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THE IMPACT OF INFORMATION TECHNOLOGY INVESTMENTS ON THE ORGANIZATIONAL STRATEGIC VARIABLES AND PERFORMANCE OF MICRO AND SMALL ENTERPRISES (MSEs)

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Abstract

Objective: We aim to measure the impact of Information Technology (IT) investments on the organizational strategic variables and performance of micro and small enterprises (MSEs).

Method: An explanatory and quantitative research was conducted by applying a survey with 235 MSEs.

Originality / Relevance: The growth in investments in Information Technology have led to an increasing number of companies adopting IT as a strategic tool in order to improve performance and gain competitive advantage. The more financially accessible these investments become the more popular they are with MSEs. Nevertheless, despite the seemingly obvious benefits of IT, there are doubts about its impact, especially on MSEs. To fill this gap, we examined the strategic and performance variables of the MSEs.

Results: IT investments were found to have a positive impact on customer management associated with cost performance, sales and productivity. We also found IT investments in MSEs primarily impact clients and internal organizational efficiency variables, suggesting that when IT investments are directed towards managing customers and the company, the benefits of IT on organizational performance will be greater.

Theoretical / methodological contributions: As for theoretical contributions, this study presents an important discussion on IT investments made in a sector for which there is little research, the MSE. Another contribution is the combination of strategic elements of IT investments with different performance variables.

Keywords: Information Technology. IT Investments. IT Impact. Performance. Micro and Small Enterprises.

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Iberoamerican Journal of Entrepreneurship and Small Business | v.9 | n.2 | p. 01-30 | Jan./Apr. 2020.

1

1. INTRODUCTION

Information Technology (IT) is drastically changing the way companies compete (Ollo-López & Aramendía-Muneta, 2012; Taruté & Gatautis, 2014) and has been adopted as a strategic business tool (Haug, Pedersen & Arlbjorn, 2011). To be successful, organizations of all kinds are increasingly investing in IT to reduce costs, increase productivity, improve performance, gain competitive advantages, and ensure new ways of creating and doing business (Altertin & Albertin, 2012; Ashrafi & Murtaza, 2008; Beheshti, 2004; Khallaf, 2012; Kossai & Piget, 2014; Yang et al., 2014).

According to Gartner (2019), worldwide IT spending is expected to total up to USD 3.79 trillion by 2019, equivalent to a 1.1% increase over 2018. With respect to IT spending by MSEs, the IDC (2018) predicted an estimate of about USD 602 billion in 2018, up 4.9% from 2017.

This increase in the value of IT investments requires managers to make quick, assertive decisions and to gain greater insight into the area so that these investments do not fail or go to waste (Bayo-Moriones & Lera-Lopez, 2007; Dolci, 2009). Thus, a stronger alignment between IT and the organization shall lead to a more relevant impact of the investment made (Nguyen et al., 2015).

MSEs have recognized IT's positive impact on the growth of organizations through the use of the Internet, e-mail, and computers. Based on a survey conducted by Sebrae (2015), three (76%) out of four business owners use computers (laptop or desktop) in the business, and 61% utilize some software to manage their business in an integrated manner.

Adopting IT may provide higher performance and productivity levels at work and thus enable the standardization of processes and tasks (Roder et al., 2014; Rikhardsson & Dull, 2016).

However, the relationship between IT investments and organizational performance does not always exhibit similar results. Estimates indicate that about USD 130 billion were wasted on IT between 2000 and 2002 (McAfee, 2004). Tallon (2007) argues that business strategies are becoming more complex, which makes it difficult to align IT with organizational strategies. As for Dada (2016), these wasted investments are still recurring, and at least 25% of IT resources are misused due to failure, mainly during the planning process for implementation by the MSE segment.

Iberoamerican Journal of Entrepreneurship and Small Business | v.8 | n.2 | p. 01-30 | Jan./Apr. 2020.

2

According to Van den Berg et al. (2019), IT investment decisions are important and risky at the same time.

Xiong and Qureshi (2012) highlight that MSEs must correctly use IT so that the advantages obtained are representative. Accordingly, there is a need for mechanisms which identify the technologies that fit the organization's strategy best (Deitos, 2003). As a result, it appears that MSEs are increasing their IT investments although failing to harness their potential in the same way as large companies, often due to lack of knowledge on the advantages of the technological tools acquired (Taruté & Gatautis, 2014).

These factors demonstrate the importance of identifying how IT resources are applied and managed and of measuring their impact on organizational strategic variables, especially for MSEs. These enterprises constitute the majority of institutions operating in the world (Consoli, 2012), and they increasingly recognize IT's potential as a way to improve their competitiveness.

In Brazil, MSEs represent 99% of all the companies in the country, accounting for 25% of Brazil's Gross Domestic Product (GDP) (Sebrae, 2013). In a 2014 survey conducted by SEBRAE, 92% of 2,108 micro and small business owners interviewed reported having Internet access, while 80% used their cellular phones, and 74% had at least one microcomputer (notebook/desktop). By this data, we can see how the use of IT and, consequently, IT investments made by micro and small business owners have been on the rise.

In this sense, business owners must recognize the value and advantages that IT investments can provide. It is necessary, however, to find ways to measure the impact of these investments on the different variables and performance of MSEs (Bayo-Moriones, Billon & Lera-Lopez, 2013; Beheshti, 2004; Maçada et al., 2012). This paper focuses on this context and intends to measure the impact of IT investments on the organizational strategic variables and performance of MSEs. For this purpose, we developed a conceptual model by identifying strategic and performance variables in the IS literature, followed by empirical testing and validation with 235 MSEs.

The paper is structured as follows. Section 2 presents the literature review and develops the model and its respective hypotheses. In Section 3, we describe the methodological procedures. We provide our analysis and results in Section 4. Finally, we offer our final remarks for the study in Section 5.

Iberoamerican Journal of Entrepreneurship and Small Business | v.8 | n.2 | p. 01-30 | Jan./Apr. 2020.

3

The ANEGEPE Magazine
www.regepe.org.br

The Impact of Information Technology Investments on the Organizational Strategic Variables and Performance of Micro and Small Enterprises (MSEs)

2. LITERATURE REVIEW: THE IMPACT OF IT INVESTMENTS ON ORGANIZATIONAL PERFORMANCE

IT has advanced dramatically over the years through the emergence of various technologies (Xu, Zhang & Li, 2016). In addition to reduced acquisition costs, this advance has led many companies to increase their investments and adopt IT for different purposes, which have caused significant effects and changes in organizations (Maçada et al., 2012; Weiss & Anderson, 2004). This increase in IT investments made by companies year after year, whether in computers, software, infrastructure, networks, telecommunications, among others, have made IT a key factor in maintaining the organization's competitiveness (Kohli & Devaraj, 2003; Meirelles, 2014; Yang et al., 2014).

Organizations around the world are investing in IT to change the way they do business both domestically and abroad and to look for the potential advantages that IT can provide (Su & Yang, 2010). Xiong and Qureshi (2012) corroborate that the company's capacity for growth tends to increase once they employ a certain technology. Over the years, IT has been acknowledged as the foundation for the operational and managerial transformations required by organizations to respond quickly to the changes and needs of the highly dynamic market (Rikhardsson & Dull, 2016).

Conversely, as much as IT investments have grown and as obvious as the benefits may seem to be, companies are cautious about what to do (Yang et al., 2014). This is because many companies do not obtain the benefits expected from these investments, as the decision to adopt IT is often made unconsciously. In general, businesses invest significant amounts in IT and are often challenged to properly develop strategies that direct these resources toward adding value to the business (Mithas & Rust, 2016).

This need for companies to invest has allowed for unplanned spending without an assessment of its organizational impact. Overall, the literature review demonstrates that IT can contribute to the overall performance of organizations, provided it is used properly (Taruté & Gatautis, 2014) and aligned with internal resources and organizational processes (Consoli, 2012).

In recent years, numerous studies have sought to evaluate the impact of IT investments on a variety of aspects (Consoli, 2012; Lunardi, Dolci & Maçada, 2010;

Iberoamerican Journal of Entrepreneurship and Small Business | v.8 | n.2 | p. 01-30 | Jan./Apr. 2020.

4

Taruté & Gatautis, 2014). This literature review identified some studies that assess IT's effect on organization-specific variables, such as productivity (Dehning, Dow & Stratopoulos, 2003; Stratopoulos & Dehning, 2000), financial performance (Stratopoulos & Dehning, 2000), and impact on work (Torkzadeh & Doll, 1999). Other studies examine this impact more broadly, thus expanding the number of strategic variables analyzed (Haberkamp et al., 2010; Lunardi, 2001; Maçada, 2001; Mahmood & Soon, 1991; Saccol et al., 2004).

There are several instruments that assess the impact of IT on organizations. For a better understanding and visual, Figure 1 presents a summary of some instruments identified in the literature and demonstrates the differences among the researchers cited.

Authors	Variables Studied
Mahmood & Soon (1991)	Customers, competitive rivalry, suppliers, search costs and switching costs, market, products and services, economics of production, internal organizational efficiency, organizational efficiency, and pricing.
Palvia (1997)	Customers, competitive rivalry, suppliers, market, products and services, economies of scope, internal organizational efficiency, interorganizational efficiency, business risk reduction, downsizing and outsourcing, learning curve and knowledge transfer, flexible operations, resources, government and country requirements, human resources, alliance with local partners and growth, time zones, coordination, integration, and IS.
Torkzadeh & Doll (1999)	Impact of information technology on work: productivity, management control, innovation, and customer satisfaction.
Maçada (2001)	Customers, competitive rivalry, suppliers, search costs and switching costs, products and services, economics of production, internal organizational efficiency, interorganizational efficiency, internationalization, government and country requirements, and interorganizational coordination.
Lunardi (2001)	Customers, competitive rivalry, suppliers, search costs and switching costs, products and services, economics of production, internal organizational efficiency, interorganizational efficiency, pricing, internationalization, government and country requirements, and interorganizational coordination.
Saccol et al. (2004)	Customers, competitive rivalry, suppliers, market, cost structure and capacity, organizational efficiency and effectiveness, and interorganizational efficiency.
Haberkamp et al.(2010)	Competitive rivalry, costs, market, products and services, productivity, internal organizational efficiency, and interorganizational coordination

Figure 1: Comparison of research models
Source: Developed by the authors

These researchers found numerous variables that might explain IT's effect on organizations. However, results show that there is no consensus regarding the impact of

Iberoamerican Journal of Entrepreneurship and Small Business | v.8 | n.2 | p. 01-30 | Jan./Apr. 2020.

5

The ANEGEPE Magazine
www.regepe.org.br

The Impact of Information Technology Investments on the Organizational Strategic Variables and
Performance of Micro and Small Enterprises (MSEs)

IT, which may vary according to the type of technology and the level of knowledge at the time of implementation (Boothy, Dufour & Tang, 2010; Das, Yaylacicegi & Menon, 2011).

Thus, it is not evident that IT investments positively transform organizations as their impact is difficult to measure. Nonetheless, it is essential to examine their effects on organizational strategic variables and organizational performance (Haberkamp et al., 2010; Tallon, 2007). IT alone does not guarantee the desired benefits. This can only be achieved through its effective application, which should lead to increased productivity and sales, reduced operating costs, a larger customer base, better decisions, and product and service differentiation (Lunardi, Dolci & Maçada, 2010). Manochehri, AlEsmail, and Ashrafi (2012) note that IT offers different contributions to the business:

• Greater visibility to companies,

• More information for small businesses,

• Companies can overcome traditional trade barriers,

• Facilitate financial transactions.

Within this context, IT interferes with organizational performance and may affect costs, sales, and productivity. Studies by the World Bank involving a sample of 20,000 companies in 50 developing countries have shown that firms that went on to apply IT have experienced faster sales growth (Matei & Savulescu, 2012). Research by Ollo-Lopez and Aramendia-Muneta (2012) demonstrates that IT has a positive effect on productivity, both directly and indirectly.

IT can be viewed as an opportunity to save resources by reducing manual efforts to search for relevant data (Rikhardsson & Dull, 2016). According to Manochehri et al. (2012), the main reason for investing in IT is to provide better and faster customer service and thus stay ahead of the competition and increase revenue as a consequence. Therefore, IT can assist companies in their performance, growth, productivity, and competitiveness (Hameed & Counsell, 2012).

2.1 IT Investments in Micro and Small Enterprises

Micro and Small Enterprises (MSEs) contribute significantly to most of the world's economies (Berisha-Namani, 2009; Löbler et al., 2015).

As stated by Alamand Noor (2009), MSEs account for more than half of all businesses and jobs in developed countries. In Brazil, MSEs represent 99% of all organizations and are responsible for 25% of Brazil's Gross Domestic Product (GDP) (Sebrae, 2013). The contribution of MSEs to the country's development, economic growth,

Iberoamerican Journal of Entrepreneurship and Small Business | v.8 | n.2 | p. 01-30 | Jan./Apr. 2020.

6

job creation and better living conditions is recognized and unquestionable (Longenecker et al., 2011).

The representativeness of MSEs demonstrates their importance to any country's economy, but there are characteristics that differentiate them from medium-sized and large companies. The companies' classification by size is the first of them. For this study, we adopted the definition for MSE developed by the Brazilian Micro and Small Business Support Service (SEBRAE) and in line with discussions on the topic in Brazil and abroad (Law No. 9.841/1999, Decree No. 5.028/2004, Supplementary Law No. 123/2006), which considers MSEs to be businesses with up to 99 employees.

Another characteristic of MSEs is the high level of uncertainty of their environment, which is influenced by rapid changes, thus making management difficult (Lunardi, Dolci & Maçada, 2010). Because of these differences and particularities in size and economic characteristics, it might be argued that MSEs differ from large corporations both in the way they operate and in their approach toward IT (Bayo-Moriones, Billon & Lera-Lopez, 2013; Haug, Pedersen & Arlbjorn, 2011; Yang & Fu, 2008). IT use by MSEs has spread rapidly and has made it possible for them to use different tools as a means to stand out amongst their competitors or at least remain competitive (Kuan & Chau, 2001). IT in MSEs has enabled them to offer their customers differentiated products and services, in addition to assisting them in performance, growth, productivity, and competitiveness (Hameed & Counsell, 2012).

IT investments made by MSEs are recent (Lunardi &Dolci, 2006; Lunardi, Dolci & Maçada, 2010). According to Albano (2001), as of the late 1990s, MSEs began to increase their investments in IT, which represents the beginning of the search for tools that bring some kind of benefits so as to remain competitive. This growth may be explained by the popularization and reduction of IT costs.

Currently, MSEs have been employing IT heavily, from simple automation to strategic use. A study by Sebrae (2014) reveals a significant increase in IT use by these companies. The main results indicate that 92% of business owners already have Internet access, which they use especially for e-mail and researching suppliers' prices. They also demonstrate that 74% of business owners who own a microcomputer utilize some software that integrates control over several business activities, such as purchases, sales, finances, and inventory.

Nevertheless, to achieve the expected benefits of IT, MSEs should be concerned with properly planning these investments, as the benefits perceived by companies that plan efficiently are greater than those that do not (Lunardi, Dolci & Maçada, 2010).

Iberoamerican Journal of Entrepreneurship and Small Business | v.8 | n.2 | p. 01-30 | Jan./Apr. 2020.

7

The ANEGEPE Magazine
www.regepe.org.br

The Impact of Information Technology Investments on the Organizational Strategic Variables and
Performance of Micro and Small Enterprises (MSEs)

Unplanned decisions can lead to poor investments and endanger the business's survival (Ghobakhloo et al., 2012). Therefore, just adopting IT is not enough for an MSE to stay in business. According to Sebrae (2018), one in four registered companies closes before completing two years in the market. Many of these micro and small businesses do not always make good choices, as they invest less in training and planning than they should (CNC, 2017).

Under these circumstances, it is appropriate to analyze the impacts of IT investments on the strategic variables and performance of MSEs as potential drivers for both larger and future successful investments.

2.2 Research Model and Hypotheses

This study is based on the research model composed of three strategic variables by Mahmood and Soon (1991): Customers, Suppliers, and Internal Organizational Efficiency. It also applies Integration as a strategic variable, from the model developed by Palvia (1997). To measure the impact on organizational performance, we utilized the performance variables Costs, Sales, and Productivity by Lunardi, Dolci, and Maçada (2010). Figure 2 presents the study's conceptual model, which investigates the impact of IT investments on the strategic variables and performance of MSEs.

Figure 2: Research Model
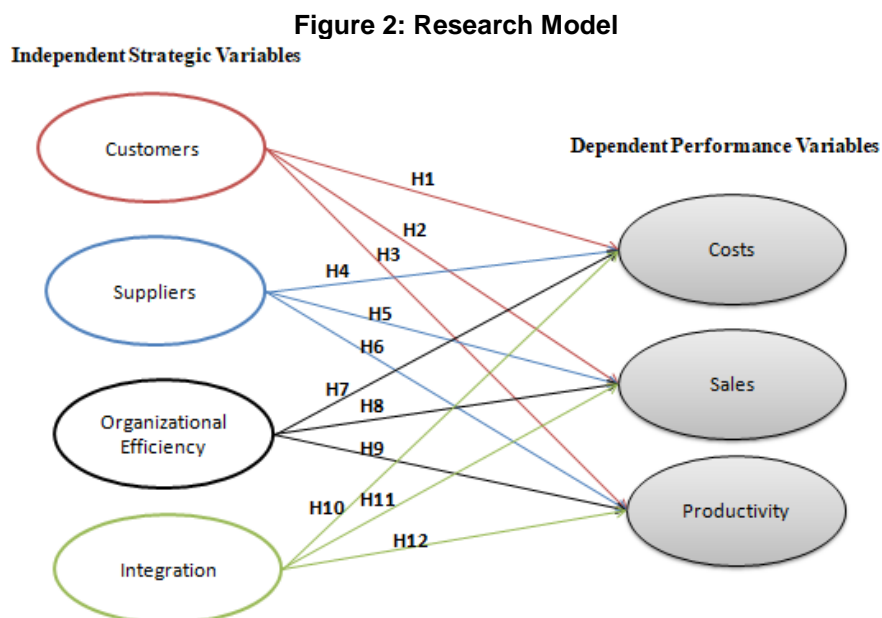
Source: Developed by the authors

The research hypotheses explore the relations among strategic and performance variables together. According to Kohli and Devaraj (2003), there are

Iberoamerican Journal of Entrepreneurship and Small Business | v.8 | n.2 | p. 01-30 | Jan./Apr. 2020.

8

already significant studies that prove the positive relationship between IT investments and organizational performance. Brynjolfsson and Hitt (1995), in turn, suggest that future studies will set out to identify which strategies are responsible for the greatest gains in organizational productivity. In other words, researchers should be concerned with identifying which organizational strategic variables will bring the greatest gains to organizational performance.

For this reason, in our research hypotheses, we explored the potential relations among organizational strategic variables (Customers, Suppliers, Internal Organizational Efficiency, and Integration) and performance variables (Costs, Sales, and Productivity). Thus, we propose 12 research hypotheses for testing in this study, as shown in Figure 3.

Iberoamerican Journal of Entrepreneurship and Small Business | v.8 | n.2 | p. 01-30 | Jan./Apr. 2020.

9

The ANEGEPE Magazine
www.regepe.org.br

The Impact of Information Technology Investments on the Organizational Strategic Variables and
Performance of Micro and Small Enterprises (MSEs)

Hypotheses	Authors
H1: IT investments in **customer** management have a positive impact on business **costs**.	Palvia (1997); Oliveira & Maçada (2000); Maçada (2001); Lunardi (2001); Saccol et al. (2004); Leão & Leão (2004); Ferreira et al. (2012); Bharadwaj (2000); Beheshti (2004); Ashrafi & Murtaza (2008); Lunardi, Dolci & Maçada (2010); Liang, You & Liu (2010); Das, Yaylacicegi & Menon (2011); Mithas et al. (2012).
H2: IT investments in **customer** management have a positive impact on business **sales**.	Palvia (1997); Oliveira & Maçada (2000); Maçada (2001); Lunardi (2001); Saccol et al. (2004); Leão & Leão (2004); Ferreira et al. (2012); Weill (1992); Raymond, Bergeron & Blili (2005); Qiang, Clarke & Halewood (2006); Ashrafi & Murtaza (2008); Lunardi, Dolci & Maçada (2010); Consoli (2012).
H3: IT investments in **customer** management have a positive impact on business **productivity**.	Palvia (1997); Oliveira & Maçada (2000); Maçada (2001); Lunardi (2001); Saccol et al. (2004); Leão & Leão (2004); Ferreira et al. (2012); Weill (1992); Brynjolfsson (1993); Torkzadeh & Doll (1999); Stratopoulos & Dehning (2000); Bharadwaj (2000); Dehning, Dow & Stratopoulos (2003); Lunardi, Dolci & Maçada (2010); Liang, You & Liu (2010); Das, Yaylacicegi & Menon (2011); Consoli (2012).
H4: IT investments in **supplier** management have a positive impact on business **costs**.	Palvia (1997); Oliveira & Maçada (2000); Maçada (2001); Lunardi (2001); Saccol et al. (2004); Leão & Leão (2004); Ferreira et al. (2012); Bharadwaj (2000); Beheshti (2004); Ashrafi & Murtaza (2008); Lunardi, Dolci & Maçada (2010); Liang, You & Liu (2010); Das, Yaylacicegi & Menon (2011); Mithas et al. (2012).
H5: IT investments in **supplier** management have a positive impact on business **sales**.	Palvia (1997); Oliveira & Maçada (2000); Maçada (2001); Lunardi (2001); Saccol et al. (2004); Leão & Leão (2004); Ferreira et al. (2012); Weill (1992); Raymond, Bergeron & Blili (2005); Qiang, Clarke & Halewood (2006); Ashrafi & Murtaza (2008); Lunardi, Dolci & Maçada (2010); Consoli (2012).
H6: IT investments in **supplier** management have a positive impact on business **productivity**.	Palvia (1997); Oliveira & Maçada (2000); Maçada (2001); Lunardi (2001); Saccol et al. (2004); Leão & Leão (2004); Ferreira et al. (2012); Weill (1992); Brynjolfsson (1993); Torkzadeh & Doll (1999); Stratopoulos & Dehning (2000); Bharadwaj (2000); Dehning, Dow & Stratopoulos (2003); Lunardi, Dolci & Maçada (2010); Liang, You & Liu (2010); Das, Yaylacicegi & Menon (2011); Consoli (2012).
H7: IT investments for **internal organizational efficiency** have a positive impact on business **costs**.	Palvia (1997); Oliveira & Maçada (2000); Maçada (2001); Lunardi (2001); Saccol et al. (2004); Leão & Leão (2004); Ferreira et al. (2012); Bharadwaj (2000); Beheshti (2004); Ashrafi & Murtaza (2008); Lunardi, Dolci & Maçada (2010); Liang, You & Liu (2010); Das, Yaylacicegi & Menon (2011); Mithas et al. (2012).
H8: IT investments for **internal organizational efficiency** have a positive impact on business **sales**.	Palvia (1997); Oliveira & Maçada (2000); Maçada (2001); Lunardi (2001); Saccol et al. (2004); Leão & Leão (2004); Ferreira et al. (2012); Weill (1992); Raymond, Bergeron & Blili (2005); Qiang, Clarke & Halewood (2006); Ashrafi & Murtaza (2008); Lunardi, Dolci & Maçada (2010); Consoli (2012).
H9: IT investments for **internal organizational efficiency** have a positive impact on business **productivity**.	Palvia (1997); Oliveira & Maçada (2000); Maçada (2001); Lunardi (2001); Saccol et al. (2004); Leão & Leão (2004); Ferreira et al. (2012); Weill (1992); Brynjolfsson (1993); Torkzadeh & Doll (1999); Stratopoulos & Dehning (2000); Bharadwaj (2000); Dehning, Dow & Stratopoulos (2003); Lunardi, Dolci & Maçada (2010); Liang, You & Liu (2010); Das, Yaylacicegi & Menon (2011); Consoli (2012).
H10: IT investments for **integration** have a positive impact on business **costs**.	Palvia (1997); Kidd & Yau (2000); Maçada (2001); Bandeira & Maçada (2008); Bharadwaj (2000); Beheshti (2004); Ashrafi & Murtaza (2008); Lunardi, Dolci & Maçada (2010); Liang, You & Liu (2010); Das, Yaylacicegi & Menon (2011); Mithas et al. (2012).
H11: IT investments for **integration** have positive impact on business **sales**.	Palvia (1997); Kidd & Yau (2000); Maçada (2001); Bandeira & Maçada (2008); Weill (1992); Raymond, Bergeron & Blili (2005); Qiang, Clarke & Halewood (2006); Ashrafi & Murtaza (2008); Lunardi, Dolci & Maçada (2010); Consoli (2012).
H12: IT investments for **integration** have a positive impact on business **productivity**.	Palvia (1997); Kidd & Yau (2000); Maçada (2001); Bandeira & Maçada (2008); Weill (1992); Brynjolfsson (1993); Torkzadeh & Doll (1999); Stratopoulos & Dehning (2000); Bharadwaj (2000); Dehning, Dow & Stratopoulos (2003); Lunardi, Dolci & Maçada (2010); Liang, You & Liu (2010); Das, Yaylacicegi & Menon (2011); Consoli (2012)

Figure 3: Hypotheses and authors
Source: Developed by the authors

Iberoamerican Journal of Entrepreneurship and Small Business | v.8 | n.2 | p. 01-30 | Jan./Apr. 2020.

10

3. METHOD

To conduct our quantitative and explanatory research, we applied a survey to verify the impact of IT investments on the strategic variables and performance of MSEs.

3.1 Data Collection Instrument

The data collection instrument consists of seven variables (Customers, Suppliers, Internal Organizational Efficiency, Integration, Costs, Sales, and Productivity) and 28 items applied to a five-point Likert scale (1 = low, 5 = high). We adapted the instrument's variables from research by Mahmood and Soon (1991); Palvia (1997); and Lunardi, Dolci, and Maçada (2010). We revalidated the variables for content and reliability, in addition to pre-testing, in order to prevent future problems over the course of the study (Oppenheim, 1993).

To validate the instrument, we followed the steps proposed by Koufteros (1999) for the validation process. The author states that the traditional techniques for developing and assessing measurement scales are useful for the researcher to observe the instrument's internal consistency, the variables' reliability, and the factors' unidimensionality. We describe the steps taken for the validation process in the results section.

3.2 Population and Sample

MSE owners from several industries based in the city of Garibaldi in the state of Rio Grande do Sul are the target population of this study. We selected the sample with support from the company Optimizy Sistemas Inteligentes and the municipality's Chamber of Industry and Commerce (CIC) and the Association of Small and Medium-sized Enterprises (APEME), which provided the enrollment of 890 micro and small enterprises of that city.

For this study, we decided to use nonprobability sampling, as it would not be possible to contact the entire population of MSE owners in the city of Garibaldi, RS. As inclusion criteria, we considered MSEs that apply some kind of IT to their business. We invited 50 micro and small business owners for pre-testing, and no problems were identified in the questionnaire. For the final survey, we invited 610 micro and small business owners, of which 244 answered the survey, corresponding to a 39.35% response rate. Of these 244 respondents, we eliminated nine for failing to complete

Iberoamerican Journal of Entrepreneurship and Small Business | v.8 | n.2 | p. 01-30 | Jan./Apr. 2020.

11

The ANEGEPE Magazine
www.regepe.org.br

The Impact of Information Technology Investments on the Organizational Strategic Variables and
Performance of Micro and Small Enterprises (MSEs)

the research instrument, thus resulting in a sample of 235 respondents, according to definitions by Hair et al. (2014).

3.3 Statistical Data Analysis

We retrieved data from the questionnaire applied and then tabulated and analyzed them for reliability and validity, as well as descriptive statistics, with the assistance of SPSS (Statistical Package for the Social Sciences) software, version 21. We examined the confirmatory model with SmartPLS 3.2.3 software, which is indicated for analyses by Structural Equation Modeling (SEM). SEM is a technique that allows for examining a series of dependent relationships simultaneously in order to explain the relationship across multiple indicators (Hair et al., 2016).

4. ANALYSIS AND RESULTS

We assessed the data obtained from 235 respondents after excluding outliers. The service sector was the most representative among the survey's respondents (42%), followed by industry (35%), and, finally, retail (23%), which presented the lowest number of respondents. Of the micro and small business owners who answered the survey, 58.3% had completed higher education or beyond, while 31.5% had completed only secondary education, and only one respondent had not completed primary education.

4.1 Reliability Analysis and Exploratory Factor Analysis (EFA)

We performed the reliability analysis for the instrument and its factors by calculating Cronbach's alpha coefficient so as to measure the instrument's internal consistency and attest its reliability. The values for alpha are between zero and one, and according to Hair et al. (2016), higher values provide a higher level of reliability, accepting values over 0.70.

The Corrected Item-Total Correlation (CITC) analysis sets out to obtain only relevant items in each factor and assess whether they share the same meaning. In this process, we adopted the correlation coefficients between each item and the corrected score of their group. The items should be eliminated if the coefficient is below 0.50 (Hair et al., 2010). Table 1 presents the results for the Cronbach's alpha test and demonstrates the consistency of the scales applied in the instrument.

Iberoamerican Journal of Entrepreneurship and Small Business | v.8 | n.2 | p. 01-30 | Jan./Apr. 2020.

12

Table 1: Results for Cronbach's Alpha from Final Survey

Variable	Items	Alpha	CITC
1 – Customers	4	0.84	0.63 - 0.73
2 – Suppliers	4	0.79	0.45 - 0.69
3 – Internal Organizational Efficiency	4	0.87	0.66 - 0.78
4 – Integration	4	0.76	0.46 - 0.66
5 – Costs	4	0.85	0.67 - 0.73
6 – Sales	4	0.90	0.74 - 0.83
7 – Productivity	4	0.89	0.70 - 0.80
Total	**28**	**0.95**	**-**

Source: Developed by the authors

The model consisting of seven variables and twenty-eight items obtained a Cronbach's Alpha of 0.95. The results from the CITC analysis were satisfactory in almost all the items. Only two variables presented CITC values below those recommended by Hair et al. (2010). However, since the difference was minimal, we chose to keep the items in the study.

As set forth by Hair et al. (2010), to perform the Exploratory Factor Analysis (EFA), we must first calculate the Kaiser-Meyer-Olkin test (KMO) and Bartlett's test of sphericity. Both indicated the data's adequacy to perform the factor analysis, as the KMO value was greater than 0.50, as suggested by the literature, and the test of sphericity was significant (p <0.000). Finally, we conducted the Exploratory Factor Analysis in blocks to verify the unidimensionality of the variables, whose factor loadings must exhibit values over 0.40 (Koufteros, 1999). The results ranged from 0.628 to 0.909, attesting the unidimensionality of the scales. The following section presents the Confirmatory Factor Analysis for the model.

4.2 Confirmatory Factor Analysis (CFA)

Confirmatory Factor Analysis (CFA) is used to determine if the items associated with a variable represent it correctly. We analyzed the loadings of each item with its respective variable, which allowed us to evaluate whether the theoretical specification represents reality (Hair et al., 2016). Confirmatory Factor Analysis evaluates the repetitiveness of the results to confirm the relationships obtained from theory or an exploratory analysis. We present our results of the CFA in the following sections.

4.2.1 Measurement Model

Following orientation by Hair et al. (2016), we assessed the measurement model by the following criteria: Composite reliability (CR), average variance extracted

Iberoamerican Journal of Entrepreneurship and Small Business | v.8 | n.2 | p. 01-30 | Jan./Apr. 2020.

13

The ANEGEPE Magazine
www.regepe.org.br

The Impact of Information Technology Investments on the Organizational Strategic Variables and
Performance of Micro and Small Enterprises (MSEs)

(AVE), and discriminant validity (Fornell-Larcker Criterion). Table 2 shows the values obtained in the analyses.

Table 2: Convergent and Discriminant Validity

	CR	AVE	CUS	COS	IOE	SUP	INT	PRO	SAL
CUS	0.89	0.67	**0.823**						
COS	0.90	0.69	0.610	**0.834**					
IOE	0.92	0.72	0.544	0.636	**0.854**				
SUP	0.87	0.62	0.465	0.532	0.426	**0.788**			
INT	0.85	0.58	0.487	0.640	0.510	0.593	**0.763**		
PRO	0.92	0.75	0.493	0.669	0.568	0.337	0.512	**0.867**	
SAL	0.93	0.77	0.481	0.720	0.531	0.530	0.472	0.561	**0.880**

Source: Developed by the authors

Composite reliability was measured based on factor loadings, which consider the item's loadings to determine the construct's reliability. Hair et al. (2016) postulate that CR values between 0.70 and 0.95 are satisfactory while values above 0.95 are problematic. The results show all CR values to be between 0.70 and 0.95, certifying the constructs' reliability.

We used Average Variance Extracted (AVE) for the factors to determine convergent validity. AVE is the average of the sum of the squares of the indices of the indicators, divided by the number of the construct's indicators. Therefore, it is directly influenced by the value of the indicators' loadings. This index varies between 0 and 1, accepting values above 0.50, which all the constructs of the model obtained (Hair et al., 2016).

Subsequently, we assessed the model's discriminant validity. As suggested by Hair et al. (2016), we adopted the Fornell-Larcker criterion in this stage. For this criterion, the square root of the AVE should be greater than the correlation between the constructs. Table 4 illustrates that the square root of the values for AVE (diagonal values in bold) is greater than the correlation between the factors. Thus, the discriminant validity of the model was met.

4.2.2 Structural Model

Based on the steps recommended by Hair et al. (2016), we first determined collinearity by employing the Variance Inflation Factor (VIF) criterion. We then examined structural relationships (path analysis). Finally, we calculated the coefficient of determination (R^2), the level of effect (f^2), predictive power (Q^2), and the scale of the effect (q^2), as stipulated by Hair et al. (2016).

Iberoamerican Journal of Entrepreneurship and Small Business | v.8 | n.2 | p. 01-30 | Jan./Apr. 2020.

14

We adopted the Variance Inflation Factor (VIF) to examine collinearity. The VIF values demonstrate that the independent variables' scores ranged between 1.613 (Internal Organizational Efficiency) and 1.816 (Integration), indicating that the results were not negatively affected by collinearity, as they were all less than five (Hair et al., 2016).

We evaluated structural relationships, or path analysis, through t-values, which can be understood simply as dividing the path coefficient's standard value by the standard error. The standard values may range from -1 to +1, and values close to zero are considered weak or insignificant. Partial Least Squares Regression does not calculate standard error for the indicators, so another technique is required to generate these data. We employed the bootstrapping technique, which determines the standard error values for each path in the model. Hair et al. (2010) clarify that bootstrapping is a form of resampling, wherein the original data are repeatedly sampled with replacement for model estimation. In SmartPLS, the technique presents the results of the Student's t-distribution test considering several samples. According to the value for *t*, it is possible to define whether the path coefficients are significant.

Hair et al. (2013) recommend setting up the number of cases for the bootstrapping algorithm with the same number of observations as the collected sample, that is, 235 cases. The number of examples should be greater than the number of cases. The authors recommend at least 5,000 samples to ensure stability in determining standard errors. Another important coefficient in the analysis is the p-value, which indicates the sample's level of significance and the probability of incorrectly rejecting the null hypothesis. In general, these values can be analyzed within the reference ranges, which vary from 0.05, 0.01, and 0.000. Thus, these results estimate the significance among the relations of the research model's constructs, as illustrated in Figure 4.
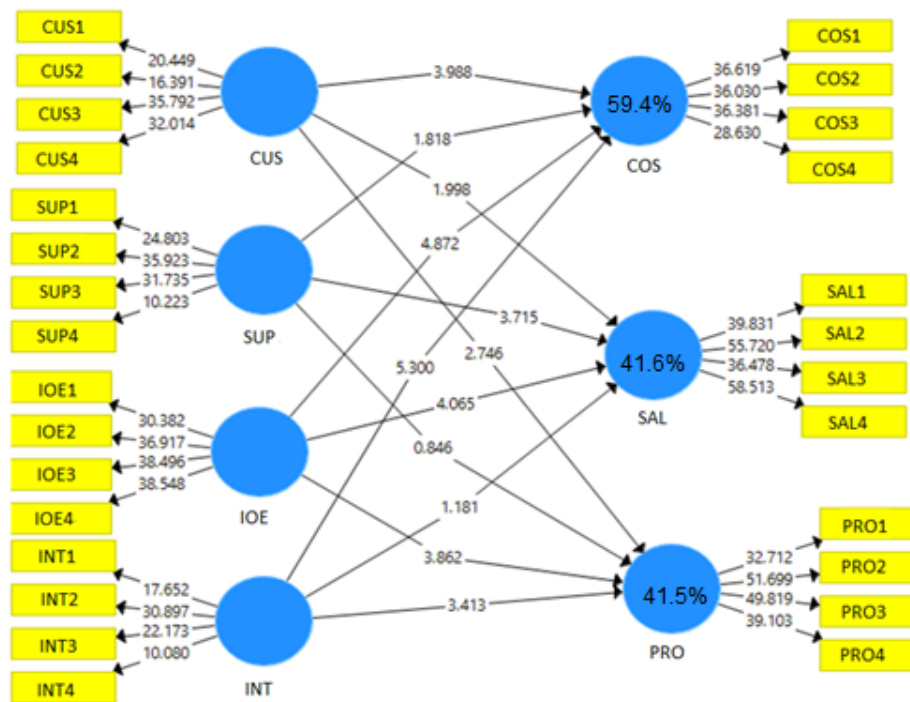
Iberoamerican Journal of Entrepreneurship and Small Business | v.8 | n.2 | p. 01-30 | Jan./Apr. 2020.

15

The ANEGEPE Magazine
www.regepe.org.br

The Impact of Information Technology Investments on the Organizational Strategic Variables and
Performance of Micro and Small Enterprises (MSEs)

Figure 4: Bootstrapping Analysis

Source: Prepared by the authors

As observed previously, we calculated the levels of significance of the model's relations through the bootstrapping analysis, where the values for *t* must be above 1.96 ($p < 0.05$) to support our hypotheses (Hair et al., 2016). Table 3 exhibits the values obtained in the hypothesis test.

Table 3: Hypothesis Test

Hypothesis	Path	t-value	p-value	Results
H1	CUS – COS	3.988	*0.000*	SUPPORTED
H2	CUS – SAL	1.998	*0.046*	SUPPORTED
H3	CUS – PRO	2.746	*0.006*	SUPPORTED
H4	SUP – COS	1.818	0.069	UNSUPPORTED
H5	SUP – SAL	3.715	*0.000*	SUPPORTED
H6	SUP – PRO	0.846	0.398	UNSUPPORTED
H7	IOE – COS	4.872	*0.000*	SUPPORTED
H8	IOE – SAL	4.065	*0.000*	SUPPORTED
H9	IOE – PRO	3.862	*0.000*	SUPPORTED
H10	INT – COS	5.300	*0.000*	SUPPORTED
H11	INT – SAL	1.181	0.238	UNSUPPORTED
H12	INT – PRO	3.413	*0.001*	SUPPORTED

Source: Developed by the authors

** 1.96 significance level = 5%; and *** t-value 2.57 significance level = 1% (Hair et al., 2016).

Iberoamerican Journal of Entrepreneurship and Small Business | v.8 | n.2 | p. 01-30 | Jan./Apr. 2020.

16

Hypotheses H1, H2, and H3 were supported, thus confirming the positive relationship between IT investments in customer management and the performance of MSEs, more specifically, on cost, sales, and productivity.

Hypothesis H5 was also supported, thus confirming that micro and small business owners perceive that IT-supported supplier management is related to sales performance. Hypotheses H7, H8, H9 were supported, thus explaining that when supported by IT investments, the strategic variable internal organizational efficiency is positively related to all the performance variables analyzed.

Finally, hypotheses H10 and H12 were also supported, thus demonstrating that IT has helped integrate business operations and has a positive relationship with cost performance and productivity. On the other hand, hypotheses H4, H6, and H11 were not supported. However, this does not compromise the validity of the research model, as it was confirmed by the confirmatory factor analysis and the results of the structural equation modeling.

After testing the hypotheses, we analyzed the Coefficient of Determination (R^2), which represents how much the dependent variable is explained by the independent variables (Hair et al., 2016). The value for the coefficient of determination ranges from 0 to 1, with larger values pointing to a better explanatory effect of the model. The values obtained – 0.594 (59.4%) for Costs, 0.415 (41.5%) for Productivity, and 0.416 (41.6%) for Sales – elucidate how much of the phenomenon is explained by the model and demonstrate a high explanatory power for studies in the Social Sciences.

We calculated the scale of the level of effect (f^2) of exogenous variables to determine the impact of each exogenous variable on the endogenous latent variable in terms of R^2. As for reference values for f^2 and impact on endogenous variables, values representing a low impact range up to 0.02, while values up to 0.15 represent medium impact, and values over 0.35 represent high impact. To reach these indices, the value for R^2 needs to be determined without the variable under analysis. In other words, the variable to be analyzed needs to be removed. The level of effect is calculated in relation to the value for R^2 of the complete model (Hair et al., 2013).

The values calculated for each variable show that the exclusion of exogenous variables from the model generated medium and high impacts on endogenous variables. The Supplier variable has the least impact on the endogenous variables Costs and Productivity. The Integration variable has the least impact on the endogenous variable Sales.

Iberoamerican Journal of Entrepreneurship and Small Business | v.8 | n.2 | p. 01-30 | Jan./Apr. 2020.

17

The ANEGEPE Magazine
www.regepe.org.br

The Impact of Information Technology Investments on the Organizational Strategic Variables and
Performance of Micro and Small Enterprises (MSEs)

To assess the predictive power of each structural relationship, we calculated the model's predictive power (Q^2) by using the Blindfolding procedure in SmartPLS software. According to Hair et al. (2016), a value of Q^2 greater than zero means that the model has predictive power. The values identified in this analysis confirmed the model's predictive power.

We determined the scale of the effect (q^2) after removing the variable under analysis and comparing the Q^2 value for the entire model with the Q^2 value without the variable under analysis. The value of q^2 is a reference for how each variable behaves under the model's predictive power. The reference values for q^2 are similar to the values for f^2. Values up to 0.02 represent a low predictive power, while values up to 0.15 represent medium predictive power, and values over 0.35 demonstrate high predictive power. The values presented evidence that the exclusion of exogenous variables from the model has medium and high impacts on the value of q^2, which shows that the model's predictive power varies significantly and that the variable with the lowest predictive power in the model is the Supplier variable.

Finally, the study evaluated the standardized root mean square residual (SRMR) to measure the goodness of fit of the model. Assuming a cut-off value of 0.08 as the most appropriate for PLS path models (Henseler, Hubona & Ray, 2016), the SRMR value resulted in 0.068, evidencing an acceptable fit of the model.

5. DISCUSSION AND FINAL REMARKS

This study evaluated the impact of IT investments on the organizational strategic variables and performance of micro and small enterprises by applying a survey that involved 235 micro and small business owners. The strategic variables analyzed herein were Customers, Suppliers, Internal Organizational Efficiency, and Integration. Performance variables were measured through Costs, Sales, and Productivity.

The study confirmed the perception of business owners of MSEs regarding the positive relationship between IT investments in customer management and organizational performance, more precisely, on cost, sales, and productivity. According to Ashrafi and Murtaza (2008), one of the main reasons MSEs invest in IT is to provide better and faster customer service. As for Leite (2004), this improvement in customer service helps reduce operating costs, which clarifies why micro and small business owners notice customer management more in organizational performance. IT can benefit organizations' customer relations by providing information on products and

Iberoamerican Journal of Entrepreneurship and Small Business | v.8 | n.2 | p. 01-30 | Jan./Apr. 2020.

18

services and administrative support, such as invoicing, billing, inventory management, and customer history (Love & Irani, 2004).

On the other hand, the effect of the relationship between IT investments in supplier management and the costs and productivity of MSEs was not representative. As mentioned in the previous paragraph, a possible explanation is that MSEs invest in IT because they wish to serve customers better. This finding was evident in the research, indicating that micro and small business owners focus their attention on the benefits of IT in terms of customer management and the company's internal efficiency. Therefore, based on the unsupported hypotheses, which are related to the Supplier variable, we observe that it is not among the variables that bring the most benefits to organizations. Consequently, investments related to supplier management did not evidence a significant relationship with the organization's cost performance and productivity.

The hypothesis that related the impact of IT investments in supplier management to sales was significant. The business owners realize that supplier management is related to their sales performance. This finding may be linked to the fact that IT facilitates quality control of resources offered by suppliers and reduces lead time uncertainty. Lead time is also the interval between the moment a purchase or production order for a product is dispatched and the moment the product is ready and available for use (Corrêa, Gianesi & Caon, 1999).

The relations with IT investments in internal organizational efficiency were confirmed and show that this strategic variable has a positive relationship with all the performance variables. This reinforces the perception that IT helps MSEs organize their internal processes and operational activities, thereby increasing their ability to provide services. Dehning and Stratopoulos (2002) highlight that one of the most common benefits IT can offer is increased efficiency. Therefore, the business owners' perception is in line with the supported hypotheses.

Another result we found in our study refers to the positive relation that IT investments for integration have on the performance of MSEs. These results reveal that IT has also helped businesses integrate their operations and has a significant relationship with cost performance and productivity. This positive relationship may be explained by the use of integrated systems known as Enterprise Resource Planning (ERP) systems, which provide greater agility and productivity in the organization's internal processes and, consequently, reduce costs. Hedman and Borell (2002) also

Iberoamerican Journal of Entrepreneurship and Small Business | v.8 | n.2 | p. 01-30 | Jan./Apr. 2020.

19

The ANEGEPE Magazine
www.regepe.org.br

The Impact of Information Technology Investments on the Organizational Strategic Variables and
Performance of Micro and Small Enterprises (MSEs)

identified ERP's contributions to organizational productivity and control, especially in relation to the integration of the organization's internal processes. Another factor that may help explain the results obtained herein is the fact that the government has been requiring the use of IT to integrate the fiscal and legal requirements of companies (Lunardi, Dolci & Maçada, 2010).

Finally, the relationship between IT-supported integration of company operations and the sales performance of MSEs was not supported, as perceived by the micro and small business owners. Although tax obligations are a requirement for organizations and the use of systems and technologies allow for more agile internal processes, this all seems to be unrelated to sales performance, thus explaining why the proposed hypothesis was not confirmed.

5.1. Theoretical and Practical Implications

As for theoretical contributions, this study presents an important discussion on IT investments made in a sector for which there is little research, the MSE. Much of the research is focused on understanding the guiding aspects of IT in medium-sized and large enterprises. However, the great economic and social importance that MSEs represent to countries emphasizes the need for research in this sector.

Another contribution is the combination of strategic elements of IT investments with different performance variables to understand which independent variables are related to the performance of MSEs and to identify which performance variables are most affected by investments made in technology. The study evidenced a positive relationship between IT investments and organizational performance. When IT is implemented in such a way that it meets the organization's individual needs, its benefits are evident. IT can help with the simplest activities, such as internal processes, operational activities, and even strategic opportunities that contribute to the organization's growth. As seen herein, one of the most important aspects considered by micro and small business owners who invest in IT is customer management, which is capable of boosting sales and achieving superior performance through its positive relationship with costs, productivity, and sales.

Conversely, we note that many micro and small business owners are unaware of IT's real potential and make investments solely as a function of better customer management and tax obligations. They forget or ignore the benefits IT can bring to

Iberoamerican Journal of Entrepreneurship and Small Business | v.8 | n.2 | p. 01-30 | Jan./Apr. 2020.

20

organizational performance. In multiple cases, as MSEs have limited resources, IT investments are made without long-term planning, leaving executives uncertain about how to assess the benefits that their IT investments bring to the organization.

As for managerial contributions, we provide business owners and IT professionals with knowledge capable of assisting them in identifying and evaluating the impacts of IT investments on strategic variables and organizational performance. We offer micro and small business owners with information that allows them to determine and assess the efficiency of IT investments.

Finally, it is noteworthy that even though the constructs used in this study had been developed based on the literature review, there is a possibility that other items may contribute to the factor analysis or supplement the relationships proposed herein. They may be explored through different theoretical lenses and considerations, which is the main limitation of this study and which can also be an opportunity for researchers who want to follow this line of research. Thus, we recommend including other strategic and performance variables that may supplement the findings of this study. Furthermore, we suggest a comparative analysis of MSEs before and after investments in IT so that the benefits gained are easier to measure and can be identified through a longitudinal analysis of the evolution of IT investments made by MSEs in organizational performance.

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Iberoamerican Journal of Entrepreneurship and Small Business | v.8 | n.2 | p. 01-30 | Jan./Apr. 2020.

21

The ANEGEPE Magazine
www.regepe.org.br

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22

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23

The ANEGEPE Magazine
www.regepe.org.br

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24

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25

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26

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27

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30