



## QUALITY MANAGEMENT SYSTEM FOR MICRO AND SMALL ENTERPRISES

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### ABSTRACT

The purpose of this paper is to provide a structured method to implant a quality management system, following the requirements of the ISO 9001 in micro and small enterprises. This method also uses concepts from the Balanced Scorecard, the 5S Program, the QC Story and the São Paulo Management Quality Award. Simplification and interconnection among these concepts were performed using information from the literature review. They were implemented in seven micro and small enterprises and have been very successful. Through the initial and final assessments, we could evaluate the progress that each enterprise achieved in terms of quality management. Many of the deficiencies of the enterprises observed before the implementation have been solved. The main differences of the proposed method in relation to the models present by the literature is the simplified form of presentation of the requirements of the ISO 9001, the interconnection of the quality management system with business strategies, the self-assessment mechanism and the great amount of examples to facilitate the understanding of the entrepreneur. This characterizes the originality of the proposed method.

**Keywords:** Quality Management System, ISO 9000 series, Micro and Small Enterprises.

### 1. INTRODUCTION

The importance of Micro and Small Enterprises (MSE) for Brazil has already been known for a long period, according to SEBRAE-SP (2014). These organizations are responsible for the employment of 68% of the economically active population in the urban environment and contribute with 24% of the wealth generated by the nation. Such data, when associated with entrepreneurial activities, demonstrate a great perspective for the country (GEM, 2014).

Despite the great correlation between the importance of MSE for the country and the high rates of entrepreneurship, Brazil still has a high rate of mortality of enterprises with up to four years of existence, when compared to developed countries. According to SEBRAE (2013), the mortality rate for this type of business and for the period studied reaches 56.3%. The explanation for such occurrence lies in the fact that the majority of the Brazilian entrepreneurs does not have managerial knowledge or is unprepared to face a competitive market. The research conducted by GEM (2014) showed that most enterprises are created out of necessity

and not by opportunity in Brazil. Persons become entrepreneurs when they lose a job or when they need to increase their sources of income; therefore, they are not well prepared for such a challenge.

It is in this context that agencies for the assistance of MSE will stand out, such as SEBRAE, federations and industry centers of each Brazilian state and the centers for enterprise development (called business incubators). They enable greater chances of success for MSE, in particular, through supplementary courses and assistance in the implementation of management models in the areas of strategies, finances, marketing, sales and quality management, among others.

Focusing particularly on the quality management area, it is observed that there are few structured methods disseminated by the literature specific to MSE, which clearly shows a gap to be filled by academic studies of Mattos *et al.* (2015). In order to fill part of this gap, this paper aims to design a



method for the implementation of quality management systems in MSE, based on the requirements of the ISO 9001 (ISO, 2008), management tools adapted from the São Paulo Management Quality Award (PPQG, 2013), QC Story (Falconi, 2014), Balanced Scorecard (Kaplan *et Norton*, 1996) and 5S program (Ishikawa, 1989). Simplifications and interconnections among these concepts were performed using information described in literature review.

Based on the above information, is it possible to define the research problem and hypothesis based on the literature: a) Research problem: how should a quality management system be structured aimed toward the reality of MSE, enabling improved performance? b) Hypothesis: the quality management system should be based on the requirements proposed by the ISO 9001, should be directly linked to business strategies, should allow the self-assessment of enterprises and must have examples that facilitate the understanding of the entrepreneur.

To answer the research problem and confirm or not the previous hypothesis, we have structured the proposed method and, in the sequence, implanted the same in seven enterprises located in the Jundiaí business incubator (São Paulo, Brazil).

## 2. LITERATURE REVIEW

This topic is intended to provide a brief review of the literature comprising papers that contributed most to the development of the proposed method. Some models were found and were related to the subject, but none of them were similar to the one presented by this paper, which demonstrates its originality. We highlight that this literature review is made in chronological order, pointing out the main contributions and concepts of each work researched.

Hakserver (1996) broadly presents possibilities, potentials and problems that the implementation of the Total Quality Management (TQM) can provide to small American enterprises. From this paper, we mainly used information correlated to motivation, empowerment, team building and employee recognition as the key to success of small enterprises.

McAdam (2000) made a critical analysis of the implementation of TQM in the context of small enterprises based on 20 case studies. The author found that the implementation of TQM can be compromised by bureaucracy and by the existence of purely mechanistic models, being necessary to link the innovation and flexibility aspects. Moreover, they also noted that the small business environment is very dynamic and needs constant updating.

Nwankwo (2000) spoke about the myths and realities observed in the implementation of quality systems in two small enterprises in the United Kingdom and points out that despite the dynamism that the implementation of standards can provide, many enterprises still forget about the strategic thinking and the development of the skills needed to incorporate a total quality orientation. This research was extremely important for this paper to strengthen the need to establish phases related to the definition and refining of goals and strategies.

The paper of Lee *et Ko* (2000) sought to build a Balanced Scorecard with elements of the SWOT analysis, from Sun Tzu's principles, and the Quality Function Deployment (QFD) methodology. Despite this paper addressing some tools and methodologies that are different from the one used in the preparation of the method proposed here in and being focused in organizations of any size, it is interesting to note that it also seeks to integrate concepts of strategic management with quality management, which is present in the method reported herein.

Andersen *et al.* (2001) presented reflections on the concepts and practices linked to the use of the Balanced Scorecard in small and medium enterprises, pointing out that, in these cases, there should be a clear sense of direction, a comprehensive understanding by the entrepreneurs in terms of the business model and a clear focus on priority and necessity, given that resources are not always available. The contribution of this research to this paper was the consideration of the above conclusions on the preparation of phases linked to the development and refining of strategies.

Spencer *et Lomba* (2001) performed a large research in small enterprises in order to analyze the contribution of the TQM and its tools for the management. As conclusions, they established that quality control circles, statistical tools, synergy, among other TQM concepts were essential for the success of the enterprises, which supports our vision that Quality Management Systems are plausible in the reality of Micro and Small Enterprises (MSE).

Williams *et al.* (2001) pointed out the need of the ISO 9000 series to be crafted more broadly, including the TQM principles, as the main conclusion of their research. These recommendations were considered in the drafting of the method proposed herein as we sought a broad structure that embraced the diverse needs of MSE.

Biazzo *et Bernadelli* (2003) presented a paper on the risks and opportunities of using Quality Management Systems based on the ISO 9000 series' standards and, although they did not establish the types or sizes of the enterprises in their conclusions; they made it clear that each enterprise must develop a management system molded to its reality.



Youssef *et al.* (2006) presented a differentiated way to implement the ISO 9001 in small enterprises, substituting the traditional model (identification of processes, development of the Quality Management System (QMS), implementation and maintenance) by a model in which a simplified QMS is defined, moving to a basic system and reaching a multi-process system. This research was interesting because it made even clearer to us that MSEs require maturation phases between the steps, generating learning and gains in terms of management.

Souza-Poza *et al.* (2008) presented a conceptual paper in which they established guidelines for the implementation of an ISO 9001 QMS oriented to the reality of small and medium enterprises. For this end, they established four early phases to achieve a minimum standard required and subsequently five more steps to move to a desirable standard in terms of quality management. These same authors established interesting definitions for the reality that they observed in the enterprises studied, when they defined their management stages as formally alive (some level of documentation and some level of functioning), informally alive (no standardized documentation, but with some level of functioning), formal death (some level of documentation, but no functioning) or complete death (no documentation and no functioning). This work guided us to the need to establish a management system oriented to MES that was formally alive.

It is emphasized once again that the differential of the method proposed here in relation to the models of Youssef *et al.* (2006) and Souza-Poza *et al.* (2008) is the simplified form to present the requirements of the ISO 9001, the interconnection of the QMS with business strategies, the self-assessment mechanism and the great amount of examples that facilitate the understanding of the entrepreneur. These characteristics were the key values of the proposed method.

Carmignani (2008) developed a method structured in eight steps to manage processes based on requirement 4.1 of ISO 9001. Assuming the macro vision, the author seeks to break up each process and establish its correlation with processes from suppliers and customers.

Munsterman *et al.* (2010) presented an interesting work when they sought to evaluate whether the standardization of processes has impacts on corporate performance, more specifically on time, cost and quality, and for this end they analyzed 156 enterprises. The findings showed statistically significant impact on performance improvement after the standardization of the processes, which corroborates our thesis on the effectiveness of management systems in enterprises.

Cragg *et al.* (2011) used a questionnaire based on the model of 12 levels of the American Productivity & Quality Center (APQC), addressing operational processes, support-

ing processes and management processes. Despite this questionnaire and this model not being fully used in the method proposed by this article, it is important to note that they contributed with ideas and concepts.

Ilkai *et al.* (2012) elaborated a very interesting research when they analyzed 255 small and medium enterprises, trying to verify whether there was difference in terms of performance for ISO 9001 of certified and non-certified enterprises. The finding results showed that, for the group analyzed, there were no significant statistical difference between the two groups, which made us aware of the fact that a Quality Management System needs to be part of the culture of the enterprise and not be characterized only as the formalization of documents.

Psomas *et al.* (2014) did an interesting analysis in Greek manufacturing companies, comparing the performance of small and medium-sized organizations with ISO 9001 system and without this Quality Management System. They observed a superior performance of certified companies (financially and non-financially) in relation of the non-certified companies.

In a subsequent study, Psomas *et al.* (2015) assessed the benefits of ISO 9001 implementation and certification in small and medium-sized Greek service organizations. The authors validated benefits related to product quality, operations and commercial and financial performance.

Valmohammadi *et al.* (2015) analyzed Iranian manufacturing companies regarding to ISO 9001. The majority of organizations analyzed were characterized as small and medium-sized. The results showed that certified companies had a better performance than non-certified companies and that internal motivations had a fundamental role in the implementation of Quality Management Systems. In relation to ISO 9001 certified companies, they also noted that organizations with higher internal motivation indexes had a better performance than organizations with small internal motivation indexes.

Lastly, Brotons *et al.* (2016) assessed in their article whether ISO 9001 certification increased the value of small and medium-sized Spanish agricultural enterprises. The results showed that implementation of Quality Management Systems contributed to increase the company value in most of the cases.

### 3. METHOD

The research development happened in four stages. The content of these stages are presented below.



### 3.1 Stage 1: defining research gap, research problem, literature review and hypothesis

Because we also acted as consultants and were in constant contact with Micro and Small Enterprises (MSE), it was possible to identify a gap in the market related to the need for Quality Management Systems (QMS) focused on the reality of these enterprises. Analyzing papers in scientific bases, such as Web of Knowledge, Scielo, Emerald and Elsevier, we noted that this gap was also academic and there were few published papers about the subject. The terms used in the bases for the search were “micro and small companies + quality”, “micro and small enterprises + quality”, “quality management system + micro” and “quality management system + small”. In this context, it was define de research problem.

The selected papers were divided into two groups, the first one having papers that do assessments or reflections about QMS in MSE and the second one having papers that propose models.

The analysis of the first group allowed us to identify the characteristics that are essential for a QMS aimed at the reality of MSE. It is also important to note that many of these papers pointed to the strategic issue as a differential factor in the quality management and, therefore, we proceeded to search for papers related to strategies, quality management and MSE again on the same bases. The terms used to search were “micro and small companies + strategies” and “micro and small enterprises + strategies”.

The analysis of the second group allowed us to identify methods or models with the same purpose, verifying their scope and limitations. We noted that there were no methods similar to that developed by this paper, which proves its originality. For this stage, we dedicated three months of analysis.

### 3.2 Stage 2: structuring of the proposed method.

Based on the information gathered in the literature review and the concepts / requirements set by ISO 9001 (ISO, 2008), São Paulo Quality Management Award (PPQG, 2013), QC Story (Falconi, 2014), Balanced Scorecard (Kaplan *et* Norton, 1996) and 5S program (Ishikawa, 1989), it was possible to design the proposed method. For this stage, we devoted three more months.

### 3.3 Stage 3: selection of enterprises and implementation.

The third phase was characterized by the selection of enterprises and implementation of the method proposed. The criteria used for this selection were: companies must present structure of MSE and must not have implemented other quality manage-

ment systems previously, in order to avoid possible management addictions and commitment to the full implementation of all phases of the method. We initially identified 13 interested enterprises, and seven of them were selected to participate in the implementation. Contracts with the objectives of the research were signed between the participating enterprises and the university. The total time for this stage was 12 months.

### 3.4 Stage 4: results and research conclusions

The analysis of the results was done on the characteristics observed along the implementation and on the added value according to the self-assessment carried out, remembering that self-assessment was verified by us. The items evaluated before and after the implantation were Leadership, Strategies and Plans, Customers, Community, Information and Knowledge, Employees, Processes and Results. The total time devoted to this stage was 2 months.

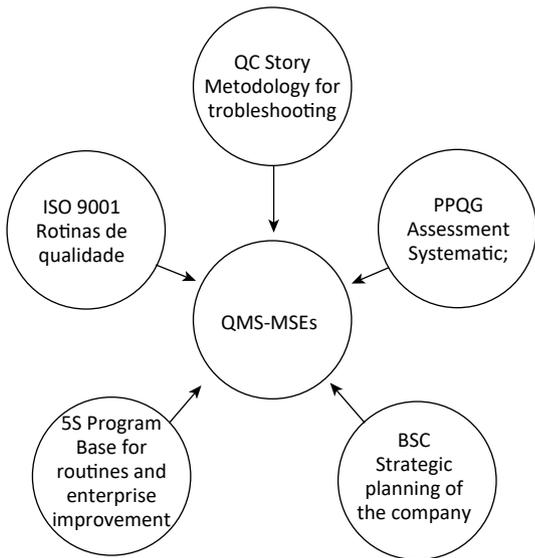
## 4. PRESENTATION OF THE PROPOSED MODEL

### 4.1 Overview of the model

The proposed method uses the concepts of the requirements of the ISO 9001, the São Paulo Management Quality Award (PPQG), the Balanced Scorecard (BSC), the QC Story and the 5S program. The PPQG was used in the preparation of a self-assessment with 40 questions through which entrepreneurs can evaluate the initial and final situation of their enterprises. The BSC was used in the elaboration of a procedure for the determination of targets and breaking up of strategies, and the QC Story was used as standard method for the implementation of corrective actions and strategic plans. Finally, the 5S program was used as the foundation for the implementation of some requirements close to the ISO 9001. Figure 1 illustrates how each of these tools or method contributed to the proposed model, named by us as QMS-MSEs.

With respect to its structure, the QMS-MSEs consist of 15 principles of quality and eight phases of implementation, plus a preparatory phase named zero phase. The flowchart shown by Figure 2 illustrates each of these phases, later detailed in topics from 4.2 to 4.10.

We highlight that, in order to assist entrepreneurs in the implementation and to reduce costs with consultancies, we developed an implementation manual and a master spreadsheet of the quality documents using the resources of the Microsoft Office and the Visual Basic. Finally, in relation to the time of implementation, the QMS-MSEs can be implemented in approximately 12 months, and this period may vary depending on the initial situation of the enterprise.



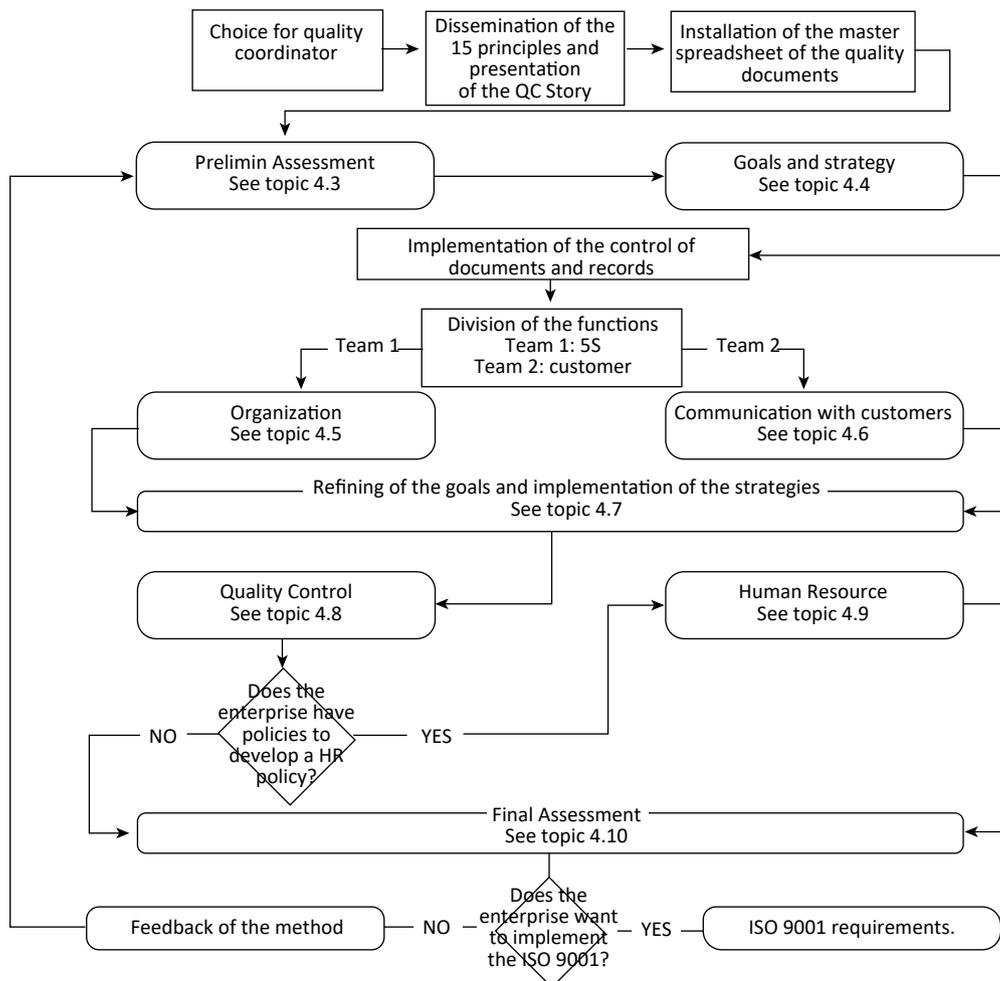
**Figure 1.** Performance of BSC, PPQG, QC Story, 5S and ISO 9001 in the QMS-MSEs.  
 Source: the authors' own.

### 4.2 Phase Zero: Preparatory Phase

Before beginning the implementation of the phases, the proposed method leads the entrepreneurs to a preparatory phase, in which some initial responsibilities and a minimal conceptual basis for the development are laid down. The activities to be developed in this preparatory phase are chosen by the quality coordinator, as well as the diffusion of managerial principles, the presentation of the QC Story and the installation of the master spreadsheet.

### 4.3 Phase 1: Preliminary Evaluation

After the preparatory phase is implemented, the quality coordinator must evaluate the initial situation of the enterprise through a self-assessment based on PPQG. This evaluation will be followed by the analysis of the strong and weak points and the legal or environmental requirements to which the enterprise is subject to, as illustrated in Figure 3.



**Figure 2.** Macro vision of QMS-MSEs.  
 Source: the authors' own.



Focusing a little more on the self-assessment, we highlight that it addresses all the activities present in the QMS-MSEs, in addition to other quality practices not disseminated by the method, the implementation manual or the master spreadsheet. The idea is to give the quality coordinator and the other leaders a reference to the best management practices and that they are fully implemented after two or three flowchart feedbacks, thus motivating the search for continuous improvement.

With respect to its structure, the self-assessment presents eight criteria and each one of them has five items, amounting to 40 multiple choice questions. The maximum score to be obtained is 250 points divided as follows among the criteria: 1- Leadership (20 points); 2- Strategies, Goals and Plans (20 points); 3- Customers (20 points); 4- Community (10 points); 5- Information and Knowledge (15 points); 6- Employees (15 points); 7- Processes (40 points); and 8- Results (110 points).

It should be noted that the imbalance between the criteria is due to the importance that each of them presents for micro and small enterprises in the early stages of management. At first, to ensure its survival in the market, the enterprise should focus on results that will mainly be the result of leadership, strategies, contacts with customers and processes. Factors such as community, information and knowledge and employees will gain importance as the enterprise develops and reaches higher stages of management.

The procedure presented above must be repeated for all the items and the evaluator must add up the percentages obtained in each one of them. By multiplying that percentage by the maximum score possible in the criterion we obtain a partial score and, by repeating the same procedure for the other criteria, we have the overall score of the enterprise.

The practices were examined by this assessment together with the weak and strong points and requirements to which the enterprise is subject to make a good information base for future decision-making. Finally, we highlight that the pe-

riodicity of this assessment is annual and it should be filed as a record to be debated at the critical analysis meetings. The form for the self-assessment is in the master spreadsheet.

#### 4.4 Phase 2: Goals and Strategies

Identified the current situation, the strong and weak points in relation to the standards of excellence, as well as the legal and environmental requirements to which the enterprise is subject to, the quality coordinator and the other leaders of the enterprise will be able to start the establishment of goals and the development of strategies to be implemented. The activities to be developed in this phase are shown in Figure 4.

The first activity consists in determining the targets based on the perspectives of the Balanced Scorecard, namely finance, customers, internal processes and training and growth of employees. The development of these targets will be done in weekly meetings and will take into consideration the relation of cause and effect between them.

Once determined the goals to be followed, the leaders of the enterprise must formulate performance indicators that allow their tracking. The implementation manual provides recommendations for some of them and suggests the allocation of 1 to 2 indicators for each of the perspectives.

With the goals and performance indicators at hand, the leaders must set up a meeting to establish the strategic plans and the preliminary schedule to be followed. It is highlighted that such plans and schedule will only be finalized after the third and fourth phases of the QMS-MSEs (Organization and Communication with Customers), when the enterprise already has more information about the environment into which it is inserted.

The next activity consists in the disclosure of the management responsibilities of the leaders of the enterprise. The proposed method points out the following responsibilities:

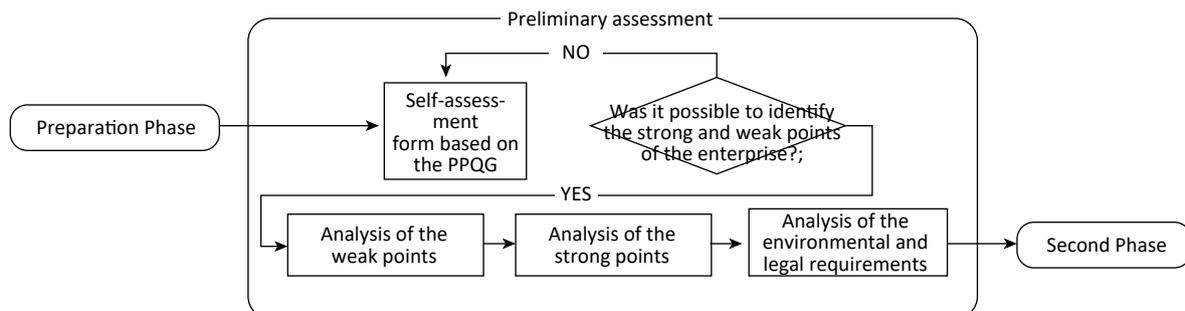
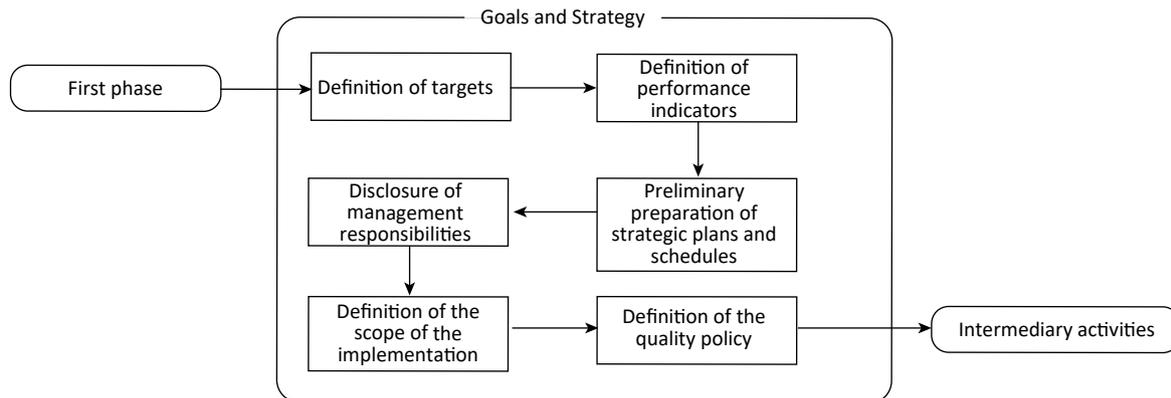


Figure 3. Activities of Preliminary Assessment phase.

Source: the authors' own.



**Figure 4.** Activities of the Goals and Strategies phase.

Source: the authors' own.

management commitment with quality activities, definition of a quality policy and its review every six months, submission of an updated organizational chart describing the functions of each employee within the enterprise, maintenance of an efficient internal communication, periodic meetings to discuss activities and results achieved by the enterprise, review of documents and their critical analysis.

Finally, the last activities of this phase consist in determining the scope of the implementation and defining the quality policy. For the scope of the implementation, the implementation manual presents guidelines on how to draft it so that it can be used later in the quality manual. For quality policy, in turn, the QMS-MSEs presents possible examples to be followed, in which the main objectives of the enterprise, the relationship with stakeholders, the market objectives, the management commitment and the periodicity for reviews are considered.

After this phase, the quality coordinator must perform two intermediate activities. The first one consists in the implementation of a procedure that defines the standards to be used by the quality records and documents. The second activity consists in forming two teams, one being responsible for the internal organization of the enterprise (team 1) and the other, for the communication with customers to ascertain their satisfaction and possible suggestions (team 2). It is important to note that both phases occur simultaneously for a period of 3 months.

#### 4.5 Phase 3: Organization

At this phase, the implementation of the 5S program will be performed with the goal of organizing the enterprise and creating a solid foundation for the management system being implemented. It is highlighted that new information could arise and it contributes to the refinement of the pre-

-defined strategic goals and plans in the second phase. Figure 5 illustrates the activities to be developed here.

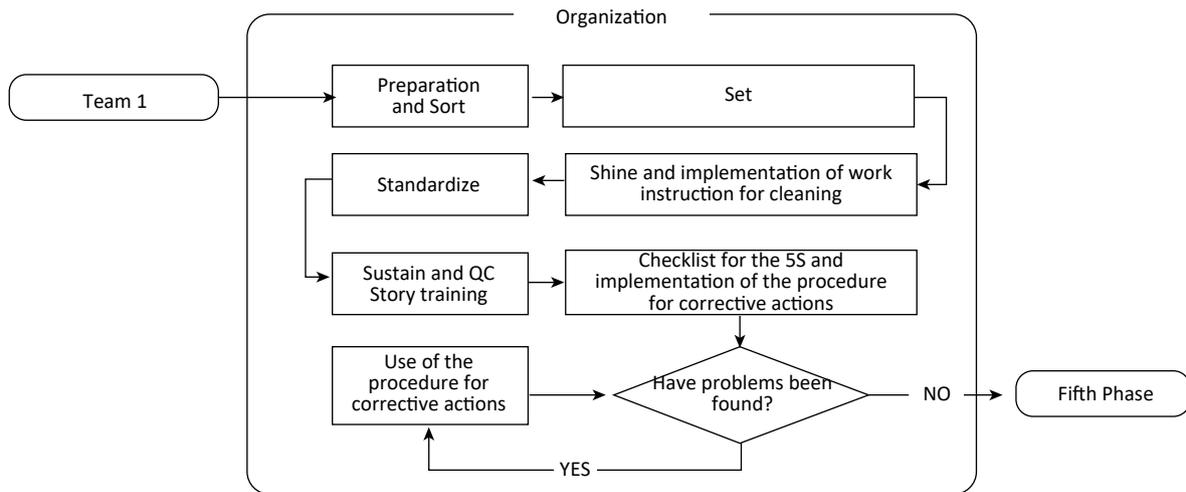
Before starting the implementation of the 5S, team 1 must conduct a preparatory phase for the 5S in which the record of the initial situation of the enterprise (through pictures, videos and other documents) and the training of employees will be done in this program. After disseminating the main concepts that guide the 5S program and recording the initial situation of the enterprise, the employees who make up team 1 must examine the possibilities of improvements based on the records elaborated.

Once implemented the 5S, the method leads the employees of team 1 to a check-list to verify whether all activities were developed during the phase and to analyze the main problems detected by the enterprise. The quality coordinator must choose some employees who will act as evaluators of the 5S, and an employee should not audit their own sector. Finally, it is highlighted that the implementation manual recommends this evaluation to be performed with quarterly periodicity and that it should be adapted to the reality of the enterprise.

Completed the assessment of the 5S, it is likely that the quality coordinator and the other components of team 1 will find problems or opportunities for improvement. Those will be solved through the instructions present in a new procedure to be implemented, which is the procedure for corrective actions based on the QC Story, according to the ISO 9001 standard. This procedure will be used until all the problems of the 5S are exhausted or when a non-conformance is identified in the enterprise.

#### 4.6 Phase 4: Communication with Customers

While the components of team 1 perform the internal organization of the work environment, the components of



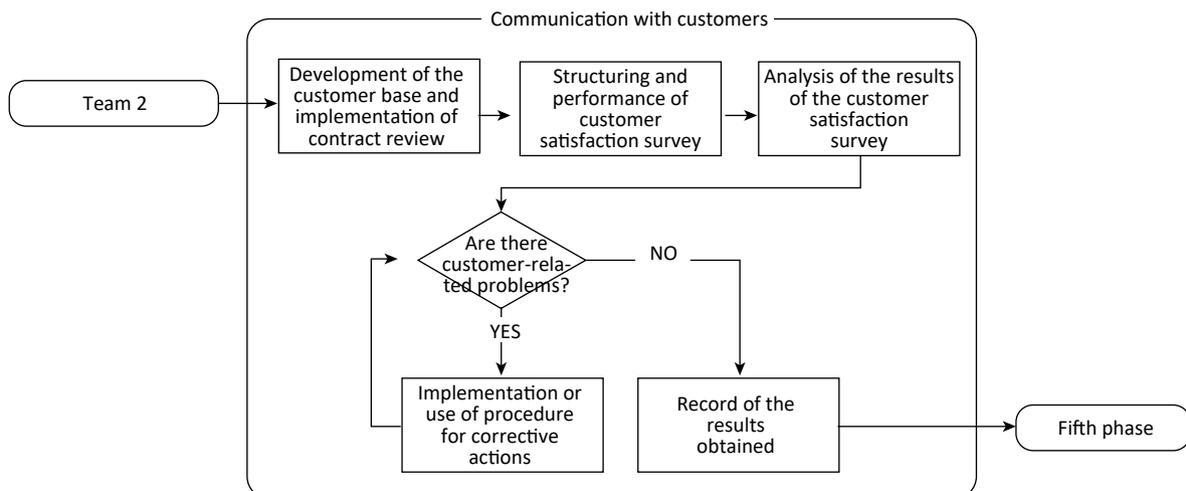
**Figure 5.** Activities of Organization phase.  
 Source: the authors' own.

team 2 will begin to establish communication with the customers of the enterprise. Thus, as in the second phase, new data will emerge and may be used as basis in the refinement of the strategic goals and plans. Figure 6 presents the activities to be developed in this phase.

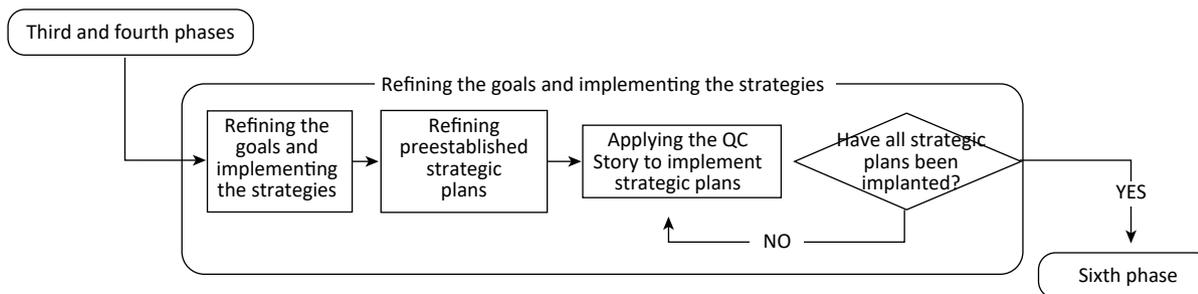
After the vitality classification of the customers, the quality coordinator and the other components of team 2 must implement a routine for the contract review. Finally, it is highlighted that the implementation manual recommends the preparation of records for the contract review.

The phase starts with the development of the customer base and their classification into vital, medium vital and little vital. This classification must be made by the quality coordinator and by the other leaders in order to allow a better understanding in terms of the importance of each of them to the enterprise. If the quality coordinator and the other employees wish, they may register the entire customer base in the master spreadsheet.

The next activity of this phase consists in structuring the research to evaluate customer satisfaction. The implementation manual recommends its execution by low-cost media such as telephone, letter or e-mail, because, this way, the contact will be simple and frequent. If the quality coordinator and the other leaders of the enterprise reach the conclusion that the costs are not prohibitive, they may also allow structured visits to their clients.



**Figure 6.** Activities of phase Communication with Customers.  
 Source: the authors' own.



**Figure 7.** Activities of Refining the Goals and Implementing the Strategies phase.

Source: the authors' own.

After the structuring of the research, the manual recommends the conduction by the quality coordinator of a pretest of the questions prepared, asking some employees from the enterprise to respond them and point the difficulties encountered. This information must be used in improving the research tool, be it a form, questionnaire, question list, etc.

Once polished the research tool, the quality coordinator and the employees that make up team 2 must start the establishment of a communication channel with the customers. If the enterprise chooses to send letters or emails, it should be aware that their return will take a few weeks and that its index may be low.

As the enterprise receives the responses from its customers, the quality coordinator and the other members of team 2 must analyze the information reported by each of them. If there are any problems or complaints, they must be solved through the procedure for corrective action (this procedure will be implemented at this stage if it has not already been used in the "Organization" phase), generating a complaint record for each of them.

When all the problems or complaints are solved, the quality coordinator and the other members of the team 2 must make a critical analysis of the research results and generate a record. At the end of this phase and the "Organization" phase, the quality coordinator will gather the members of teams 1 and 2 so that they can assist in the implementation of the next phases.

#### 4.7 Phase 5: Refining goals and implementing strategies

With the completion of the third and fourth phases of the method, new information could be obtained, and this information must be used for the refining of the strategic goals and plans, before their implementation. The activities described previously comprise the fifth phase of the QMS-MSEs and are presented by Figure 7.

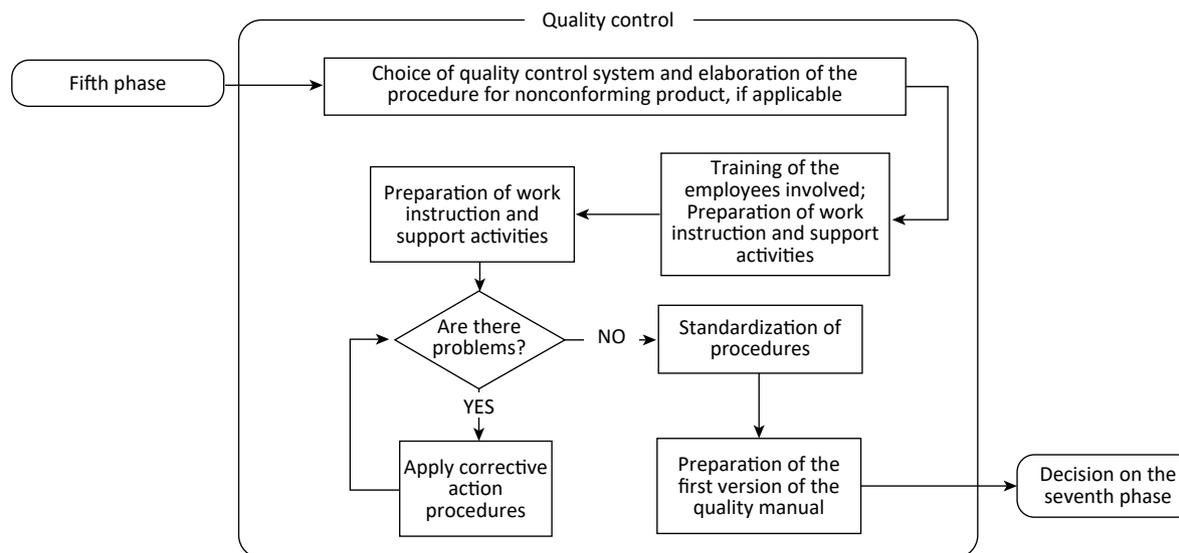
The first activity to be developed in this phase is the refining of the goals and performance indicators, followed by the refining of pre-established strategic plans. The quality coordinator must schedule meetings with the leaders of the enterprise in order to analyze the need to update the information pre-established in the second phase. In these same meetings, the employees responsible for putting into practice the strategic plans through the "act" stage of the QC Story will be defined. This procedure will be repeated until all plans have been implemented and followed up weekly by the quality coordinator.

#### 4.8 Phase 6: Quality Control

After implementing the improvements in the enterprise, it becomes necessary to implement a quality control system, which, along with standardization, will ensure the benefits achieved. Many of the activities developed in this phase will meet the requirements of the ISO 9001 standard and will be mentioned later. Figure 8 illustrates the activities to be developed in this phase.

The first activity is the choice of the quality control system to be implemented. One of the simplest ways to perform this control is the implementation of inspections based on check-lists or forms. The implementation manual presents a series of examples to identify products or services that do not meet customer and technical specifications, classifying them as non-conforming products. The quality coordinator and employees must define how these products will be segregated in a procedure for the control of non-conforming products.

The next step in the implementation of this phase is the training of the employees involved with the quality control system. The implementation manual recommends the training to be done in the work environment itself, so the quality coordinator can verify how the employees use it and what the most frequent doubts and errors are. This information will be extremely valuable in improving the control system before its standardization.



**Figure 8.** Activities of Quality Control phase.

Source: the authors' own.

In addition to the mentioned procedure, the quality coordinator and employees must also draw up a work instruction, describing the activities carried out in the quality control system. Such a document must be used in case of doubt or when new employees are hired.

All these ancillary activities are described in detail in the implementation manual, with examples available for them in the quality master spreadsheet. If the quality coordinator and employees identify problems in the implementation of the quality control and its ancillary activities, they must use the procedures for corrective action to address the non-conformities found.

After implementing the quality control system that allows the enterprise staff to separate and treat the products or services labeled as non-conforming, the next step is the standardization of all documentation prepared so far, if it still does not follow the guidelines of the procedure for the control of documents and records. The quality coordinator and employees must check each of the generated documents and verify whether they follow pre-established standards.

With all the standardized documentation, the quality coordinator and employees may go to the preparation of the first version of the quality manual. The implementation manual explains step by step how to prepare each of the items in a simple and objective way, presenting an order similar to that contained in the ISO 9001. Another striking feature of the quality manual is the fact that it integrates in a single document aspects related to quality and strategic planning (since it presents the business goals and plans summarized),

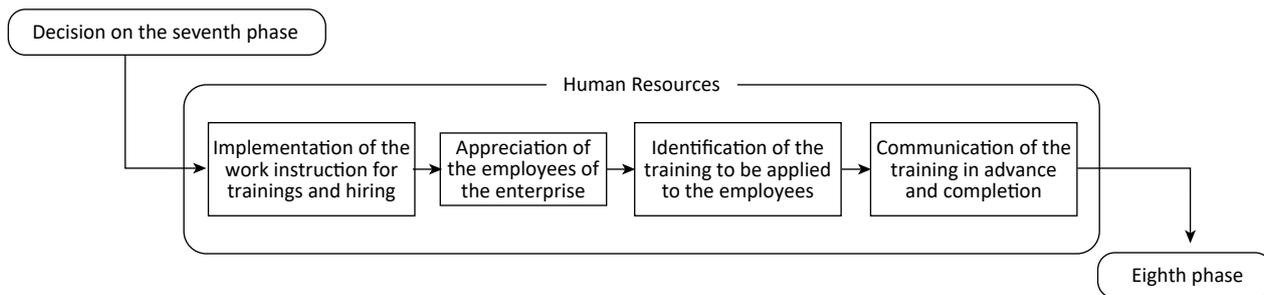
thus optimizing the amount of documents to be used by the enterprise. Finally, it should be noted that this is the first version of the quality manual and that it will only be completed after the completion of the eighth phase of the method.

After the elaboration of the quality manual, the flowchart will question about the possibility of implementing some concepts related to the human resource management. It is highlighted that the purpose of the seventh phase is just to introduce some concepts and not to implement them completely. If the quality coordinator judges that his enterprise is prepared for these introductory activities, he should develop the activities mentioned below; otherwise, he should go directly to the eighth phase of the method.

#### 4.9 Phase 7: Human Resources

According to Saviani (1995), the confusion between personnel department and the policy of the human resources is common in many micro and small enterprises. For this reason, the implementation manual starts this phase differentiating these two concepts. Figure 9 presents the activities to be developed in this phase.

The first activity of this phase consists in implementing the work instruction that will standardize the conduct of trainings and hiring of new employees. The implementation manual presents the details of this document and the master spreadsheet brings an example for a fictitious enterprise. Moreover, the method opens space for the quality coordinator to study ways for the appreciation of the employees.



**Figure 9.** Steps of the Human Resources phase.

Source: the authors' own.

After implementing the work instruction for trainings and hiring of new employees, the quality coordinator and the other leaders must identify the training to be carried out for the dissemination of the new knowledge to the employees of the enterprise. As a first suggestion, the implementation manual recommends the conduction of a simplified training on the ISO 9000 series, available in the "presentations" field of the master spreadsheet.

Once decided the training to be conducted, the quality coordinator must communicate the interested employees with an advance of at least one week so that they can organize themselves. On the day of the training, small printed guidelines should be distributed to each employee with the main topics or concepts to be presented.

With respect to the hiring of new employees, the implementation manual suggests that the enterprise should focus on persons who are dynamic, creative and who have experience in the required area. In addition, it also recommends that the quality coordinator should establish a test period of two to three months to verify whether the employees meet the needs of the enterprise and if they are satisfied with their assignments. Finally, it is highlighted that the master spreadsheet presents models of records for the activities to be developed in this phase.

#### 4.10 Phase 8: Final Assessment

Between nine and eleven months after the beginning, it is expected that the enterprise will have achieved some benefits and that they may be confirmed through evaluations, audits, analyses of indicators and critical analysis meetings. Figure 10 presents the activities to be developed in the eighth and last phase of the method.

The first activity consists in the elaboration of the procedure that will govern the activities of audits and evaluations, meeting the ISO 9001 standard. Generally speaking, this document must mention the self-evaluation based on

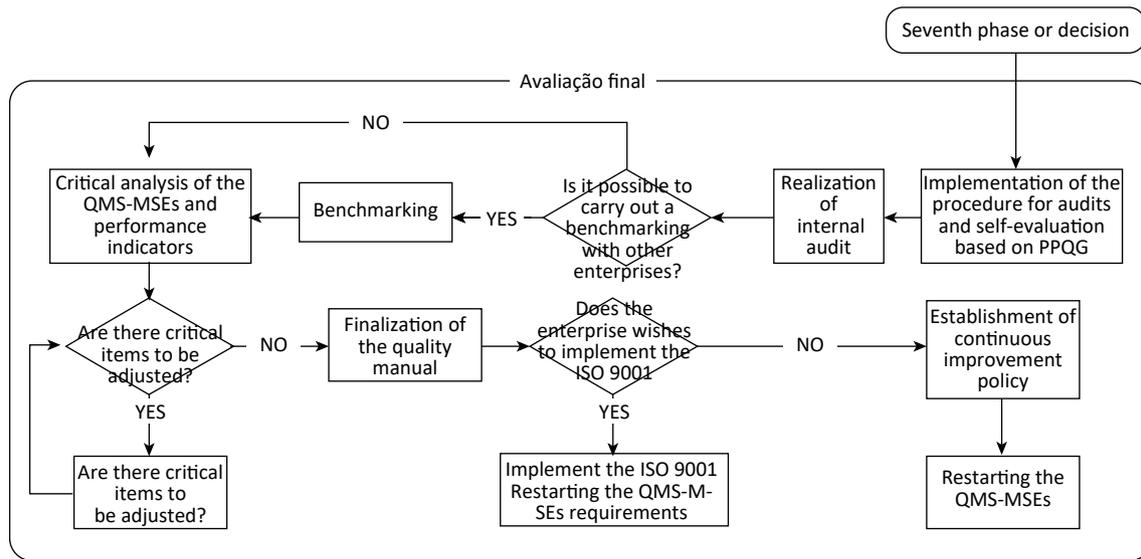
the PPQG, which was performed on the first phase of the method, and an internal audit that will be performed with the aid of some employees.

The self-evaluation based on the PPQG must be conducted annually by the quality coordinator through the form available in the master spreadsheet. We highlight that this form has instructions for its filing in its scope and it must be shown in the critical analysis of the QMS-MSEs. The internal audit will also be conducted annually by the employees chosen by the quality coordinator, and each of them must audit an area with which they are not involved, based on the quality manual. The non-conformities detected in the audits must be pointed in records and stay pending until they are solved.

After finishing the evaluation and audit, the quality coordinator and the other leaders of the enterprise must determine whether there is a possibility to carry out a benchmarking, in which the characteristics of the company market leader will be analyzed. It is highlighted that the implementation manual also stimulates the exchange of information between enterprises in this activity, especially if they are located in technological parks or business incubators.

The next activity consists in carrying out a critical analysis through meetings with the other leaders. The implementation manual recommends the discussion of the main topics mentioned in the second phase of the method, when the management responsibilities were disclosed. As a result of the self-evaluation based on the PPQG, of the audit, of the benchmarking (if performed) and of the meeting of the critical analysis of the management system, there will be non-conformities to be solved or improvements to be implemented. The quality coordinator must put them into practice through the procedure for corrective actions and, if necessary, carry out a review of the quality documents.

With the solved non-conformities and the implemented improvements, the QMS-MSEs will be finally implemented and, as one of the last activities, the quality coordinator must finalize the quality manual.



**Figure 10.** Activities of the Final Assessment phase.

Source: the authors' own.

Of course, depending on the initial situation of the enterprise and the commitment of the leaders and employees, the results will vary, but in general it is expected that, by the end of the implementation, the enterprise will have approximately 60% of the language and requirements present in the ISO 9001. Thus, if it is of interest to the leaders, the quality coordinator can continue with the activities and guide the employees in the implementation and certification of such standard.

## 5. RESULTS FROM THE IMPLEMENTATION

Initially, it is interesting to present a brief description of the seven enterprises that participated in the research in order to improve the understanding of the results. All these enterprises were allocated in the Jundiaí Business Incubator.

- Enterprise 1: textile industry, production of pillows and blankets for aircraft, as well as aromatic pillows for pharmacy. Micro enterprise.
- Enterprise 2: textile industry, production of bags and backpacks for notebooks. Small enterprise.
- Enterprise 3: electronics industry, design and development of boards for industrial automation. Micro enterprise.
- Enterprise 4: metal mechanic industry, design and development of agricultural and farming equipment. Micro enterprise.

- Enterprise 5: machining industry, provision of services in the area of machining and tooling. Small enterprise.
- Enterprise 6: electronic industry, design and development of electrical energy consumption meters. Small enterprise.
- Enterprise 7: business automation industry, development of equipment and software for businesses. Small enterprise.

To present all the results observed at the end of the implementation, we opted for the construction of Table 1, in which it is possible to make a comparison in terms of evolution of each enterprise or in relation to general aspects.

## 6. DISCUSSION

Through the initial and final assessments presented in Table 1, it is possible to see the improvement in terms of the performance of each enterprise, which demonstrates the effectiveness of the proposed method. Importantly, the degree of improvement in terms of efficiency was achieved at different levels, fully or partly eliminating the difficulties presented by the enterprises before the implementation.

Specific analyzes of the data of Table 1 demonstrate that the greatest benefits were obtained by enterprises 3, 6 and 7, in which managers and employees have developed a new way of thinking, creating a "culture of quality". For these three enterprises, it is possible to say that the





method proposed created a quality management system that is appropriate to their needs. The participation of employees in the daily routine of the enterprise was intense, the objectives to be achieved by each employee were aligned with the business goals and the problems were solved through methodologies defined by QC Story, among other activities. Improvement opportunities still exist; however, the method provided to these enterprises a new way of thinking and acting.

Enterprise 1 was in a more primitive management stage than the other candidates, as seen through the first assessment and, on that basis, the improvements provided by the method happened more slowly. We believe, however, that after two or three feedbacks, the results of the method become more satisfactory. This enterprise, in particular, still needs to better work the development of its employees, aligning its goals and adjusting working procedures.

Enterprises 2 and 5 achieved a similar performance and they did not achieve better results only because of a financial crisis that hit the enterprises after six months of implementation of the method. It is noteworthy to say that up to that moment they were getting good results. Finally, enterprise 4 had the smallest development among the participants, in particular, because of the conservative character of one of its entrepreneurs.

Focusing on the management criteria analyzed through the self-evaluation based on the PPQG, the enterprises developed more in the issues related to leadership (139.5), strategies (130.7%) and processes (127.1%), which demonstrates the emphasis and efficiency of the method in the development of these activities. The smallest contributions, in turn, were linked to aspects related to community and employees, which corroborates the ideas that these administrative features, although important, are initially still neglected by micro and small enterprises.

In relation to the tools and methods provided by the QMS-MSEs, the entrepreneurs had no great difficulties in their use. The simpler concepts of the Balanced Scorecard such as the analysis of the enterprise in four perspectives, the relationship of cause and effect and the trend indicators were well understood and showed to be ideal in the breaking up of the strategies from the targets. For the QC Story, initially there were some minor difficulties arising mainly from the belief that troubleshooting can occur empirically, but over time it began to be used by all employees of all enterprises. The 5S program, in turn, proved to be ideal for the organization of the workplace and for the implementation of the first documents related to the ISO 9001 standard.

We highlight that, in this first moment, the self-evaluations were followed closely by us and this method, al-

though validated in Brazilian enterprises, can be applied to any enterprise in the world with the same characteristics and size.

## 7. CONCLUSIONS

As mentioned in topic 1 of this paper, micro and small enterprises have an extremely important role in the economy of any country in relation to income generation and employment, not being different for the Brazilian reality. Academic research associated with new management models for these enterprises are extremely valuable to enhance their performance.

The main objective of this paper was to develop a method to implement a quality management system in micro and small enterprises. The method was developed and implanted in seven micro and small enterprises located in the Jundiaí Business Incubator, being effective in relation to the proposed objectives and eliminating various managerial difficulties observed before its implementation. Thus, it was possible to answer the research problem and prove the hypothesis based on the literature that a method for implementing a quality management system in micro and small enterprises should be based on the ISO 9001, should be directly linked to business strategies, should allow the self-assessment of enterprises and must have examples that facilitate the understanding of the entrepreneur.

Despite the good results obtained during this research and the efficiency of the QMS-MSEs, we recognize some limitations in the research developed, such as, the fact that the method has been implemented only in incubated enterprises. It is possible that its implementation in enterprises from other regions, with a larger number of employees and outside the incubation regime, could show other characteristics and, as a consequence, reach other conclusions. However, it is important to highlight, again, the originality and contribution of this research for the subject of quality management in micro and small enterprises.

## REFERENCES

- Andersen, H., Cobbold, I. and Lawrie, G. Balanced Scorecard implementation in SMEs: reflection and practice. 2 GC Conference Paper, available <http://www.2gc.co.uk/pdf/2GC-SMES-MEp.pdf> >. 2001.
- Biazzo, S. and Bernadelli, G. (2003), "Process Management Practices and quality system standards: risks and opportunities of the new ISO 9001 certification". Business Process Management Journal, Vol. 9 No. 2, pp. 149-169.
- Brotos, J.M. Sansalvador, M.E. (2016). "The value of ISO 9001 certification in the Spanish small and medium enterprises be-



- longing to the agriculture sector: the impact of the economic crisis" *Revista ITEA*. Vol 112 No. 1 pp. 72-87
- Carmignani, G. (2008), "Process-based Management: a structure approach to provide the best answers to the ISO 9001 requirement". *Business Process Management Journal*, Vol. 14 No. 6, pp. 803-812.
- Cragg, P., Mills, A. (2011). "IT support for business process in SMEs". *Business Process Management Journal*, Vol. 17 No. 5, pp. 697-710.
- Falconi, V.C. (2014). *Total Quality Control: Japanese way to quality*, UFMG, Minas Gerais. 2014.
- GEM (2014), *GEM 2014 Global Report, Global Entrepreneurship Monitor*, Santiago, Chile. Available <<http://www.gem-consortium.org/docs/3616/gem-2014-global-report>>
- Hakserver, C. (1996), "Total Quality Management in the small business environment", *Business Horizon*, Vol. 39 No. 3, pp. 33-34.
- Ilkai, P. and Aslan, A. (2012) "The effect of ISO 9001 quality management system on the performance of SMEs", *Business Process Management Journal*, Vol. 29 No. 7, pp. 753-778.
- Ishikawa, K. (1989), *Introduction to Quality Control*, Productivity Press, New York.
- ISO (2008), "ISO 9001:2008 Quality Management Requirements", International Organization for Standardization, Geneva.
- Kaplan, R.S. et Norton, D.P (1996), *The Balanced Scorecard: Translating Strategy into Action*, Harvard Business Review Press, New York.
- Lee, S.F. and Andrew, S. (2000) "Building a Balanced Scorecard with SWOT Analysis, and implementing "Sun Tzu's the Art of Business Management Strategies on QFD methodology", *Managerial Auditing Journal*, Vol. 15 No. 1, pp. 68-76.
- Mattos, V. L. D, Soares, M.C., Viticoski, R.L., Agreda, L.M. (2015), "sistema de Gestão da Qualidade em Empresas localizadas no Sul do Rio Grande do Sul", *Sistemas & Gestão*, Vol.10 No.4, pp. 587-598.
- McAdam, R. (2000) "Quality Models in SMEs context", *International Journal of Quality & Reliability Management*, Vol. 17 No. 3, pp. 305-323.
- Munsterman, B., Eckhardt, A. and TIM, W. (2010) "The performance impact of business process standardization: an empirical evaluation of the recruitment process", *Business Process Management Journal*, Vol. 16 No. 10, pp. 29-56.
- Nwankwo, S. (2000) "Quality Assurance in small business: myths and realities" *International Journal of Quality & Reliability Management*, Vol. 11 No. 1, pp. 82-99.
- PPQG (2013), São Paulo State Quality Management Award. Available <http://www.ipeg.org.br/premiopaulista/criterios.html>>
- Psomas, E. Kafetzopoulos, D. (2014) "Performance measures of ISO 9001 certified and noncertified manufacturing companies", *Benchmarking: An International Journal*, Vol. 21 No. 5, pp. 756-774,
- Psomas, E. Pantouvakis, A. (2015) "ISO 9001 overall performance dimensions: an exploratory study", *The TQM Journal*, Vol. 27 No. 5, pp.519-531.
- Sebrae (2014), "Regulation of micro and small enterprises", Brazilian Service to Support Micro and Small Enterprises, available at <http://www.sebrae.com.br/sites/PortalSebrae> (accessed 03 February 2014)
- Sebrae-SP (2013), "Generals" Brazilian Service to support micro and small enterprises: São Paulo State Office, available at [www.sebraesp.com.br](http://www.sebraesp.com.br) (accessed 20 December 2013)
- Souza-Poza, A., Altinkilinc, M. and Searcy, C. (2008) "Implementing a Functional ISO 9001 Quality Management System in Small and Medium-Sized Enterprises", *International Journal of Engineering*, Vol. 3 No. 310, pp. 220.
- Spencer, M.S. and Lomba, A.P.S. (2001) "Total Quality Management programmes at smaller manufacturers: benchmarking techniques and results", *Total Quality Management*, Vol. 12 No. 5, pp. 689-695.
- Valmohammadi, C. Kalantari, M. (2015) "The moderating effect of motivations on the relationship between obtaining ISO 9001 certification and organizational performance", *The TQM Journal*, Vol. 27 No. 5, pp.503-518.
- Williams, A.R.T., Brown, A. and Dale, B.G. (2001) "The ISO 9000 series as a tool for organization change: is there a case?" *Business Process Management Journal*, Vol. 7 No. 4, pp. 323-331.
- Youssef, A. and Aldowaisan, T. (2006) "An ISO 9001:2000-based framework for realizing quality in small businesses". *Omega*, Vol. 34 No. 6, pp. 231-235.