

Continual improvement in an ISO 9001:2008 certified company: a case study of a Brazilian leasing and service company

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Abstract

This study aimed to identify how the Organization researched has enhanced a continual improvement implementation and if and how employees perceived it after the ISO standard 9001 implementation. This Quality standard, besides specifying the requirements for a quality management system, as used by organizations, also focuses on the effectiveness of a Quality Management System (QMS) to meeting customers requirements, which requires the maintenance of the Management System through continual improvement driven by its employees. We used as a methodology an exploratory qualitative research related to a case study. The research results was assessed by means of categorizations, through the so called 'Content Analysis Method' as proposed by Bardin (1977). It is worth mentioning, that the implementation of the ISO standard 9001 at the MAXCON company, favored the promotion of the continual improvement methodology and that additionally those managerial improvements were perceived by the employees, through the learning generated for the Organization and its participants.

Keywords

Continual improvement, employees, quality, quality management, implementation of continual improvement.

1. Introduction

Continual improvement practice adopted by organizations reflects the interest shown by them, to maintain a high degree of competitiveness, in increasingly unstable markets. According to Ham and Park (2014) promoting the continued productivity of the manufacturing systems is one of the important components, to ensure the efficiency of the operation and consequently the improvement of its processes.

The changes promoted in manufacturing and organizational processes come from answers that organizations must give to the demands of their markets, customer's requirements and the way companies seek to differentiate themselves from their competitors (MARZAK, 2014).

According to this author, the adjustment between external demands and internal possibilities can only be obtained successfully, if there is a corresponding support on the side of employees, which must be mobilised and aligned to achieve challenging goals.

It was therefore with this intention that the company MAXCON implemented the QMS according to ISO standard 9001 in order to ensure that its organizational processes were established, implemented and maintained. It should be noted that this standard establishes the direction representatives must report to the company's senior management the QMS performance and any need for improvement, thus ensuring the promotion of awareness of customer requirements in order to keep informed the entire organization.

Continual improvement is one of the challenges to be overcome by organizations; according to Gonzalez and Martins (2007), "The concept of continual improvement follows the evolution of the quality". It turns out that, in the years 90, there was a previous migration status focused on operational needs and facilities for the pursuit of Total Quality, favoring the management by processes and in turn, the improvement activities involving the entire organization".

The author Marzak (2014) points out, that changes in the environment in which organizations are inserted leverage processes of continual improvement, if companies want actually serve its clients, offering them a package of value that brings satisfaction, not only by calls to the technical requirements of products, but for a solution to a problem faced by them.

This growing importance of understanding processes in organizations has close relationship with the continual improvement process, as the environment changes with speed and depth and, usually in relation to organizations (MARZAK, 2014).

Thus, to achieve improvements in organizational processes continuously it is necessary first to define, implement and maintain the QMS, as established by this standard, being the next step to direct the company in pursuit of quality of products and services generated by its processes, for only then, promote the improvements requested by their internal and external customers (GONZALEZ and MARTINS, 2007).

1.1 The Maxcon Company

The Maxcon company is a small business, 38 employees, founded in the city of Campinas, State of São Paulo, Brazil. According to its mission, it is dedicated to delivering customer's eco-friendly and sustainable equipment. In addition to the concern about the ecological and sustainable aspects of its products, ranging from its use to collection, the company focuses on quality, commitment and a fair price offered to its customers. In order to increase the management quality of its processes, the Maxcon implemented, in February 2013, a QMS according to the ISO standard 9001. The company, which worked only with leasing of containers and chemical toilets, through strategic growth movements, increased its product mix, adding other equipment, such as sentry boxes, Food Containers, Container House, Tents and storage of goods, to better positioning and meeting the needs of its customers in the market.

2. Theoretical framework

2.1 Internacional standard ISO 9001:2008 - key concepts

The study made was based on the ISO standard 9001 implementation process at MAXCON company. This implementation allowed company managers to understand, in addition to its central concepts, how to relate it to an integrated Quality Management System (QMS) for the sake of continued improvement and implementation, especially those which were originated by the standard certification.

Second Paladini (2011) the ISO standard 9001 constitutes more than a Quality System, once it goes beyond regulations set, being necessary to understand the organizational culture focused on the client. The same author points out that is important to have the understanding of the whole, in order to allow for the systematic analysis of the Organization and also for learning promoted and raised by the knowledge of their internal processes. Another important component for the standard implementation is the commitment of senior management and its collaborators, so that continued improvements, arising from the application of the standard, were developed and maintained over time.

Although the ISO 9001 is a generic application system template, those characteristics of the system of quality ISO 9001 compel companies to develop an organizational culture based on the principles of customer focus, quality, leadership, vision and systemic processes, scientific approach to continual improvement, commitment and involvement (PALADINI, 2011).

2.2 Quality Management System (QMS)

To meet the expectations of customers it is necessary to have quality, related to the QMS in accordance with the concept of Mota and Marshal (2015), for whom this is a substantial factor for the perpetuation of organizations, especially those, who seek their position in a highly competitive market.

The term Quality, in this context, becomes a strategic requirement and ceases to be a mere Appendix to the product; it acquires a greater dimension and becomes a must for companies, who wish to remain active in the market and, in this sense, Quality becomes an essential prerequisite for the survival of the Organization (PEREIRA, 2015).

According to Agmoni (2016), the concepts associated with the Quality Management, have come to mean a management model that seeks efficiency and organizational effectiveness. These actions performed over time aimed at the implementation and maintenance of a Management System, designed to improve the performance of organizations, taking into account the needs of all stakeholders.

Johansson, Witell and Ronnback (2013) when referring to systems of management mention that (...) an improvement program can be defined as a purposeful and explicit set of principles, practices and techniques adopted to generate systematic information and cumulative improvement in the processes and results of an organization."

2.3. Continual improvement and the Kaizen methodology

According to ISO standard 9001, the continual improvement reflected on Kaizen methodology, aims to improve the satisfaction of customers and other interested parties. This standard also signals that, for continual improvement, it is necessary to perform a series of actions, the results of which should be critically analysed to check the existing opportunities for improvement and the effectiveness of the actions implemented.

Organizations that proceed in this way with constant focus on improvement of its processes, geared to the needs of its internal and external clients, becomes a learning organization (MARZAK, 2014).

In this way, continual improvement allows developers to articulate the sequences and the flow of organizational activities, so it may become able to respond to changing expectations of their customers (MARZAK, 2014). The above author recommends continual improvement assume dimensions, which are beyond simple concern with organizational processes, reaching the boundaries of responsibilities and the commitment of all the people and levels of the organization. To achieve this level, therefore, the managers began to realize the importance of the opportunities for change and its causes.

The author Marzak (2014) reinforces that the search for a solution of the problems related to processes implies actions that go beyond functional boundaries. This same author goes further, by saying that only the understanding of this situation does not allow a solution to the problem, since there is a lack of competent persons willing to change. The implementation of the processes stages as an integrated system implies in practice to cause managers to act beyond its borders.

This same author still understands, that the opportunity for improvement, when conducted properly by the Organization, can function as a learning facilitator and, as a result, increase satisfaction and confidence in people, involved in the improvement processes. In this way the managers, in the exercise of their leadership, have to demonstrate to its employees the opportunities and benefits of the changes to be made to obtain positive results, of great value to the organization.

The Kaizen philosophy of continual improvement principle, consisting of important resource in the pursuit of the improvement of productive and administrative processes, makes the Organization efficient, fast and leaner; it has aroused interest of many researchers and companies internationally, being the main cause related to the increased efficiency of enterprises, improving the quality, efficiency and reduction of investment and operational costs, additionally to increasing mobilization and alignment of work teams.

However, as reminds us Agmoni (2016), not all attempts at implementation of this methodology were successful, which led some companies to give up their use.

Large portion of the Western organizations fails to understanding the philosophy behind the word Kaizen, applies it improperly and, therefore, do not understand its reasoning on Japanese culture, suggesting that constant improvement must occur both in life and in people's behavior, as in the cycle of life itself (AGMONI, 2016).

This is the difference observed by the above author, between the use of the Kaizen concept in Western and in Japanese companies and, for this reason, affect the success of its implementation. Still according to this same author Kaizen is characterised by daily actions that include improvements in all aspects of organization, involving all employees, from the top to the base.

Still in this samem sense, Marzak (2014) believes that the process of continual improvement requires the effort of large portion of employees for daily activities, performed in their jobs.

This author believes that these activities represent fragments of the whole, which runs the Organization, impacting Kaizen teams interdepartmentally, because such impacts go beyond their functional boundaries. Continual improvements, as opposed to radical initiatives, are less costly and represent minor risks to companies, besides having high potential over time, when performed continuously (MARZAK, 2014).

Samman (2016) proposes five phases for the implementation of the Kaizen methodology, corresponding to phase one the generation and implementation of the necessary mechanisms for the realization of the Kaizen project. The phase two concerns the qualification and a more in-depth analysis of the proposal, including training of the Kaizen team, which conducts to the final evaluation of the project.

If there is an expectation of improvement, we proceed to the phase three; otherwise, the project should be abandoned. In the phase three is created the improvement solution, the implementation and evaluation of the resulting project performance. In the phase four, the documentation system and quality standards are reviewed and updated; and finally, in the phase five, the system is monitored continuously to process improvement proposals.

The implementation of small improvements, as simple as it may seem, increases the efficiency of operations and, more importantly, provides the necessary cultural impact, to ensure the continuity of the improvements and the participation of employees in search of new opportunities and more challenging goals.

3. Methodology

Methodology is the systematic, theoretical analysis of the methods applied to a field of study. It comprises the theoretical analysis of the body of methods and principles associated with a branch of knowledge. Typically, it encompasses concepts such as paradigm, theoretical model, phases and quantitative or qualitative techniques. According to Gil (2002), a research has a pragmatic character, that is (...) a formal and systematic development process of the scientific method. The primary goal of a research is to discover answers to problems through the use of scientific procedures". This definition has guided the work performed in this research, as the development of a method, which provided answers to the problem formulated."

3.1 Methodological Procedure

Qualitative research is a method of inquiry employed in many different academic disciplines, including in the social and natural sciences, but also in non-academic contexts including market research, business, and service demonstrations by non-profits orgnizations. Qualitative research, according to Gil (2002) search perceptions and understandings, to develop space for interpretation and encourage respondents to think freely about some topic, goal or concept. The above-mentioned author believes the exploratory research, if familiar with the phenomenon investigated, can be performed with greater understanding and accuracy. In addition to the qualitative research, this research had also exploratory character, once it allowed for the the consideration of the various aspects relating to the fact studied.

We chose to interview people who had practical experience with the problem researched. On the other hand, the case study aimed to analyze the phenomena that are present in real life, with the understanding provided by them, by means of analyses performed which in turn, additionally provided a better decision-making, contributing to a better understanding of how results were achieved (YIN, 2010).

Therefore, the research developed in this study had a qualitative and exploratory nature, and was employed to better understand the problem researched, based on employees' perceptions and directly related to the activities daily performed by them.

It should be noted additionally, that one of the study objectives was to identify how the ISO 9001 implementation at MAXCON company favoured the promotion of the continual improvement philosophy and how it was perceived by their employees.

The analysis and the consolidation of the responses contained in forms delivered, enabled the identification of five categories and a subcategory, which were obtained by grouping sets of elements identified through the interviews conducted. "To classify elements into categories requires the investigation of what each of them has in common with the others. Is the common part between them that will allow its grouping (BARDIN, 1977)".

Flores (1994) signals that the grouping or the conceptual categorization of results, can be performed either a priori or a posteriori; when categorization is made in advance to research, the approach is designated as being a priori and, otherwise, that is, when the categorization of the elements is obtained after the search, and this was the case in this research, it is classified as being a posteriori.

3.2 Method and research techniques

The implementation of the interviews was developed in different hierarchical levels of the company, ensuring thus greater representativeness of the responses collected. However, due to the fact that one of the researcher had family connection with the CEO, we chose by his exclusion among the respondents. This caution was necessary not to contaminate the respondents answers.

3.3 Data collection instrument

The instrument employed for data collection was a form with structured questions, which were answered by the company's employees. The forms filled were placed by these, in an urn sealed, for the preservation of their identity. Ten forms were distributed and answered: 30% by female and 70% by male employees, with an answered return rate of 100%. The company's average time of respondents ranged from a minimum of one and a maximum of five years.

Figure 1. Sample deviation by Gender

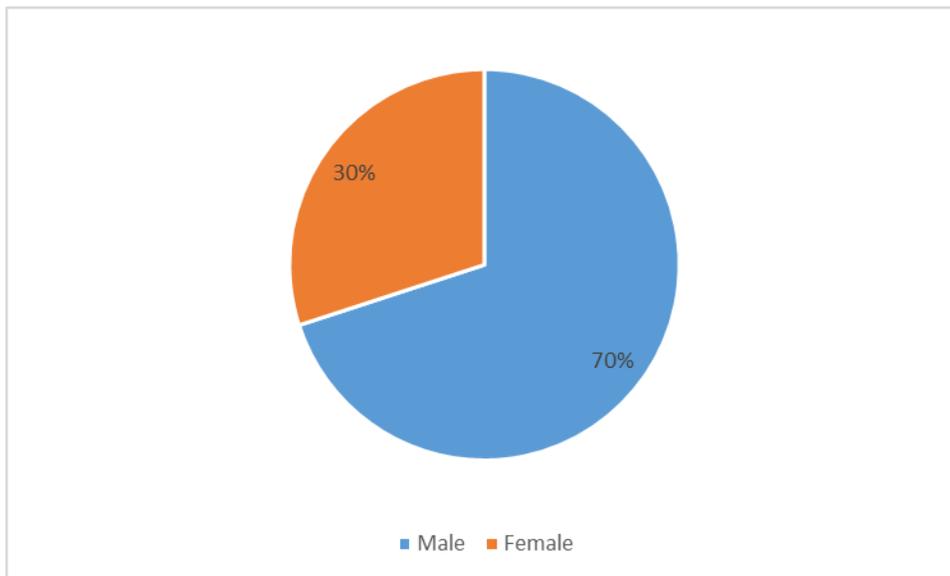
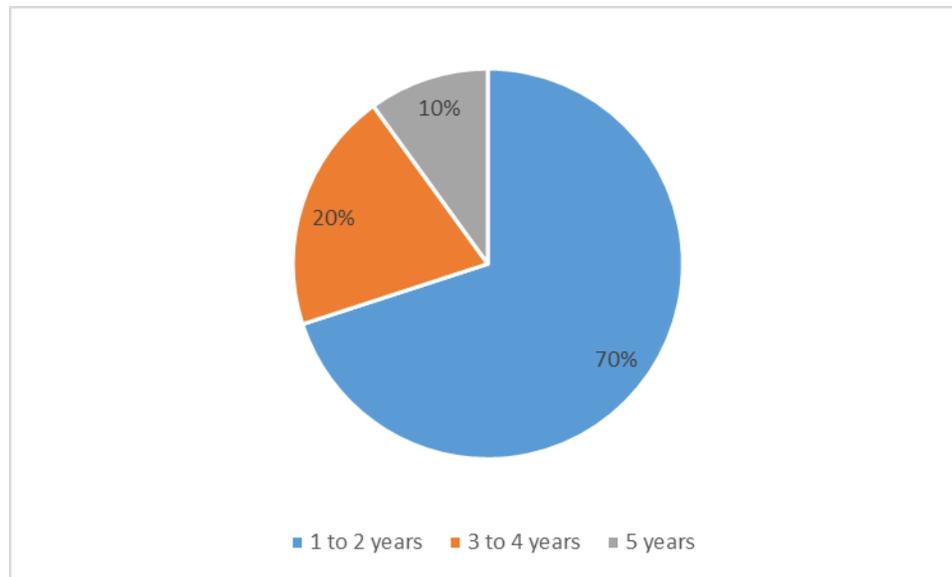


Figure 2. Sample division by employee working time



For the better understanding of data collection employed, we developed the Tables 1, 2 and 3, seeking to demonstrate the relationship between the questions placed and the concepts employed according to the theoretical framework developed.

The chosen employees belonged to the following Organization areas: Logistics, Maintenance, Administration and Human Resources. This staff sampling of chosen with the intent to have a greater representativity of the data set collected and examined in the different organizational levels.

The consolidation of the data has allowed the identification of a set of category groups obtained through the responses of employees, which were related to the theoretical references adopted.

The consolidated data were the basis for the categorisation of the respondent's speeches, relating them to the concepts presented in the research theoretical framework.

Table 1. Quality related questions

Author	Concept	Questions
Pereira (2015)	Quality, in this context, it is no longer a matter of decision, a commitment or an ornament in the product: became first a need for those who wish to remain active in the market. The quality became a prerequisite for the organization survival.	<ol style="list-style-type: none"> 1. Cite and explain the changes perceived by you after the company certification. 2. Did your understanding about quality change, after the ISO 9001 standard implementation? Explain the situation in which it occurred.

Table 2. Continual improvement related questions

Author	Concept	Questions
Marzak (2014)	"The continual improvement allows developers to articulate the sequences and organizational activities flows so that the processes can become able to respond to constant changes and expectations of its customers"	<p>3. Do you believe that only implement the quality management system ensures customer satisfaction?</p> <p>4. The company challenges and encourages people to perform continual improvement? Exemplifies a situation in which it occurred.</p> <p>5. Do you believe that continued improvements suggested by employees are applied at MAXCON? Describe a case in which this occurred.</p>

It is noticed that the questions 3 to 5 are in line with the argument that the improvements to become continuous, can concatenate changes in organizational processes making them flexible due to the demands of the markets in which the company operates.

Table 3. Quality management system related questions

Author	Concept	Questions
Agmoni (2016)	The concepts associated with the quality management, have come to mean a management model that seeks efficiency and organizational effectiveness. These actions performed over time aimed at the implementation and maintenance of a management system, designed to improve the performance of organizations, taking into account the needs of all stakeholders.	<p>6. Explain how the quality system impacts in your function/activity.</p> <p>7. What the Quality Management System (QMS) brought to you, and what benefits do you expect for your professional life?</p>

In addition to the questions contained in the form distributed to employees, one ‘open’ question was laid down to make possible to respondents to make considerations about any relevant consideration which has not been prioritized on the issues proposed. It should be mentioned that the analysis of open questions revealed that the some observations made by respondents were contained in previous answers, so they were not taken into consideration.

4. Categories

It should be mentioned that the answers obtained by the forms were transcribed literally from the respondents answers. The letter R in the context below, is for respondent. So, for example, R5 means fifth respondent. The most significant answers were selected from the total of the replies received, once the remaining responses repeated, in some cases, the same categories already identified, only mentioned with other words. The categories and subcategories examined are indicated below:

4.1 Subcategory I - “Continual improvement”

This category was highlighted by the statement of a number of respondents, as it can be seen in the transcript below, among them, we highlight:

R5: "The impact was straight, adding more value in the activities performed and targeting them with the aim of continual improvement". It was found that the respondent R6 reinforced what has been said by R5 because:

R6: "With the implementation of ISO 9001 there have been many improvements, which must be continuous, that is, to follow the instructions exactly as given, so we don't have future problems, always seeking quality for our customers". To complement the answers above, the speech of respondent R7 was mentioned.

R7: "[...] It's no use just implementing the system and not following the procedures, i.e. not qualifying manpower and investing in training for continual improvement "

It can be perceived, by the responses of the employees listed above, the importance of continual improvement for the maintenance of the QMS. It can also be observed that the respondent R6 proposed to change the quality of the products offered by the company for the quality of its customers.

4.2 Subcategory II - "Continuous management changes"

This subcategory was characterized by means of the following respondents, listed below. It was classified as a subcategory, because of the direct relationship of continual improvement with the changes caused by it.

R2: "The changes were deployments procedures and quality standards in the company. One of them are our customers more satisfied with the services offered by our company "

R6: "There have been changes. Today, I think more about what and how I'm going to talk to the customer. The quality service is essential "

To complement the talks of the respondents R2 and R6, the words of respondents R3, R4 and R8 were inserted as shown below.

R3: [...] Before I could see (the changes) just as another procedure and nothing else, today I see them as something of importance, because the quality is not only in the work processes, but in our lives "

R4: "The ISO 9001 brings changes and causes the entire company, forcing everyone to get out of his comfort zone"

R8: [...] before implementation, there was no organization with respect to how the working tools were left in the courtyard to be used, ever after (the implementation of the standard), we can find the tools easily without losing time looking for them.

According to the respondents R3, R4 and R8 and the perceptions of employees, the standard has provided greater understanding for them with regard to quality and also made possible a new culture not only within the Organization, but also for life, being well accepted by employees.

4.3 Subcategory III – "Quality Management System"

The QMS subcategory was created by relevance of the talks of the respondents below:

R5: [...] Monthly meetings, awareness and training, thus giving space and knowledge to employees to improve and participate directly in the management system."

R8: [...] The Quality Management System (QMS) reconciled security and production, in addition to excellence in customer service quality (leaving customer satisfied). In my professional life, it helps a lot with my curriculum, to worked in an ISO 9001 certified company."

In view of the comments of the respondents E5 and E8, we conclude that it is not enough just to implement the quality management system; what is important is to keep it and follow established standards, by applying the continual improvement philosophy, in order to remain competitive.

We noticed that the responses of employees is aligned with the theoretical references, according to Paladini (2011), in the sense that quality is no longer a matter of decision, and has become a basic need, for those who want to stay active in the market.

4.4 Category IV - “Training”

To generate customer satisfaction is necessary to standardize the processes within the Organization, thus, it is imperative that employees know to perform tasks in a standardized way. In this sense, we selected 2 comments, which reveal the importance of the training for the workforce.

E2: [...] The company invests in outside and in company trainings, but also encourages the dialogue for this to occur between managers and employees."

E3: [...] The training offered by the company in order to improve the processes is important to us, because we can bring to our lives these experiences."

4.5 Category V - “Quality in processes”

This category was highlighted by the statement of a number of respondents, as can be seen in the transcript below:

R5: [...] The impact was direct, adding more value in the activities performed and targeting them with the aim of a continual improvement."

It was found that the respondent R6 reinforces what has been said by the R5 because:

R6: [...] With the implementation of ISO 9001 there have been many improvements, which must be continuous, that is, strictly following the procedures so there won't be future problems, always seeking the quality of our customers "

To complement the responses above, it was mentioned the talk of respondent R7.

R7: [...] It's no use just implementing the system and not following procedures, i.e. not qualifying labor and investing in training for continual improvement "

We noticed by the responses of the employees listed above, the importance of continual improvement for the maintenance of QMS. It was also observed that the respondent R6 changed the quality of the products offered by the company for the quality of company's customers.

4.6 Category VI - “Results of the standard implementation”

This category has shown how results are important for realizing the vision of employees in relation to the standard implementation.

R1: [...] The standard implementation provided increased reliability of customers, in addition to the standardization of processes and better control of the company."

R2: [...] My understanding has changed on the issue of how to understand the way services are offered by a company that has quality and satisfactory services to our customers."

R4: [...] With respect to the processes organization, there is concern about the quality and training. The company acquired the culture of excellence."

According to the respondents R1, R2 and R4 there was a positive change in the processes, which provided, in the perception of employees, a change of habits, a better organization, cleaning, health and standardization. We noticed, according to [3] that organizations with constant focus on improvement of its processes and the best care of his internal and external clients, becomes an organization that learns.

5. Research results

The results obtained showed the importance of implementing continual improvement in organizations and how these improvements result in a positive impact on processes, in addition to an improvement on the economic results of organizations. The forms assessment indicated that employees, aligned with these improvements understand the quality standard and its implementation, and in consequence became more productive and proactive.

The implementation of continuous improvements in the company, resulting from the process of certification of the ISO 9001 Standard, generated a series of restructurings in productive processes that resulted in a productivity increase of up to 40%. It is noteworthy to mention that every process of continuous improvement was carried out in conjunction with the work teams, which increased of commitment of the employees.

It should be mentioned also in this context, that the implementation of continual improvement in the company Maxcon contributed to the improvement of the internal environment of the company.

The improvements of processes generated by the implementation of the ISO 9001 quality standard generated in the company researched, learning for the Organization and for its employees in such a way, that the benefits of implementation are perceived and visible as reported by Agmoni (2016).

The survey results also showed the changes occasioned by the quality standard implementation and the advantages of continual improvement to the company's employees highlighted the importance of continual improvement, when properly deployed by the organization as reported by Paladini (2011). The search results also allowed to infer, that the proper implementation of continual improvement can function as a facilitator of learning and consequently increasing the satisfaction and confidence of the internal and external clients.

In this way, the results lead to the understanding that Quality Improvement is the systematic, coordinated and priority-based approach to improving quality performance standards and reducing costs across all organizational functions.

The research also allowed to conclude that continuous improvement within an organization today is of great value for the processes improvement in organizations, its market growth and impacts on the quality of the products, on the conscience, safety and confidence of internal and external customers that use the ISO 9001: 2008 standard.

References

- Agmoni, E., *The role of kaizen in creating radical performance results in a logistics service provider*, LogForum, Scientific Journal of Logistics, pp. 1-22, 2016.
- Bardin, L., *Análise de conteúdo*. "Content Analysis", São Paulo, Edições 70, pp. 117-132, 1977.
- Flores, J., G., *Análisis de datos cualitativos – aplicaciones a la investigación*. "Analysis of quality data - applications to research" Barcelona: PPU, 1994.
- Gil, A., C., *Como elaborar projetos de pesquisa*, "How to prepare research projects", 4rd Edition, Atlas, 2002.
- Gonzalez, R.,V., D., Martins, M., F., *Melhoria contínua no ambiente ISO 9001: 2000: estudo de caso em duas empresas do setor automobilístico*. "Continual improvement in the ISO 9001:2000 environment: case study in two companies of the automotive industry". Revista Produção, vol. 17, no 3, pp. 592-603, 2007.
- Ham Won. K., and Park, S.C., *A framework for the continuous performance improvement of manned assembly lines*, International Journal of Production Research, vol. 52, n. 18, pp. 1-20, 2014.
- Johansson, E., Witell, L. and Rönnbäck, A. *Using interventions to change the quality profile of an organisation*. International journal of quality and service sciences, vol. 5, No. 1, 32-45, 2013.
- Marczak, R. B., *Employee engagement in continual improvement of processes*, De Gruyter, pp. 1-17, 2014.
- Mota, E., B., and Marshall, I., J., *Gestão da qualidade e processos*, "Quality management and processes", FGV, 2015.
- Paladini, E., P., *Avaliação estratégica da qualidade*, "Strategic evaluation of quality". 2nd Edition, Atlas, São Paulo, 2011.
- Pereira, P., I., *Aplicação da metodologia kaizen à GRH: o recrutamento e seleção na Worten*, "Application of kaizen methodology to HRM: recruitment and selection in Worten, In: Instituto Superior de Economia e Gestão, Universidade Lisboa, pp. 1-57, 2015.
- Samman R. A. and Ouenniche J. (2016). Continuous quality improvement programs – part I: survey, critical analysis and future research directions. The Journal of Developing Areas, vol. 50, No. 4, pp. 1-29, 2016.
- Yin, R., K., *Pesquisa estudo de caso-planeamento e métodos* "Case study research: design and methods". 4rd Edition, Artmed, 2010.

Biography

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