

The Quality Management System in Small and Medium-sized Entities: a field study in the city of São Roque, São Paulo State, Brazil

Alequexandre Galvez de Andrade, Nélio Fernando dos Reis & Taune Moreira Geraldo

Abstract

The conquest of the market is related to meet the needs of customers with a focus for the relational orientation. In this scenario the quality is the guarantee that the implicit and explicit needs will be met. The objective of this study is to identify which requirements of quality were used by micro and small businesses in the city of São Roque, São Paulo State. To attain the object, was conducted bibliographic research and field study, with the application of a questionnaire to 52 companies, containing 37 closed questions using a Likert scale. To analyze the data was applied to factor analysis. This study was considered the limit of revenues of up to R\$ 4.8 million to set up small business. The results indicate that the operational requirements related to the product, call the legal norms and communication with customers stood in the analysis, which indicates the need to improve the quality management system to achieve total quality. This study can be applied to small business to diagnose their quality systems and consequently improve processes to achieve better results.



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About Author

Alequexandre Galvez de Andrade, (Corresponding Author), Lecturer in Business Administration, IFSP Institute, Department of Management, Quintino de Lima roadway, São Roque 5.100, Brazil.

Nélio Fernando dos Reis, Lecturer in Business Administration, IFSP Institute, Department of Management, Mutinga boulevard, São Paulo 951, Brazil

Taune Moreira Geraldo, Degree in Business Administration, IFSP Institute, Department of Management, Quintino de Lima roadway, São Roque 5.100, Brazil

1. Introduction

The Quality Management System is critical for organizations to gain competitive advantage, must therefore take part in the strategic planning of the organizations. Second Grönroos (2003) [1], The conquest of the market is directly related to the satisfaction of the needs of customers, which fidelizam the brand through the relational aspect. In this perspective, Deming (1986) [2] is exhaustive to say that quality is to meet the demands and needs of the clients. The quality standards of the International Organization for Standardization ISO', in particular the ISO 9001, published in Brazil by the Brazilian Association of Technical Norms, which are detailed requirements for the quality, points out that the quality can be implemented by any company, regardless of size. Micro and small businesses represent 93.3% of companies in the city of São Roque, which is characterized by being a city facing services and industry, as the indices of regional specialization, which are above 1. There are many definitions of quality, but all converge to customer, either through the fulfillment of expectations, requirements and others. Thus it is important that companies formalizem the quality systems so that they can act in a preventive and predictive. On the other hand, there is the consumer legislation which regulates the relations of consumption, guaranteeing them certain rights of way which have preserved the respect and dignity in consumer relations. As for example, the Code of Consumer Protection Law 8,078 of 11 September 1990 [3], in articles 24, 26 and 50, deals with the guarantee of an exchange, which sets the time limit of 30 days for products not durable and 90 days for durable products. Furthermore the legislation deals with the hidden vices, those of difficult detection at the time of purchase, where the deadlines are counting from their labels. It is the companies observe carefully the quality problems, at this point the ISO 9001-2015, brought the monitoring of risks, which are unforeseen situations, but that should be monitored by the company. According to the wording of the magazine Auto Sport (2014) [4] the Chevrolet announced a recall of over 400 thousand vehicles due to fire hazards. According to the code of consumer protection, the Recall is a call to consumers to remedy problems with the product, are the responsibility of the company. According to Reuters (2014) [5] General Motors of Brazil, spent R\$ 300 million reais in a recall of the ignition system of vehicles. Certainly in a small company, these defects or lack of standards of quality could mean the closure of their operations.

This study aims to identify which requirements of quality were used by small business. To achieve the proposed objective was applied a questionnaire containing 37 questions that were divided in 7 axes, as shown in the series of standards of quality ISO-9001-2015 and context of the organization, leadership, planning, support, operation, evaluation and performance improvement. To extract the data we use the reduction of factors with principal components analysis, performing the reduction by the varimax method, the software used was SPSS®. The results indicate that the main requirements are related to the axis operations, demonstrating that it is need to improve the quality management.

2. Literature Survey

There is a diversity of concepts attributed to quality by several authors. However all converge to the needs and expectations of our customers (CROSBY, 1992 [6]; DEMING, 1986 [7]; JURAN, 1991 [8]; FEIGENBAUM, 1991 [9]). To Falconi (1992, p.15) [10] the total quality is governed by the principles: to produce, and provide products that satisfy the customer; ensure the survival of the company; identify the most critical problem and fix it by more high quality; decide based on data and facts; manage the company throughout the process; reduce methodically dispersion; it does not permit the sale of defective products; seek to prevent the source of the problem; never allow the problem to repeat; respect employees and ensure the

implementation of the vision and strategy of the high direction. The contemporary quality is not only characterized by excellence in the final product. The quality must be reached by every organization, because, surely, that is what the stakeholders and specifically the customer expects a product and consequently the company.

2.1 Fundamentals of Quality

Some principles of quality are designed so that the quality programs are applied with success. For this reason, some authors such as Oliveira (2004) [11], Conte and Duski (2002) [12], Singh, Kumar & Singh (2018) [13], indicate that implementation of quality programs in enterprises are related to methodologies that comprise a total of 10 to 14 Principles.

In Oliveira (2004) are presenting 11 principles, total customer satisfaction, participatory management, development of human resources, constancy of purpose, continuous improvement of processes of the PDCA cycle, management and control of processes, dissemination of Information, delegation, technical assistance, management of Interfaces with external agents and Quality Assurance.

All these principles are connected to the needs of customers and logical manner when you know what the customer wants and needs, the processes are determined and improved to avoid waste, the communication of updates must be efficient, people should participate in the process and the company must ensure that the product has fulfilled all the steps and that this free of defects to the client.

2.2 Management of Quality

For Mello et. al (2002, p. 15) [14]: "system of management refers to everything that the organization does to manage its processes or activities. In small organizations, probably does not have a system, just a way of doing things, which, in most cases, is not documented, but at the head of the owner or manager. Thus, the larger the organization, and more people are involved, the greater the possibility of some procedures, instructions, forms or records documented. To be efficient and effective, the organization can manage their way of doing things in a systemic way." According to Oliveira (2004, p. 15) [11], "producing goods or service with quality is not an easy task to be achieved". Organizations that have an interest in applying the quality management system should invest in this mechanism. For Bianco and Salerno (2005, p. 58) [15] with the increasingly competitive market, companies go through moments of instability caused by new patterns of competitors, related to several elements of quality, for example, security, reliability, service, cost, among others that end up interfering with the efficiency of the organization. Therefore, companies in the search for competitiveness in the market, are investing in Quality Management System to the growth of the organization. With this increase the level of its processes, products and services, thus causing a greater satisfaction in their customers. This satisfaction is guaranteed by the involvement of everyone in the organization in pursuit of continuous improvement, it is important that the objective is to achieve excellence in process and product. The implementation of the quality management system is so important for small and large organizations. Both companies need quality management system, because in any company needs to monitor the activities through rules, only thus can ensure quality in processes and their continuous monitoring. The micro and small companies have an advantage over big businesses to have implemented the quality management system, because their processes are more streamlined and have a smaller volume of information, facilitating the monitoring of indicators and of the quality system. However, the hiring of skilled professionals becomes a disadvantage, which must be improved through transparent processes of career plan. To

Oliveira (2004, p. 15) [11], "there is a strong and clear correlation between profitability and quality, despite the cost that usually demand to implement the quality management system many companies have implemented" The quality management system can be deployed in a strategic way, given that organizations with quality in its processes, products and services has been highlighted and has been gaining market share which is increasingly demanding which reflects the quality goals. This interaction with the environment requires a lot of effort of the administration in the process of planning and control, and when well implemented aims if a change in culture, integrating all levels of the organization (OLIVEIRA, 2004) [11]. According to the global community of people adept the quality 'ASQ' (2017) [16], several companies have achieved significant results in various segments, with the use of quality tools such as Six Sigma, systematic use of data to match customers and processes, process of knowledge management and operational efficiency. Figure 1: presents the main strategies adopted by the companies

Figure 1: Strategies and results of quality.

Company	Strategy	Quality tool	Results
 Anheuser-Busch inbev	The goal of this project was to study and understand how to improve the flexibility of production lines to deal with multiple products, creating more capacity and improve the delivery of the customer	Six Sigma and clicks in kaizen projects and on a large scale	The economies of projects were more than \$1.5 million at the beginning, with a scale of \$100 million.
 Oats Iletisim Hizmetleri A.S.	Improve the deployment process BSC / RNCS. BSCs And snrc are central units that connect the base stations to the core network GSM	Using the DMAIC methodology and Lean Six Sigma approach, the team used quality tools such as Pareto, boxplot, fish bones, multivotejamento and diagram of cause and effect.	With the implementation, the process has been improved at a rate of approximately 75%. The project has brought an annual OPEX savings of \$547,000, minimizing deviations and standardizing the period of deployment.
 Max Life Insurance Co. Ltd.	Discusses the progression of the relationships between the company and the customer and desmistifica the reason why customers abandon your precious investments and simply depart	Combining the systematic understanding based on data from the world of customer and translate that into business benefits.	Generated revenues of more than \$77 million and an additional revenue for the renewal of \$100 million
 Nokia HERE	This project focused on the reduction of costs of manual inspection associated with a process of creating maps.	Using the DMADV methodology, the team used analysis of measurement system, quality function deployment, DoE, Pareto chart, diagram of affinity, multivoteando and a series of valuable tools for designing the final recommendations for improvement	The improvement provided the potential for a cost reduction of 2.5 million euros, creating a qualification process and inspection throughout the organization.
 Tetra Pak Packaging Solutions	This project focused on the development of engineering capabilities within the Tetra Pak. A capability is the integration of competences of people and their processes, methods and tools	Following the principles of change management, and the steps in a process of transformation of business, the team has shared knowledge and experiences in all units, based on existing capacities and developed new	The project resulted in a score increased from 30 per cent in the measures of engineering capabilities and a noticeable change in the way the team works.

Source: The authors, based on the data of the global association ASQ.

2.3 ISO 9001

For Mello et. al. (2009) [17] to ISO 9001 is composed by a set of international standards and guidelines for quality management system. This standard has a worldwide reputation as the basis for the establishment of the quality management system, since its first publication in 1987. Regardless if a product or service, any kind of organization, large or small can apply these standards. The ISO 9001 can be applied in conjunction with other standards as of occupational health, safety and environment. The objective of this standard is to improve the

management of an organization. Second (ISO 9001:2000; 2008)[18] the management system is related to everything that involves the processes and management of an organization. In micro and small companies often, there is not a formalized system, only an informal way to meet with the activities that often represent the way that the senior management determines, there is a discussion with the other peers of the company. In large organizations, the records of documents and processes are formal and there is an involvement of all employees of the organization. In addition to the independent quality audits that analyze whether the undertaking is complying with the requirements of the management system, in order to issue opinions and authorize the issuance or maintenance of certification. Only accredited audits to the National Institute of Metrology, Quality and Technology 'INMETRO' may issue the certification. (ISO 9001:2000; 2008) [18]. The management system determines what should be done, when, how, why and where. Thus, creating a standardization of processes, efficiently and effectively, in a way that time, money and other resources are used efficiently (ISO9001:2000; 2008). [18] In accordance with ISO: "Organizations in search of the implementation of ISO9000:2000 complement all standard requirements that are applicable to your products and services within their scope of its quality management system".

2.4 Methodology

The concept of micro and small enterprise has several definitions. According to the Constitution of the Federal Republic of Brazil 'Constitution' of 05 October 1988 [19], in its article 146, item III, letter d, the Complementary Law defines differentiated treatment and favored the micro and small companies, and may establish a single system of collection of taxes and contributions from the Federal Government, States, Federal District and municipalities. Even in article 179, that is inserted in the title that deals with the financial and economic order, stresses the treatment the micro and small companies. But not all companies have differentiated treatment, must observe the limit of revenues of up to R\$ 4.8 million reais, formation of corporate framework and activity. For Sebrae (2016) [20], the criterion used for the definition of smes refers to gross revenue, however, in a study published by the aforementioned source in 2014, it is considered that the criterion of IBGE, which considers gross revenue and number of employees. For this study, we used the concept of gross revenue. To meet the proposed objective, a bibliographic research was performed according to Lakatos & Marconi (1990, p. 57) [21] refers to the collection of data of any scientific research being conducted with primary and secondary sources. In this study we used secondary sources. The books and articles consulted refers to quality management, focusing on the evolution of the quality, total quality and ISO 9001. To collect the information was conducted field research, to Gil (2008, p. 57) [22] this study is characterized by the deepening of questions previously proposed, with flexibility in your planning. In addition, the field study allows the study of only one social group, emphasizing the interaction exists. Finally, it is a technique of observing more than mark. The data collection was carried out through the application of a questionnaire with Likert scale of 1 to 5, being 1-I do not agree, 2-not partially agree, 3-neutral, 4-I and 5-I agree completely. The application occurred in loco, in 52 companies of the city of São Roque, São Paulo State. There are many definitions of samples for the factorial analysis, for some authors, the analysis can be used with samples of 50 respondents, other binding the quantity per variable and there are some who do not estimam quantities (LAROS, 2012) [23]. The questionnaire has 37 questions that were divided in 7 axes, as shown in the series of ISO 9001-2015 [24] quality standards, and the context of the organization, leadership, planning, support, operation, evaluation and performance improvement. To extract the data, we use the reduction of factors with principal

components analysis, performing the reduction by the varimax method to simplify the analysis of the data, the software used was SPSS®.

2.5 Result and Discussion

The principal components analysis was conducted in 37 items from the instrument with orthogonal varimax rotation (). The initial analysis showed that two components explained 74.25%, as shown in Table 1.

Table 1: Total Variance Explained

Componente	Valores próprios iniciais		
	Total	% de variância	% cumulativa
1	15,480	48,375	48,375
2	8,432	26,351	74,726
3	3,972	12,412	87,138
4	2,747	8,583	95,721
5	1,369	4,279	100,000

The array of patterns and the matrix structure, as shown in table 2, showed that the positive items, i.e., that used raw scores of the Likert scale, had a higher load on component 1. The table 2, matrix of components presents the main factors that influenced the quality management system for small businesses.

Table 2: Matrix of Components

	Matriz de componente rotativa*				
	Componente				
	1	2	3	4	5
x5	,966		-,196	-,167	
x27	,888	,310	,221	-,181	-,184
x28	,888	,310	,221	-,181	-,184
x30	,888	,310	,221	-,181	-,184
x7	,883	,276	,145		,351
x11	,811	,242	,107		,512
x4	,787		-,329	,518	
x29	,767	,485	,394	,145	
x8	,767	,485	,394	,145	
x20	,586	,547	,466	,357	,113
x24	,586	,547	,466	,357	,113
x13	,115	,934	,104	-,214	,241
x12	,173	,895	,161	-,346	-,152
x25	,307	,857	,255	,153	-,289
x26	,317	,843	,382		-,203

Linking the references of Table 2 with the issues presented in the questionnaire and the axes of analysis, shown in table 3. It identifies that these companies attach importance impedes the operations. According to the ISO 9001-2015 [24] "The organization must plan, implement, and monitor the processes needed to meet the requirements for the provision of goods and services...". This axis represents the make, which identifies and communicates the client's needs, ensures and meets the legal requirements in relation to its products and services. It is possible that by legal issues contained in the code of consumer protection, there is a strong influence on the system of management of these companies. As regards the leadership, only one item has significant influence on the quality management system, it is the customer

service. The other items such as definitions of responsibilities compatible with positions and functions and communication of the performance of the quality management system, not included in the matrix components, demonstrating that does not influence the quality management system.

Table 3: Relationship between the references of the test, axes and issues presented

Reference	Shaft	Question
X4	Context of the organization	The company has a quality management system formalized?
X5	Context of the organization	The company monitors the internal and external environment?
X7	Context of the organization	There is a monitoramneto the processes needed for the company. Example: Sales Process, approval of production discounts, customer service and other more?
X8	Context of the organization	The company enhances the processes continuously. This forms part of the mores and values of the company?
X11	Leadership	The high direction establishes requirements to ensure customer service
X12	Leadership	The company has a policy of quality
X13	Leadership	The quality policy is formalized and made available to all employees
X27	Operations	The Company informs the customer of its products and services
X28	Operations	To offer products and services, the company check the legal standards applicable? As part of the consumer, environmental laws.
X29	Operations	Before you sell or provide services, the company performs a critical analysis to check if you have service capacity
X30	Operations	The company ensures the changes of requirements, if there are changes in the product or service to be provide
X25	Support	The company documents all quality processes
X26	Support	The company controls the documentation

The axes of planning, support, evaluation and performance improvement, not listed as influencers in the management system of the companies researched, scoring that we must discuss what is a quality management system for small businesses. According to ISO 9001-2015 [24] "the adoption of a quality management system is a strategic decision for the organization that can help improve your overall performance." In this way, it may be that these companies were not observed to quality management as something strategic, but to meet the requirements relating to the legal standards. Even with an emphasis on the shaft of operations, companies stated that they have a quality system formalized and continuous improvement is part of the culture of the company. However, no company replied that fully agrees that there is awareness campaign the quality policy and only one company replied that documents all quality processes. According to Oliveira (2004, p. 15) [11], "producing goods or service with quality is not an easy task to be achieved". Organizations that have an interest in applying the quality management system should invest in this mechanism. How much more formalized system is greater investment, because to obtain the certification is required the hiring of specialized auditing. As Kotler (2009) [25], the economic crises are a reality in companies and increasingly unpredictable, so the company must create effective management systems so that you can be alerted and take advantage of the opportunities of this scenario. Ohno (1997, p. 35) [26], highlights that the opportunities are always present, but it takes effort to recognize them. Therefore, companies in the search for competitiveness in the market, are investing in Quality Management System to the growth of the organization. With this increase the level of its processes, products and services, thus causing a greater

satisfaction in their customers. According to Barbêdo And Turrioni (2003, p. 65) [14], "the implementation of the quality management system is so important for small and large organizations." This statement is in line with the ISO 9001-2015 [24], to mention that the quality is independent of the size of the company. Although much used by industries, can be deployed in any segment, such as trade, services and others.

Small businesses have advantages and disadvantages over the big companies, the advantages relate to flexibility of processes, because they have a lower volume of information, facilitating the monitoring of indicators and of the quality system. However, the hiring of skilled professionals becomes a disadvantage. The quality management system can be deployed in a strategic way, given that organizations with quality in its processes, products and services has been highlighted and has been gaining market share that is ever more demanding about the quality of the products, which reflects the quality goals. This interaction with the external environment, requires a lot of effort of the administration in the process of planning and control, and when well implemented aims if a change in culture, integrating all levels of the organization (OLIVEIRA, 2004) [11]. For Mello, Silva e Turrioni (2008, p. 15) [17] to ISO 9001 is composed by a set of international standards and guidelines for quality management system. This standard has a worldwide reputation as the basis for the establishment of the quality management system, since its first publication in 1987. The ISO 9001 can be applied in conjunction with other standards as of occupational health, safety and environment. The objective of this standard is to improve the management of an organization. Second (ISO 9001:2008) [18] the management system is related to everything that involves the processes and management of an organization. As researched in this study, the companies did not have a system of management of the formal quality, only an informal way to meet with the activities that often represent how senior management determines, therefore it is observed that there is a strong inclination for the operational aspects, including customer care and customer service legal standards. In large organizations, the records of documents and processes are formal and there is an involvement of all employees of the organization. In addition to the independent quality audits that analyze whether the undertaking is complying with the requirements of the management system, in order to issue opinions and authorize the issuance or maintenance of certification. Only accredited audits to the National Institute of Metrology, Quality and Technology 'INMETRO' may issue the certification. (ISO 9001:2008) [18].

3 Conclusion

The management system is related to everything that involves the processes and management of an organization. In small companies often there is not a formalized system, only an informal way to meet with the activities that represent the way that the senior management determines, there is a discussion with the other peers of the company. There is a confusion between implementation of standards and certification, all companies can deploy, but in order to obtain the certification and disclose to the market must go through a process of external audit, carried out by companies enabled. However, this may not be a reason for not formalizing the system. In 7 axes surveyed the main factors that influenced to quality management in small firms, were sales processes, improvement of processes, customer, dissemination of best practices, communication plan and attendance of the legislation. In this study, we observed that no company had a system of quality management formalized, it may be that this explains the strong inclination to operational aspects. Furthermore, only one company replied that fully agrees with the assessment of performance management, demonstrating the vulnerability of managerial aspects. To achieve total quality, you need to

observe and understand the structure and the principles of quality, so that they can gain a competitive advantage and improve its processes, reducing costs and increasing customer satisfaction. For greater reliability and statistical data for comparison, we suggest that further studies with larger samples.

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