

THE THREE-DIMENSIONAL APPROACH  
OF TOTAL QUALITY MANAGEMENT,  
AN ESSENTIAL STRATEGIC OPTION FOR BUSINESS EXCELLENCE

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### Abstract

In a complex and dynamic business environment, managers widely appeal to modern methods and techniques that would help them cope with the competition and offer their customers new, attractive, good quality products and services and at competitive prices. In this context, total quality management is a viable and sustainable option that can systematically contribute to the consolidation of the capacity of organizations.

The aim of this paper was to put forth a three-dimensional approach of total quality management and provide some concrete action ways through which organizations in Romania that implement total or partial quality management integrated systems would produce significant competitive advantages.

The main research methods used were: the questionnaire, document analysis, applications offered by Word and Excel and the Statistical Package for Social Sciences, one of the most complete software packages with which we calculated means and standard deviations and determined and analysed correlations between variables and various quality parameters.

In this research, have been identified the main key success factors, the vulnerabilities and weaknesses of the systems, their causes and the necessary changes through which the three-dimensional approach of total quality management could become a preferred strategic option with a major positive impact upon business excellence.

The most important results obtained are a three-dimensional approach of the Total Quality Management and a substantial number of certain proposals for the Romanian firms in order to achieve business excellence.

**Keywords:** total quality management, business excellence, quality, customer, competitiveness, standards, three-dimensional approach

**JEL Classification:** L15; M11

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## **Introduction**

Globalization has significantly influenced the behaviour of the companies on the market and the profile of goods and services consumers (Zeithaml, Rust and Lemon, 2001). Most customers have increasingly higher demands regarding the quality and prices of goods and services (Kantardjieva, 2015; Leonard, 2015; Schor, 2016).

Recent studies (Dixon, 2016; Svizzero, and Tisdell, 2016) have shown that 80% of the consumers of products and services on international markets consider quality to be at least as important as the price when making the decision to purchase (Pellettiera, 2015; Pollifroni, 2014).

As the strategic management system and competitive advantage are based on quality, every member of the organization should have a clear picture of the definition and measurement of quality (Nica, Manole and Potcovaru, 2016), depending on their position and the work they perform (Morselli, 2015).

The intensified competition under the globalization (Androniceanu and Drăgulănescu, 2012) determined most high performing companies to develop new quality management integrated systems based on information and communication technologies that consistently generate business excellence (Foster, 2015). This explains the fact that the managers of the successful companies are constantly preoccupied with developing comprehensive strategies based on total quality management (TQM).

This paper is based on recent research on TQM developed by various authors (Akyuz, 2015; Psomas, 2016), but is different through the contribution to the knowledge development and the applied research carried out on a representative and selective sample of Romanian organizations.

The scope of the research has two dimensions, one is theoretical and the other is practical. From the theoretical perspective, I aimed to offer a new three-dimensional approach of TQM. From practical perspective, I was focused on discovering the main features of TQM that are implemented in the Romanian organizations and the possible main ways in which the three-dimensional approach can be implemented in order to achieve business excellence.

The research methods used were: the questionnaire, Excel and SPSS, with the help of which the creation of the database was possible, the results were analyzed, the research hypotheses were checked and the research objectives, presented in the second section of the paper, were achieved.

Competition increase at national and international level, companies' strategy orientation towards quality, perceived as a major competitive advantage, goods and services consumers' increased exigency for quality are only a few reasons that determined me to undertake research on this topic in Romania and to present in this paper interesting and relevant aspects regarding total quality management as an essential strategic option that generates business excellence.

## 1. State of art regarding quality and total quality management

Quality has gained increased importance and is more and more distinguished as a determinant factor of competitiveness. Whereas today it is easy to compare prices, it is more difficult to compare quality levels. According to the standards ISO 9001 in 2015, "The quality is a set of properties and features that give the product or service the property to meet specific needs" (Romanian Society for Quality Assurance, 2016).

In Europe, there was established the European Foundation for Quality Management, which approaches quality based on a widely recognized model called EFQM Excellence Model. This model is implemented in more than 30,000 companies in Europe with very good economic results. The model explains best how quality can contribute to development and business excellence. An interesting study on this subject was drawn up by a group of Romanian specialists, who managed to provide a relevant picture on how the total quality excellence model is implemented in companies in Romania. (Olaru, et al., 2010). Often, quality is defined or perceived differently in the same company, depending on the stage of the life cycle of a product (Hackman and Wageman, 1995).

In the literature, there can be identified some of the most important and relevant views on quality and quality management, whose main founders were: Shewhart, Deming, Juran, Crosby, and the Japanese: Ishikawa, Taguchi, Massaki Imai.

It is well known the case of the Bell System Company from Western Electric, where the great American physicist Walter Andrew Shewhart, employed by this company, designed and implemented a system of quality statistical control for the production of phones aimed at "zero defects". In his famous book "Economic Control of Quality of Product Manufacturing", Shewhart (1931) explained the concept of quality control, which was later taken up and developed by Juran, Deming, Feigenbaum and Crosby.

According to J. M. Juran, an American expert of Romanian origin, quality means "suitable for use" (Juran and Gryn, 1973). He also defines quality as "the property of a product to be suitable for consumption in terms of design, conformity to the specifications, reliability, market availability and scope of use". Juran expressed his approach to quality management as "The Quality Trilogy", considering that quality management involves three managerial processes: quality planning; quality control; quality improvement.

Armand Feigenbaum had an outstanding contribution to the development of the concept of quality and to its implementation in organizations from the United States of America. He argued that it was more efficient *to follow and ensure quality throughout the manufacturing process* than to control quality at the end of this process (Ionescu, 2016).

Philip Crosby successfully promoted his ideas through the book "*Quality is free*". According to Crosby (1979), quality is "the conformity to the requirements". He argues that poor quality costs approximately 20% of the revenues of an average company, costs that can largely be avoided by improving quality.

Edwards Deming (1986) explained that "good quality means a predictable degree of uniformity and durability, with quality appropriate for the market". Deming brought a new perspective on the concept of quality, that of *predictability* in relation to the market. Deming is the first specialist who focuses on *the human resources* that contribute to obtaining quality products, repeatedly stating that it is people who design and manufacture quality products. Therefore, he said, they must be motivated and encouraged to understand and correctly exercise their role in relation to the quality.

In Japan, the idea of total quality control was materialized by Kaoru Ishikawa (1985), who supported "quality control throughout the company." Kaoru Ishikawa is the one who proposed for the first time voluntary organization of employees in *quality circles* to identify punctual solutions to specific problems (Line, 2006; Laratta and Nakagawa, 2016).

In 1988, David Garvin, professor at Harvard University, published his famous work "Managing Quality: The Strategic and Competitive Edge", in which he demonstrated the *multidimensionality of the concept of quality*, namely: transcendent, product based, user or consumer based, manufacturing and value based. Thus, the concept of total quality emerged, which comprises all activities undertaken by an organization.

Another interesting approach of total quality belongs to Kelada (1990), who explained this concept in his work "*La gestion integrale de la qualite. Pour une qualite totale*" as "a process of satisfying customers' needs regarding product or service quality, delivering the required amount at the required time and locations, at a cost as low as possible for the customer (Sigauke, 2016), in terms of pleasant and effective relations with them and of a flawless administrative system, starting from the order fulfilment to the payment of the bill" (Leonard, 2013).

Total quality management (TQM) consists in the integration of all functions and processes within an organization in order to achieve continuous improvement of the quality of goods and services, that is to achieve customer satisfaction (Dean and Bowen, 1994). Research (Popescu et al., 2014; Popescu, 2016) shows that most managers of competitive companies consider that total quality fundamentally contributes to business success (Leonard and McAdam, 2003).

According to the general theory of TQM, a product, service or process can be improved, and the company can be successful only if they find and consciously capitalize on the possibilities to improve quality at all levels in order to satisfy customers (Levine and Toffel, 2010).

Total quality management is a modern management system that integrates not only the basic principles formulated by Deming, Juran, Philip Crosby, Armand Feigenbaum and Kaoru Ishikawa, but also the Japanese values referring to quality and continuous improvement (Ashok et al., 1996). One of the definitions of TQM that emphasizes the management system was given by Hellsten and Klefsjö (2000) who define TQM as "a management system with continuous development, consisting of values, methodologies and tools, which aim to increase external and internal customers' satisfaction, with a reduced amount of resources". Karl J. Koller (2006), the founder of the Institute for Total Quality Management in Zurich, has a different opinion. He defines TQM as: "a systematic way for managing an organization".

Professor Marieta Olaru (1999) is an expert recognized in Romania for the publications and research in the field of quality management. In her opinion, total quality is first of all: "a model of company culture, which aims to orient all its activities and processes towards the customer and to optimize them so as to bring long-term benefits". In Romania, the Foundation of the Romanian Quality Award J.M. Juran proposed "the Romanian Model of Business Excellence" (the Foundation of the Romanian Quality Award J.M. Juran, 2016).

According to the author of this paper, TQM is both an instrument and a management philosophy that should be approached *three-dimensionally* (Figure no.1). The three closely

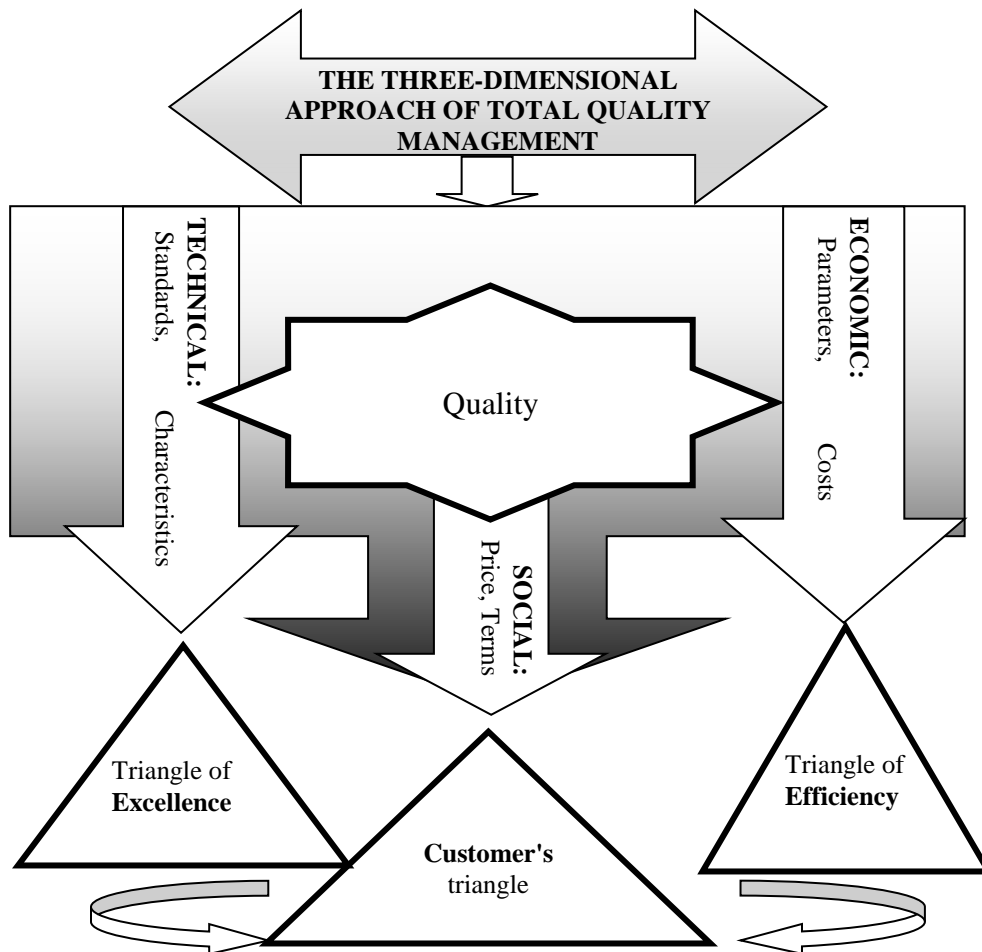
interdependent dimensions are: the *technical, social and economic* dimension, among which inter-conditioning relationships exist.

Each dimension integrates *the quality* of the products and services as the primary and fundamental parameter, to which two specific elements grouped into three subsystems (technical, economic and social) are being added. (Figure no.1)

*The technical subsystem* is represented in the *triangle of excellence* and has the following three elements: quality, standards, technical characteristics.

*The economic subsystem* is represented in the *triangle of efficiency* and has the following three elements: quality, product/service parameters, costs.

*The social subsystem* is represented in the *triangle of products and services customer* consisting of the following three elements: quality, price, terms. According to the author of this work, professional implementation of TQM can naturally lead to business excellence.



**Figure no.1. The three-dimensional approach of Total Quality Management**

Through *business excellence*, it is understood constant economic performance achieved by an organization as a result of the efficient and progressive implementation of *total quality management* based on modern information and communication technologies integrated into processes and activities and highly qualified human resources motivated to offer customers excellent quality products and services, at a competitive and accessible price and within the planned schedule. In my opinion, investing in TQM is a viable and sustainable option that I have studied within an extensive research process whose main results are presented in the next section of this paper.

## **2. Research regarding total quality management in companies in Romania**

As the literature has shown (Dinu, 2014; Popescu and Popescu, 2015), there is a variety of ways of development that companies have at their disposal, but most of them require investments in modern management systems that include *quality as a fundamental objective for business excellence*.

### **2.1 Research methodology**

The research process was conducted during October 2015 and April 2016 and is representative for the segment of organizations in Romania that started to implement total quality management at least five years ago, have a turnover of less than 50 million euro and less than 250 employees.

The undertaken scientific research had a specific methodology based on the online questionnaire as the main tool for data collection, which was processed using specific applications available in Word, Excel and SPSS. *The questionnaire* is one of the most effective tools in building a representative, accurate and complete database, which facilitates testing and verification of the research hypotheses. The questionnaire had 21 questions and was filled in by 280 managers from 56 companies included in the target group, selected to participate in this research, which ensures the representativeness of the results of this research for the targeted segment. Data systematization was performed in an *Excel* file in order to obtain a configuration that permits their statistical processing. For an analysis as correct and consistent as possible, the collected data was grouped according to certain *research variables*: turnover, duration since total quality management has been implemented; areas of employment of the respondents and the management positions they hold; quality dimensions and key success factors. Based on the data obtained using the questionnaire and on the statistical data picked out from the websites of the National Registry of Commerce and the National Institute of Statistics as well, we conducted a series of correlations in SPSS using the *Pearson coefficient*, which helped us understand the connections between the research variables and how they influenced the implementation of total quality management in the organizations selected for this research. For certain questions in the questionnaire, a simple classification was performed, that is by a single variable, while for others, where two or more variables reflected a clearer situation, a combined classification was used. Most of the data was introduced in *SPSS* and processed.

### 2.1.1 Research aim and objectives

The aim of this research was to identify *relevant ways of action for the organizations in Romania through which TQM and its three-dimensional approach can contribute to attaining business excellence.*

The specific objectives of the research were:

- To know *the components and dimensions of TQM* that had a major impact on business in Romania in managers' opinion;
- To identify the main *methods* used by Romanian managers in TQM;
- To identify *the key success factors* that contributed to TQM;
- To know the main *vulnerabilities* of TQM;
- To know to what extent Romanian managers consider that, on the medium and long term, the three-dimensional approach of TQM is *an essential strategic option for achieving excellence in their businesses* on the Romanian, European and international market.

### 2.1.2 Research hypotheses

The main hypotheses were as follows:

- *Hypothesis 1:* The organisations that implement TQM improve their capacity to cope with competition and register turnover and profit increases.
- *Hypothesis 2:* The improvement of the TQM components, the three-dimensional approach of TQM and of the quality dimensions can contribute to business excellence.
- *Hypothesis 3:* The reduction of TQM vulnerabilities influences managers' decision for this preferred strategic option.

### 2.1.3 Sample dimension and characteristics

The procedure used to establish the selection basis of the organizations involved in this research was a ordered and systematic one and was based on statistical data published on the website and the National Registry of Commerce and on the official website of the National Institute of Statistics.

The size of the sample (N) was determined using the formula below, adapted from Virgil Balaure (2003):

$$n = \frac{NZ^2 \times 0,25}{[d^2 \times (N - 1)] + (z^2 \times 0,25)} \quad (1)$$

Where:

n – the size of the sample;

N – the total size of the research basis (in the study, it is the number of registered organizations that have implemented the quality management system);

d – the level of precision (in the study, it is 3%, 0.03 in absolute value);

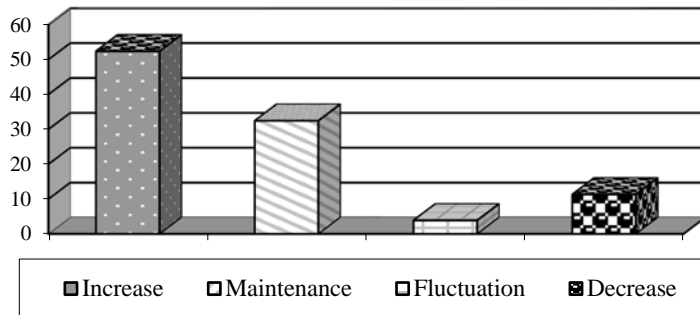
Z – 1.96 corresponding to a 95% confidence level.

Following the calculations, has been determined the sample size to be of 56 organizations that implemented total quality management out of the 343 that represented the selection basis. The 56 selected organizations have less than 250 employees and recorded a turnover of less than 50 million euro per year.

For the research to be representative for this segment, I involved in the research 5 managers from each organization, namely: *the general manager; the technical director for production; the quality director; the commercial director and the financial manager.* Therefore, the number of respondents was of 280 subjects with managing positions from the determined sample.

**2.2 Research results and analysis**

In general, the organizations included in the sample registered favourable economic and financial developments in the last five years, as shown below (Figure no. 2). The results show that more than half (52,38%) of the surveyed companies recorded increases in their turnover and profit. To these, another 32,44% are added consisting in companies that maintained their turnover and profit at a relatively constant level. Only (11,31%) of the companies included in the sample registered fluctuations or decreases of the business indicators (3,87%).



**Figure no.2: Identified trends in the analysed organizations in the past five years**

From data analysis, it resulted that TQM contributes to strengthening the capacity of the organizations to cope with the competition, while the impact on turnover and profit is positive in most companies. Most managers added that, following the implementation of the TQM, the companies have experienced sustainable development and strengthened their capacity to face competition on the Romanian and European market (Nica, 2016). Based on data entered into SPSS, we determined and analysed several *relevant correlations* for this research point using the Pearson coefficient (Table no.1)



**Table no. 1: The correlation between total quality management and the evolution of the turnover in recent years (2012-2015) based on the Pearson coefficient**

<b>How did the turnover and profit of your company evolve in the last 5 years?</b>	Pearson Correlation	1	,255**
	Sig. (2-tailed)		,000
	N	280	280
<b>The intensification of the competition prompted you to take action for increasing competitiveness ?</b>	Pearson Correlation	,255**	1
	Sig. (2-tailed)	,000	
	N	280	280

The results show that the competitive pressure positively influences the business of the surveyed companies, these being largely helped by the fact that they have implemented the total quality management system. As can be noted in the figure above, the resulting correlation is perfect, direct and positive. *These results confirm the first research hypothesis according to which the organizations that implement total quality management gradually and significantly improve their capacity to face competition, increasing turnover and profit.*

Another objective of this research was to identify the *key success factors*, which resulted from the implementation of total quality management. The undertaken research revealed that the majority of the subjects (83%) consider *quality-price report* to be a key success factor in the business they conduct in Romania (Popescu, Comănescu and Sabie, 2016). Also, more than half of the subjects consider that business excellence will be conditioned by their capacity to maintain a quality-price ratio favourable for their customers and profitable for their businesses (Friedman, Friedman and Leverton, 2016). They pointed out that this performance can be maintained only if they continue to invest in total quality management improvement.

The second key success factor highlighted by the managers of the surveyed companies was *the integrated approach of total quality management*, which included all areas, processes and core activities (. More than half of the respondents (64%) consider that the implementation of total quality management system has significantly contributed to systemic and balanced development of the organization, determining them to efficiently cooperate in key areas: research and development; production; marketing; human resources and economic-financial.

The third key factor, which according to the respondents is crucial in the total quality management system, is *the relationship of the organization with the customers*. The data and information obtained were immediately capitalized on in the internal research in order to develop products with a structure appropriate to customers' expectations. More than half of the respondents (51%) considered that this key success factor will continue to be in their attention for a good relationship with traditional as well as with new customers (Popescu and Popescu, 2015). Through the research, the author aimed to identify *the components of the total quality management system* that had a major impact on business in the last five years (Figure no. 3).

The components we considered in this research are the following: *the methods used; the quality standards; internal leadership; marketing strategies; "flawless" production and quality circles.*

As we can see in the figure no. 3, the components of the quality management system produced different influences. It can also be noted that, according to the managers, there are components of quality management system in the surveyed organizations that should be improved. It is worth noting that all components positively influenced the business of the organizations.

It was found that less attention is paid by the subjects to the influence produce by marketing strategies, methods and leadership (Nica, 2015). Significant variations in the points of view were found with regard to the quality circles and the "flawless" production, while the quality standards are considered by most subjects as having a relevant and determining role in business development.

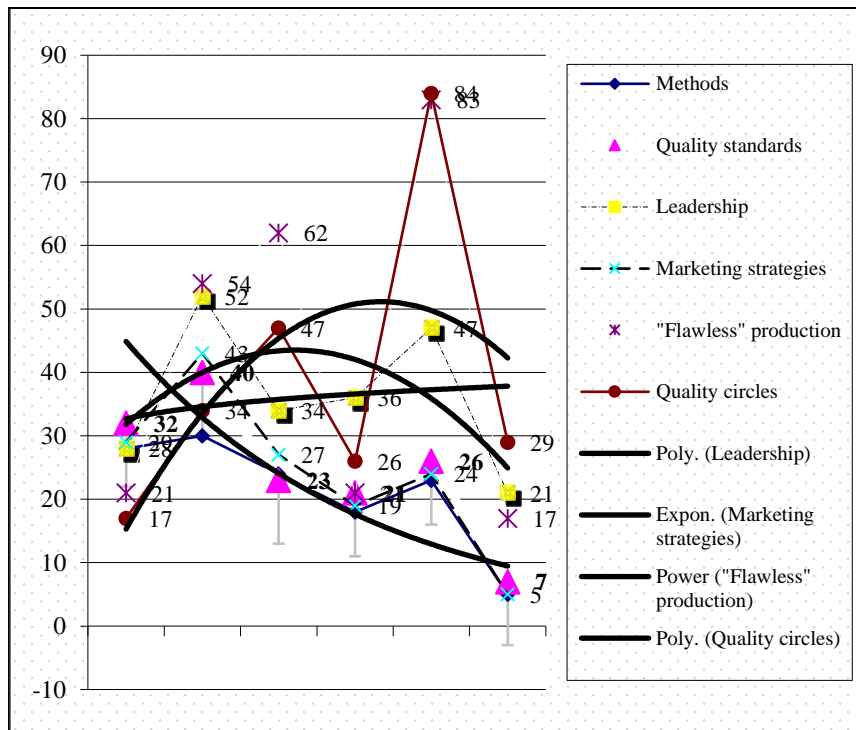


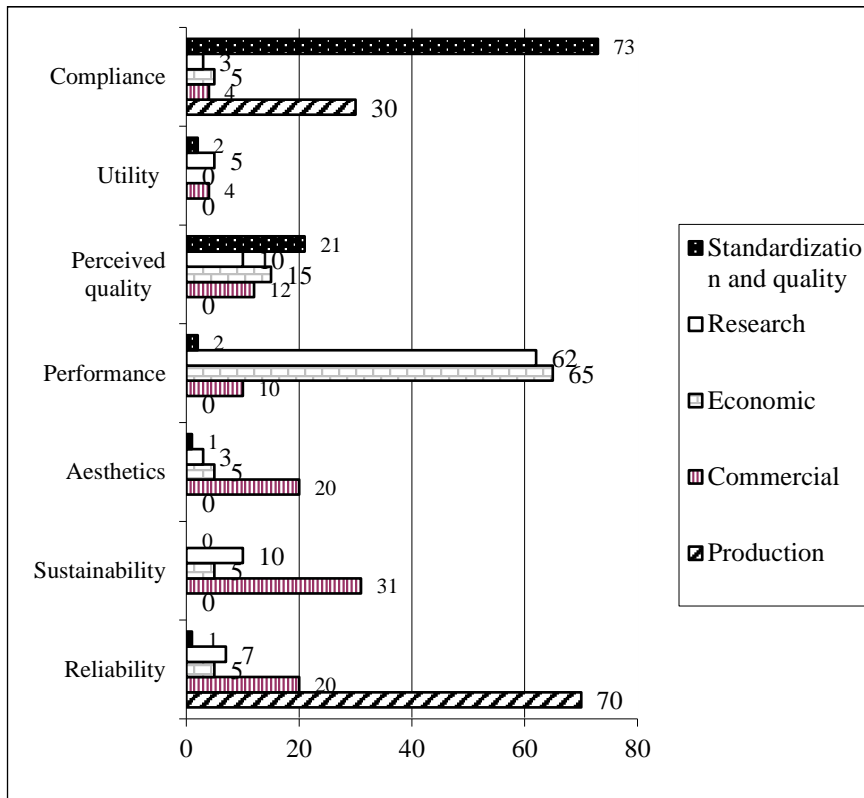
Figure no. 3: The components of TQM and their influence on business development

Another investigation parameter in this research was represented by *the dimensions of total quality*. To know the opinion of the subjects regarding these dimensions the author applied *Garvin's approach* (1988). Garvin identified the following dimensions of quality that I took into consideration in this research: *economic performance; reliability; compliance; sustainability; utility (service-ability); aesthetics; perceived quality*.

The research revealed subjects' different opinion that were justified by the influence of the following variables: the area of activity in which managers performed, management level and seniority (Machan, 2016) within the organization.

As shown in the Figure no. 4, the managers with basic training in the technical area (70%) considered the reliability and compliance of products to be dimensions with a major impact on the quality, while 65% of the managers with basic economic training and average seniority within the organization considered performance, sustainability and quality to be the dimensions with the highest relevance for the products and services offered by the organization (Lazaroiu, 2015).

A special category was formed by the respondents specialized in the fields of standardization and quality from the specialty departments. 73% of them considered *compliance* to be a defining parameter, followed by *quality* perceived as relevant by 21% of managers, while the remaining parameters such as performance, aesthetics and reliability were perceived in relatively small proportions.



**Figure no. 4: The main dimensions of quality and choices of managers in various fields**

*These results support the second research hypothesis according to which if companies improved the dimensions of the quality of products and services and the TQM components, the economic indicators would significantly improve and business excellence would be reached.*

Through this research the author aimed to know *the methods and instruments* used by the managers of the organizations in the implementation of total quality management (Figure no. 5).

Thus, the following methods were submitted to subjects' attention: *management by objectives; management by projects; quality by objectives and value added productivity; quality circles, Deming cycle; Kanban, Total Productive Maintenance and Kaizen.*

The results showed that, in the analysed companies, the total quality management systems integrate in different manners the methods submitted to their attention.

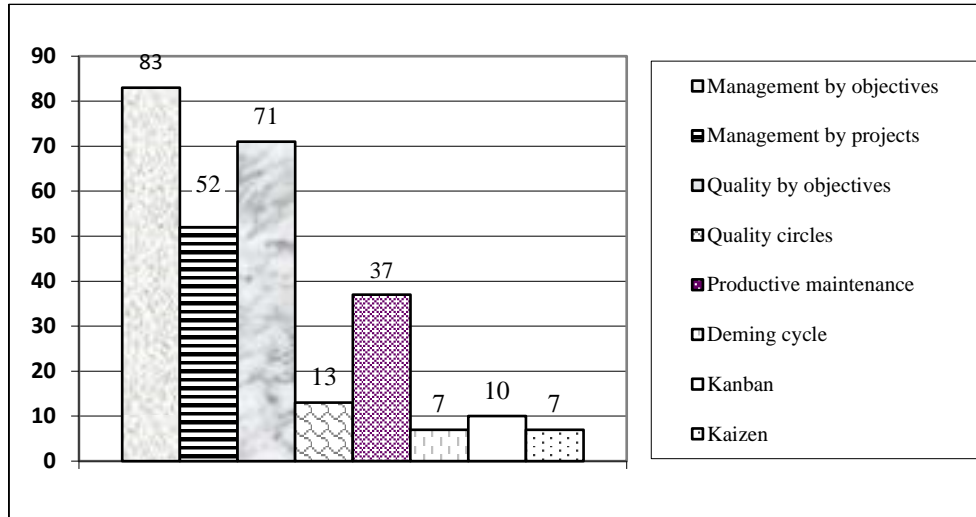


Figure no. 5: Main methods used by managers

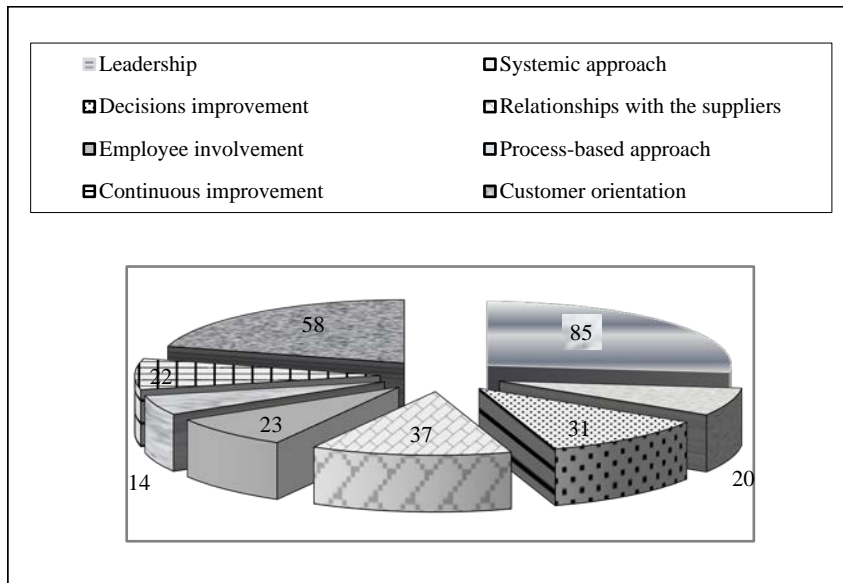
Thus, 83 of the 280 managers included in this research use management by objectives and another 52 managers turn to management by projects. Of the total number of managers, 71 frequently appeal to the quality by objectives and value added productivity, while only 13 managers organize quality circles. It is interesting to note that total productive maintenance is integrated by 37 managers from the surveyed companies, proving their concern for the excellent functioning of the production systems (Madanhire and Mbohwa, 2016). Other methods used by a relatively small number of managers are: The Deming cycle (7), Kanban (10), Kaizen (7).

Research has shown that *TQM principles* are well known and assumed by most of the questioned managers (68%). The author also discovered a major responsiveness (73%) to the *three-dimensional approach of TQM*. The elements considered in this research were grouped into the three subsystems of the three-dimensional approach, as follows: (1) *the social subsystem*: customer focus; employee involvement; mutually beneficial relationships with the suppliers; (2) *the technical subsystem*: process-based approach; system-based approach; continuous improvement; (3) *the economic subsystem*: leadership; decision making approach based on indicators.

Managers' opinions were differentiated according to the level of their position in the organizational hierarchy. The results show that the majority of the senior managers (75%)

stated that the principles of leadership (Laudan, Nica and Lazaroiu, 2016), systemic approach and decisions improvement have a major role in their work to develop quality, while medium level managers (32%) considered the process-based approach, employee involvement and mutually beneficial relationships with the suppliers (Popescu and Predescu, 2016) to be essential in their work for continuous quality improvement.

Low level managers, 85% of them, mentioned customer relationships, decision making based on indicators and employee involvement as essential for quality improvement in their work (Figure no.6).



**Figure no. 6: The correlation between the principles and three-dimensional approach of TQM**

Overall, the three-dimensional approach of TQM is supported by managers at all organizational levels, which determines us to support and propose it as a viable alternative for the development of TQM integrated systems in organizations from Romania and elsewhere. *These results confirm the second research hypothesis according to which the improvement of the TQM components, the three-dimensional approach of TQM and of the quality dimensions can contribute to business excellence.*

In order to identify respondents' opinions regarding the vulnerabilities of total quality management system, we included two questions in the questionnaire (What are in your opinion the main vulnerabilities derived from implementing TQM?; What is in your opinion the level of risk derived from each of them?). As can be noted from Table no. 2, the vulnerabilities considered the managers were grouped by them into three levels of risk: major, medium, minor.

**Table no. 2: Main vulnerabilities and their positioning depending on the levels of risk**

No.	Vulnerabilities	Level of risk perceived by managers	Number of manager who assessed the level of risk	Percentage of managers' answers
1.	Complexity of the procedures and standards	Major	115	0.41
		Medium	84	0.30
		Minor	81	0.29
2.	Overload of the information systems	Major	256	0.91
		Medium	15	0.05
		Minor	9	0.03
3.	Implementation and monitoring costs	Major	142	0.50
		Medium	88	0.31
		Minor	50	0.17
4.	The value of the quality certificates	Major	128	0.45
		Medium	72	0.25
		Minor	80	0.28
5.	Human resources professionalism	Major	34	0.12
		Medium	103	0.36
		Minor	143	0.51

*These results confirm the third research hypothesis that if the vulnerabilities of total quality management with high levels of risk were reduced within the organizations, total quality management could become a preferred strategic option with a major impact on business excellence.*

The main ways of action relevant for organizations in Romania through which TQM and its three-dimensional approach can contribute to the attainment of business excellence proposed by the managers included in this research were: improved monitoring of the operational processes and quality (56%); integration of the quality function together with the other five functions within the organization (62%); motivation of human resources depending on the quality (83%); diversification of the specific methods integrated in the total quality management (52%); refinement of the methods of production statistical control (43%); introduction of new methods to prevent and avoid errors (73%); integrated development of the TQM based on the three-dimensional approach (68%).

**Conclusions**

The research revealed the fact that the quality dimensions (Nihal and Sevil, 2015), the key success factors and the components of TQM as well as its vulnerabilities need to be addressed with utmost attention by the managers of Romanian companies in order to effectively contribute to the development of some essential skills that generate strategic advantages and increase of the market segments (Mohammadi and Najafi, 2016).

The performed research showed the need to renew the tools, methods and techniques integrated by the total quality management. Thus, there were expressed options for new methods (Burlacu and Jiroveanu, 2012), such as Kaizen; Quality circles; HACCP; PokaYoke; Lean management and Six Sigma (Dragulanescu and Popescu, 2015). The

research facilitated the identification of the key success factors and of the main vulnerabilities of TQM.

In the end, we can state that the research this paper was based on demonstrated that TQM, in general, and its three-dimensional approach, in particular, represent an essential, feasible, viable and sustainable option for companies in Romania, whose managers continue to be concerned with the development and modernization of management instruments in order to reach higher levels of quality and business excellence.

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