

# **THE IMPORTANCE OF QUALITY IN THE CONSOLIDATION OF TEXTILE FIRMS IN THE MINHO REGION IN NORTHERN PORTUGAL**

**Sónia Oliveira**

College of Technology - Polytechnic Institute Cávado Ave, Campus do IPCA,  
Lugar do Aldão, 4750-810 Vila Frescainha S. Martinho, Barcelos – Portugal

**Gilberto Santos**

College of Technology - Polytechnic Institute Cávado Ave, Campus do IPCA,  
Lugar do Aldão, 4750-810 Vila Frescainha S. Martinho, Barcelos – Portugal  
gsantos@ipca.pt

**J. Batista Costa**

College of Management - Polytechnic Institute Cávado Ave, Campus do IPCA,  
Lugar do Aldão, 4750-810 Vila Frescainha S. Martinho, Barcelos – Portugal

**Abstract:** The textile industry has a long tradition in Portugal and is one of its most important sectors, despite the current economic crisis. The lack of quality and the practice of higher prices decrease a firm's competitiveness and can lead to the loss of clients. Thus, the implementation of quality-related measures plays an important role in this context. The objective of this analysis was to determine the importance of quality in the consolidation of textile firms in northern Portugal. To undertake our analysis, we examined data from 60 textile firms. In addition, we sent these firms a questionnaire to obtain information on the current state of the textile industry in Portugal. Most firms in our sample believed that quality improvement, business benefits, mobilizing employees' knowledge and business image were important factors to increase their competitiveness. Furthermore, we found that competition in the textile industry can be very intense and is mainly driven by price and not by product/service differentiation. Most firms undertook Total Quality Management measures to ensure the quality of their production, meet customer expectations and prevent errors. Quality was highlighted as an important factor for firm survival.

**Key-words:** quality, Portuguese textile industry, Quality Management System, Minho;

## 1 - Introduction

Today's economy is global (Frederik, 2009). The rapid development of technology and communications has reduced the distance between nations and improved the time from order to delivery (Bergvall-Forsberg, 2007). As with Portugal, according to Towers (2005), many textile businesses have significantly reduced their manufacturing capacity in the UK and have transferred some or all of it overseas to Eastern Europe, the African continent and Asia. With their significantly lower labour and production costs, such companies are able to widen their profit margins considerably. Hence, according to Middleton (2004), the textiles market has become highly competitive, with the main manufacturing base moving from the developed countries to the developing countries such as India, Pakistan and China, where manufacturing costs are significantly lower (e.g. labour costs, taxes and transport costs) and governments grant subsidies. The lower production

costs allow developing countries to export goods at cheaper prices than developed countries, which is compounded when developing countries markets mature and they have difficulty selling the goods. In order for companies in developed countries to remain in business, they must change their strategy drastically (Middleton, 2004). As such, evaluation of product quality is a complex task in which a hierarchy of attributes needs to be taken into account (Dadashian et al., 2009). Within this concept, according to Towers (2005), Total Quality Management (TQM) is an approach to improving the competitiveness and flexibility of an organisation for the benefit of all stakeholders. It is a way of planning, organising and understanding each activity and of removing all the wasted effort and energy that is routinely exerted in the organisation. It ensures the leaders within the organisation adopt a strategic overview of quality and focus on the prevention of problems (Towers, 2005). Quality, or more importantly perceived customer value, is an important source of competitive advantage for a modern company (Middleton, 2004). On other hand, with today's global competitive marketplace, new textile product development requires a design, marketing, materials and technology interface (Powell, 2006).

The textile industry has a long tradition in Portugal and is still one of its most important industrial sectors, despite the current economic crisis. It has always assumed a prominent role in terms of employment and thus a relevant position within the Portuguese economy. Furthermore, it has registered dynamic and competitive behaviours in certain sub-sectors and firms. The geographical and cultural proximity to the European market is a positive aspect, which firms must take advantage of (Vasconcelos, 2006). Although it is a mature sector, it is quite fragmented and subject to periodic mismatches between supply and demand. Thus its performance is strongly conditioned by fluctuations in the global economic activity. Nonetheless, the Portuguese textile industry has revealed to be dynamic in many sectors, such as clothes making, although it has been losing its market share in favour of European Union countries, in particular those with cheaper labour (Vasconcelos, 2006). The global textile trade liberalization and the consolidation of the position of Asian countries in the European market have increased the difficulties that this sector has experienced in the last years, affecting not only Portugal but the entire European textile industrial sector (Sousa, 2009). Most countries have lost clientele due to the lack of quality and the practice of lower prices by competing countries. On other hand, by focusing their operations on quality and speed of response as well as cost, UK based organisations have been able to sustain a position in their markets (Towers, 2005). Also in Portugal, quality became an important survival factor for the textile sector. This is an attribute generally sought out by potential clients. In addition, clients search for partners that they can delegate responsibility to. This typically does not occur with Asian firms, contrary to the case with Portuguese firms.

The needs and demands of the present markets, which are becoming increasingly global and competitive, have made the improvement of quality into a maxim to be followed by organizations who wish to consolidate their market position

(Pina and Sellés, 2008). The concern for increasing competitiveness has favored the development of Quality Management in large and small companies. According to Rebelo et al. (2013), the sustained success of an organization is achieved by its ability to satisfy the needs and expectations of its customers and other stakeholders in the long run and in a balanced way. Presently, in the context of a global market that is becoming progressively more demanding and competitive, organizations are under substantial pressure to meet the requirements of their stakeholders.

The subject of organizational culture is becoming more and more important for organizations in the pursuit of quality and excellence (Dahlgaard-Park et al., 2013) because evaluation of product quality is a complex task in which a hierarchy of attributes needs to be taken into account. More research attention should be paid to the core values related to building a quality culture, such as customer-centrism (focus on customers' problems, needs, and expectations), continuous improvement, and the participation of everyone involved (Dahlgaard-Park et al., 2013). Within this context, the Quality Management System (QMS) is an important tool to increase competitiveness and increase a firm's market share. As part of a TQM approach, an organisation must develop and implement an appropriate quality assurance system that is tailored to the type of manufacturing activity for the product or service being offered. A fully documented Quality Management System (QMS) will ensure that the two important requirements of customer expectation and the organisation's requirements, both internally and externally, are met (Towers, 2005).

When QMS is well implemented, it is an instrument that can manage everything in a firm such as human resources, behaviors, involving everybody in the firm, with the clients and the society. Workers are an important link in the firm's performance and if all involved perform their functions properly, this will be reflected throughout the firm. Quality improvement has been an important part of competitive strategies of firms. In this context, TQM has emerged as a business management strategy which aims to create awareness of quality through all organizational processes. The TQM philosophy has resulted in a tremendous interest in, and efforts to develop, good practices (Dereli et al., 2011). Worldwide, the quest for quality is an endeavor that organizations in every industry embark on in a continuous effort to succeed. The main objective is for organizations to reach world-class excellence through high-quality products and/or services, customer satisfaction, and cost reduction with profit optimization. It was found that the issues that influence quality performance, cost performance and sales performance of ISO 9000 vary according to company size; however, issues defining the performance of internationalization are the same for small, medium and large companies (Arauz et al., 2004). Firms are normally encouraged by the market to become certified, but above all, as a requirement by major clients. The quality system certification improves business relations and it has a positive effect on a financial perspective. (Santos et al., 2012). Studies suggests that the ISO 9001 system can be a useful tool for organizational learning and knowledge management, and can usefully complement knowledge management approaches in that sense. To do so, managers must have a broad, and sometimes,

a critical interpretation of the ISO 9001 standard. This will not only comply with the requirements of the certifying body, but also achieve internal efficiency in the organization (Lambert et al., 2008).

The objective of this study is to determine the role of quality in the textile industry in the Minho region in northern Portugal. To undertake our analysis, we examined data collected on 60 firms to evaluate the impact of quality on textile production, and to understand why some survived while others did not. In particular, we interested in understanding how quality can influence firm survival, namely how the lack of a QMS can lead to the closure of some firms, and how its implementation can enhance competitiveness and innovation.

## 2 - Methods

### 2.1 Data from the questionnaire

To undertake our analysis, we made use of a questionnaire, as shown on Table 1. Data were collected to understand the impact of implementing quality management system in firms certified by ISO 9001 in the Minho region in north of Portugal.

Table 1 - Main sections and main topics included the original survey (Oliveira, 2013)

Main Sections	Main topics
General Description of the firm	Type; Firm's Activity; Year of first certification; Number of employees;
Deployment of the quality management system - ISO 9000 certification	Motivations Benefits Deployment time Payback Practices used before Barriers Competition Deployment level Factors Income Income of the QMS Impact Archetype Income obtained from the QMS Culture

The study presents the benefits, drawbacks and difficulties of implementing quality management systems and the importance of quality in the production process. The questionnaire was sent to 260 firms. However, the sample for our study was of 60 firms in total.

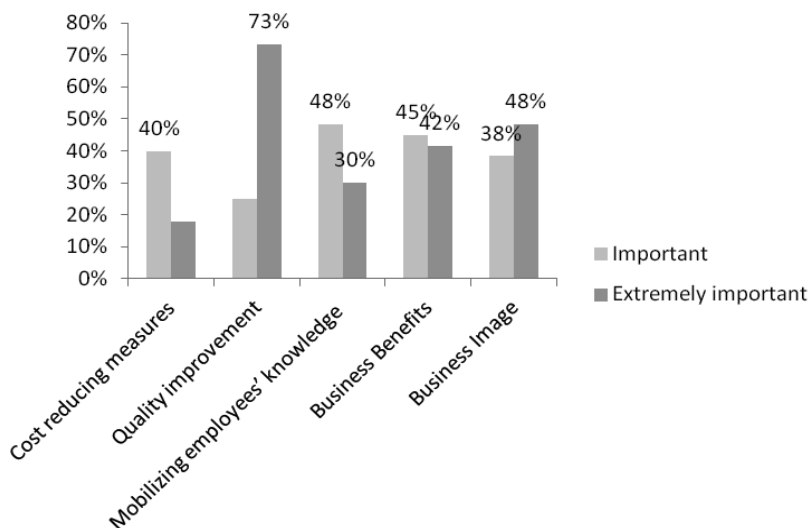
## 2.2 Data Collection

The questionnaire used simple and clear language. We also sent the firms additional questions to obtain more information about the current situation in the textile industry in Portugal. These questions covered topics such as the importance of quality in the textile firms in Portugal, the actual situation of the textile sector, the reasons why some clients are searching new markets and leaving Portugal.

## 3 - Results

### 3.1. Results from questionnaire

All firms included in our sample were Portuguese with the exception of one. According fig. 1, most firms in our sample felt that quality improvement, business benefits, mobilizing employees' knowledge and business image were important or extremely important factors to implement and certificate the QMS (Quality Management System).



**Fig. 1** - Reasons to implement Quality Management System (Oliveira, 2013).

Fig. 2 shows that benefits obtained by other certified firms, improved relations with authorities and the community were generally identified as unimportant reasons to implement and certificate QMS by roughly one-third of the firms in our sample.

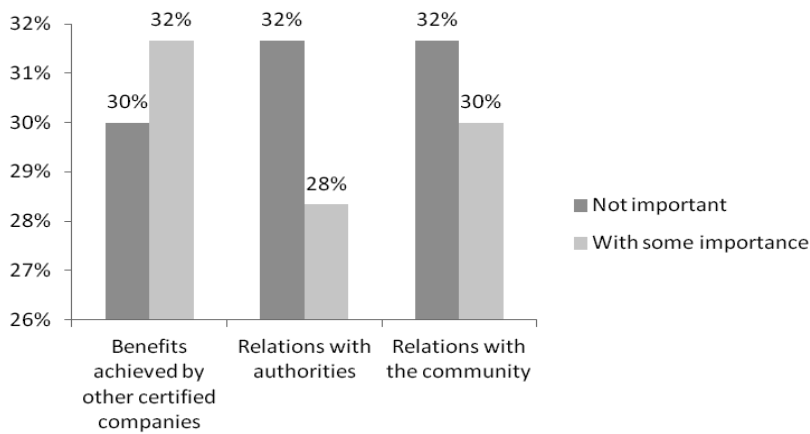


Fig. 2 – Others reasons to implement and certificate QMS (Oliveira, 2013).

The majority of firms in our sample found that the main benefits of certification translated into increased confidence in the firms' quality; improvement of the definition and standardization of work procedures and improvement of the firm's image (fig. 3).

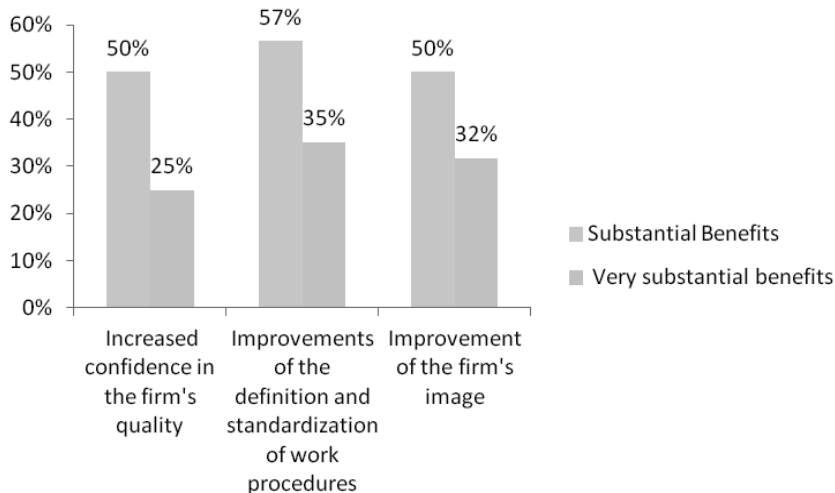


Fig. 3 – Main benefits of certification (Oliveira, 2013)

Maintenance/increase in net profit and improved relations with authorities and the community were identified as providing the least benefits to firms that underwent the certification process (see fig. 4).

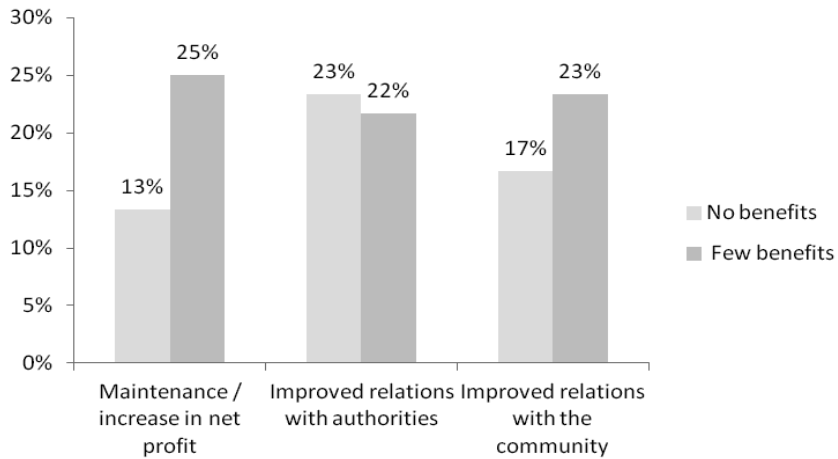


Fig. 4 – Other benefits of certification (Oliveira, 2013)

Most firms in our sample (85%) do not require much time (2 years or less) to implement a QMS according ISO 9001 and respective certification; only less than a quarter of the firms took less than one year (fig. 5).

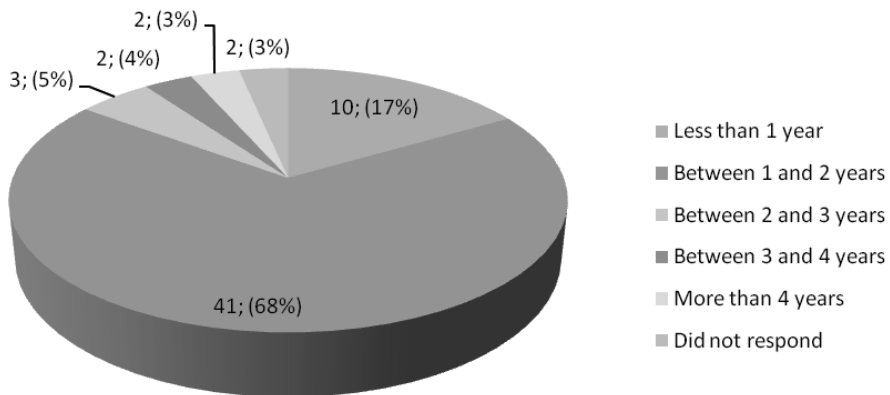


Fig. 5 - Length of time to implement the QMS according ISO 9001 and obtain certification (Oliveira, 2013)

One third of the firms in our sample agreed that competition is mainly by price and not by differentiation of product or service and that competition is extremely intense compared to other sectors (fig. 6).



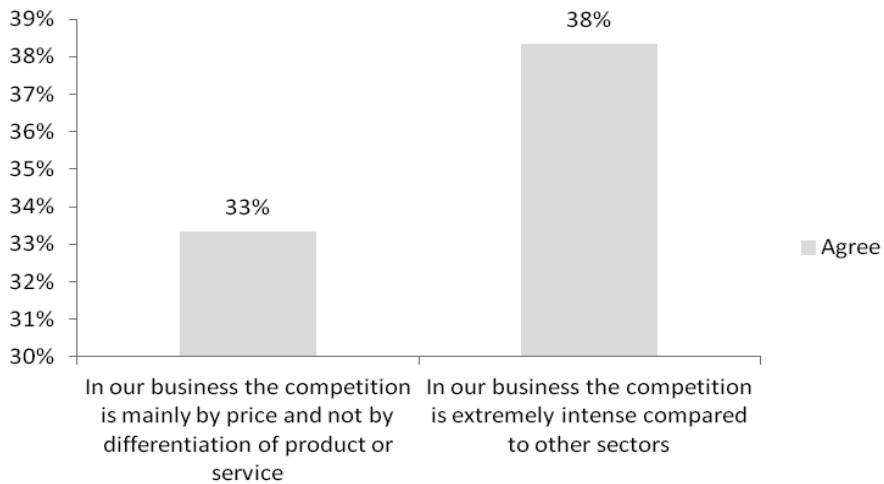


Fig. 6 – Competition – Agree (Oliveira, 2013)

Accordinging fig. 7, firms do not feel that the demand in their business has been growing rapidly over the last 3 years. In particular, 80% of firms do not believe that in the past 3 years their business has been more profitable than other activities. 85% of firms felt that the fact that their activity is still in early growth is an important factor for competition.

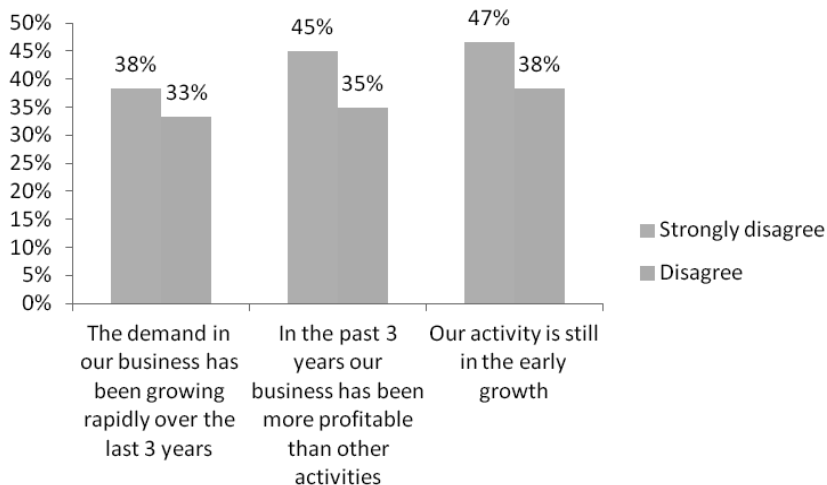


Fig. 7 – Competition – strongly disagree/disagree (Oliveira, 2013)

Most firms in our sample believe that quality improvement, business benefits, mobilizing employees' knowledge and business image were important or extremely important factors to implement quality system according ISO 9001 and achieve the certification (fig. 8). Benefits obtained by other certified firms, improved relations with authorities and the community were generally identified as unimportant reasons to implement the quality system by roughly one-third of the firms in our sample.

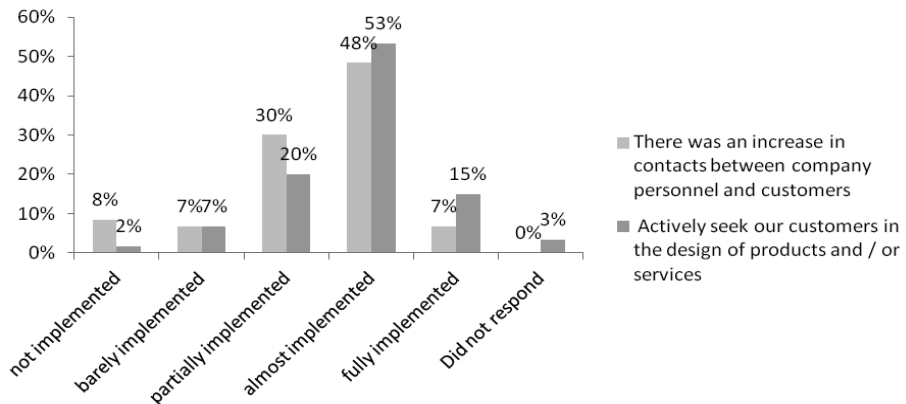


Fig. 8 - Implication for customers (Oliveira, 2013)

Close to half of the firms have not implemented the internal program of competitive benchmarking, while approximately a quarter of the firms have partially implemented it and about half a quarter as barely implemented it (fig. 9).

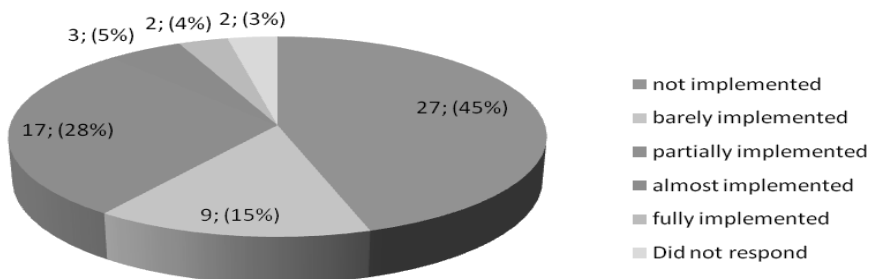


Fig. 9 - Benchmarking (Oliveira, 2013)

We found that 40% of the firms had partially implemented a very active system of employee suggestions and half of the firms increased the autonomy of employees to make decisions (fig. 10). The majority of firms (81%) increased the

employee involvement in planning and design tasks. This is a very important subject.

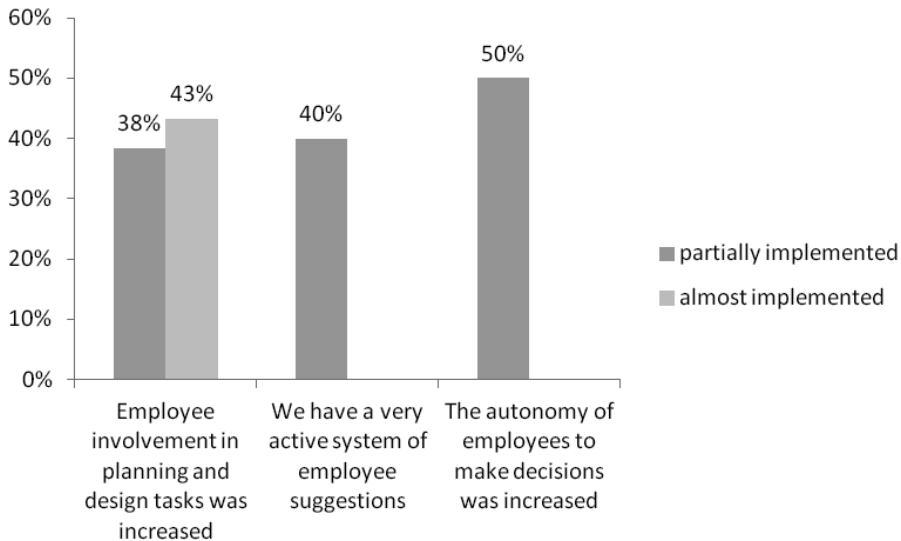


Fig. 10 – Empowerment (Oliveira, 2013)

The majority of firms (64%) have a commitment to a goal of zero defects (Fig. 11). About three quarters of the firms (73%) have a program of continuous reduction of defects and failures partially and almost implemented. 65% of the firms have a plan partially and almost implemented to dramatically reduce the reprocessing.

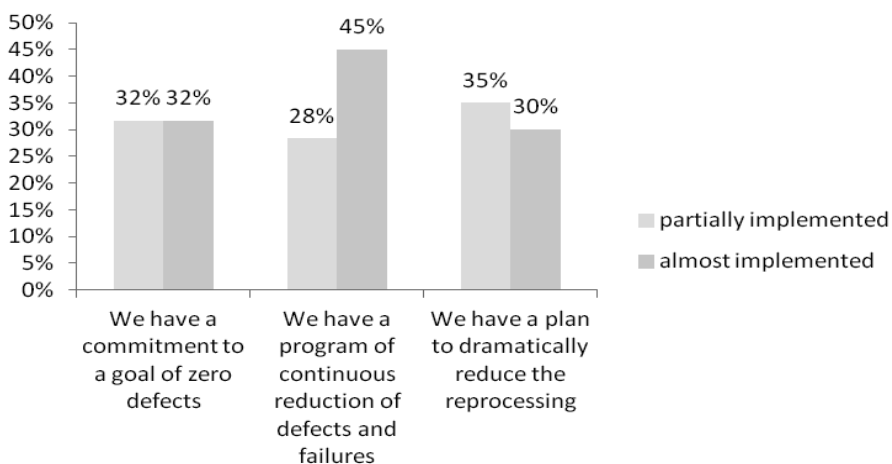


Fig. 11 - Zero defects mentality (Oliveira, 2013)

Almost half of the firms agreed that the quality program has contributed dramatically to improve their competitive position and the quality program has contributed significantly to the improvement of their overall performance and about one third neither agreed nor disagreed (fig. 12).

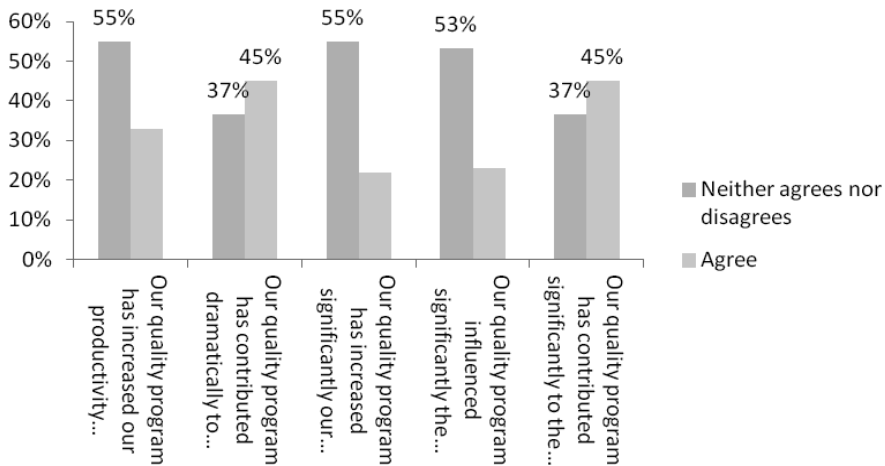


Fig. 12 - Incoming of the QMS, regarding the way Quality program has impacted and influenced the results of the firm (Oliveira, 2013).

Half of the firms neither agree nor disagree that the quality program has increased their productivity significantly, their profitability and has influenced significantly the enhancement of their sales.

The vast majority of the firms in our sample (87%) did not feel that they were better off without the quality program in terms of improving the firm's results (fig. 13).

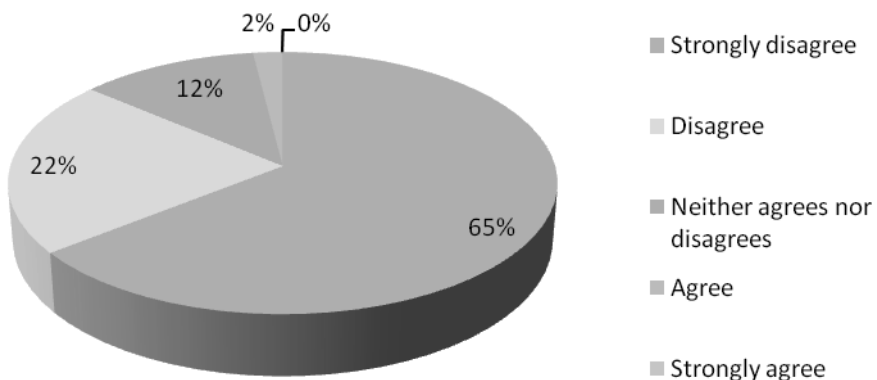


Fig. 13 - Firms did not feel that they were better off without the quality program in terms of improving the firm's results (Oliveira, 2013).

Finally, we asked that all firms to provide the main reasons why they undertook TQM measures. In particular, we asked each one to divide 100 points among 24 attributes based on their importance. With this information, we constructed Table 2, which includes the attributes which received the highest rankings. The majority of the firms in our sample undertake TQM measures for quality purposes to meet customer expectations and prevent errors (Table 2). Cost reductions, inspection/detection of errors, quick and appropriate response to customer complaints and improvement of current levels of performance were also identified as important factors to undertake TQM measures (Table 2). Obtaining customer preferences in advance and compensation customers beyond what they expected were identified as the least important factors (Table 2).

**Table 2 – Culture (Oliveira, 2013)**

	Attributes
1	Meet customer expectations
2	Prevent errors
3	Reduce costs by failures / malfunctions / waste
4	Inspect and detect errors
5	Respond quickly and appropriately to customer complaints
6	Improve current levels of performance
7	Projecting correctly from the beginning
8	Surprise and delight the customer
9	To focus on the management of suppliers and customers as well as in processes
10	Reduce customer dissatisfaction
11	To focus on “process” and the causes of errors
12	Anticipate customer expectations
13	Correct errors
14	To focus on Client’s “needs”
15	Zero defects
16	To focus on “production” (products)
17	Helping customers in order to avoid future problems
18	Avoid inconvenience to customers
19	Create new alternatives of doing things
20	To focus on Customer’s “preferences”
21	“Create” customer preferences
22	Review up on things well done
23	Obtain customer preferences in advance and follow them
24	Compensate customers beyond what they expected

### 3.2 Results from Interviews

In the textile industry, the main reason for clients to seek other markets was price. In countries like Bangladesh, China, India and Vietnam, clients find that the prices to produce garments are lower as are the raw materials. On the other hand, these countries manage practice low prices because they are not concerned with environmental and social demands and so it can make them, incorrectly, more competitive. Another case is the salary paid to workers. Chinese can produce at a lower price, also, because salaries are much lower than Portuguese salaries are. According to Shapiro (2008), *"the International Labor Organization and the Bureau of Labor Statistics of the USA, reported that an average worker in the manufacturing sector earns \$ 23.65 (US dollars) per hour in the USA, 24.63 dollars in France, and \$ 21.76 in Japan. It is compared with the \$ 6.38 in Taiwan, \$ 13.56 in South Korea and \$ 2.63 in Mexico"*. On the other hand, also in accordance with Shapiro (2008), *"the manufacturing industry workers earn about 20 cents of the U.S. dollar per hour in China and 40 cents of the U.S. dollar per hour in India. Chinese and Indian workers employed in modern installations built by foreign firms earn more - like in Korea, Mexico and Thailand"* (Shapiro, 2008). In Portugal the average worker in manufacturing industry earns about \$ 7 per hour (in the textile industry is less). As such, for example the gains of French companies that move their production to Portugal may be about 351 %, but if he moves to China will be 12 315%. It is certain that the firms will have to pay the travel, but profits are still astronomical. Also according to Shapiro (2008) *"large differences in costs of labor in China and India, as compared with Taiwan and Mexico are the main reason that justifies that China, every year, claim hundreds of thousands of jobs to other developing countries"*.

We can ask: under what conditions Chinese workers work and how many hours a day? This is the new competition or new slavery in the XXI century? Under what conditions worked those people, when on 24 April 2013, in Rana Plaza, an eight-story commercial building, collapsed in Savar, a sub-district in the Greater Dhaka Area, the capital of Bangladesh? And trademarks that occupy much of the production done in China and Bangladesh, what they say about working conditions? Or just interested in profit, even at the cost of lives and slavery?

On other hand, Portuguese firms respect all trademarks of clients and products while Chinese devalue it. There is a massive and thriving black market in counterfeit designer apparel and accessories in countries such as China. Due to this China may practice low costs but also have more losses. As their garments do not have quality, clients return to their initial suppliers. Portuguese firms may have relocated their production to be cheaper but still fulfill all properties.

As prices in Portugal are higher, clients demand many quality tests in order to compensate the money that they paid. Some reasons that make clients come back to Portuguese textile firms are quality, punctuality, and creativity, when it comes to giving solutions and suggesting interesting new products.

The majority of the clients that once left Portugal did not come back. The few who came back were because the experience they had with other countries did not come out as they wished and the product was not as they were expecting too.

But the fact that the clients came back it does not necessarily mean that it is good because their return rouse less stability, less loyalty, many demands in order to achieve the desired price. The ones that are still in Portugal were the ones that never left our country. The clients are here but the orders are fewer amounts and the types of garments too. They still continue in Portugal because they know that Portuguese firms accept all types of orders when it concerns quantities. Orders with less quantities lead to higher costs with the management of processes, more errors and more technical human resources. Some new clients come to Portugal to visit Portuguese firms, to see how they work, what are their prices, their quality and to study their market.

Quality is very important because if Portugal did not bet on quality, the clients would never return. The lack of quality leads to the decrease of sales. That is one of the factors that make clients of Portuguese firms see that their product has quality and the sales are good because of that. During the time that the clients look for new markets, Portuguese firms took advantage of improving and optimizing their resources.

The clients are returning but as all know, the big orders are not coming back. Portuguese firms have to adapt and have a versatile structure to be prepared to receive them and to guarantee that their helpdesk is improved. "Made in Portugal" is a guarantee of quality unlike the image of the past. In order to survive the crises, the satisfaction of the final client is very important. Portuguese firms need to study very well all markets, need to know which products that the clients are looking for, need to be creative when it comes to the design of the garments, bet on innovation, be concerned with the product's image and its versatility. If Portuguese firms take into account these factors, their space will guarantee. Without quality and without punctuality, clients seek for better conditions in other countries.

Many firms in Portugal work for clients that represent very well known brands and quality is very important to assure that it creates more value, more margins, so that it justifies their stay. The work places are very important in a firm because they are responsible for quality. If they do not work properly, quality will not exist and neither will their work place. More and more, workers know it is like that. Workers have training in order to sensitize them with this issue; they receive information and are taught to deal correctly with the client's complaints, customer service, which are the firm's main goals and why the client is so important.

Clients like the loyalty felt by Portuguese firms because they like to create roots, feel well with the ones they work with and feel that it is not only because of the money. A very important aspect that happens in Portugal and does not happen with the majority of the countries is that Portuguese firms trust the clients based on the prestige and feedback collected initially and payments are made 30 to 60 days after the order is delivered. This does not happen in the other countries.

They have to pay as they place the order.

Quality is an important tool that if it is used properly, it is a great weapon that Portuguese firms can use in their defense. The QMS well implemented is an instrument that can manage everything in a firm (human resources, behaviours ...), involving everybody with the firm, with the client and with the society. Workers are an important link in the firm's performance and if all perform their functions properly, this will be reflected throughout the firm.

#### **4. Discussion**

We undertook this analysis to evaluate the impact of quality on textile firms' survival in the Minho region in northern Portugal. This region was chosen because the majority of the Portuguese textile industry is located there. Most firms in our sample felt that quality improvement, business benefits, mobilizing employees' knowledge and business image were important factors in implementing quality-related measures. Furthermore, we found that competition is very intense and is mainly driven by price and not by product/service differentiation. The majority of firms undertook TQM measures to meet customer expectations and prevent errors. This is a general concern in, among all countries. We can state that Portuguese textile businessmen have a similar approach to those in the UK described by Middleton, (2004). This approach is also shared by Spanish businessmen (De Cerio, 2003). They consider quality to be an important tool to survive in textile market. However, they also believe that it is important to closely follow the market to increase their competitiveness. Despite this concern with quality, some UK firms have reduced their manufacturing capacity and transferred it to countries that offer cheaper labour, such as Eastern Europe, Africa and Asia. With lower costs, firms' profit margins will increase many thousands percent. Quality is very important because the lack of it would lead the clients of Portuguese firms never return to them. The lack of quality leads to the decrease of sales. It is very important to assure that it creates more value, more margins, so that it justifies their stay.

Although quality is the one of the most important aspects of the production process, there are other factors that clients consider important, such as, competitive prices, delivering orders on time, creativity, customer loyalty, and more recently, the environment, working conditions and social responsibility.

##### **4.1. Strengths**

Our study focused on the Minho region where the majority of the Portuguese textile industrial is located. Thus, results of this study will help provide some insight on the current situation of the textile sector in Portugal.



## 4.2. Limitations

One of the limitations is that we only focused on the Minho region and therefore our findings may not be applicable to the whole of Portugal. For example, there are a considerable number of textile firms in the Covilhã region. We did not know specifically where each firm was located (for example, if they are from the north or south of the Minho region) and therefore the type of produced garments may be different. Another limitation was the delayed response of some firms; this led to a longer data collection process. The size of the firms was another limitation as the results may have been influenced by this factor.

## 5. Conclusion

The textile industry in Portugal is going through many changes, which have a direct impact on a firm's level of competitiveness. We found that the quality plays an important role in a firm's survival. The results of our study suggest that the majority of the firms in our sample undertake TQM measures for quality purposes, to meet customer expectations and to prevent errors. Most firms chose to implement QMS because they felt that quality improvement, business benefits, mobilizing employees' knowledge and business image were important to increase competitiveness. They found that the main benefits of certification translated into increased confidence in the firms' quality; improvement of the definition and standardization of work procedures and improvement of the firm's image. Moreover, the majority of the firms stated that the implementation of quality programs led to higher profits and an improvement in the quality of their output. Overall, the implantation of a quality program has improved their competitive position and their overall performance.

It can be concluded that Portuguese firms in Minho share similar views regarding quality-related interventions and its importance within the Portuguese textile sector. Findings of our study can help shed light on the current situation of the Portuguese textile sector and how the implementation of quality-related measures can impact the textile industry in other regions in Portugal.

## References

- Arauz, R. & Suzuki, H. (2004). ISO 9000 Performance in Japanese Industries. Total Quality Management & Business Excellence. Vol. 15, No 1;
- Bergvall-Forsberg, J., Towers, N. (2007). Creating agile supply networks in the fashion industry: A pilot study of the European textile and clothing industry. The Journal of The Textile Institute Vol. 98 No. 4 pp. 377-385
- Costa, J., 2008. Sistemas de Gestión de la Calidad en las Empresas Portuguesas:

- Implantación, Impacto y Rendimiento. Doctoral Thesis, University of Seville, Spain;
- Dadashian F., Monfared M.A.S., Nasrabadi, H.G. (2009). Design of a new quality assessment system for textile products. *The Journal of The Textile Institute* Vol. 100, No. 7, 640–648
- Dahlgaard-Park, S. M., Chen, C.-K., Jang, J.-Y. & Dahlgaard, J. J. (2013). Diagnosing and prognosticating the quality movement – a review on the 25 years quality literature (1987–2011). *Total Quality Management & Business Excellence*, Vol.24, No1-2, 1-18;
- De Cerio, J. M.-D. (2003). Factors relating to the adoption of quality management practices: An analysis for Spanish manufacturing firms. *Total Quality Management & Business Excellence*, Vol 14, No 1, 25-44;
- Dereli, T., Durmuşoğlu, A., Delibaş, D. & Avlanmaz, N. (2011). An analysis of the papers published in *Total Quality Management & Business Excellence* from 1995 through 2008. *Total Quality Management & Business Excellence*. Vol 22, No 3, 373-386;
- Frederick, S., and Cassill, N. (2009). Industry clusters and global value chains: analytical frameworks to study the new world of textiles. *The Journal of The Textile Institute* .Vol. 100, No. 8, 668–681;
- Lambert, G. & Ouedraogo, N. (2008). Empirical investigation of ISO 9001 quality management systems' impact on organizational learning and process performances, *Total Quality Management & Business Excellence*. Vol 19, No 10, 1071-1085;
- Middleton, D. (2004). The Business Process Revolution in UK Textile Manufacturing. *Journal of The Textile Institute*, Vol.95, No 1-6, 1-7
- Oliveira, S. (2013). The importance of quality in the consolidation of textile firms in Minho. Master Thesis. Polytechnic Institute Cavado Ave, Barcelos, Portugal.
- Pina, J. A. T. & Sellés, S. M. E. (2008). Management and Measurement of quality in ISO 9000 organisations: An empirical study in Spain. *Total Quality Management & Business Excellence*. Vol 19, No 5, 481-492;
- Powell, N. B., Cassill, N. L. (2006) New textile product development: Processes, practices, and products. *The Journal of The Textile Institute*. Vol. 97 No. 2, 155–166;
- Rebelo, M.; Santos, G.; & Silva, R. (2013). Conception of a flexible integrator and lean model for integrated management systems. *Total Quality Management & Business Excellence*, DOI: 10.1080/14783363.2013.835616;
- Santos G., Costa B., Leal A. (2012). The estimation of the return on firms' investments – as to ISO 9001. *International Journal of Engineering, Science and Technology*, Vol. 4, No. 2, 2012, pp. 46-57.
- Shapiro, R. J. (2008). Futurecaste. Portuguese version. Actual editora, Lisbon.
- Sousa, C. M. T. (2009). Valorização energética de resíduos industriais têxteis e poliméricos. Universidade do Minho.
- Towers, N., McLoughlin J. (2005). Effective Total Quality Management in the textile

fashion retail supply chain: A pilot survey of the UK textile manufacturers. The Journal of The Textile Institute Vol. 96 No. 2 pp. 87-92;  
Vasconcelos, E. (2006). Análise da Indústria têxtil e do Vestuário. Consultoria empresarial, Lda. (Spinoff académico, Universidade do Minho).  
Visão Magazine, January 2012;