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## The influence of organizational culture on the use of quality techniques and its impact on performance

Gambi, Lillian Do Nascimento; Jørgensen, Frances; Boer, Harry; Carpinetti, Luiz C.R.; Gerolamo, Mateus C.

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Industrial Engineering Department



Aalborg University  
Center for Industrial Production

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# The influence of organizational culture on the use of quality techniques and its impact on performance

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This report is part of the doctoral thesis developed at University of São Paulo, Brazil in partnership with Aalborg University, Denmark.

**Authors:** Lillian Do Nascimento Gambi (University of São Paulo, Brazil), with Frances Jørgensen (Aarhus University, Denmark), Harry Boer (Aalborg University, Denmark), Luiz C. R. Carpinetti (University of São Paulo, Brazil) and Mateus C. Gerolamo (University of São Paulo, Brazil).

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# Summary

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This report presents the results of a study about the influence of organizational culture on quality techniques and the impact of matching culture and technique to enhance performance. Data were drawn from 250 manufacturing companies in Brazil and Denmark. Profiles were identified according to the companies' cultural characteristics and use of quality techniques. Findings suggest:

- 1- Certain cultural profiles predict the use of certain quality techniques better than others. For example, companies with a group culture, which is oriented towards collaboration and development of human resources, tend to use goal setting and continuous improvement techniques, rather than measurement techniques. In turn, companies that have a rational or hierarchical culture, which are oriented towards control and competition, tend to use measurement techniques more than cultures oriented to collaboration or creation.
- 2- Quality techniques contribute to improve performance, provided they are supported by appropriate cultural characteristics. For instance, the use of goal setting, continuous improvement, and failure prevention and control techniques supported by group and developmental cultures contribute to enhanced performance more than if those culture profiles are combined with the use of measurement techniques.

This research has important implications for managers in the sense that they need to be actively aware of the need to adopt quality techniques that fit with the culture of their organization.

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## 1. Introduction

Many companies have focused on Quality Management (QM) as part of their strategy to improve quality and consequently performance. The benefits of QM include fewer defects, cost reduction, higher flexibility, and increased employee and customer satisfaction. However, the results achieved are often far from the company's expectations: research suggests that only about one-third of companies achieve the intended results.

One explanation for the fact that these expectations are not realized is a failure to consider and integrate cultural characteristics into the implementation of QM. Indeed, this means that there is no best way to implement quality initiatives appropriate for all organizations.

## 2. Purpose

Accordingly this study has two main purposes:

- 1- To examine the relationship between organizational culture and QM techniques based on the assumption that cultural characteristics will affect what techniques firms use.
- 2- To determine whether cultural characteristics influence the effectiveness of QM techniques used.

## 3. Dimensions analyzed

Three dimensions considered in this study are: *organizational culture, quality management techniques, and performance.*

**Organizational culture:** This study adopts the Competing Values Framework (CVF) to identify different profiles of organizational culture. The CVF is based on two main dimensions. The first dimension reflects change (requiring flexibility) versus stability (allowing tight control). The second dimension concerns the extent to which an organization is internally versus externally oriented. These two dimensions create four cultural profiles: the **group, developmental, hierarchical, and rational** profiles, respectively. Figure 1 presents the key characteristics of these profiles.

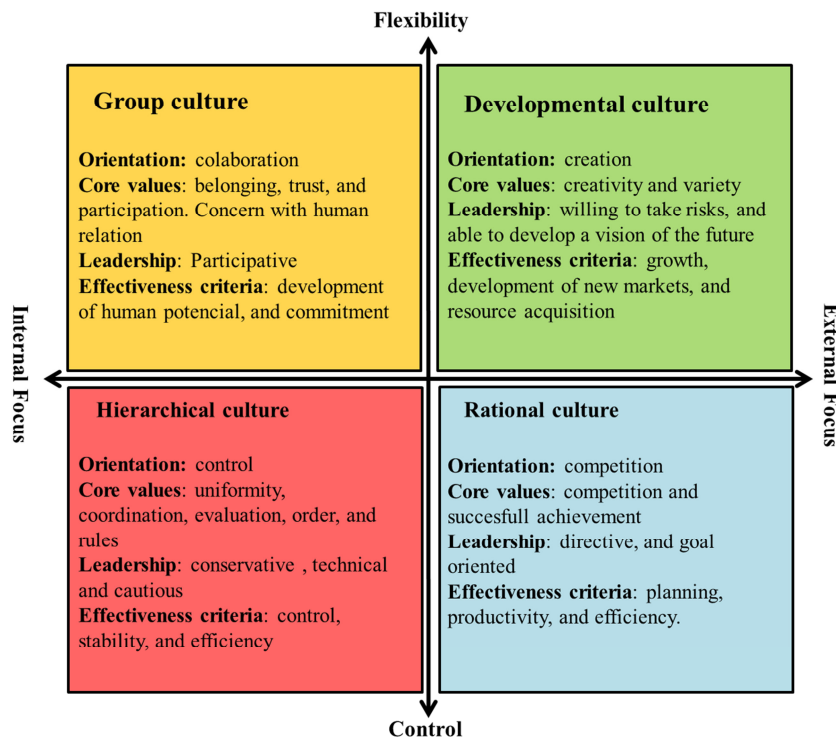


Figure 1 – Competing Values Framework (Adapted from Cameron and Quinn, 2006)

**Quality management techniques:** QM techniques help institutionalize practices and principles of QM, supporting, for example, continuous improvement, people and process management, customer satisfaction. In addition, they can provide many benefits to companies including cost reduction less re-work, increased employee morale and customer satisfaction, amongst others. Techniques are practical methods, skills, means, mechanisms or tools that provide support for the quality management (for example flow charts, mistake-proof devices, benchmarking, statistical process control).

Although there are numerous techniques available, this study focuses on four comprehensive groups of quality techniques: **goal setting, continuous improvement, measurement, failure prevention and control**, and examines some of the most common quality techniques used in the companies. Table 1 presents those groups, their characteristics and the individual quality techniques examined.

Table 1 – Quality technique groups, characteristics and examples

Quality technique groups	Characteristics	Quality techniques
<b>Goal Setting</b>	Techniques that emphasize process and product design based on best practices and customer needs and wants. These techniques are useful to help an organization to set goals that lead to better results.	QFD, benchmarking
<b>Continuous Improvement</b>	Techniques that are people-oriented and help the employees to use their knowledge effectively to support continuous improvement. These techniques emphasize openness, participation, and contribute to employee involvement.	Brainstorming, kaizen event, quality tools, 5S
<b>Measurement</b>	Techniques that provide information about the quality of manufacturing activities. These techniques help the organization to take fast actions based on data, besides promoting alignment regarding the quality goals.	Quality performance indicators, visual quality information.
<b>Failure Prevention and Control</b>	Techniques that are aimed at 1) identifying and generating useful information about possible causes of variation in manufacturing quality, and 2) preventing defects to occur in the manufacturing process. These techniques contribute to a stable and controlled production flow.	SQC, FMEA, mistake-proof devices, preventive maintenance

**Performance:** Indicators of performance measured in this study are related to customer satisfaction, operational performance (using time, cost, and quality indicators), human resource performance (using labor turnover and absenteeism indicators), and relative-to-competitors performance. Those indicators are measured in a qualitative way because of the difficulty of obtaining objective performance data.

## 4. Methodology

Data used in this research was collected from 250 manufacturing companies in Brazil and Denmark. Two models were devised (see Section 5) to investigate the relationship between and among organizational culture, quality techniques, and performance.

The response rates in Brazil and Denmark were 52.8% and 47.2%, respectively. The questions asked concerned the organizational culture of, the quality techniques used by, and the performance of, manufacturing plants. Most of the respondents (80.0%) are quality managers or production managers. In terms of organizational size, 18% of the companies have 500 employees or more, 44.5% between 499 and 100 employees, 35.1% between 99 and 20 employees, and 2.5% fewer than 20 employees.

## 5. Models

The model presented in Figure 2 is used to test the relationships between the four cultural profiles and the four groups of quality techniques. This will show whether all cultures freely choose all quality techniques or, in contrast, if one culture has a preference of certain quality techniques, while another culture prefers adopting a different set of techniques.



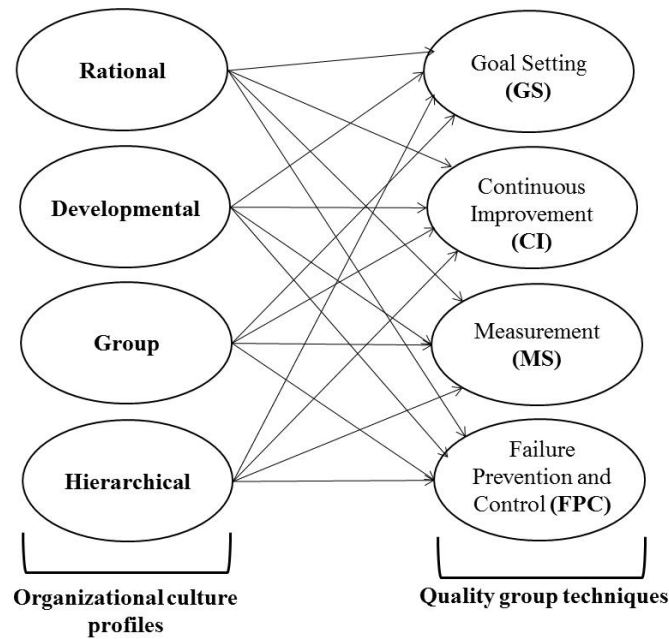


Figure 2 – General structural model of the relationships between culture profiles and quality technique groups

The model in Figure 3 illustrates the relationships between the organizational culture profiles, the groups of quality techniques, and performance, which are tested in the study. This model examines the direct effect of organizational culture (arrow (a)) and quality techniques (arrow (c)) on performance, and the indirect effect of organizational culture on performance through the use of quality techniques (arrow (b) plus arrow (c)).

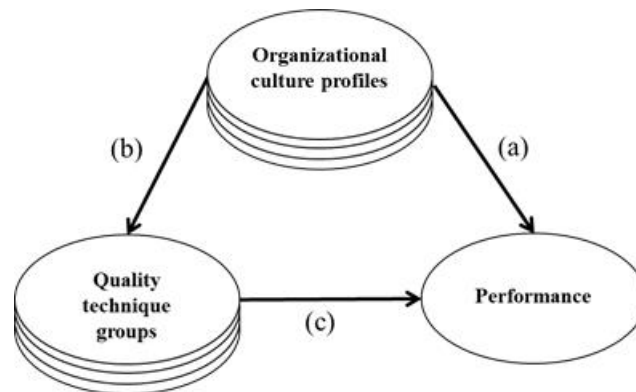


Figure 3 – General structural model of the relationships among organizational culture profiles, quality technique groups, and performance

## 6. Results

The results show that the relationship between culture and quality varies across different organizational culture profiles and groups of quality techniques:

- Companies with a rational culture oriented towards competition tend to use goal setting, continuous improvement, measurement, and failure prevention and control group technique groups.
- Companies with a developmental culture oriented towards creation tend to use goal setting and continuous improvement technique group. This culture is not associated with the use of measurement, failure prevention and control techniques.
- Companies with a group culture oriented towards collaboration tend to use goal setting, continuous improvement, failure prevention, and control techniques. Also, a negative relationship was found between this culture and the use of measurement techniques, meaning that the stronger the characteristics of this culture are, the lower the use of measurement techniques.
- Companies with a hierarchical culture oriented towards control tend to use goal setting, measurement, failure prevention, and control techniques. This culture is not associated with the use of continuous improvement techniques.

In brief, companies with a rational culture tend to use all quality techniques. Companies with a group or developmental cultures use goal setting and continuous improvement techniques more than companies with a hierarchical culture, which in turn, is more likely to prefer measurement techniques than the group and developmental cultures. Figure 4 summarizes those relationships.

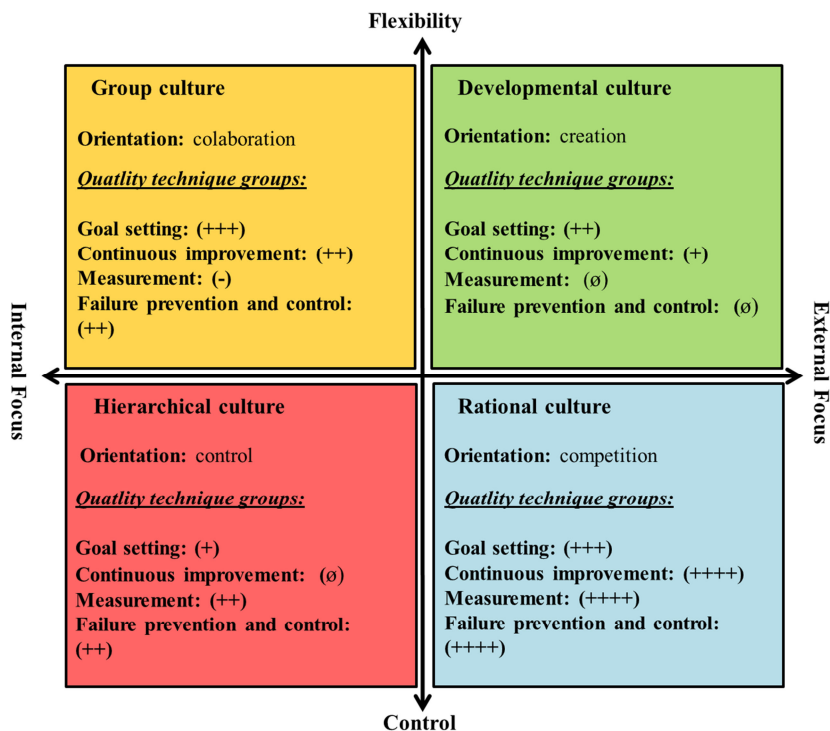


Figure 4 – Relationship between organizational culture and groups of quality techniques  
 (Notes: (ø) not related, (+) positive related, (-) negative related)

The tests of model depicted on Figure 3 show that the organizational culture affects performance through the quality management techniques used in the firms, for most combinations of the cultural profiles and quality techniques examined in this study:

- The group and developmental cultures positively affect performance directly and indirectly through all quality technique groups.

- The hierarchical culture positively affects performance directly as well as indirectly, through the use of goal setting, continuous improvement and measurement techniques. However this culture has a negative effect on performance if it is associated with the use of failure prevention and control techniques.
- The rational culture has only a direct effect on performance, meaning that performance is not influenced by the quality techniques used.

Those results are summarized in Table 2.

*Table 2 – Effects of matching culture and quality techniques on performance*

		Effect on performance		
		Direct	Indirect	Result
<b>Culture</b>		<b>Group and Developmental</b>		
<b>Quality technique groups</b>	Goal setting	✓	✓	Positive
	Continuous improvement	✓	✓	Positive
	Measurement	✓	✓	Positive
	Failure prevention and control	✓	✓	Positive
<b>Culture</b>		<b>Hierarchical</b>		
<b>Quality technique groups</b>	Goal setting	✓	✓	Positive
	Continuous improvement	✓	✓	Positive
	Measurement	✓	✓	Positive
	Failure prevention and control		✓	Negative
<b>Culture</b>		<b>Rational</b>		
<b>Quality technique groups</b>	Goal setting	✓		No effect
	Continuous improvement	✓		No effect
	Measurement	✓		No effect
	Failure prevention and control	✓		No effect

## 7. Conclusions and recommendations

In general, quality techniques are considered easily applicable in any company. However, this study shows that, in order to obtain the best results from the use of these techniques, they must be supported by appropriate cultural characteristics. This means that the traditional “one size fits all” approach to the use of quality techniques cannot be applied.

This has an important implication for managers in the sense that they need to be actively aware of the cultural characteristics of their organization to achieve the best results from the use of quality techniques. For instance, for an organization characterized primarily by a group culture, it may be much more difficult to benefit from techniques related to measurement than from techniques that are people-oriented, such as brainstorming and kaizen. In contrast, for an organization emphasizing a developmental culture, it should be easier to benefit from techniques related to process and product design than from

techniques that are, for instance, related to uncertainty avoidance, such as failure prevention and control techniques.

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## Suggestions for further reading

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