

The Impact of ISO 9001 Certification on Brazilian Firms' Performance: Insights from Multiple Case Studies

Matheus Borges Carneiro, Fabiane Leticia Lizarelli, José Carlos de Toledo

Abstract—The evolution of quality management by companies was strongly enabled by, among others, ISO 9001 certification, which is considered a crucial requirement for several customers. Likewise, performance measurement provides useful insights for companies to identify the reflection of their decision-making process on their improvement. One of the most used performance measurement models is the balanced scorecard (BSC), which uses four perspectives to address a firm's performance: financial, internal process, customer satisfaction, and learning and growth. Since ISO 9001 certified firms are likely to measure their performance through BSC approach, it is important to verify whether the certificate influences the firm performance or not. Therefore, this paper aims to verify the impact of ISO 9001:2015 on Brazilian firms' performance based on the BSC perspective. Hence, nine certified companies located in the Southeast region of Brazil were studied through a multiple case study approach. Within this study, it was possible to identify the positive impact of ISO 9001 on firms' overall performance, and four Critical Success Factors (CSFs) were identified as relevant on the linkage among ISO 9001 and firms' performance: employee involvement, top management, process management, and customer focus. Due to the COVID-19 pandemic, the number of interviews was limited to the quality manager specialist, and the sample was limited since several companies were closed during the period of the study. This study presents an in-depth analysis of how the relationship between ISO 9001 certification and firms' performance in a developing country is.

Keywords—Balanced scorecard, Brazilian firms' performance, critical success factors, ISO 9001 certification, performance measurement.

I. INTRODUCTION

QUALITY management has evolved throughout the years due to changes in customers' requirements and competitors' rigor [1]. Firms have been implementing continuous improvement program to attain competitive advantages in a long-term basis, in which three can be highlighted: Total Quality Management (TQM), Six Sigma and ISO 9001 certification, based on a quality management system (QMS) program [2].

The implementation of an international QMS is a basic precondition for a firm's entrance to several markets [3]. Although the adoption of ISO 9001 is not required to have a QMS [4], the ISO 9001 certification has had an important

impact on the development of quality management and is considered a crucial requirement for several customers, especially on business-to-business markets [5].

Previous studies have investigated the interrelationships between ISO 9001 and firm performance [4], [5]. For instance, [6] investigated the influence of internal audit in firm performance, [7] measured ISO 9001 outcomes from the Balanced Scorecard (BSC) perspectives, [8] compared the performance from certificated and non-certificated firms, [9] studied Kenya's certified manufacturers, [10] studied Greek certified manufacturers, and finally [5] investigated Brazilian firms. However, all these prior studies adopted a quantitative approach to verify the hypothesis of the benefits of ISO 9001 on firms' performance. On recent literature reviews, there is a need for a study with a qualitative approach to confront the quantitative results and collect evidence from in-depth analysis on companies with ISO 9001 certification [11], [12]. Thus, the present paper aims to verify the influence of ISO 9001:2015 on Brazilian firms' performance based on the BSC perspective.

Based on the discussions above, two research questions can be formulated: RQ. 1 "Does ISO 9001:2015 certification impact on Brazilian firms' performance?"; RQ2: "What are the critical success factors to achieve excellence on performance through ISO 9001 certification?"

The study was conducted in Brazilian firms due to geographical availability, based on a qualitative approach, within a multiple case study method. The study was conducted within nine Brazilian companies, from small to medium and large-sized enterprises. The data collection process occurred during September and October of 2020, and an exploratory content analysis was used to provide insights for the proposed Research Questions.

To facilitate the discussions and understanding, the paper is structured in five sections: I. The introduction; II. A theoretical background; III. The research method used in this study; IV. Results analysis and discussion; V. Conclusion, limitations and guidelines for future studies.

II. THEORETICAL BACKGROUND

To understand the influence of ISO 9001 on Brazilian firms' performance, a brief discussion of ISO 9001 certification, performance measurement and its link with ISO 9001 is required.

Matheus Borges Carneiro is with the Industrial Engineering Department at Federal University of São Carlos, São Carlos SP Brazil (corresponding author, phone: 16 9 9298-9946; e-mail: matheusborgescarneiro@outlook.com).

Fabiane Leticia Lizarelli and José Carlos de Toledo are with the Industrial Engineering Department at Federal University of São Carlos, São Carlos SP Brazil (e-mail: fabiane@dep.ufscar.br, toledo@dep.ufscar.br).

A. ISO 9001:2015 Certification

The ISO 9001 standard is one of several standards proposed by the International Organization for Standardization (ISO), created in 1947 to universally standardize measurements, process and management systems [12]. During the twentieth century, several countries worldwide had their own quality management standard [13], which precluded the existence of an international standardization [14]. The first version ISO 9001 was proposed in 1987, and it aimed to provide guidelines for an international model of QMS [15].

To keep up with the constant changes in market, the ISO 9001 standard has been reviewed in 1994, 2000, 2008 and, more recently, in 2015 [16]. More than 30 years after the first version of the ISO 9001 standard, it has been adopted by more than 150 countries around the world, and its certification has been growing each year [12], [17]. ISO 9001:2015 framework consists of the PDCA cycle of continuous improvement, which was proposed by William Deming, and it is based on Plan, Do, Check and Act [16], [17].

Reference [18] suggests that ISO 9001:2015 certification is aligned with market complexity and customers' requirements. Reference [15] identified some aspects related to this standard: I. It attends to the business quality management requirements and allows firms to adopt international standardization; II. internal audits might mislead some of the requirements of the standard, which suggests the relevance of in-company training and constant knowledge enhancement. Moreover, the benefits of ISO 9001 for firms' performance rely upon its successful implementation [19]. Thus, several studies attempted to investigate CSFs related to ISO 9001 implementation and resulted in some key variables: process management, top management-leadership, customer focus, supply quality management, continuous improvement, employee involvement [20]-[23] and internal audit [6].

B. Performance Measurement

Although firms need to measure their performance to identify key aspects to be improved [24], firms' performance is a multidimensional construct [10]. The complexity of a firms' performance makes researchers often group indicators in dimensions, and these dimensions are used to understand firm's performance [24]. Moreover, studies on ISO 9001 certification have adopted either non-structured dimensions [6], [8] or structured dimensions, based on the BSC perspective [25].

C. BSC Perspective

The BSC is a performance measurement instrument with multiple perspectives that integrates the company strategy, vision and evaluation [26]. The BSC model uses input from four perspectives: I. financial; II. customer; III. internal process; and IV. learning & growth [27]. The emphasis of the BSC model consists on the evaluation of a business from financial and non-financial viewpoints, and integrates this evaluation with a firm's overall characteristics [7]. One relevant aspect of the BSC is its cause-and-effect connections, like the influence of learning and growth perspective with the

financial, customer and internal process perspectives [28]

D. ISO 9001 and BSC Integration

In recent studies, several organizational dimensions have been used to measure the influence of ISO 9001 on firms' performance, like product quality, customer satisfaction, operational, market and financial performance [8], prevention of nonconformance, business performance c, net profit gains, revenue and assets [9]. Nonetheless, these organizational dimensions do not provide insights into the cause-and-effect relationship among dimensions. Thus, the use of BSC can provide insights on how ISO 9001 certification may affect one perspective, and how this perspective affects another one, in a chain reaction [7].

III. RESEARCH METHODOLOGY

Since this paper aims to analyze the impact of ISO 9001:2015 certification on Brazilian firms' performance, an empirical study was required to achieve this purpose. In recent literature reviews, both [11] and [12] suggest the need for case studies on ISO 9001 certified firms to evaluate its impact on operational performance. Thus, this paper adopted a multiple case study to fill in this literature gap. A case study is a phenomenon analysis, drawn from multiple sources of evidence, which can include data from interviews, direct observation and archives [29].

The case study approach attempts to clarify the reason why a decision or a collection of decisions were made, how they were implemented and what results were attained [30]. To ensure the validity of the results, the case study in this research was conducted based on the six-stage framework proposed by [31]: I. define a theoretic-conceptual structure; II. plan the cases; III. conduct the pilot test; IV. collect the data; V. analyze the data; VI. report the results.

For the first stage, the relevant studies available on Scopus and Web of Science databases were analyzed. To gather data, keywords like "ISO 9001", and "performance" were used. The papers were selected on a non-systematic approach, through an eligibility criterion: I. only papers written in English were included; II. only papers relating ISO 9001 to firm's performance were included; III. papers published before 2000 were not included. After this selection, 15 papers were studied and provided information for the questionnaire design.

For the second stage, the questionnaire was formulated to assist on the interview conduction, which was based on the literature review. Moreover, in this stage the unit of analysis were considered. For this study, nine companies from the Southeast region of Brazil were analyzed, and two more were included in the pilot test stage. The companies were contacted through a LinkedIn direct message for the quality manager of the company, in which the study was explained, and they were invited for the study.

In the third stage, a pilot test was conducted with two quality management specialists with over 10 years of experience in ISO 9001 certification. After the conduction of the pilot interviews, the respondents were asked to evaluate the questionnaire, the interviews conduction and suggest

adjustments. Based on the specialists' analysis, the questionnaire was adjusted, in which some similar questions were joint, and the approach became more flexible, letting the respondent feel comfortable to discuss the company's reality.

In the fourth stage, semi-structured interviews were used to collect the data. The interviews were recorded, after asking permission to the respondents. Moreover, to provide triangulation process, documents were asked if required to understand some aspects of the organization. Due to the COVID-19 pandemic, the companies only allowed the quality management specialist to be interviewed, via Google Meet, avoiding personnel contact.

In the fifth stage, the data analysis was conducted after the transcription of the interviews. Based on the transcriptions, an exploratory content analysis [32] was performed to find evidence related to ISO 9001 and firms' performance. Thus, the software Atlas TI was used to conduct the analysis. Besides, findings from barriers and enablers were highlighted to understand how the ISO 9001 certification process impacted on the firm's performance. In the last stage, based on the findings of the cases, the results were presented, and a discussion was made linking the results of this study within similar ones. Thus, based on the similarities and dissimilarities among other studies, managerial and theoretical implications were identified, and future studies proposed to enhance this research field. In Table I, the research case protocol entails further aspects of this research method.

TABLE I
RESEARCH PROTOCOL

Stage	Stage's content
Research question	RQ1: Does ISO 9001:2015 certification impact on Brazilian firms' customer satisfaction, operational, learning and employee growth, and financial performance?
Literature review eligibility	I. Include only papers written in English; II. Exclude papers not related to ISO 9001 or organizational performance; III. Exclude papers published before 2000.
Case selection	I. Brazilian firms located in the Southeast region; II. Firms with ISO 9001 certification for over one year; III. Firms with a quality management specialist working full-time for over a year;
Pilot test	I. Firms with ISO 9001 certification for over five years; II. Interview with quality management specialists working over 10 years with QMS; III. Require feedback from pilot respondents referring to the conducted study;
Data collection	I. Conduct the interview during September and October of 2020; II. Ask permission for recording the interviews; III. Follow the questionnaire in a flexible approach; IV. Transcript interviews;
Data analysis	I. Design code book for the study; II. Code interviews on Atlas TI software; III. Analyze the content based on;
Study report	I. Provide details for methodological procedures; II. Present the results; III. Content analysis

IV. RESULTS

As the companies requested, their names will not be shared upon this study. Instead, the alphabet letters will be used to refer to them. Table II presents the company's sector, size, interviewee position in the company and experience, measured

in years. Base on the interviews conducted, it was possible to verify the relationship of their firms' ISO 9001 certification and BSC four perspectives.

TABLE II
CASES INCLUDED IN THE STUDY

Case	Sector	Size (employees)	Interviewee position	Experience
A	Civil construction	Small (<100)	Quality Coordinator	12 years
B	Windshields	Large (>1000)	Quality Assurance Coordinator	4 years
C	Milling	Small (<100)	Operations Manager	8 years
D	Sugarcane mills	Large (>600)	Process Control Coordinator	20 years
E	Healthcare supplies	Small (<100)	Quality Coordinator	15 years
F	Airline	Large (>1000)	Quality Manager	6 years
G	Diapers	Large (>600)	Quality Manager	7 years
H	Hospital	Large (>600)	Quality Senior Coordinator	2 years
I	Packaging	Medium (<300)	Quality Assurance Coordinator	6 years

A. ISO 9001 and Internal Process Perspective

Based on the nine cases, there is a strong influence of ISO 9001 certification on internal process performance. All respondents confirmed this influence, which was the only perspective with point of views in convergence. In some aspects, the documentation required by ISO 9001 has assisted companies to achieve standardization, which improved process performance.

When we started the ISO 9001 certification, we verified several unstandardized processes, mostly on business processes. Thus, we reviewed the processes, improved them and provided the basis for standardization. The documentation required to assure the process is correct makes the process flow standardized, and therefore better. (Company I).

Standardization is also relevant in the operations process. Although industries often conduct processes with low variation, the standardization is often easier to be achieved than on business processes, or other operations, like civil construction.

We design checklists and trainings so that the workers conduct the same tasks on every building. Since the buildings are different from each other, the worker sometimes misses one step, which leads to rework. We've been trying to avoid rework in the operations process, to reduce costs (Company A).

Besides the standardization and documentation, through ISO 9001 certifications, companies can provide an environment of process improvement, which leads to performance enhancement. Some companies mentioned that after ISO 9001 certification, Lean, Six Sigma or other programs were adopted to assist on the process improvement. Thus, there is evidence of ISO 9001 being an enabler for continuous improvement programs in some of these companies.

As the company process is reviewed during the ISO 9001

certification, several failures are identified and attempts to eliminate them have been proposed. Most of the respondents mentioned that rework, wastes and scrap have been significantly reduced after ISO 9001 implementation.

We decided to understand how much it costs to produce and deliver a product to the customer. We even measured the electricity consumption of our machinery and the fuel used in the forklift. Within this analysis, we understood how many wastes we had, and how many mistakes we were making. Then, we focused, and have been focusing, on eliminating these mistakes (Company C).

Undoubtedly, the motivation for this intensive analysis was the attempt to fulfill ISO 9001 requirements. Although it is not a mandatory analysis, it is one possible approach to identify wastes, and provide action plans to improve the process and the firm's performance.

B. ISO 9001 and Customer Satisfaction Perspective

Several companies adopt ISO 9001 to meet customers' requirements [14]. This enabler was noticed in some of the cases studied, in which the company operates in a business-to-business market and a large customer required the implementation of ISO 9001.

The reason why we adopted ISO was because of our biggest client. They asked us to implement a quality management system and assure that our products would meet their needs. However, during the implementation program we understand the benefits of ISO and how we could be better through the certification (Company I).

Moreover, some of the respondents mentioned that the framework of ISO 9001 leads to customer satisfaction, which implies that the adequate implementation of ISO 9001 can direct the internal processes and business operations towards to customers' requirements, therefore achieving satisfaction.

Although customer satisfaction suggests a direct contact to customer's opinion, it is not the case on hospitals and airlines. These companies consider the construct customer satisfaction related to safety, in which the customer is satisfied when he or she is safe, health and no hazard has impacted his or her experience on the company.

The fact our customer is happy with our service is way subjective for an airline quality assurance. So, we use requirements checklists to make sure our client is safe. If we assure our quality, our client will not notice, but if we don't, it will be badly noticed (Company F).

C. ISO 9001 and Learning & Growth Perspective

Most of the companies have perceived a positive relationship between ISO 9001 certification and employees' growth and learning. To attend the standard requirements, some companies reviewed their organizational chart, and developed a career path for employees.

Since we are a small company, we didn't have a career plan. It changed when we implemented ISO 9001, and identified a growth on our turnover, specially on our core sector. Thus, we decided to create one for our operations,

at first, in which an intern can identify a path to become a senior manager (Company A).

Companies expect employees to achieve better results, through constant learning. There is strong evidence that ISO 9001 certificated companies emphasize employee training. Some companies measured the influence of employee's learning based on his or her performance before and after a training, for instance. Moreover, some companies have been suggesting and fomenting employees to learn more and directing this knowledge towards the company.

To engage employees in the quality thinking, we have implemented the employee suggestion program. In this program, an employee suggests an improvement on any process whatsoever, based on his direct leader's approval. The idea is then validated and, if implemented, the employee is rewarded for it (Company G).

D. ISO 9001 and Financial Perspective

The perspective of implementing ISO 9001 and linking with financial performance growth is still unclear. There are three main divergent opinions among the nine companies studied. Four of them suggest that there is an indirect relation between ISO 9001 and economic-financial performance, which is moderated by the role of internal business performance, learning & growth performance and customer satisfaction performance.

Yes, there is a positive reflection of ISO practices on financial outcomes, but it is not directly. When we implemented ISO, we reviewed our process, we reduced waste and rework, therefore reducing costs, which contributes for our financial outcomes (Company G).

On the other hand, three companies suggest that there is a positive direct effect of ISO 9001 on financial performance. Although these companies shared similar analysis of financial outcomes being moderated by other perspectives, it is possible to directly connect ISO 9001 to economic-financial performance.

Here, we see the benefits of the standard in two aspects: first, of course, by improving processes we reduce costs, and we can achieve new markets, improving our sales and market performance. But we also see the standard being an enabler for financial outcomes, because it makes us think on the value we are creating to the customer, and to review if we are doing it right, in the most productive and effective way (Company B).

In the last point of view, ISO 9001 does not affect firms' financial performance, neither directly nor indirectly. From the two cases that supported this argument, it was evidenced that ISO 9001 in fact decrease firms' performance, due to the costs implementing the standard.

We know ISO 9001 helped us reduce costs with rework, but we also increase costs maintaining the standard. We have employees focused on that, and there are costs in the internal and external audit. Moreover, there are costs in consulting, since we often pay consulting companies to review our certification and

provide in-company trainings (Company I).

Although three different analyses were supported on the cases related to the effect of ISO 9001 on financial performance, there is an emphasis on a positive relationship among these two variables. Hence, there is evidence supporting a positive indirect effect of ISO 9001 on financial performance, and a less strong direct effect of ISO 9001 on financial outcomes.

E. Critical Success Factors

Based on the seven CSFs identified on the literature, it was possible to identify what are the most relevant for the companies studied. Process management was highly linked with internal process perspective, which suggests that it is a critical factor for the implementation of ISO 9001. Notwithstanding, continuous improvement was also linked with process perspective, but it was not a critical factor, as it was mentioned by only three of the companies.

Top management-leadership was also identified as a critical factor for most of the companies. Even the cases where the top management was top highly involved, it was mentioned as a critical aspect to be improved, as the engagement of leaders motivates employees to be engaged as well. Hence, employee involvement was highly mentioned as a CSF, both to achieve firms' performance and to sustain the standard.

Besides internal key factors, customer satisfaction and

supply selection and development were also considered within this study. Hence, on one hand customer satisfaction was quoted by most of the cases as a key factor for the success of the QMS implementation. On the other hand, supply selection and development were not key factors, yet a few of the cases mentioned the relevance of supplier integration.

Finally, internal audit was conducted by every company, as it is a requirement on the standard. However, the use of internal audit is not a success factor, as it is considered a review of what have been done by the firm. Therefore, within seven CSFs identified in the literature, only four were found relevant from the cases conducted, which were: process management, top management, customer focus and employee involvement.

V. DISCUSSION

Within the data analysis from the nine cases, it was possible to identify the effect of ISO 9001 certification on firms' performance and verify which CSFs were relevant for ISO 9001 implementation in Brazilian firms. As several findings were mentioned from the nine cases, Table III synthesizes the key findings for each case.

TABLE III
CONTENT RELATED TO ISO 9001 AND FIRM'S PERFORMANCE IDENTIFIED IN EACH CASE

Cases	BSC			CSFs							
	Internal process	Customer Satisfaction	Learning & Growth	Financial	Process Management	Top Management	Customer focus	Supply	Continuous Improv	Employee involvement	Internal audit
A	✓	✓	✓	✓	✓	✓	✓			✓	
B	✓	✓		✓	✓		✓		✓	✓	
C	✓	✓	✓		✓	✓	✓			✓	
D	✓	✓	✓	✓	✓	✓		✓		✓	✓
E	✓	✓	✓	✓		✓	✓	✓		✓	✓
F	✓		✓	✓	✓		✓			✓	✓
G	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	
H	✓		✓		✓	✓	✓			✓	
I	✓	✓	✓		✓		✓		✓		

Based on the findings of the present study, there is evidence supporting the positive influence of ISO 9001 on firms' performance [8]. In this study, the BSC was used to measure firm's performance related to ISO 9001 certification [7]. Thus, within the cases analysis, it was possible to verify a positive impact from ISO 9001 certification on firms' performance, which was also verified on other studies [9], [10].

This study provided two research questions. The first one is related to the impact of ISO 9001 on Brazilian firms' performance, which was studied based on the BSC perspective. The cases provided insights suggesting ISO 9001 improves internal process performance, as the standard suggests mapping and improving operations. Moreover, a positive impact was found from ISO 9001 and customer satisfaction, since ISO 9001 is designed to meet customers' requirements.

The learning & growth perspective was also evidenced as

positively impacted by ISO 9001, since the standard requirements that employees are engaged on the QMS of the company. However, the financial performance outdrew mixed opinions, which were grouped in three categories: I. the positive direct effect of ISO 9001 on financial performance; II. the positive indirect effect of ISO 9001 on financial performance; and III. the negative effect of ISO 9001 on financial performance. Hence, the positive effect of ISO 9001 on Brazilian firms' performance is evident. This result could be compared within other developing countries' firms, which share similar characteristics related to ISO 9001 certificate [25]. Although the positive relationship is evident in most of the firm's perspectives, future studies could focus on the relationship among ISO 9001 certification and firms' financial performance.

The second research question consisted on the identification of CSFs on ISO 9001 certification that contributes for firm's

performance. The literature provided seven CSFs, which were evaluated and verified within the companies studied. Thus, four factors highlighted as key successful aspects: process management, top management, customer focus and employee involvement. Future studies could identify the role of this critical factors to the successful linkage of ISO 9001 implementation on firms' overall performance. As it is shown on Fig. 1, the influence of ISO 9001 on Brazilian firms' is contributed and mediated by the role of the four CSFs identified.

VI. CONCLUSION

The present paper aimed to verify the influence of ISO 9001 on Brazilian firms' performance based on the BSC four perspectives, through a qualitative multiple case approach. Notwithstanding, this study presented several limitations, such as the limited cases selected on a specific Brazilian region. Moreover, due to the COVID-19 pandemic, the number of employees engaged on the study was limited. Thus, future studies should adopt a larger sample, within a higher in-depth approach.



Fig. 1 Simple overview of ISO 9001 impact on Brazilian firms' performance, moderated by the role of CSFs

To enhance this field, two future research directions were proposed: (1) empirical studies focusing on the direct and/or indirect effect of ISO 9001 on firms' financial performance; (2) within the four CSFs proposed and the relationship among ISO 9001 and BSC performance, future studies could also identify the intensity of the mediate effect of the four CSFs to ISO 9001 and firms' performance. Hence, this paper provided several theoretical and managerial implications. From the theoretical perspective, this paper provided evidence for the relation between ISO 9001 and firms' performance and conducted a case study approach to confront the many quantitative studies on this issue. Besides, two research guidelines were proposed for future studies, which are the input for researchers enhance this study and compare within our results.

On the managerial perspective, this paper provides guidelines of companies that adopt ISO 9001 and attains performance outcomes, which is not a common practice among ISO 9001 certificated companies [12]. Thus, several examples have been proposed to attain performance (e.g., employee suggestion program), to provide guidelines for consultants, professionals, managers and entrepreneurs to

conduct practices attaining operational performance.

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