

Total Quality Management implementation in Greek businesses: Comparative assessment 2009-2013

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Abstract: The competition in the Greek manufacturing sector has become very intense and the need for businesses to survive, under these very difficult conditions, forces them to find new ways to increase their profits, but also to attract new customers and to retain old. A necessary condition for long-term business survival is to maintain a high product quality level. The implementation of Total Quality Management (TQM) approach is a key factor to achieve this goal. The main objective of this research is to identify the current situation as far as the implementation of TQM by Greek manufacturing firms, and finally to compare the results between the current research and the previous research of 2009 (Vranaki *et al.*, 2010). The research model that has been developed incorporates nine factors which are found in literature to influence Total Quality Management. A structured questionnaire has been developed and distributed to executives of 61 companies. Descriptive statistics as well as Structure Equation Modeling (SEM) techniques were used to analyze the data.

Key words: Quality, Total Quality Management, Business Performance, Management Leadership, Supplier Management, Customer Focus.

1. Introduction

In the first decades after the Second World War, the competitiveness of products and services in international trade was defined by two related features, quality and production cost. A more recent important dimension of competitiveness is the ability to develop innovations in products and production processes. The ability to develop innovations frequently combined with quality and productivity, determine the time our chances to survive a business in a complex and uncertain environment in a context of rapid globalization, technological developments.

Moreover, development in recent decades led many companies to consider the quality as the basic and most effective condition for success. This explains the ease of penetration in foreign countries many products in Japan and Germany, software packages and various technical and financial services in the U.S., and their example followed by South Korea,

Singapore, Taiwan etc. . What ultimately establish and differentiate the products of the countries is the high quality that offer the purchaser in relation to their cost, in other words a great value compared to cost to the customer.

2. Literature Review

In recent years, increasing attention has been paid to improving the overall quality. Many companies have taken initiatives to implement various techniques of quality management. An important strategy for achieving high quality is TQM (Total Quality Management). The Total Quality Management (TQM) was defined as a management system to improve efficiency within a business to maximize customer satisfaction, conduct continuous improvements and great support to the involvement of employees.

2.1. Factors that affect operational results

Improving business results through quality, assumes that many factors are quite important for enterprises. A comprehensive review and a classification of the relevant empirical literature revealed that, in general, the nine factors discussed below were the most important parameters in the application of TQM.

2.2. Leadership

As documented by various researchers (Deming, 1986; Juran, 1986), the administrative leadership is an important factor in the implementation of TQM because it improves performance by influencing other practices of TQM (Anderson *et al.*, 1995; Flynn *et al.*, 1995; Ahire and O'Shaughnessy, 1998; Wilson and Collier, 2000). The successful implementation of TQM requires effective change in the culture of a company. It is almost impossible to have changes in a company without any a concentrated effort by the administration, which aims at a continuous improvement in an open communication and cooperation throughout the enterprise (Bell and Burnham, 1989; Etkin *et al.*, 1990; Goodstein and Burke, 1991; Handfield and Ghosh, 1994; Choi, 1995; Hamlin *et al.*, 1997; Zeitz *et al.*, 1997; Daft, 1998; Abraham *et al.*, 1999; Adebajo and Kehoe, 1999; Ho *et al.*, 1999).

2.3. Human resource management

The administration has a complex role in the implementation of TQM. It is impossible to improve the procedures of any business without a well-trained workforce. The management of human resources, previously known as personnel management, has been upgraded to the science that studies the staff not as a factor that causes costs, but as an asset in which each company must invest. The administration should provide the necessary resources for the training of staff in the use of new concepts and tools and creates a work environment that encourages employee participation in the process of change (Bell and Burnham, 1989; Schroeder *et al.*, 1989; Burack *et al.*, 1994; Anderson *et al.*, 1995; Flynn *et al.*, 1995; Hamlin *et al.*, 1997; Ahire and O'Shaughnessy, 1998; Daft, 1998; Handfield *et al.*, 1998; Ho *et al.*, 1999; Wilson and Collier, 2000). Top management should also ensure that the necessary resources for the relevant quality training is available (Ahire and O'Shaughnessy, 1998; Anderson *et al.*, 1995; Flynn *et al.*, 1995; Handfield *et al.*, 1998; Ho *et al.*, 1999). It takes more than education to be effective and successful change. Employees should be involved

at this stage. A crucial factor in accordance with the Adebajo and Kehoe (1999), is that the participation of workers, because affected by the creation of a new working environment that encourages and facilitates open communication. In such an environment, it is possible for workers to commit themselves to work and contribute their ideas in that it facilitates and enhances the process of change (Burack *et al.*, 1994; Anderson *et al.*, 1995; Flynn *et al.*, 1995; Das *et al.*, 2000).

2.4. Information and data analysis

The information and analysis of data related to quality, including the unnecessary actions of a "poor" quality, such as repetitive labor costs, waste and control charts to identify quality problems and provide information on the areas of potential improvement (Choi, 1995; Lockamy, 1998; Ho *et al.*, 1999). The data relating to quality have a positive effect on firm performance through three business practices of TQM. Specifically, through the quality management of suppliers, to design new products / services and through management processes.

2.5. Supplier management

Since all businesses (especially large) have their suppliers from whom they buy either materials or products, the quality that they provide them is able to affect the overall quality of the finished products. So the complete identification of products needed by their suppliers a company is a hub avoiding production of defective products and, therefore, increase business performance. The quality management of suppliers requires regular monitoring of suppliers by creating a database that measures this performance, a critical tool for improving material and raw materials costs required to develop, market prices and responsiveness of suppliers (Krause *et al.*, 1998). With this database, companies can pursue qualitative measures such defective parts-per-million (parts-per-million defective), the reliability and the rate of discarded products (Forza and Flippini, 1998; Krause *et al.*, 1998; Trent and Monczka, 1999), as well as timely delivery and performance in the percentage of acceptable incoming materials (Tan *et al.*, 1998).

2.6. Product design

Each product has specific characteristics. For the design of the process or production processes, products are categorized into groups depending on

their type, their production volume, complexity, and on the basis of characteristics of the contact point with these firm-customer. Regarding the model can distinguish the specific products that can be manufactured in many different styles, standard products and products of mass production (Adamidis, 2002). Under the IGI, efforts design new products have two objectives: planning the construction part of the products, and the design quality of the products (Flynn *et al.*, 1995; Handfield *et al.*, 1999).

Top management of a company is responsible for the design of products for the market and meet consumer needs (Deming, 1986; Garvin, 1987; Shetty, 1988; Flynn *et al.*, 1995). This focus is critical for the development of products, especially when they meet customer needs (Juran, 1981; Leonard and Sasser, 1982; Flynn *et al.*, 1995; Hackman and Wageman, 1995). To simplify the design of products, top management uses interoperable groups to reduce the number of parts that make up the product and standardize these parts (Chase *et al.*, 2001). By doing so achieves a more efficient management processes by reducing process complexity and differences between the procedures (Flynn *et al.*, 1995; Ahire and Dreyfus, 2000).

2.7. Process management

Another factor that affects the operational results through management procedures. Management processes in an enterprise implies a proactive method to improve the quality, such as the design of processes that provide stable production schedules and distribution work (Saraph *et al.*, 1989; Flynn *et al.*, 1995) to reduce the complexity of processes (Flynn *et al.*, 1995) with the build quality of the product during the production phase (Handfield *et al.*, 1999). Reducing the complexity of the process increases the uniformity of production, while reducing duplication and defective (Anderson *et al.*, 1994; Forza and Flippini, 1998) because the quality problems are identified and corrected immediately (Ahire and Dreyfus, 2000). The process used to produce a product directly affects the quality. The market, for example, a machine that will facilitate the production and thus improve the quality of a solution where the money will be invested in the market will be amortized from the best production, the easiest and best price sale.

2.8. Customer focus

One element of TQM is the focus on customers. The establishment and maintenance of an open

relationship between the firm and its clients facilitate the design of new products. This is achieved because there is immediate clarification of needs and wants of customers. The key to nurturing strong relationships with customers is to establish communication between the firm and its clients (Tillery, 1985). These practices include frequent contact with customers. The Wright and Snell (2002) argue that simply focus and customer acquisition is not always good for business. Since customers can easily be lost in case they have a bad experience with the product or even if a new product does not attract them. Businesses should target customer trust to have improved operational results.

2.9. Strategic Planning

Strategic planning is the process of development and analysis of the mission and the vision, objectives, strategies and defining the sources of business. Strategic planning has a long time horizon, considering the external environment and determines the general direction of the business. This programming will be made by the highest levels of administration (Jackson and Ferguson, 1952).

3. Proposed conceptual framework and research hypotheses

Through this research aims to study o Role of TQM in Greek businesses, and the comparison to the applications of the principles of TQM in the years 2009 and 2013. Research model is a synthesis of research findings from the literature. The opinions are varied and numerous, so an attempt was made to include as much as the model to be an integrated presentation that takes into account all factors affecting the IGI.

The 9 factors of TQM presented will serve as part of the model. All are interrelated and the proper functioning of one affects the proper functioning of the other. All are considered particularly important for an enterprise to improve its results, should take them seriously. Even the improvement of some of these factors will lead to greater earnings. Since the model will create some initial assumptions that depending on the findings of the investigation or will be verified or disproved. The research model is framed by an external agent is the economic crisis. The processing in our country now is now at breaking point. The economic crisis and the number of bureaucratic barriers that are in any healthy business initiative have created uncertainty and insecurity in the market.

Meanwhile, the business of the country, especially manufacturing companies based in the Greek region, seeking development measures that the state promised one part, and the other was obliged to take to remove disincentives to entrepreneurship and the establishment of structural economic reforms. Given the negative sentiment in the market, it is obvious that a new approach to the development effort, especially in the field of policies to improve the external business environment in Greece.

As shown in Figure 1 above, created the following assumptions:

- Hypothesis 1: The administrative leadership positively affects:
 - a) strategic planning,
 - b) customer focus,
 - c) the information and data analysis,
 - d) human resource management,
 - e) management procedures,
 - f) and supplier management.
- Hypothesis 2: The strategic planning positively affects:
 - a) customer focus, and
 - b) operational results.
- Hypothesis 3: The focus of customer positively affects business results.
- Hypothesis 4: The information and data analysis positively affects:
 - a) strategic planning,
 - b) customer focus,
 - c) the design of products,
 - d) human resource management,
 - e) management procedures,
 - f) managing suppliers.
- Hypothesis 5: The management of human resources positively affects:
 - a) the management of suppliers,
 - b) customer focus, and
 - c) operational results.
- Hypothesis 6: The process management positively affects business results.
- Hypothesis 7: Managing suppliers is positive:
 - a) designing products, and
 - b) operational results.

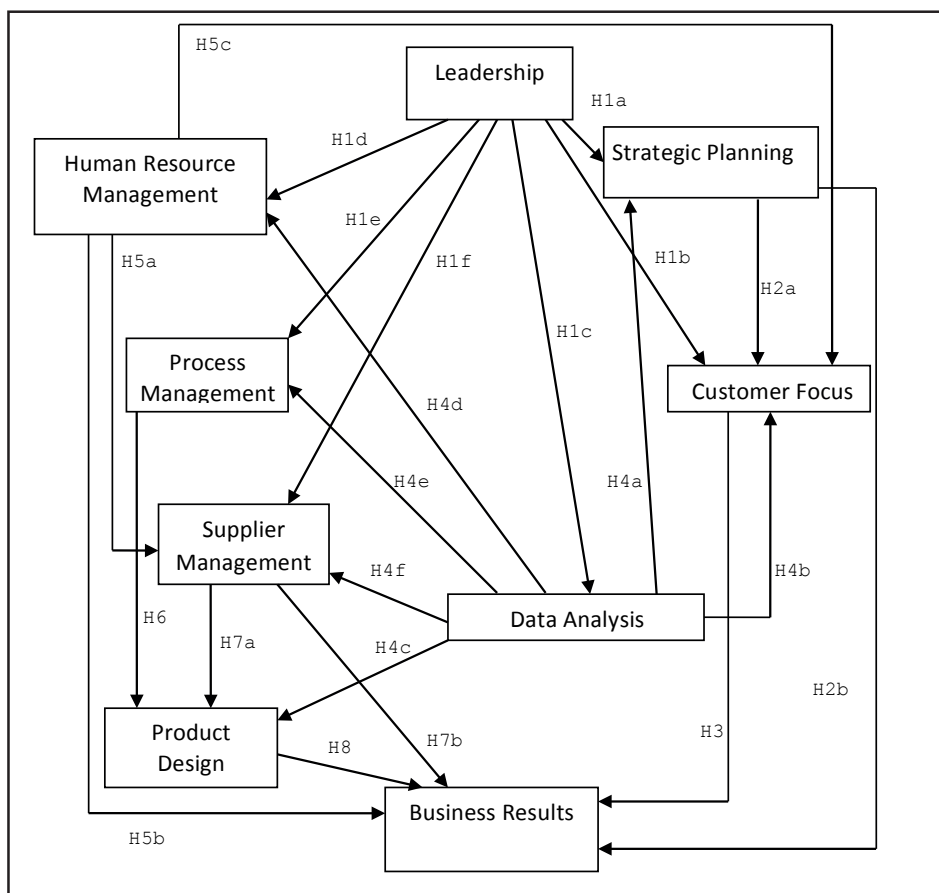


Figure 1. Proposed Conceptual Framework.

- Hypothesis 8: The product design positively affects management procedures.

4. Research Methodology

Field survey of the research are Greek companies that belong to the manufacturing sector of Greek economy, and employ more than 20 employees. The final sample consisted of 61 correctly completed questionnaires from the secondary sector. 67 of the 95 companies responded, returning 61 completed questionnaires. However, questionnaires six of them, were deemed unsuitable because responses completed poorly. Therefore 61 questionnaires (from 67 firms) were assessed as suitable for statistical analysis with a response rate of approximately 64.21% of the total population (95).

5. Exploratory Factor Analysis

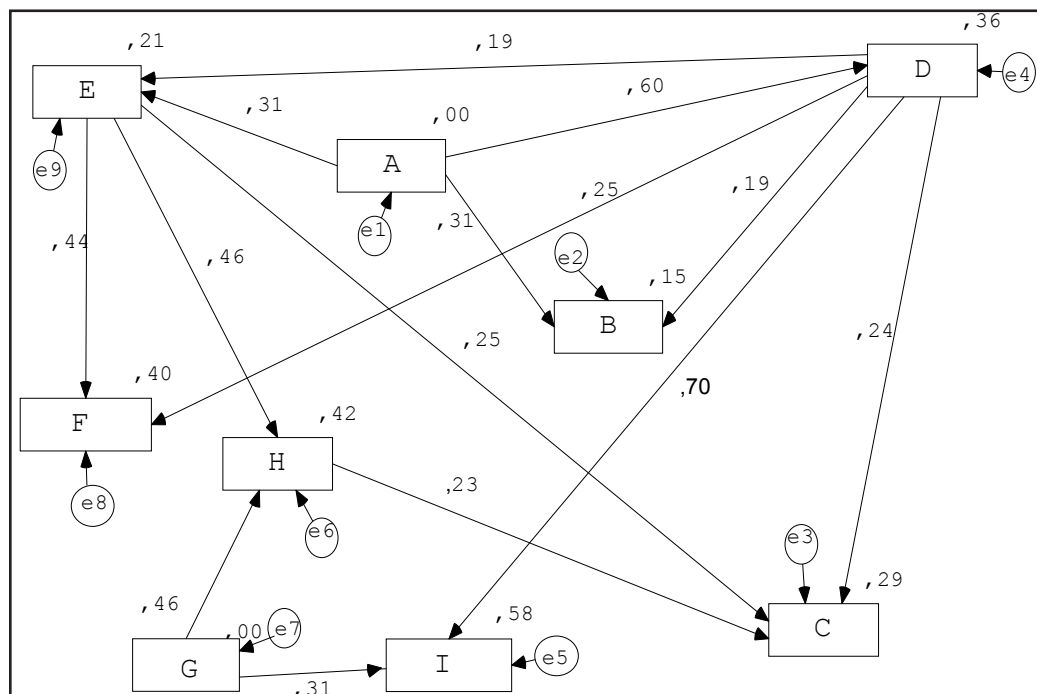
One measure of sample adequacy is the ratio of the Kaiser-Meyer-Olkin (KMO), and must take values greater than 0.5 (Malhotra, 1999). In this study, the KMO values are satisfactory and acceptable. An additional check of the correlations of our data is

testing sphericity of Bartlett (1950). Note that variables removed from the tables because of low loadings (see Appendix). The results of the checks carried out, allow to assert, that the deterministic variables are compact and reliable structures, able to contribute to the measurement of the agent to which they belong. To assess the goodness of fit of deterministic variables applied confirmatory Factor Analysis. Initially, took control of the overall model, and then testing the structural model.

In the model below, the encodings are as follows: A. Leadership, B. Strategic Planning, C. Customer Focus, D. Information & Data Analysis, E. Human Resource Management, F. Process Management, G. Supplier Management, H. Product Design, I. Business Results.

The overall model was estimated using four indicators. Acceptable values of the indicators are: CMIN/DF<3, GFI>0.9, CFI>0.9, RMR<0.05 (Smith & McMillan, 2001). The levels of these markers suitability is acceptable, so the model is valid.

In summary, it should be noted that at first glance, observed that the main core of the model is the administrative leadership and information and analysis. The first factor directly influences the



CMIN/DF	CFI	GFI	RMR
1,946	0,878	0,847	0,041

Figure 2. Fitness Model.

Table 1. Results of hypothesis testing.

Hypotheses	Investigated relationships	Regression	Result
1a	A → B	0.31***	Accepted
1b	A → C	-	Rejected
1c	A → D	0.60***	Accept
1d	A → E	0.21***	Accept
1e	A → F	-	Rejection
1f	A → G	-	Rejection
2a	B → C	-	Rejection
2b	B → I	-	Rejection
3	C → I	-	Rejection
4a	D → B	0.19***	Accept
4b	D → C	0.24***	Accept
4c	D → H	-	Rejection
4d	D → E	0.19***	Accept
4e	D → F	0.25***	Accept
4g	D → G	-	Rejection
5a	E → G	-	Rejection
5b	E → C	0.25***	Accept
5c	E → I	-	Rejection
6	F → I	-	Rejection
7a	G → H	0.46***	Accept
7b	H → I	0.31***	Accept
8	I → F	-	Rejection

***p<0.001 level, **p<0.05 level

strategic planning, the factor relating to information and data analysis and management of human resources, which verifies three of the initial assumptions. While indirectly affects the other actors and the operational results. The second factor is that the core is the information and data analysis, which directly-affected in human resource management, the operational results and customer focus.

6. Conclusions

The aim of this study was to analyze the factors affecting the IGI operating results, the impact of the economic crisis and to compare the results of this research with the corresponding 2009. Comparing the results of this research with the research conducted in 2009 (Vranaki *et al.*, 2010) resulted in the following conclusions:

1. To improve operational results, emphasis should be placed on all factors of TQM.
2. Focusing on customers is a key objective of Greek firms.
3. Changes in customer preferences significantly affect the management of suppliers.
4. Factor information is a “station” of administrative leadership.

The first and very impressive conclusion drawn from this research are the indirect effects that accept

business results, which verified in earlier research (Vranaki *et al.*, 2010). It was expected that these factors will directly affect business performance to some extent. The significance of this finding is the indirect influence of these factors on business outcomes. The interpretation of the above can be a very useful tool in the hands of Greek firms. More specifically, from the above we understand that companies need to pay attention to many parameters to achieve their purpose. It is not enough to be consumed in a particular agent and others to fail.

The focus of the customer no effect. Unlike the earlier survey where the customer focus impacted upon four factors, and this in turn is impacted upon the management of suppliers. Thus, we conclude that the customer satisfaction and knowledge on the requirements of customers is the second most important goal you want to achieve the Greek companies, but also that most businesses do not make changes in supplier management with the slightest change in customer needs. The administrative leadership does not act directly to target customers, but indirectly through other factors, in contrast to the 2009 survey. Administrations business to achieve its approach and establishment of good relations with clients through the collection of information, training workers but also through product design. At this point it should be noted that research verifies the Wright and Snell (2002), The who argue that simply focus and customer acquisition is not always good for business.

Since customers can easily be lost in case they have a bad experience with the product or even if a new product does not attract them. The Greek companies surveyed are showing great interest in customer retention. Besides, studies have shown that attracting new customers is much more expensive strategy than keeping existing customers (Kotler, 1982). The Greek firms, given the large and increasing competition are trying to focus on customer satisfaction rather than on improving operational results, but for obtaining “good reputation.”

The next conclusion we reached was that the administrative leadership through the management of human resources affects product design product design. In the 2009 survey design products in turn impacted upon on business outcomes. However, it is very encouraging that most companies place great emphasis on training their employees. Course, must be included with the necessary resources for the training of staff in total business expenses. On the other hand, when a company has fully trained staff on quality issues as avoiding possible mistakes and defective products and therefore achieves customer focus. It should be noted that the management of human resources including the health and safety of workers. As we can conclude, businesses protecting employees from any accidents aimed at improving their emoluments as well as to improve the image of the company. Furthermore, observed that the level of training of governing and management procedures, which is repeated from 2009. Process management involves reducing the complexity of the processes in the production stage. Officials, however, the companies to be able to respond to change a process must first have the proper training. In any other case,

the “change” in business processes will have no positive benefit to business results.

Vendors directly affect the design of new products. Any change in production processes or customer habits involves the review of suppliers. As mentioned above, the quality of raw materials of products is the basis for good quality of finished products.

Finally, reference should be made to study the economic crisis as an external factor. The economic crisis, according to the frequency analysis, seems to have the most negative effects on human resource management and management of suppliers. This was expected, considering the increase in the unemployment rate in the country the last two years, but also the need for companies to increasingly seeking “best prices” for their raw materials.

6.1. Research limitations

Observing the results of the investigation, it is useful also to refer to some restrictions. The survey was conducted with a sample of 61 Greek and craft industries in the manufacturing sector. A larger sample would likely give different results.

All companies operate in manufacturing sector, but 45 of the 61 belong to the food industry, so they subject to each agent from a different perspective, than if it were operating in different manufacturing activity.

Questions contain elements of subjectivity. Thus, some of the respondents may be overestimated to a question by scoring 1 in Likert scale that can be “worth” 2 or underestimated some grading at 7 in the Likert scale that can ‘deserved’ 6.

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Appendix 1. Check the one-dimensional nature and reliability

Factors	Variables	Loading	KMO	TVE	Bartlett's Sig	Cronbach alpha
Leadership	Aa1	0,745	0,750	60,386	0,00	0,675
	Aa2	0,710				
	Aa3	0,690				
	Aa4	0,668				
	Ab1	0,710				
	Ab2	0,750				
Strategic Planning	B2	0,730	0,584	67,025	0,00	0,747
	B3	0,907				
	B4	0,809				
Customer focus	C1	0,671	0,625	52,623	0,00	0,596
	C3	0,522				
	C4	0,814				
	C5	0,692				
Information and data analysis	Da1	0,677	0,748	62,575	0,00	0,705
	Da2	0,792				
	Db2	0,877				
	Db3	0,856				
	Db4	0,850				
Human resource management	Db5	0,614	0,685	51,647	0,00	0,658
	E1	0,734				
	E2	0,810				
	E3	0,727				
Process management	E4	0,513	0,611	51,514	0,00	0,525
	F1	0,674				
	F2	0,746				
Supplier management	F3	0,731	0,801	52,070	0,00	0,674
	G1	0,702				
	G3a	0,650				
Product design	G3b	0,673	0,664	50,846	0,00	0,664
	H1	0,780				
	H2	0,710				
	H3	0,752				
Business results	H4	0,561	0,704	56,941	0,00	0,704
	I1	0,826				
	I2	0,776				
	I3	0,540				
	I4	0,667				
	I5	0,652				