

# A Strategy to Reinforce the Textile and Clothing Sector Cluster in Portugal

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**Abstract.** The need for open innovation emerged from worldwide organizational competitiveness, as well as from the demand for constant improvement and innovation. Companies today must possess a competitive edge and be sustainable. Organizational assets within the house are often insufficient; yet, they constitute a precious key in the joining of efforts with external players and in achieving better performance. The present paper was conducted in the Clothing and Textile industry in Portugal, one of the most relevant activity sectors in the country's performance. The study aims to contribute to the reflexion of conceiving and maintaining a harmonious dynamic balance between the different features of open innovation. By interviewing some of the top authority players from the textile sector in Portugal, the paper's findings suggest that open innovation constitutes a combined model which involves Government, Universities, Research Centres, Associations and Enterprises. This paper concludes that open innovation requires action and will produce a greater impact if all the players adopt a cluster approach, even if this is undertaken at different levels and by means of varied tactics.

**Keywords.** Innovation, Open Innovation, Closed Innovation, Textile Industry, Collaboration.

## 1. Introduction

The need for open innovation (OI) emerged with the improvement and development of business conditions, but where organizations have restricted assets to meet their advancement needs within the house [1]. The central idea behind open development is that, in a universe of broadly appropriated information, organizations are unable to depend totally on their own research, so that they must purchase or permit procedures or innovations (i.e. licenses) from different organizations [2]. Many of the studies dealing with this issue have concentrated on considering OI in multinational companies (MNCs). However, insight into OI in small and medium-sized enterprises (SMEs) is still divided [3]. Studies have analysed the case of SMEs in numerous specific situations; yet, due to the many features involved in OI and to the broad spectrum of the concept itself, which means incorporating different advancement exercises, there have been significant difficulties in the estimation of OI [4]. This has made it troublesome for specialists to cover the full OI range. Recent activities in the field have focused on OI intermediaries as opposed to OI itself, for example the seeking of data to establish a wider spectrum and depth [5], innovation sourcing and exploration, or authoritative systems. The purpose of the study described in this paper was to implement a strategy to improve SMEs in the Textile and Clothing sector in Portugal. The study's main objective was to show how large-scale firms and SME firms tend to

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see open innovation and how they objectify it. It also presents a possible course for the achievement of successful open innovation by combining open and closed features: what should be shared, how to value the process and its effects, and what the benefits of sharing are. The Clothing and Textile industry has a long tradition in Portugal and the recent evolution of the global market presented several challenges. The way chosen for being so competitive resulted specially from high quality, quickest response available in the market, endogenous design and technological innovation and less commodities and more specialities. With the support of a strong and active scientific and technological system, the sector developed vigorously their activities in the field of non-commodity TechTextiles. Now, the technology-intensive and design-intensive products are responsible for the main part of the growth of Portuguese exports and, specially, the growth of GVA (Gross Value Added) per employee.

The structure of this article is divided into five sections: the first of these presents the introduction; section 2 consists of a literature review concerning the Open Innovation concept, its practice and activities; section 3 deals with the methodology used in the development of this study; section 4 describes an exploration of the situation of SMEs in Portugal in the area of focus study and work developed; section 5 presents the final conclusion and suggestions for future research.

## **2. Literature review**

Innovation pertains to the implementation of a new or significantly improved product (goods or service) or process, a new marketing method, or a new organizational method in business practices, which occurs in the workplace of an organization or in its external relations [6,7]. The advancement of innovation occurs through the innovative effort developed within society and the economy, where all kinds of actors may perform, namely firms, government, non-profit institutions or universities [8]. Innovation is a core business necessity, so that if companies do not innovate they will invariably fail to produce the desired impact on the market [9]. Making this innovation process available to all active players is the basic premise of open innovation: knowledge can circulate more freely and be transformed into products and services that will create new markets, thus fostering a stronger culture of entrepreneurship [10]. As a consequence, businesses which adopt this innovation model need to engage in proactive intellectual property management in order to exploit their own and other firms' knowledge and innovation in a strategic manner [11]. In a closed innovation model, firms try to internalize their firm-specific research and development activities and commercialize them through internal development, manufacture and distribution processes [2]. In the real economy, the distinction between open innovation models and the traditional "closed" approach to innovation is not as clear-cut as is sometimes presented. In fact, businesses frequently employ a combination of approaches [12]. Companies can pursue this innovation model in different ways, including bilateral collaboration, networks, and innovation "ecosystems", in which participants retain their knowledge and collaborate informally. These channels generally depend on clear, predictable intellectual property (IP) arrangements. Other activities include incubation, as well as spin-offs or spin-ins, and crowdsourcing [13]. In these unique circumstances, genuine alternatives are perceived as instruments which will reduce instability, allowing organizations to make choices and persist until the vulnerability associated to a given open door has diminished [14,15]. One of the primary favourable

circumstances of open innovation in potentially risky activities is that organizations can benefit from early contributions in new advances or business opportunities [3]. In order to cope with the complex nature of current products and technologies, an extremely open innovation setting advocates that actions should be taken both in-house as well as externally [16]. In other words, OI is about tapping into the knowledge of experts outside companies; this will complement companies' internal knowledge, balancing internal and external R&D and benefitting from others' discoveries [17,18,19]. The depiction of the features which are intrinsic to MNCs and SMEs demonstrate their primary contrasts. When implementing OI in MNCs, and to some extent in SMEs, one is able to comprehend how difficult it can be for SMEs to manage OI. Due to the absence of research on OI in SMEs, different approaches depend entirely on the intrinsic qualities of the SME in question [20].

### **3. Methodology**

In the paper we present the results of a study conducted to contribute to the reflexion of conceiving and maintaining a harmonious dynamic balance between the different features of open innovation in the Clothing and Textile industry in Portugal, as this is a very important sector contributing 11% of GVA and one of the largest among 28 EU member states. This study adopted a methodology which was divided into six main stages. In the first stage (Define), one collected information from scientific articles and books published in order to present a coherent review of literature dealing with the Open Innovation concept, its practice and activities. The second stage (Collect), presents an exploratory case study from the textile sector in Portugal, pointing to some of the challenges and thoughts which pertain especially to innovation in SMEs. One then proceeded with the third stage (Meeting), which involves direct meetings with top officials representing the textile field. In the fourth stage (Analyze), one presents a reflection on the collected data. In the fifth stage (Strategy), an efficient collaborative strategy is introduced with a view to its implementation in SMEs. Finally, the sixth stage presents the conclusion, as well as proposals for future work.

### **4. Exploratory case study (the textile sector in Portugal)**

Due to the impact of Portugal's presence in Brazil, the Portuguese cotton industry began its activities in the eighteenth century with most of this activity centred in Lisbon. By the nineteenth century, Portugal had started to develop another specialty within the fabric business: the production of cloth. With flax strands imported from Hamburg, the nation was in a prime position to initiate this activity within the business, particularly in the northern region of the country. An example of one of these towns is Guimarães, which is located in an area where the many water streams provided the water supply essential to this activity. The textile and clothing sector in Portugal is one of the key industrial sectors in the country and constitutes one of the most important industries in the Portuguese economy. It represents 9% of the Portuguese Total Exports, 20% of the Assembly Industry's Employment, 8% of the Manufacturing Industry's Turnover and 8% of the Manufacturing Industry's Production. The sector provides employment to a large sector of the labor force in the country. It creates employment for 180,000 employees and contributes to approximately 12% of Portugal's export revenues. There

are around 13,300 companies in Portugal, working in all of the sub-sectors of the textile and clothing industry. Some of these are vertical units but the majority are small and medium-sized enterprises, which are all well-known for their flexibility and quick response regarding expertise and innovation (see table 1) [21].

**Table 1.** Textile Sector Performance (in million (€)) [21].

Content	Year						
	2006	2007	2008	2009	2010	2011	2012
Production	6,608	6,660	6,132	5,123	5,631	5,102	4,905
Turnover	6,827	6,895	6,358	5,349	5,829	6,075	5,774
Exports	4,218	4,352	4,088	3,501	3,844	4,152	4,128
Imports	3,289	3,417	3,295	3,038	3,424	3,388	3,046
Employment	180,379	176,226	168,117	148,059	138,124	133,10	127,976

In order to improve the industry's performance and increase market value, there are three business models (see table 2).

**Table 2.** Business Model [21].

Model	Percentage
Services: Specialized Sub-contracting and Co-contracting	55
Brand and Distribution Management, including retail	25
Development based on technological innovation. Technical and Functional Textiles	20

#### 4.1. Challenges and thoughts pertaining to SMEs

A large number of the smaller organizations in the sector have been confronted with unforgiving economic situations. The current monetary emergency has debilitated the budgetary soundness of numerous small and medium-sized firms (SMEs), particularly in ventures where remote, minimal effort-makers have entered the market and are undermining the survival of the current contenders. Likewise, new government directives can change a productive SME specialty business into a nightmare in a matter of months. Innovative new companies already have in-house innovation; however, there are no assembling capacities or dispersion channels to transform this innovation into an effective and profitable business. It should also be pointed out that these small firms do not possess the required inner budgetary assets and specialized capacities. As the relentless pace of globalization juggernauts into the 21st century, SMEs need to be conscious of the value of Intellectual Property (IP), as well as the fact that it constitutes an instrument and benefit. At this point, SMEs need to figure out how to enhance IP administration to support and foster development. Intellectual Property Rights (IPR) empower SMEs to be selective and thus limit the exploitation of their developments.

#### 4.2. Analysis of the survey

For the recognizable proof of open development practices, one utilized the overview technique. A survey was created to suit the circumstances, where the enquirer is absent or for cases when it is important to present more exact questions [22]. The survey included open-ended questions, which promote a faster reaction procedure and enable better consistency and rearrangements in the examination of the reactions [23]. The survey, which presented six sets of questions, is explained in table 3.

**Table 3.** Survey of Enquiries.

<b>Content</b>	<b>Description</b>
General	The Portuguese textile and clothing sector, and personal experience concerning this sector.
Innovation	The importance of innovation in the textile sector, how innovation influences the organization.
Path to Open Innovation	Driving open innovation in organizations, issues on open innovation, experience in open innovation, old and new innovation thinking.
How to be Open	Perception of the company as open, cultural differences and their impact on open innovation, advice to innovation leaders working in the innovation department.
Sharing and Protecting	Perception of the company as protective, satisfaction with this protection, assurance that the organization is both sharing and protecting.
SME (Small and Medium-sized Enterprises)	Whether SMEs should embrace open innovation, benefits of innovating together with other SMEs, view on SMEs being unsuitable for open innovation.

The present research focuses on an open innovation strategy for large companies and small and medium-sized companies in Portugal. The scope of this study is to identify the challenges and the opportunities that Portugal has encountered so far, in order to propose the implementation of a strategy to improve open innovation. The method used in this research was a qualitative one. The data analysed was gathered through direct interviews consisting of open-ended questions. With the objective of obtaining a broad perspective of the textile sector in Portugal, one worked with people/institutions from different places (regions), who held different views on the subject at hand (see Table 4).

**Table 4.** List of institutions and people interviewed.

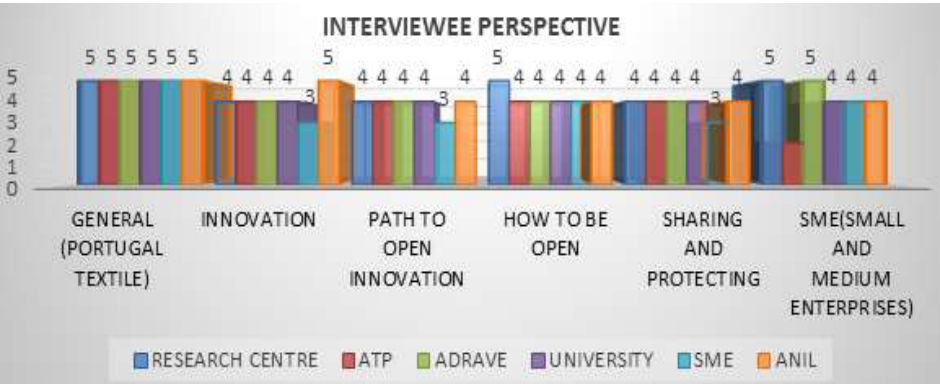
<b>Institution</b>	<b>Number of Interviewer</b>
University	1
Research Centre	1
Portuguese Textile Association (ATP)	1
Textile development association (ADRAVE)	1
Wool Development Association (ANIL)	1
SME (Small and Medium-sized Enterprises)	1

These people/institutions are the most sector's representative institutions in Portugal, being the major players near enterprises, knowledge, technological transfer and public agencies. The interviewees occupy a prominent place in their organization and decisions also depend on their way of thinking. These players often meet and discuss strategies in order to have success in the competitive worldwide market.

One presented a questionnaire which covered various aspects of the Portuguese textile industry and included open-ended innovation questions; for evaluation purposes, one classified the questions on a scale ranging from 1 to 5, where 5 meant "Excellent"; 4 meant "Good"; 3 meant "Average"; 2 meant "Poor" and 1 meant "Very Poor".

4.3. Analysis of the interviewees

Figure 1 explains the different views expressed by the interviewees in the questionnaire.



**Figure 1.** Views expressed by interviewees in the questionnaire.

A subsequent analysis of the interviews enabled one to conclude that the interviewees seem to have similar approaches to the themes presented. All interviewees have long experience and know very well this sector and its constraints. They all agree that this sector is one of the most relevant activity sectors in the country's performance and is internationally positioned. Actually, in some fields, Portuguese TechTextiles are a worldwide reference, because of a very particular ecosystem, namely due to i) a complete and integrated cluster, ii) tradition and manufacture knowhow, iii) cutting-edge research capacities, iv) good cross link between Clothing and Textile sector and the high value added chains and v) Professionals' sense of customer service. Innovation is crucial and every player involved in the ecosystem should work together, ensuring the sharing of knowledge and protection of intellectual property. Portugal should position itself as a reference on this sector at a global scale. The main differences seem to come from SME's and ATP eventually because they are daily confronted with real problems and market restrictions. Portuguese economy is down and SME's have serious difficulties in financing themselves. Many times they fight against survival and not against the aggressive competitiveness of the global world. There is not much associative spirit among SME's and companies often continue to work alone without large formal and informal contact networks. There are qualified Human Resources (HR), but SME's are not properly taken advantage of them because they do not have opportunities to risk and identify new solutions. Companies do not exchange experiences with one another or use Universities and Technological Centers to improve and offer new solutions. ATP, even representing all the enterprises, work specially with big enterprises who have different conditions, are globally presented and are more innovative. ATP feels that SME's must improve their performance as imports, exports or internationalization are no longer reserved only for large companies. More and more SMEs, with a much smaller volume of business, must diversify their activity to foreign markets, representing a significant percentage of their total activity, but additional care is required. It is our opinion that some of the proposed solutions could be the following (see Table 5).

**Table 5.** Identified problems and their solutions.

<b>Problem</b>	<b>Explanation</b>
SMEs face difficulties to implement Innovation in their Industry.	The largest problem faced by SMEs is the financial crisis. Companies possess insufficient financial resources to practise and develop innovation. The result is that the added value of their offer has dropped steadily when compared to other worldwide players and competitors. In order to surpass this hurdle, SMEs need to change their mindset and adapt to the open innovation strategy. The Government must organize strategic and differentiated programs to be implemented in SMEs, not in the form of a subsidy but as a financial tool that would provide companies with leverage.
ATP (the Portuguese Textile Association) is of the opinion that Open Innovation is unsuitable for SMEs.	ATP is the most important textile association in Portugal and plays a major role in the development of the textile sector. However, its view concerning SMEs and Open Innovation is rather unsatisfactory. SMEs are lagging far behind large companies in every aspect and require additional care. ATP has more contact with large companies, and thus has a wide knowledge of the textile sector in Portugal as well as the world market. ATP also knows its associates well, and is in a position to organize initiatives and actions in order to improve SMEs. ATP should act as a link between large and small enterprises and should accept the commitment of leading this process. Most of the companies in the textile industry in Portugal are SMEs; it is thus essential that they be helped in this process, otherwise they will ultimately disappear in the short and medium term.

#### 4.4 Introduction of an efficient collaborative strategy to implement in SMEs

For the development of the textile industry in Portugal, SMEs will need to promote an effective strategy in order to improve performance and create more opportunities. There are different collaborative strategies that can be used. In our opinion, the following strategies would be suitable (see table 6). These four strategies are the most adequate. However, strategy 1 and strategy 3 should be highlighted as being the most important: if the University and Government take steps to implement forces in all valuable SMEs, everyone will collaborate.

**Table 6.** Strategies to Implement in SMEs.

<b>Strategy</b>	<b>Explanation</b>
1.The University in the centre of the changing process	To promote open innovation thinking, the best solution is to start from the University. Education of students should focus more on the benefits of acquiring further knowledge of this issue. Open innovation constitutes a group strategy where each individual exercises responsibility, so that the Government should pay more attention to this and play a major role in fostering it. Government should also promote conditions to draw universities closer to companies. If students learn and are aware of what the market requires, they will be better prepared to respond to problems efficiently.
2.The Research Centre as a link between companies	Another way of promoting open innovation thinking can ensue from Research Centres, since these have a wide knowledge of open innovation. This scenario will help companies to know and understand better what open innovation is and why it is so important for their competitiveness. Eventual approaches between Research Centres will enable companies to make more contacts and work on their own research and development. Government must organize strategic and differentiated programs to be implemented in SMEs, and which should be introduced in every region of

3.The Government in the centre of the changing process	the country. Government should provide funds to improve companies' business and competitiveness. These will certainly enhance opportunity and participation for all small and medium-sized enterprises, as well as larger ones.
4.Open Innovation in the centre of the changing process	The best solution to promote open innovation thinking seems to be that of working on an innovative project in groups or clusters. When SMEs start to collaborate and cooperate with each other, this constitutes a good indication of development. This collaborative strategy represents cooperation between all the players in the clusters. This strategy results in reduced financial restrictions and will certainly lead to an increase in market value. It will also help to promote networking and competitiveness.

5. Conclusion and future work

Open Innovation is essential in the current context of entrepreneurial activities since it fosters the improvement of business conditions. When an organization wishes to be more competitive and differentiated, the necessary changes must invariably occur “within the house” first. Open Innovation infers another worldview for the administration of the 21st century. It is a fact that organizations need to be more open and more collaborative, sometimes even developing new products or concepts together with clients, suppliers or competitors. Both the literature review and the case study of the textile sector in Portugal seem to demonstrate that viewing the market alone and from an internal perspective is something of the past. The world of today is constantly subjected to rapid change, so that organizations are required to be agile and flexible. Companies should also work more closely and in a collaborative and cooperative way to meet the challenges at hand. The future is certainly more sustainable for the companies which have already understood that open innovation is the key to gaining a competitive edge and facing the market’s adversities successfully. The study conducted seems to point out that the main benefits of Open Innovation reside in:

- Innovation: In the Institutional point of view there should be enough place for the innovation of ideas. The impact of innovation changes organizational culture and, in recent years, the impact of the innovation strategy has proved to be extremely positive. Consequently, ideas from the outside have been introduced and developed further in institutions.
- Open Innovation: the Open Innovation philosophy creates a huge impact and the satisfaction level produced is better than when compared to previous levels. The Open innovation technique should, therefore, be developed in every organization.
- How to be Open: Open innovation creates a major impact on cultural differences and demonstrates the importance of innovation. The person in leadership is essential to the entire organization and should thus have a wide knowledge of open innovation.
- Sharing and Protecting: It is possible to exercise both a protective and collaborative innovation philosophy. Being open to everyone is important in the current scenario.
- SME: Open Innovation is suitable for small and medium-sized enterprises, but the mindset should be changed in order to adapt to the current philosophy.

The initiative to promote open innovation should be taken by the University, Government, Research Centres, Textile Associations and Large Companies:



- The University: the University is the centre of the changing process. Student education should provide a greater focus on open innovation. Government should promote conditions to draw universities closer to companies, as this approach constitutes a key factor in the process of responding more effectively to the market's needs.
- The Government: Government must organize strategic and differentiated programs to be implemented in SMEs, which should subsequently be introduced in every region of the country. Government should, additionally, provide funding to companies, with a view to improving business and performance.
- The Research Centre: Research Centres have a wide knowledge of open innovation. If they work closely with companies, the latter will certainly understand what open innovation is and why it is so important for their competitiveness and sustainability.
- The Textile Association: the Textile Association should promote initiatives to implement Open Innovation and thus improve SMEs. It should also act as an intermediary between large companies and SMEs. This will ultimately lead to the improvement of the textile sector in Portugal, as SMEs represent a huge percentage of the total industrial sector in Portugal.
- Large Companies: Large companies should change their mindset and start to collaborate more with SMEs on large and innovative projects.

Current trends suggest that being open is now worth far more than being closed. Indeed, it is impossible to ensure success without being innovative, and this requires a certain level of openness. In this paper, the survey was conducted and directed at a limited number of institutions (6), even if major representatives of the Clothing and Textile industry. The sample size is small and the people (6) may not be a good representation of other cultural mindsets. The survey results simply do not show much discovery with respect to the conditions of open innovation in the sector, but highlights that companies can act much more quickly and more flexibly if they are open to outside ideas. As such, being open and collaborative has become crucially important. Future research work could consist of studying:

- Other players in the textile sector in Portugal.
- The textile cluster in Portugal.
- Other areas of activity, namely the automotive and aeronautics sectors, where open innovation is already a requirement for survival.
- How to change people's mindset concerning open innovation, especially when the people in question are in leadership positions.
- How the University faces this theme and how it promotes education on this subject.
- How knowledge could be shared and developed in R&D for SMEs and in concrete situations.

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