The adoption of quality management systems in order to achieve better performance is increasingly widespread among companies looking to remaining competitive in the market. This study aims to identify and analyze, through a survey research, the quality constructs and their relationship with the competitive skills and organizational performance in manufacturing companies. Statistical data analyzes were carried out using a structural equation software. As a result, it has been observed that both the customer focus and the human resources constructs are the most influential regarding the company’s competitive criteria, while supplier management and customer focus exert the greatest impact on its performance.

Palavras-chave: Quality management, Quality constructs, Competitiveness, Organizational performance, Structural equation modeling
1. Introduction

Organizations are constantly seeking new and more effective ways to improve performance and gain competitive advantage over their competitors, and, in this regard, quality management initiatives are invariably the first ones to be implemented. It is vital that companies define and develop quality management practices, also called quality constructs, therefore supporting critical activities that will lead to the improvement of both their performance quality and competitive advantage. There is no consensus among researchers about which constructs are the most important ones for quality management. Nonetheless, the recurrence and high relevance of some of them determined those that would be analyzed in the present research: customer focus, human resources, continuous improvement, standardization of processes and supplier management (ARNOLD, 2015).

The question that guided this research has been: what is the relationship between quality constructs and the organization’s competitive capacities and performance, and what are the impacts of this relationship?

The main objective of this article is to identify and analyze, through a sampling field survey, the relation of the quality constructs with the competitive capacities and the organizational performance within Brazilian manufacturing companies. The target population consisted of 108 managers from companies in the state of São Paulo who participated in a training course for managers, where 100% of the questionnaires were answered. In total, 12% were micro or small companies, 24% were medium-sized and 64% were large companies.

After this brief introduction, a synthesis of the theoretical reference is presented, followed by the research method, the presentation of the results and, ultimately, the work’s conclusion.

2. Theoretical Reference

2.1 Quality Management and its Constructs

Quality management can be defined as a holistic philosophy encompassing all the functions of an organization, responsible for creating and maintaining these functionalities through organizational changes and continuous improvement. The definition of quality management practices is essential to support critical activities that will lead to the improvement of quality, performance and competitive advantage (ZAKARIA et al., 2014).
All in all, there is no consensus among researchers regarding which are the most important quality constructs. Therefore, given the recurrence of some of them during the theoretical study, the authors determined the constructs that will be analyzed in the present study: customer focus, human resources, continuous improvement, process standardization and supplier management.

Customer focus can be defined as the priority and intensity with which an organization seeks to understand its customers’ needs (HOLTTINEN, 2014). The Human Resources construct generally encompasses the initiatives of leadership, training, education, and employees’ involvement and recognition (ZHU et al., 2013). Continuous improvement, as defined by Ariff et al. (2013), focuses on increasing success and reducing failures, as well as plans to reduce rework and a program to identify all internal processes’ waste times and costs.

The standardization of processes is based on the notion that an organization’s productive capacity is intrinsic to its processes and can be strengthened by a proper management of those processes (NG et al., 2015). A company’s performance is increasingly dependent on and linked to its suppliers’ performance, since the continuous supply of raw material within specified quality requirements is essential at all production stages. (LOCATELLI; MANCINI; ISHIMWE, 2014).

2.2 Competitive Capacities and their Influence on the Market

Regardless of the interpretation, competitiveness is usually based on the company’s internal factors, such as cost, price, quality and deadline, that is, factors closely related to daily production and, therefore, considered critical elements to determining the company’s competitive position in the market, its competitive capacities. Among the several strategic elements influencing competitive capacities, the five most cited by researchers and most widespread in the business world were selected for the present study, namely: cost, quality, time, flexibility and reliability (OTHMAN et al., 2015).

3. Research Methodology

A field survey was carried out, which is an appropriate method when one wants to answer “what?”, “why?”, “how?” and “how much”, that is, whenever the focus is to find out “what is happening in a specific scenario and how so”. Quality control managers, on the occasion of a training course for managers of manufacturing companies located in the state of São Paulo,
were the target group. In total, 108 managers responsible for the companies’ products’ and services’ were invited to participate in the survey, ensuring 100% response rate. Of these companies, 12% were micro or small companies, 24% were medium-sized and 64% were large companies.

A three-part structured questionnaire was applied during face-to-face interviews. The first part, which was fully developed based on the theoretical reference, aims at analyzing the quality constructs, allocating three questions for each of them. The second part focused on the competitive capacities through five questions, one for each capacity, while the third part addressed the organizational performance criteria, approached through three questions. Additionally, questions were raised on the main benefits (four questions) and difficulties (three questions) inherent in quality management. Thereby, the questionnaire was structured with 30 affirmations verifying the respondent’s agreement level through a 1 to 5 Likert scale, where 1 represents total disagreement (“I totally disagree”), and 5 total agreement (“I totally agree”).

The SmrtPLS, a Structural Equation Modeling (SEM) software, was used to analyze the study’s data. SEM could be defined as the extension of multiple regression and is presented as a method that simultaneously analyzes different groups of variables, allowing multiple dependency relationships to be considered and thoroughly explored (SARSTEDT et al., 2014). In the case of quality constructs, larger values represent greater adherence of the company to practices related to that construct, while smaller values indicate that these practices are not so developed within the organization.

The interviewees’ responses to each of the 30 questions of the questionnaire, grouped in blocks as previously mentioned, were then tabulated based on this value/weight allocation. The questionnaire is presented in this study’s appendix.

The mathematical model used for the data analysis is shown in Figure 1, where it was possible to relate the questionnaires’ answers to their respective groups and, therefore, to analyze how these groups or blocks also relate to each other. The boxes represent the questions with their respective numbering, while the circles define the questions’ groups and the arrows demonstrate the relationships that the model intends to analyze.
The five quality constructs are represented in the left-hand circles in Figure 1: customer focus, HR, continuous improvement, process standardization, and supplier management. The two circles at the top of the figure represent the benefits brought and the difficulties faced, while the circles on the right represent the competitive capabilities: cost, quality, time, flexibility and reliability. The circles at the bottom, in turn, represent performance aspects: financial, market share and company’s image.

Therefore, Figure 1 depicts the quality constructs’ influence on the other factors by means of the arrows coming out of their respective circles and reaching out to the other ones. At the end of the modeling phase, a simulation was performed based on the illustrated model and a report was generated with all the necessary data for the statistical analyzes.

The validation of both the data and the model has been accomplished through a Confirmatory Factor Analysis (CFA), following Daneva et al. (2014), who point out that studies based on simulations with samples varying between 100 and 1000 produce reliable statistical results when subjected to this type of analysis. Since this research used a sample of 108 companies, it constitutes, thus, a valid model. This model has also verified the Composite Reliability (CR) and the Average Variance Extracted (AVE) as validation and reliability measures, as suggested by Ketchen (2013). It is a crucial step for any research involving modeling.

Figure 1 - Structural equation modeling

Source: Authors
The questionnaire validation used the Cronbach’s coefficient alpha, which is one of the most effective ways to test a questionnaire’s reliability. The test measures the correlation among the questionnaire’s answers, presenting a mean correlation among them and allowing the verification of the answers’ quality. The next section presents a comprehensive discussion regarding the present study’s results.

4. Presentation, Validation and Analysis of Results

4.1 Confirmatory Factor Analysis

The results of the confirmatory factor analysis are presented in Table 1. The CR should be greater than 0.7 and the AVE greater than 0.5 for the data to be considered reliable.

Table 1 - Confirmatory factor analysis

<table>
<thead>
<tr>
<th></th>
<th>Average Variance Extracted (AVE)</th>
<th>Composite Reliability (CR)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Customer focus</td>
<td>0.6749</td>
<td>0.8616</td>
</tr>
<tr>
<td>HR</td>
<td>0.6528</td>
<td>0.8483</td>
</tr>
<tr>
<td>Continuous improvement</td>
<td>0.7586</td>
<td>0.9040</td>
</tr>
<tr>
<td>Process standardization</td>
<td>0.7342</td>
<td>0.8922</td>
</tr>
<tr>
<td>Supplier management</td>
<td>0.8226</td>
<td>0.9329</td>
</tr>
<tr>
<td>Benefits</td>
<td>0.6072</td>
<td>0.8598</td>
</tr>
<tr>
<td>Difficulties</td>
<td>0.4523</td>
<td>0.2880</td>
</tr>
<tr>
<td>Competitive capacities</td>
<td>0.4431</td>
<td>0.7319</td>
</tr>
<tr>
<td>Performance</td>
<td>0.6909</td>
<td>0.8693</td>
</tr>
</tbody>
</table>

Source: Authors

Considering the aforementioned reference values, the confirmatory factor analysis demonstrates that, apart from difficulties and competitive capacities, all other groups fit the analysis’ criteria, which corroborates the data reliability and that the latent variables are well represented by the observed variables.

Since displaying AVE values below 0.5 and CR numbers well under 0.7, the difficulties will not be considered in this study. Nevertheless, as the analysis of this group was not included in the general objective of the present research, its absence will not have any noteworthy consequences.
The competitive capacities, however, are part of this study’s focus and their analyses are fundamental to the completion of the work. The fact that the CR is greater than 0.7 confirms that the latent variables are well represented by the observed ones, whereas the low AVE value indicates that the data is not reliable and the variance could invalidate the analyzes.

For this reason, this work will only perform analyses comparing the quality constructs to the specific competitive capacities, since, when analyzed in this manner, they present acceptable confirmatory measures, as presented in Table 2. Analysis of Table 2 shows that all values are equal to 1, which is due to the fact that only one question was asked for each competitive capacity in the questionnaire. This means that there is no variance among the questions’ blocks, considering there is only one block for each capacity. The values of the confirmatory factor analysis can be then deemed as acceptable, allowing conclusions on the basis of the individual analyzes of each competitive capacity.

The validation of the questionnaire has been done through the Cronbach’s coefficient alpha, which can be observed in Table 3. According to Matsushima et al. (2014), the questionnaire’s quality analysis can be accomplished with the help of the Cronbach’s coefficient alpha’s reference values in Table 4.

<table>
<thead>
<tr>
<th>Table 3 - Cronbach’s coefficient alpha</th>
<th>Table 4 - Cronbach’s coefficient alpha (adapted from Matsushima et al. (2014))</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Cronbach’s Alpha</strong></td>
<td><strong>Cronbach’s Alpha</strong></td>
</tr>
<tr>
<td>Customer</td>
<td>0.7615</td>
</tr>
<tr>
<td>HR</td>
<td>0.7309</td>
</tr>
<tr>
<td>Improvement</td>
<td>0.8404</td>
</tr>
<tr>
<td>Standardization</td>
<td>0.8185</td>
</tr>
<tr>
<td>Suppliers</td>
<td>0.8929</td>
</tr>
<tr>
<td>Benefits</td>
<td>0.7845</td>
</tr>
<tr>
<td>Difficulties</td>
<td>0.3665</td>
</tr>
<tr>
<td>Competitive capacities</td>
<td>0.6290</td>
</tr>
<tr>
<td>Performance</td>
<td>0.7746</td>
</tr>
</tbody>
</table>

Source: Authors

### 4.2 Results and Analyses

Table 5 presents the respective mean values and standard deviations of the questionnaire responses for each of the groups. The customer focus construct and benefits are the two groups presenting the highest average values, while the difficulties appear with the lowest average, corroborating the notion that quality management systems considerably reduce the
difficulties faced by organizations.

Table 5 - Analysis of the mean value and standard deviation

<table>
<thead>
<tr>
<th></th>
<th>Customer</th>
<th>HR</th>
<th>Improv</th>
<th>Standard.</th>
<th>Supplier</th>
<th>Benefits</th>
<th>Difficulties</th>
<th>Competitive capacities</th>
<th>Perfor</th>
<th>Total</th>
</tr>
</thead>
<tbody>
<tr>
<td>Mean value variance</td>
<td>4.21</td>
<td>3.75</td>
<td>3.61</td>
<td>3.52</td>
<td>3.65</td>
<td>4.09</td>
<td>2.92</td>
<td>3.74</td>
<td>3.98</td>
<td>3.73</td>
</tr>
<tr>
<td>Standard deviation</td>
<td>0.95</td>
<td>1.15</td>
<td>1.17</td>
<td>1.42</td>
<td>1.14</td>
<td>1.02</td>
<td>1.27</td>
<td>1.20</td>
<td>1.06</td>
<td>1.21</td>
</tr>
</tbody>
</table>

Source: Authors

The highest standard deviation occurs in the process standardization construct, indicating a larger response variation. Table 6 exhibits the relationship between quality constructs and competitive capacities.

Table 6 - Analysis of the relationship between quality constructs and competitive capacities

<table>
<thead>
<tr>
<th></th>
<th>Cost</th>
<th>Quality</th>
<th>Time</th>
<th>Flexibility</th>
<th>Reliability</th>
</tr>
</thead>
<tbody>
<tr>
<td>Customer</td>
<td>-0.18</td>
<td>0.533</td>
<td>0.12</td>
<td>0.351</td>
<td>0.612</td>
</tr>
<tr>
<td>HR</td>
<td>0.07</td>
<td>0.060</td>
<td>0.31</td>
<td>0.094</td>
<td>0.126</td>
</tr>
<tr>
<td>Improvement</td>
<td>-0.01</td>
<td>-0.028</td>
<td>-0.13</td>
<td>-0.274</td>
<td>-0.011</td>
</tr>
<tr>
<td>Process</td>
<td>0.25</td>
<td>-0.089</td>
<td>-0.04</td>
<td>-0.135</td>
<td>-0.216</td>
</tr>
<tr>
<td>Supplier</td>
<td>-0.09</td>
<td>0.093</td>
<td>0.08</td>
<td>0.157</td>
<td>0.093</td>
</tr>
</tbody>
</table>

Source: Authors

The results presented in Table 6 shows an inverse relationship between customer focus and cost (-0.18), indicating that, despite having a significant coefficient in relation to other competitive capacities, customer-oriented quality practices may entail additional costs for businesses. On the other hand, the HR, continuous improvement and supplier management constructs do not exert a great influence on the organization’s costs.

The same interpretation is applied when observing the positive relationship of cost and process standardization (0.252), indicating that companies that invest in standardization practices may achieve positive results, or benefits, regarding their cost. In relation to quality as a competitive capacity, it can be noticed that, with the exception of customer focus, all other constructs have coefficients close to zero, meaning that, in order to obtain benefits in terms of product quality, the company must turn its attention to quality practices that focus on
its customers.

As far as time is concerned, both the continuous improvement and the process standardization constructs present low coefficients, which could indicate their low influence, while customer focus exhibits a slightly expressive coefficient. On the other hand, continuous improvement presents a coefficient similar to that of customer focus, only with an inverse relation, meaning that such practices influence time in a weak way.

The HR construct should be highlighted, considering it implies that companies performing practices related to this construct have great benefits regarding the competitive capacity of time. Flexibility appears to be highly influenced by quality practices focusing on the customer. In that sense, continuous improvement has also showed a high coefficient in terms of flexibility, but, considering it is an inverse relationship, this means that continuous improvement practices could jeopardize flexibility.

The HR, process standardization and supplier management constructs have similar low-value coefficients, therefore indicating a relatively low influence. It should be noted, however, that both the HR and the supplier management constructs show a positive relation, while there is a negative correlation between process standardization and flexibility.

Finally, the reliability analysis of products and services points, once again, to a significantly positive influence of the customer focus construct (0.612), while continuous improvement seems to have no influence on reliability. The HR and supplier management constructs have positive and close coefficients, but their relatively low values indicate a small influence. The process standardization presents a more significant coefficient, although in a negative correlation, pointing to a negative influence on reliability.

The next step was to establish the relationship between quality constructs and the organizational performance, as displayed in Table 7. Looking at the overall performance, it could be noticed that the customer focus and the supplier management constructs present the highest coefficients, indicating large positive impacts on the overall performance of the companies that focus on these practices. Continuous improvement also has a significant coefficient, although smaller, demonstrating its positive relation with the corporative performance. HR and process standardization exhibit coefficients close to zero, meaning a
considerably weak influence.

In terms of the financial performance, its coefficients mildly highlight the correlations with customer focus, continuous improvement and supplier management. Since the HR construct has a negative coefficient, yet close to zero, its impact can be considered null. Process standardization also demonstrates a very low impact on financial performance, given its positive non-significant coefficient. Considering market share, customer focus exerts the greatest impact, while HR has a close-to-zero coefficient and, therefore, has no relevance. Despite being insignificant values, both the continuous improvement and supplier management constructs have positive coefficients, implying that they have a low impact on market share. The only construct to present a negative correlation with market share, in spite of its low coefficient, is process standardization.

Finally, regarding the company’s image in the market, supplier management indicates great, as well as customer focus, corroborating its intense relation with corporate image. Presenting non-relevant coefficients, both HR and continuous improvement are interpreted as non-influential, whereas process standardization has a negative average coefficient, indicating a low, if not negative, influence towards the company image. Figure 2 consolidates the very relationship discussed in this study.

Figure 2 - Relationship of the quality constructs with both the competitive capabilities and the organizational performance

Source: Authors

5. Conclusion
The present work accomplished its main objectives: promotion of a conceptual discussion on quality constructs, competitiveness and organizational performance; analysis of the relationship of those constructs with the competitive capacities and also with the organizational performance; and the identification of the quality constructs that influence
competitive capacities and organizational performance, and the degree of such impact.

The study’s main academic contributions are the discussions on quality management practices and the comparisons made between such practices and competitive capacities and organizational performance. Despite its limitations, the study was able to demonstrate empirical evidence that could support future researches, considering that companies of different sizes and sectors were studied. Regarding the applied contributions, the results exhibited represent an advance in identifying which quality management practices benefit companies the most, improving their performance and contributing with their respective competitive capacities.

The sample size, as well as assuring its randomness and representativeness, can be listed as the work’s great challenges. The managers eventually fulfilled the necessity for randomness in that population the moment their voluntarily enrolled for the training,. The representativeness would also be guaranteed, albeit not ideally, for this same reason, since there were manufacturing companies from the market’s most diverse sectors. Lastly, the sample size (108 managers) was close to the minimum limit required for this model, allowing its validation. Nevertheless, it is undeniable that a larger sample would bring more reliability to the results.

The study’s limitations are related to the location of the companies surveyed, restricted to the state of São Paulo, and to the fact that these companies did not belong to a specific sector. Quality management systems can present particularities that have greater and better adherence in specific environments. Based on that, it is recommended that future research replicate the model in other locations and focus on specific market sectors.

6. Acknowledgements
We would like to acknowledge the fundamental support of CAPES concerning the scholarship granted.

ANNEX - QUESTIONNAIRE
Profile of the organization and its respondent
Respondent’s job position: _________ Company’s sector: _________________ Founded in: _______
Number of employees (approx.): ____ ISO 9001? ( ) Yes ( ) No. In case of yes, when was the
company first certificated?
1. The company assesses customer satisfaction in a structured way and on an ongoing basis
   ( ) Totally disagree  ( ) Partially disagree  ( ) Indifferent  ( ) Partially agree  ( ) Totally agree
2. The company effectively identifies and incorporates customer requirements into its products/services
3. The company effectively uses the quality of processes and products/services as a strategy to win customers.
4. The company has employees effectively trained for their duties.
5. The company encourages employees to implement improvements in production processes.
6. The company grants benefits due to employees’ performance.
7. The company has trained and motivated quality teams.
8. The company has a continuous improvement-focused culture.
9. The company has structured and effective corrective and preventive action plans.
10. There are standardized processes in the company and they are frequently reviewed.
11. The high degree of standardization is a fundamental element for the company’s success.
12. The company has an ISO 9001 certificate and follows it rigorously.
13. The company continuously and structurally assesses its suppliers.
14. The supplier’s assessment has clear and well-established criteria.
15. The company has objective criteria for the classification of its suppliers.
16. The company evaluates the quality of the products/services continuously and feeds back projects and processes in order to improve them.
17. The quality of its processes, products and services positively influence the company’s image.
18. There are processes related to quality management that facilitate the company’s relationship with customers and suppliers.
19. Quality processes contribute to increase the company’s productivity and reduce its costs and non-conformities.
20. The investment in quality management is excessively high for the results it generates to the company.

21. Staff resistance and lack of commitment are high whenever quality matters are concerned.

22. There is lack of support from the top management for quality matters in the company.

23. The company competes in the market mainly via cost (lower prices).

24. The company competes in the market mainly via quality (better products and services than its competitors).

25. The company competes in the market mainly via time (smaller delivery and technical assistance times than its competitors, for example).

26. The company competes in the market mainly via flexibility (products/services changes and/or variations in delivery time or quantity).

27. The company competes in the market mainly via reliability of its products/services.

28. The company exhibits excellent financial performance when compared to its competitors.

29. The company has significantly increased its market share in the last 5 years.

30. The company has an outstanding image in the market.

REFERENCES


