**Abstract:** This research investigates the impact of quality management systems on working capital management of Brazilian manufacturing SMEs. The companies analyzed were selected with a stratified sampling technique based on economic criteria. The data was collected through a questionnaire that was administered through a face-to-face interview. The time horizon subject to observation was three years and concerned the period 2016-2018. Overall, 122 companies participated in the research. The analysis was developed using statistical matrix tools. The results are statistically significant and suggest that companies using quality management systems have more efficient working capital management, collect receivables faster and pay off debts faster.

**Keywords:** working capital management, quality management system, emerging economy, current ratio.

## INTRODUCTION

Over the past few decades, the corporate finance literature has progressively reevaluated short-term financial decisions. Starting from Smith's seminal paper (1980), several scholars have verified that such decisions can have a fundamental impact on corporate profitability and risk, significantly influencing the survival and development conditions of firms (Kim & Chung, 1990; Shin & Soenen L., 1998; Deloof, 2003; Mannetta et al., 2014; Chalmers et al., 2020; Alvarez et al., 2021; Chen et al., 2021; Hernandez et al., 2021)

As highlighted by the literature, the management of current assets and liabilities must be adequate to the specific characteristics of the company and to the operating context in which it carries out its business (Chen et al., 2020; Diaz and Vazquez, 2019; Sensini and Vazquez, 2021; Shan et al., 2019).

In this regard, the literature has shown that it is difficult to identify the optimal level of working capital, as it is influenced by the characteristics of the company and the dynamics of the market and the sector, which are highly variable (Campos et al., 2015; Chen et al., 2019; Arnaldi et al., 2021).

Working capital management is essential for businesses of any size, but it becomes essential for small and medium-sized businesses. These firms are in fact often characterized by resource constraints that can significantly affect their economic and financial equilibrium conditions (Stiglitz & Weiss A., 1981; Cohen et al., 2013; Ukaegbu, 2014; Alvarez et al., 2014; Chen et al., 2014; Sanchez and Sensini, 2017; Sensini, 2020)

These constraints are even stronger in emerging economies, where capital markets are underdeveloped and the system is mainly focused on bank credit (Sanchez and Sensini, 2017; Amendola et al., 2018; Chauhan and Banerjee, 2018; Chalmers et al., 2018). As a result, companies in these economies are often forced to use internal sources to finance their operating cycle (Allen et al., 2012; Sensini, 2017; Wasiuzzaman, 2015; Das et al., 2000).

Furthermore, the constraints just outlined can be accentuated by the lack of managerial skills and the lack of adequately qualified human resources (Diaz and Sensini, 2020).
In the context briefly outlined, the most proactive SMEs have introduced quality management tools and techniques to improve business processes and, at the same time, to control the variables that influence the size of working capital. In this perspective, quality management systems can improve business processes and promote organizational growth (Kureshi & Mann, 2009; Chen & Sensini, 2014; Della Porta & Diaz, 2016; Fonseca & Domingues, 2018; Hong et al., 2019).

However, the introduction and implementation of quality management systems require skills often absent in SMEs, requiring additional costs that discourage entrepreneurs (Diaz & Sensini, 2020).

The issue of working capital management, like that of quality management systems, has been extensively investigated.

However, these issues have rarely been the subject of a joint study.

Therefore, this paper intends to study the relationship between quality management systems and working capital management, focusing on an emerging economy, such as the Brazilian one.

To this end, we used a sample of Brazilian manufacturing SMEs chosen using a stratified random sampling technique (Amendola et al., 2020). The data was collected through a questionnaire submitted to 500 companies. At the end of the survey, 122 companies replied to the questionnaire.

The analysis results showed that companies that use quality management systems have more efficient management of working capital.

The results of this research suggest that quality management systems positively impact the management of working capital in the context analyzed, helping to form the literature on this topic.

Furthermore, the results can be useful in stimulating SME entrepreneurs to use these tools.

The paper is organized as follows. The second section analyzes the reference literature, while the third describes the research design and the methodology followed. The fourth section shows the results, while the last section contains the concluding remarks.

LITERATURE REVIEW

The theoretical debate and empirical evidence have shown the difficulties in identifying an optimal level of working capital valid for each type of company and economic context.

Some authors have suggested that high investment in working capital can positively affect the company's profitability, allowing it to increase sales, expand the customer base, and reduce procurement costs while reducing its reliance on fluctuations in material prices (Deloof, 2003; Aktas et al., 2015; Petersen and Rajan, 1997; Wilner, 2000; Zariyawati et al., 2009; Chalmers et al., 2014; Sanchez & Sensini, 2017; Chen et al., 2020).

On the contrary, other authors have suggested that excessive investment in working capital can reduce the company's profitability, increasing the financial requirement, the rigidity and consequently the risk of financial difficulties (Hughes et al., 2013; Campos et al., 2014; Sensini, 2016; Della Porta et al., 2016). In this perspective, other scholars have suggested that optimal working capital management requires a trade-off between risk and efficiency (Shin & Soenen, 1998; Fernandez et al., 2014). Finally, other scholars have found a non-linear relationship between working capital and performance (Opler et al., 1999; Mueller and Nowak, 2014; Wasiuzzaman, 2015).

In the context briefly outlined, quality management systems can represent a crucial factor in managing working capital, as they involve the entire company and its stakeholders in improving business processes (Bamford and Greatbanks, 2005). Several studies have shown that the introduction of quality management practices produces positive effects on organizational, economic and financial performance (Wong et al., 2015; Hong et al., 2019; Wu et al., 2015; Zhou and Benton, 2007; Sadikoglu and Zehir, 2010; Chalmers et al., 2020).

The increase in competitive dynamics, the diffusion of technology, and the need for qualified human resources have expanded the importance of quality management practices to improve the company's competitive capacity.

In the context briefly outlined, some authors have shown that quality management systems can improve financial management efficiency, favouring the optimization of the individual components of working capital (Nollet et al., 2017).

However, several types of research have shown that introducing such management systems is particularly complex for SMEs in emerging economies, also due to the specific characteristics of the reference environmental context (Ihua, 2009; Ratna wati et al., 2019).

Research Design and Sample Characteristics

The study investigates the impact of quality management systems on working capital management methods, focusing on Brazilian manufacturing SMEs.

The sample was selected with a stratified technique on economic criteria, making it possible to consider companies with different characteristics in terms of turnover, investments and number of companies.
employees. The initial sample consisted of 500 companies.

The data were collected through a questionnaire administered to all the companies in the sample. The questionnaire was structured in two sections: a) the first was intended to collect general data on the company and verify the possible presence of quality management systems; b) the second was instead intended to collect information on the individual elements that make up the working capital.

The period under observation is three years and refers to 2016-2018.

Data was collected through face-to-face interviews with entrepreneurs, using properly trained interviewers. Overall, 122 companies participated in the research by the deadline and were analyzed.

Table 1 shows the main characteristics of the sample of SMEs analyzed.

### Tab. 1 - General sample information (N = 122)

<table>
<thead>
<tr>
<th>Information</th>
<th>%</th>
</tr>
</thead>
<tbody>
<tr>
<td>Company Members/Shareholders</td>
<td></td>
</tr>
<tr>
<td>1</td>
<td>16.2</td>
</tr>
<tr>
<td>2</td>
<td>37.8</td>
</tr>
<tr>
<td>3-5</td>
<td>36.8</td>
</tr>
<tr>
<td>6 or more</td>
<td>9.2</td>
</tr>
<tr>
<td>0 - 10</td>
<td>21.3</td>
</tr>
<tr>
<td>Age</td>
<td></td>
</tr>
<tr>
<td>11 - 20</td>
<td>39.3</td>
</tr>
<tr>
<td>&gt; 20</td>
<td>38.4</td>
</tr>
<tr>
<td>Gender</td>
<td></td>
</tr>
<tr>
<td>Female</td>
<td>25.9</td>
</tr>
<tr>
<td>Male</td>
<td>75.1</td>
</tr>
<tr>
<td>Number of employees</td>
<td></td>
</tr>
<tr>
<td>&lt; 10</td>
<td>16.9</td>
</tr>
<tr>
<td>11 - 20</td>
<td>31.5</td>
</tr>
<tr>
<td>21 - 50</td>
<td>31.5</td>
</tr>
<tr>
<td>51 - 250</td>
<td>20.1</td>
</tr>
<tr>
<td>Average Turnover</td>
<td></td>
</tr>
<tr>
<td>&lt; 2 millions (*)</td>
<td>20.1</td>
</tr>
<tr>
<td>&gt; 2 &lt; 10 millions (*)</td>
<td>29.8</td>
</tr>
<tr>
<td>&gt; 10 &lt; 50 millions (*)</td>
<td>33.2</td>
</tr>
<tr>
<td>&gt; 50 millions (*)</td>
<td>16.9</td>
</tr>
<tr>
<td>Profitable Firms</td>
<td></td>
</tr>
<tr>
<td>2018</td>
<td>68.9</td>
</tr>
<tr>
<td>2017</td>
<td>69.3</td>
</tr>
<tr>
<td>2016</td>
<td>73.4</td>
</tr>
</tbody>
</table>

(*) US dollars

As can be seen from the table, the prevalence of the companies interviewed has a limited number of shareholders, has been established for over 10 years (75.7%) and is governed by male managers. Most companies have fewer than 50 employees, a turnover of less than $ 50 million, and a profit in the past three years.

Tables 2 and 3 show the companies that have introduced quality management systems and the main reasons that hinder the introduction of such systems.

### Tab. 2 – Quality Management Systems (QMS)

<table>
<thead>
<tr>
<th>Introduction of QMS</th>
<th>%</th>
</tr>
</thead>
<tbody>
<tr>
<td>Yes</td>
<td>26.8</td>
</tr>
<tr>
<td>No</td>
<td>73.2</td>
</tr>
</tbody>
</table>

### Tab. 3 - Motivations

<table>
<thead>
<tr>
<th>Motivations (more than one answer)</th>
<th>%</th>
</tr>
</thead>
<tbody>
<tr>
<td>High consultancy and training costs</td>
<td>63.2</td>
</tr>
<tr>
<td>Difficulty collecting and organizing data</td>
<td>43.9</td>
</tr>
<tr>
<td>Complex tools</td>
<td>34.6</td>
</tr>
</tbody>
</table>

Only a part of the companies interviewed use quality management systems. The main reasons for the failure to adopt these systems are the high costs and difficulties associated with the collection and organization of data.

**RESULTS AND DISCUSSION**

Before analyzing the impact of quality management systems on working capital management, we divided the companies into two groups. The first group, indicated with the number 1, includes companies that do not use quality management systems. The second group, indicated by number 2, includes companies that use quality management systems.
For each group, we measured the main components of working capital indicators using a statistical matrix methodology. Furthermore, we found it appropriate to use the non-parametric Mann-Whitney test due to the significant deviations we recorded in some indicators.

Table 4 shows the Current Liquidity Ratio (CLR), the Working Capital Level (WCL), the operating cycle (WCC, credit collection period + inventory turnover - payment period Debt Period) and the Cash Conversion Cycle (CCC, Pending Inventory Days + Pending Sale Days + Pending Payment Days).

<table>
<thead>
<tr>
<th>Indicators</th>
<th>1</th>
<th>2</th>
<th>p (*)</th>
</tr>
</thead>
<tbody>
<tr>
<td>CLR</td>
<td>Mean</td>
<td>Median</td>
<td>Std Dev</td>
</tr>
<tr>
<td>WCL</td>
<td>22.7</td>
<td>21.1</td>
<td>8.4</td>
</tr>
<tr>
<td>WCC</td>
<td>159</td>
<td>137</td>
<td>29.1</td>
</tr>
<tr>
<td>CCC</td>
<td>75</td>
<td>65</td>
<td>34.5</td>
</tr>
</tbody>
</table>

(*) p-value (Mann–Whitney test)

The analysis results show that the manufacturing companies examined have a liquidity index and a positive net working capital. However, the operating cycle analysis shows that group 1 firms have a short-term excess of assets relative to their financial needs. Indeed, group 1 firms have excess short-term assets. The results relating to the Cash Conversion Cycle (CCC) show that Group 2 companies, which use quality management systems, have more efficient management of working capital, as they can transform their investments into cash over a period of time shorter.

Table 5 shows the results of the analysis.

<table>
<thead>
<tr>
<th>Indicators</th>
<th>1</th>
<th>2</th>
<th>p (*)</th>
</tr>
</thead>
<tbody>
<tr>
<td>ART</td>
<td>Mean</td>
<td>Median</td>
<td>Std Dev</td>
</tr>
<tr>
<td>LWC</td>
<td>78.3</td>
<td>74.8</td>
<td>23.7</td>
</tr>
<tr>
<td>WCC</td>
<td>77.6</td>
<td>72.6</td>
<td>19.7</td>
</tr>
</tbody>
</table>

(*) p-value (Mann–Whitney test)

The analysis shows that Group 2 companies can collect receivables faster and can pay their debts more quickly. Furthermore, the management of inventories is also strongly influenced by the presence or absence of quality management systems.

CONCLUDING REMARKS

This paper studies the impact of quality management systems on working capital management of Brazilian manufacturing SMEs.

All companies have a liquidity index and positive net working capital. However, companies that do not use quality management systems have a short-term surplus of assets over their financial needs.

The results suggest that companies using quality management systems reap significant benefits for their short-term financial management, as they can convert their investments into cash flows faster than other companies. In addition, these companies can pay suppliers in a shorter time. This circumstance suggests that these companies are also able to obtain discounts on supplies.

This research provides further empirical evidence of the positive impact that quality management systems have on short-term financial management, enriching the literature on the topic.

Furthermore, the results can help entrepreneurs better understand the benefits that can result from the introduction of quality management systems.

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REFERENCES


