, analyzing the innovative and non-innovative firms. We will start by classifying firms into innovative and non-innovative categories. Later, we will explore the characteristics of innovative firms focusing in product and process innovation.

Considering a dummy variable (innovative vs non-innovative firms) it results from the sum of the following issues of the CIS 2010:

- Goods/Services: new or significantly improved;
- Production manufacturing methods new or significantly improved;
- Logistics, delivery and distribution methods of productive factors (inputs) or final products (goods and or services) new or significantly improved;
- Process support activities new or significantly improved;
- Introduction by the firm:
  - New business practices in the procedures organization;
  - New methods of responsibility and decision-making organization;
  - New methods of organizing external relations with other companies or institutions;
  - Significant product aesthetic changes or packaging (goods and/or services);
  - New techniques or media to promote goods or services;
  - New methods of products distribution / placement or new communication channels;
  - New prices policies.

For the companies with Product Innovation, the innovation activity results from the sum of the following variables:

- New or significantly improved goods;
- New or significantly improved services;

On what concerns Process Innovation, the innovation activity results from:

- New or significantly improved production methods;
- New or significantly improved logistics, delivery and distribution methods of productive factors (inputs) or final products (goods and or services);
- New or significantly improved process support activities.

Thus, the variable assumes the value “1” if Yes, that is, if introduced some of these factors and “0” for a No answer, that means, that there were no introduction of those factors, this methodology will be used throughout this study.

<table>
<thead>
<tr>
<th>Firms with activity innovation</th>
<th>23,75%</th>
</tr>
</thead>
<tbody>
<tr>
<td>Firms without activity innovation</td>
<td>76,25%</td>
</tr>
</tbody>
</table>

**Table 1. Innovation in the Portuguese Footwear Industry**

Source: Database CIS2010 - INE, own elaboration

In **Table 1** it is possible to verify that only 23.75% of firms present at least one innovation strategy. In Table 2, were considered the innovative firms by typology. Under the column “Accumulated” a firm that innovates for instance at product level may also be accounted for any other type of innovation. Under "Autonomous" a firm that innovate in product, innovate exclusively in this typology.

<table>
<thead>
<tr>
<th>Innovation by Typology</th>
<th>Accumulated</th>
<th>Autonomous</th>
</tr>
</thead>
<tbody>
<tr>
<td>Firms with Product Innovation</td>
<td>47,37%</td>
<td>10,53%</td>
</tr>
<tr>
<td>Firms with Process Innovation</td>
<td>47,37%</td>
<td>21,05%</td>
</tr>
<tr>
<td>Firms with Organizational Innovation</td>
<td>15,79%</td>
<td>10,53%</td>
</tr>
<tr>
<td>Firms with Marketing Innovation</td>
<td>31,58%</td>
<td>15,79%</td>
</tr>
</tbody>
</table>

**Table 2. Innovation by typology**

Source: Database CIS2010 - INE, own elaboration

In Table 2 the column for the innovation "Autonomous" presents for all typologies figures lower than the column "Accumulated". It means that firms that adopt an innovative strategy choose to innovate at various levels.

The next step is to analyse the relationship between product innovation with other types of innovation. For that it will be used the technique of the cross tabulation. The results are presented below.
Table 3. Product and Process Innovation
Source: Database CIS2010 - INE, own elaboration

<table>
<thead>
<tr>
<th>Firms with Process Innovation</th>
<th>Count</th>
<th>% of Total</th>
</tr>
</thead>
<tbody>
<tr>
<td>No</td>
<td>5</td>
<td>26.3%</td>
</tr>
<tr>
<td>Yes</td>
<td>5</td>
<td>26.3%</td>
</tr>
<tr>
<td>TOTAL</td>
<td>10</td>
<td>52.6%</td>
</tr>
</tbody>
</table>

Table 4. Product and Organizational Innovation
Source: Database CIS2010 - INE, own elaboration

<table>
<thead>
<tr>
<th>Firms with Organizational Innovation</th>
<th>Count</th>
<th>% of Total</th>
</tr>
</thead>
<tbody>
<tr>
<td>No</td>
<td>8</td>
<td>42.1%</td>
</tr>
<tr>
<td>Yes</td>
<td>2</td>
<td>10.5%</td>
</tr>
<tr>
<td>TOTAL</td>
<td>10</td>
<td>52.6%</td>
</tr>
</tbody>
</table>

Table 5. Product and Marketing Innovation
Source: Database CIS2010 - INE, own elaboration

<table>
<thead>
<tr>
<th>Firms with Marketing Innovation</th>
<th>Count</th>
<th>% of Total</th>
</tr>
</thead>
<tbody>
<tr>
<td>No</td>
<td>6</td>
<td>31.6%</td>
</tr>
<tr>
<td>Yes</td>
<td>4</td>
<td>21.1%</td>
</tr>
<tr>
<td>TOTAL</td>
<td>10</td>
<td>52.6%</td>
</tr>
</tbody>
</table>

Table 6. Process and Organizational Innovation
Source: Database CIS2010 - INE, own elaboration

<table>
<thead>
<tr>
<th>Firms with Organizational Innovation</th>
<th>Count</th>
<th>% of Total</th>
</tr>
</thead>
<tbody>
<tr>
<td>No</td>
<td>7</td>
<td>36.8%</td>
</tr>
<tr>
<td>Yes</td>
<td>3</td>
<td>15.8%</td>
</tr>
<tr>
<td>TOTAL</td>
<td>10</td>
<td>52.6%</td>
</tr>
</tbody>
</table>

Table 7. Process and Marketing Innovation
Source: Database CIS2010 - INE, own elaboration

<table>
<thead>
<tr>
<th>Firms with Marketing Innovation</th>
<th>Count</th>
<th>% of Total</th>
</tr>
</thead>
<tbody>
<tr>
<td>No</td>
<td>5</td>
<td>26.3%</td>
</tr>
<tr>
<td>Yes</td>
<td>5</td>
<td>26.3%</td>
</tr>
<tr>
<td>TOTAL</td>
<td>10</td>
<td>52.6%</td>
</tr>
</tbody>
</table>

In table 1 the results show that only 23.75% of the firms in the Portuguese footwear industry conducted innovation activities in the period 2008-2010, which means that approximately 3/4 of firms do not innovate. The results also indicate that for those that were classified into innovative, 47.37% innovated in product/service. The same figure is valid for firms that presented processes innovation.

Considering the results obtained at the intersection of the types of innovation, from Table 3 (product * process) it can be concluded that 21.1% are innovating simultaneously in product and process. From Table 4 and Table 5, it is possible to conclude that from firms that presented product innovation only 5.3% also innovated in organizational aspects (Table 4), while 10.5% also innovated in Marketing (Table 5).

Since in Table 3 was already presented the result for product/process cross tabulation, we will proceed to present the results on process * organizational and process * marketing.

As it is possible to verify in Table 2 the organizational innovation is the type of innovation that presents a lower percentage. This figure is reflected in the results of Table 6, where it is possible to verify that there are no firms innovating simultaneously in processes and at the organizational level. This means that firms are more product oriented (manufacturing) than market oriented (external relations – selling activities). Even on marketing results the percentage of firms that play process and marketing innovation is just 5.3% a bit lower than the figure from product * marketing. Even with slight differences marketing innovation activities are closer to product innovation than process innovation. This result reinforces the idea that firms are focusing in new products and leaving for a second plan the way of doing and delivering it.
5 Conclusion
After analyzing the results presented in the previous section, it is possible to say that the most representative variables are product and process innovation. These results are valid both at individual analysis as on cross tabulations.

From Table 2 it was possible to verify that even with similar results (product and process innovation) when analyzing accumulated innovation, in autonomous terms process innovation takes the lead. As mentioned in the previous section it might mean that product innovation is the main concern, and at the same time, when it occurs it promotes innovation at other organizational levels.

The organizational and marketing innovation mostly turn out to be entailed by the adoption of another innovation strategy. This is demonstrated in the results presented in Table 2 where it appears that the autonomous innovation presents values 50% lower than accumulated innovation (with the exception of organizational). The results also lead us to identify interdependence among the types of innovation, often more visible between the variables product and process innovation.

For this relation some chi-square test (χ²) were performed to test the variable independence, since there were signs of dependence. However, the low number of firms classified into innovative does not verify compliance with the assumptions for statistical validation of those tests.

As a possible response to the focus of this research, it is clear that there are some firms that perform innovative activities, but most companies in the Portuguese footwear industry are averse to innovation. This conclusion comes from the 76.25% of firms that do not innovate at any of the 12 possible points to classify the firms in the innovative category.

The results from this paper, even requiring some other statistical procedures show that most firms in this sector do not adopt an innovation strategy. From an entrepreneurial perspective, result of some field experience, this is due mainly to firms that still work in an outsourcing basis, and just recently are taking the first steps in presenting to the market its own brand. These changes necessarily lead the firm to provide itself with innovation processes and an innovation strategy. Despite the weak propensity to innovation in the Portuguese footwear industry, it is clear that the most significant innovations are at the product and process levels and immediately afterwards appears marketing innovation.

For the present and future of this industry, as referred to in the sectorial study “Footure 2020” [12] innovation is critical to the survival of these firms. For their success it is expected that innovation activities become a short-term element in the strategic and operational management. This opens up new research opportunities to follow the development of innovation at the firm level, or to identify the reasons that keep blocking it.

References:


