

# IMPORTANCE OF ADOPTING, IMPLEMENTING, AND/OR CREATING ADMINISTRATIVE SOFTWARE BASED ON ERP AND MRP SYSTEMS IN THE BUSINESS ACTIVITIES OF PUEBLA MSMEs IN THE COMMERCE SECTOR BY 2025

## SIGNIFICANCE OF USING, IMPLEMENTING OR DEVELOPING ERP AND MRP BASED OFFICE SOFTWARE IN PUEBLA MSMEs TRADE OPERATIONS BY 2025

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**Abstract:** The research addresses the importance of adopting, implementing, and creating administrative software based on ERP and MRP systems in micro, small, and medium-sized enterprises in the commerce sector in Puebla, Mexico, with a projection to 2025. It highlights that most Mexican companies are MSMEs, many of which operate informally and lack a solid business and technological culture, which limits their growth and competitiveness. Digitization and the use of integrated systems such as ERP and MRP are essential for optimizing processes, improving real-time decision-making, automating tasks, and reducing errors, all of which are essential for survival in highly competitive markets. However, high investment, training costs, resistance to change, and lack of technological infrastructure represent significant obstacles for these organizations. The research also emphasizes that a business and technological culture is a prerequisite for the successful adoption of these systems, since without it, the potential benefits do not materialize and can lead to economic losses. In addition, the evolution of information systems is analyzed, from manual methods to automation using advanced software, highlighting that most Mexican micro and small businesses have not developed a culture of technological innovation, which limits their capacity for growth and formalization. Resistance to change, lack of computer skills, and the perception of high costs hinder the incorporation of these technologies. The research concludes that companies with a strong business and technological culture can experience improvements in operational efficiency, resource management, and strategic decisions, favoring their scaling and sustainability. Therefore, it emphasizes that cultural and technological change is essential for MSMEs to adapt to the demands of the current market and ensure their long-term survival.

**Keywords:** ERP systems, MRP systems, MSMEs, business culture, technological culture.

**Abstract:** This study investigates the potential advantages of adopting enterprise resource planning (ERP) and manufacturing resource planning (MRP) software in Mexico's micro, small, and medium-sized commercial firms, projecting outcomes through 2025. It observes that MSMEs constitute the bulk of the national economy yet many still operate informally and with vague technological habits, both of which hamper long-term competitiveness. By digitizing core activities through ERP and MRP, firms can streamline workflows, base decisions on real-time data, automate routine tasks and minimize costly errors—steps that increasingly determine survival in crowded markets. Still, high initial costs, the

need for extensive employee training, ingrained resistance to change, and patchy hardware represent daunting barriers for smaller businesses. The authors assert that a firm-level culture valuing technology is essential for any system rollout, because without this mindset the anticipated gains often fail to materialize and investments may instead translate into losses. To illustrate this point, the paper traces the shifting trajectory of information management, from purely manual record-keeping to today's sophisticated, cloud-enabled suites. Evidence suggests that most micro and small enterprises in Puebla have yet to embrace this evolutionary leap, leaving them vulnerable and stalling efforts to formalize operations on a wider scale. Organizational inertia, limited digital literacy, and fears of excessive expense still block many firms from adopting modern technologies. Yet, evidence shows that enterprises with a robust culture of business and tech proficiency gain sharper operational workflows, smoother resource control, and better strategic insights, all of which support faster growth and longer viability. Accordingly, the study argues that a deep cultural and technological overhaul is no longer optional for MSMEs that wish to meet today's market pressures and secure their future.

**Keywords:** ERP, MRP, MSMEs, business culture, technological culture.

## INTRODUCTION

Information and communication technologies are essential for the economic growth of private and government companies. In Mexico, 99.8% of companies are MSMEs, so it is crucial to foster an organizational culture that promotes proficiency in computer and office automation tools to efficiently manage economic entities. Various organizations develop techniques, methodologies, and resources to promote business culture, focusing on meeting the needs of micro, small, medium, and large organizations. Software innovation is essential to achieving these objectives, enabling the integration of operations across functional areas, optimizing processes, and improving productivity and profitability. Companies such as SAP, Microsoft, Oracle, and others offer solutions that facilitate management in large companies, but their implementation cost, which ranges from \$50,000 to \$250,000 USD, limits their access to micro and small businesses, whose licensing costs vary between \$1,500 and \$3,000 USD. In Puebla, Mexico, 99.9% of establishments are MSMEs, many of which are unaware of the use of ERP and MRP software

due to a lack of business culture and adequate administrative knowledge. Most of these companies have been in operation for less than 10 years, highlighting the need to promote technologies that improve their management and sustainability. This study analyzes the adoption and use of ERP and MRP software in MSMEs in Puebla, Mexico.

### **General objective**

Analyze the importance of adopting, implementing, and/or creating administrative software based on ERP and MRP systems in Puebla's MSMEs in the commerce sector, identifying its influence on improving internal administrative control.

### **Specific objectives**

- Recognize, analyze, and define the level of business culture that owners of commercial MSMEs in Puebla have in order to exercise internal administrative control within their organizations.
- Identify the main problems faced by CEOs of commercial companies with MSME stratification in adopting, implementing, and/or developing an ERP and/or MRP system within their organizations.
- Define the relationship between the integration of processes through ERP and MRP systems and the traditional operational efficiency used by commercial MSMEs in Puebla.
- Examine how resistance to change in the use of new technologies affects the management of Puebla's commercial MSMEs, identifying its implications for operational efficiency, decision-making, and business competitiveness.

### **Justification**

It is important to consider that business administration today must be carried out in a comprehensive manner, that is, considering not only the local economy but also the global or international economies, so that, regardless of the stratification and magnitude of an organization in a market, it can become part of the so-called globalization, since growing business competitiveness forces entities to seek tools that allow them to adequately optimize and improve their processes, so that the creation, development, and/or implementation of software becomes an indispensable instrument for businesses to achieve this objective.

Among the most important software programs available for administrative management are ERP (Enterprise Resource Planning) and MRP (Material Resource Planning),

which have now become key elements in ensuring effective business management, as they are used to optimize decision-making by executives and managers in organizations, to such an extent that these applications provide real-time data that improves planning and the generation of business strategies. as well as automating tasks, drastically reducing the time required to carry out operational and/or administrative activities, order management, inventory control, operational efficiency, reduction of errors and waiting times, reduction of waste, strengthening of relationships with customers and suppliers, ensuring compliance with legal regulations, and above all, the possibility of scaling up a business.

Therefore, it is important to acquire sufficient knowledge, in addition to understanding the advantages and disadvantages involved in the acquisition, ownership, and/or development of comprehensive software such as ERP and MRP, to cite a few examples of applications that integrate business operations. These are not the only technological tools that can improve organizational efficiency and competitiveness in companies, but they are used as a basis because they have demonstrated their ability to contribute to the economic growth of various economic units as well as developing and industrialized regions.

This research is essential for promoting business culture and providing knowledge about 21st-century administrative technological tools. This will help administrators and managers of MSMEs in Puebla engaged in commercial activity to face the challenges of today's market and promote the region's economic growth and development, while respecting at all times the employer obligations dictated by the Mexican legal framework, as well as the rights and working conditions of their employees.

## **DEVELOPMENT**

### **Methodology**

This research is qualitative in nature and seeks to explore the perceptions, experiences, and opinions of entrepreneurs as reflected in secondary sources of information. It will also comprehensively analyze the importance for MSMEs in the commerce sector in Puebla of adopting, implementing, and/or creating ERP and/or MRP administrative software. Therefore, the logical approach of the research is inductive, beginning with the observation of specific cases, compilation, analysis

and prioritization of subsequent secondary sources. Finally, based on this, it will be possible to generate a sufficient and adequate understanding of the implementation of administrative software and its influence on the competitiveness of commercial MSMEs in Puebla.

Exploratory review is the research method that will guide this project, derived from the adoption of a qualitative documentary research design, which involves a detailed analysis of existing literature and relevant documents that address the topic.

It is important to mention that the proposed level of research is exploratory, as well as proactive, since it not only seeks to examine the current situation regarding the adoption of administrative systems in MSMEs, but also to offer strategies that facilitate their adoption, generation, and implementation.

Thematic filing, analysis of key citations, and documentary analysis of secondary sources are the main research techniques that will be used in this research project, as only through these techniques can a systemic and organized approach to information be generated, which is expected to yield conclusions that not only describe the current situation but also generate practical recommendations in the field of business management.

Finally, the research tools to be used are: laptop, computer, analysis guides to support the thematic filing process, as well as document analysis and file templates to facilitate the organization of information and promote its interpretation.

### **Information systems, evolution, and development in business management as the basis for ERP and MRP.**

Since the early 20th century, Ludwig Von Bertalanffy's systems theory has been used in various disciplines, including economics and administration. In this way, systems remain, in their purest form, a set of elements that must interact with each other to achieve a goal. This concept requires business administrators to concern themselves not only with the parts that make up an information system within an entity, but also to study the result or results generated from this correlation, without ever forgetting to generate sufficient and adequate indicators that allow them to assess the fulfillment of the company's overall objective.

Information systems (IS) are one of the most relevant components of today's business environment , offering great opportunities for success for companies, as they have the capacity

to collect, process, distribute, and share data in a timely and integrated manner. In addition, they help bridge geographical gaps, enabling employees to be more efficient, which is reflected in improved processes, management, and information handling, resulting in a positive impact on the productivity and competitiveness of companies. (Bakos et al., 1986, as cited in Abrego et al., 2017, pp.303-320).

Measuring the quality of a company's information system is a priority, as not only its operational efficiency depends on it, but also the positive, negative, or neutral economic results that may be generated. Implementing information systems is a difficult activity to standardize for any type of company, since "the dimensions of quality are a distinctive feature of user perception" (Solano et al., 2014, as cited in Abrego et al., 2017, pp. 303-320). Therefore, the business sector, size, and legal status of organizations directly influence their activities, the way in which they are carried out, and the ethical and moral strategies from which they derive, At the same time, representing the basis on which customers will perceive a good product and/or service, every information system represents "the set of human and material resources responsible for processing business information" (Medina, 2005, as cited in Abrego et al., 2017, pp.303-320). Therefore, each company will have different information systems, depending on the business culture of each manager.

In the early 1900s, information systems in companies were originally managed through the use of manual notes in physical instruments such as books, records, cards, and files, which provided basic administrative control. However, starting in the 1950s and with the arrival of the first computer, companies began to desire the standardization of processes to obtain competitive advantages, effectiveness, and efficiency in their operations. Practices such as database generation, process modeling, procedure modeling, computer models for data analysis aimed at proper decision-making, as well as software development using different programming languages, were fundamental activities that allowed information systems to evolve and catapult companies that are now recognized as top-tier companies, outstanding for their size, prestige, financial strength, leadership, national and international presence, but above all for the solid corporate culture forged as a result of a sufficient and adequate internal administrative control system both within and outside the organization.

For their part, second- and third-tier companies, which we currently know as medium, micro, and small enterprises, mostly lack a broad and sufficient business culture that would allow them, in addition to standardizing processes, to truly generate effectiveness and efficiency in their daily operations. In the particular case of Mexico, considering its 31 states and Mexico City, the economic, financial, governmental, and social policies exercised by its government over time mean that, before generating a business culture that gives the owner of a company business vision, as well as sufficient knowledge of the ethical, moral, and legal responsibilities and obligations they have towards their employees and government institutions regulated by federal, state, and municipal laws, they are more concerned with the lucrative aspect of their activity or line of business, which is a valid consideration given that their permanence in the market depends directly on the income they generate. although in extreme situations, such organizations tend to generate job dissatisfaction among their employees, a lack of ethical and moral justification for their ordinary and extraordinary income that supports their business activity before government agencies such as the Secretary of Tax Administration, and a lack of procedures backed by national or international standards that ensure the quality of internal operations.

As a result, currently in Mexico, 99.8% of companies are classified as MSMEs, and of these, more than 50% are informal. Therefore, it is urgent to generate a business culture among this type of entrepreneur, and they must take this into account before deciding to acquire, adopt, implement, and/or develop a digital or manual internal administrative control system.

Currently, companies are forced to be connected to each other and to other organizations as a result of mergers, reductions in operating costs, market strategies, among other causes. Therefore, the need for investment in IS is not debatable, but its high cost means that management is interested in ensuring that its implementation is successful and integrated with the institution's objectives. However, empirical evidence indicates that mere investment in IS and new management tools does not guarantee improved business results (Lee et al., 2015, as cited in Abrego et al., 2017, pp. 303-320).

The above forces entrepreneurs to create a business culture before adopting any information system, so that elements such as economic profitability, economic solvency, productivity, efficiency, effectiveness, usefulness, marketing objectives, innovation,

quality, budgets, costs, finances, improved supplier relationships, strategic decision-making, among others, promote the detection of significant relationships between the dimensions of success of an information system and the present and future economic benefits derived from it. (Sedera & Gable, 2004, as cited in Abrego et al., 2017, pp.303-320).

ERP (Enterprise Resource Planning) systems are software programs focused on business management, but above all on resource planning, regularly used by large and medium-sized companies, as these applications allow the needs of organizations to be sufficiently and adequately met.

ERP systems were originally used by the US armed forces during World War II for resource management and supply.

Benvenuto (2006) argues that over the years, these systems evolved in such a way that organizations, especially industrial ones in the United States, began to adopt the practices promoted by these programs, giving them a cost-control focus within companies and placing special emphasis on inventory management, which, in subsequent years led to the emergence of new software structures or applications, which would be called MRP (Material Resourcing Planning) and would seek to manage the logistics of the aforementioned entities.

Recently, any ERP system must be interpreted as computer software responsible for integrating each of the areas of a company into interdependent units called modules, such that for its operation there will be basic modules as well as secondary modules called optional modules or vertical modules. Therefore, it is mandatory for those responsible for using such software to have sufficient and adequate special training to enable them to generate the necessary interfaces as a means of efficient communication in the transmission and reception of data generating information by area within the company, which will be duly analyzed and interpreted by the software and will serve as a basis for correct decision-making, provided that an effective workflow is created between the different users who feed information from the different areas, since this workflow will avoid repetitive tasks and provide feedback to the areas with information generated in real time (Benvenuto, 2006).

**Advantages and disadvantages of acquiring and implementing ERP/MRP software for MSMEs compared to traditional information systems.**

Compared to traditional information systems, acquiring and using computer applications such as ERP (Enterprise Resource Planning) and/or MRP (Material Resource Planning)

) has both advantages and disadvantages for MSMEs.

The first benefit is access to the different interfaces that make up the application in order to interact with it, so that every menu, window, and/or form that makes up that environment is properly pre-designed and standardized for proper configuration and subsequent implementation.

The automation and simplification of processes provided by ERP and MRP systems represent a competitive advantage for micro, small, medium, and large companies, since, when these processes were carried out manually in traditional systems, the time, costs, and development of administrative control instruments, in addition to the number of people involved in their development and implementation, required a high degree of coordination and control when implementing such systems, depending entirely on the experience, professional practice, and quality of work of those who carried out these processes, which was crucial if entities did not want to incur high costs and expenses, with the possibility that poor management could turn these into losses.

The savings in time and effort required to carry out traceability and process mapping activities also represent an advantage for companies, since having ERP and/or MRP software makes it easier to identify the processes that generate bottlenecks, analyze them, represent them, and correct them. The fact that the aforementioned computer programs applied to business management integrate the functionalities of all areas into a single platform promotes not only internal administrative control but also the effective and efficient establishment of communication that generates cooperation and coordination between them, facilitating the internal and/or external audit process.

The creation of a single database with permanent 24/7 access that allows for the recording, processing, monitoring, and control of day-to-day business functions also represents a benefit for social organizations. (Benvenuto, 2006).

On the other hand, when studying and analyzing the disadvantages of implementing and/or acquiring ERP/MRP systems for micro, small, medium, and large companies, it is curious that some of their advantages are often also their disadvantages, since, according to Benvenuto (2006):

In terms of costs: This is one of the most significant drawbacks facing a company. In addition to the costs of the product itself, there are costs such as training, implementation, support, configuration, etc.

In terms of time and complexity of implementation: Implementing an ERP system is a time-intensive process, which can affect the temporary efficiency of the company's operations.

In terms of personnel: An ERP system automates many tasks performed by people. If they are not well trained and do not have the skills to use the ERP system, the organization as a whole will be affected.

Another major disadvantage of these systems is that once they have been implemented and configured, they cannot be easily modified if there are errors. This means that their configuration requires specialists with interdisciplinary expertise (preferably) in the company's activities. Therefore, the decision-making process when implementing the applications turns out to be a complementary process, since users are not allowed to design independent reports, but rather the reports are already predesigned. Therefore, initial configuration errors in the software will result in unwanted and erroneous information that can lead to poor decision-making. At the same time, and contrary to the scenario described above, if the user wanted to make any innovative modifications to the reports provided by the software, this would not be possible either, since the programs themselves already have an initial configuration and predesigned reports, with no possibility of quick and easy modification. This would force the user to create applications parallel to the ERP and/or MRP process, generating a duplication of functions, increased time and movement, and therefore a generation of costs and/or expenses that the company must be prepared to absorb.

**Creation of information systems for MSMEs: The importance of software development.** In the contemporary scenario in which micro, small, medium, and large enterprises operate within different markets and in response to their different business lines, information and communication technologies represent a great support in facilitating and streamlining their operations, automating or semi-automating their processes, constantly monitoring them, and generating administrative, financial, and technological indicators, among others.

This highlights the importance of the use and creation of information and communication technologies by economic units. In other words, just as there are companies focused on creating advanced computer programs such as ERP (Enterprise Resource Planning) and MRP (Material Resource Planning), there are also companies that generate basic and intermediate computer software applications that can provide results similar to those of ERP and/or MRP. However, purchasing these programs represents both an advantage and a risk for MSME owners, given that these types of suppliers often do not provide technical support if the software malfunctions, which must be covered independently and separately. Furthermore, they do not guarantee that the tools that make up the program are tailored exclusively to the specific size and operation of the business, since the software developer (supplier) generates the program or programs considering a general business line with commonly frequent operations.

In addition to the above, it is important to mention as an additional risk the lack of technological culture when using the tools provided by suppliers; since the person who purchases the software must manage the risk of training their employees sufficiently and adequately. However, if the trainer (who in an SME is usually the owner) does not have the necessary knowledge and expertise, they will incur expenses that will call into question the benefits of having software as a generator of internal administrative control and will turn to a manual and traditionalist information generation system, which is a barrier to the growth and development of companies, as well as the employees who work for them, the municipalities where they are located, and the states of which these economic units are a part.

Consequently, owners of micro, small, and medium-sized businesses who wish to generate efficiency and effectiveness in their operations at the lowest possible cost, considering the configuration, application, and implementation of any comprehensive administrative software, must be concerned with generating not only a broad business culture but also a technological culture that supports it, in order to be in total sync with current market demands. Likewise, if it is in the entrepreneur's interest, the aforementioned culture will also allow them to make use of tools created by third parties, without having to undertake the arduous task of performing operations related to computer programming in any of its known languages.

Moreno (2014) argues that small companies respond more closely to market demands than large companies; therefore, these companies enjoy a competitive advantage related to smaller, more efficient, sometimes informal bureaucracy, internal information systems, and flexibility and adaptability through proximity to the market. (pp.1-14)

The capacity of micro, small, and medium-sized enterprises to generate innovations is fully correlated with the activity carried out by large companies when adopting, applying, and adjusting existing innovations in the market to their current processes. Therefore, the innovation process in MSMEs does not depend entirely on the ability of entrepreneurs to develop applications in specialized laboratories, but rather must be supported by the constant work of human capital distributed across different areas of the organization to generate a greater and better selection of existing innovations in the market.

Several studies indicate that there is a positive relationship between the size of companies and their ability to generate innovations. These authors argue that SMEs play a complementary role to that of large corporations, following their own technological path based on the adoption, application, and adjustment of innovations already present in the market. In this sense, the innovation process in SMEs does not depend primarily on formal research and development activities carried out in specialized laboratories, but rather on the constant work of human resources distributed across different areas of the company, such as quality, production, sales, marketing, and distribution. (Yoguel, 1996; Nooteboom, 1994, as cited in Moreno, 2014, pp.1-14)

Given everything mentioned above regarding the creation of information systems (software development) for MSMEs, it can be said that both the administrative approach to innovation and systems development are closely related. If we consider the philosophy of Henry Fayol, the father of classical management, administrative action can be identified in the phrase: "To manage is to get things done through others." while, if we take the philosophy of Frederick W. Taylor, father of scientific management, administrative action changes, as reflected in the phrase: To know how to command, you must know how to do. Therefore, if these philosophies are applied to the development of administrative software, it can be concluded that an application of this type can be acquired with one's own resources if one has the economic capacity to pay for the software and all the additional expenses

involved in its purchase. There is also another option, which is to generate the software yourself, but this option has prerequisites, as technological and business culture are essential if you do not want to incur losses.

### **MSMEs and their resistance to change according to the 2019-2024 work program of the Secretary of Economy and the 2024-2030 PED of the state of Puebla.**

At the federal level, according to the study on business demographics published by the National Institute of Geography and Statistics (2023), it was estimated that 99.8% of all businesses in Mexico (formal and informal private sector) are classified as MSMEs, representing around 5,096,322 economic units.

For its part, the Ministry of Economy of the State of Puebla (SE, 2019), through its 2019-2024 work program, stated that: MSMEs are recognized as key organizations for regional economic development, since in 2019 there were around 306,121 MSMEs in the state, of which 95.73% were micro, 3.40% small, 0.56% medium, and 0.31% large, which indicates that in the region, 99.69% of companies up to 2019 had an MSME stratification.

However, according to the latest data published in 2025, corresponding to the third quarter of 2024 from the National Occupation and Employment Survey (2024), in the state of Puebla, the population employed in the informal sector aged 15 and over amounts to 1,025,180 people (p.1).

Taking into account that the population of the state of Puebla, according to the latest updated population and housing census by the National Institute of Geography and Statistics (2020), showed that there were 6,583,278 inhabitants in Puebla and that of these, if we consider the working-age population (15 years and older), there are 5,037,442 people, representing 76.5% of the state's total population, leaving 1,545,836 people under the age of 15 who are not available for the labor market. Within the working-age population (15 years and older) is the economically active population (EAP), consisting of the employed and unemployed populations, where 3,021,287 people are part of the former and 68,762 people of the latter, generating a grand total of 3,090,049 individuals, making the EAP represent 61% of the total population of the state and 61.3% of the working-age population (15 years and older). It is important to mention that within the employed population mentioned above, 259,497 individuals are people who work (employed population) without receiving a salary or direct monetary payment, given that this figure includes

workers who are part of a family business and do not receive a salary as such, and/or, where applicable, those persons who are not part of the family business but receive payment in kind for their work, as well as informal workers who do not receive direct income for their activity.

In addition to the above, according to data from the National Institute of Geography and Statistics (INEGI, 2024) through the January 2024 economic censuses, published on January 23, 2025, 97.2% of establishments in 2024 were microbusinesses and employed 58.0% of the employed population (formal and informal sectors) in the state (1,752,346 people). Considering that 1,025,180 residents of Puebla are part of the employed population in the informal sector, it can be concluded that approximately 727,166 inhabitants are part of the employed population in microbusinesses under formal working conditions. This figure is only an approximation, as it is obtained by subtracting the employed population in the informal sector from the total number of people employed in microbusinesses (58% of the employed population), and although this information is generated through general data cross-referencing, it does not accurately reflect the complete administrative records of the labor market. However, it does allow us to visualize an approximate proportion of formal employment within the microbusiness sector, thus showing that not all economic activity takes place outside the formal sector, as some informal workers may provide their labor to larger economic units. In order to obtain accurate information, it would be necessary to analyze the contractual, social security, and tax conditions of each economic unit that generates employment. It is precisely for this reason that this research only presents an approximation that can generate an objective view of job creation, which is the central theme of the study.

Consequently, based on the above, it can be asserted with the aforementioned data that informal companies, and in some cases formal companies within the region, do not sufficiently and adequately comply with their employer obligations, either due to a lack of corporate culture generated by ignorance or due to unethical and immoral business strategies that evade compliance with government regulations.

In view of the above situation, the government of the state of Puebla has implemented various mechanisms throughout 2019 to 2024 to address these issues, such as: Training programs and actions for entrepreneurs, federal, state, and commercial banking financing alternatives

for entrepreneurs, programs for opening businesses in one day, and simplification of procedures for obtaining building permits.

Even though the federal and state governments have implemented all the strategies to support MSMEs, these entities continue to resist the paradigm shift in both business culture and the adoption of a technological culture that promotes their transition to formality. This can be deduced from an analysis of figures presented by the National Occupation and Employment Survey (2025), which contains information from its latest bulletin published in January 2025, with information from the fourth quarter of 2024 regarding data on the economically active population mentioned in previous paragraphs. Therefore, MSMEs must currently swim against the tide and try to mitigate any statistics that work against their survival, such as the fact that only 53% of them manage to survive the first year, or that only 15 out of every 100 manage to survive for more than 20 years. Therefore, the average life expectancy of an MSME in the market is 7.9 years, coupled with few financing options to grow in the market.

The above explains the resistance to change among MSME entrepreneurs when it comes to creating a business culture and, more importantly, their resistance to adopting a technological culture that would enable their growth and development. The fact that 1,025,180 people in Puebla were working in the informal sector in 2024 is indicative of the type of companies they worked for, that is, companies that lack administrative structure, that are guided by empiricism, that prioritize profit generation over the development of their workforce, that lack accounting, financial, and fiscal strategies, and, at the same time, lack sufficient and adequate technological knowledge to compete with other companies and remain in the market. It could even be said that they lack interest in generating a culture of training and education in their favor, since the fact that the federal and state governments have launched various programs to benefit micro-enterprises and their figures represent a stagnation in their scalability as businesses since 2019 does not seem to be a very encouraging sign for the future.

The above argument can be supported by figures from February 2020 from the latest National Occupation and Employment Survey produced by the National Institute of Geography and Statistics (2020), which shows data on the economically active population for the third quarter of 2019, which, as of December of that same year, amounted to 2,992,818, representing 46.51% of the total population at that time, and considering that in that year, according to

According to INEGI data, the number of Puebla residents working under informal conditions was 2,130,000. It can be concluded that from 2019 to 2025, there was a 48.13% decrease in informal employment. This percentage can be attributed to various factors, such as changes in companies' internal policies in response to SARS COVID-19 in order to adapt to new market demands, changes in economic, fiscal, and social policy during the López Obrador administration, to name a few key elements, but there may be many others. Finally, it should be noted that the positive changes in employment between 2019 and 2025, even though they show positive figures, do not represent 50% of the generation of business culture in MSMEs, so that the lag in knowledge of employer, labor, accounting, financial, tax, and technological obligations remains present, and the federal, state, and even municipal governments will be forced to redouble their efforts to provide effective and efficient solutions through public policies that deliver quality results and translate into economic, social, and productive benefits for all the people of Puebla.

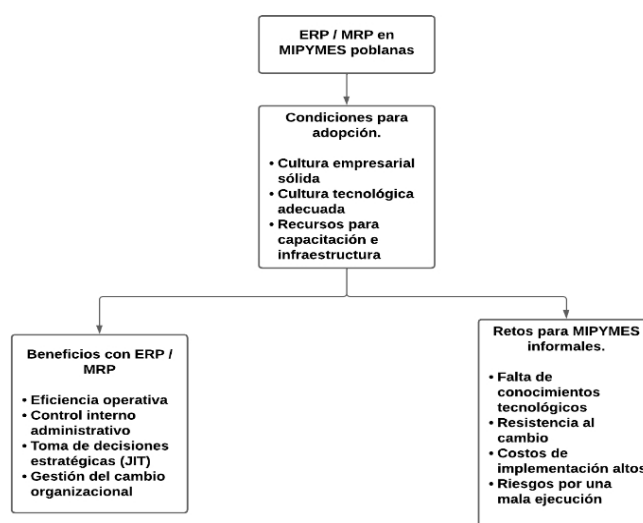
## **DISCUSSION AND ANALYSIS OF RESULTS**

The future of business management will be increasingly linked to technological advances and mastery of the tools that come with them. Therefore, as professionals or future professionals, entrepreneurs, and businesspeople, it is necessary to receive sufficient and adequate training in each of the IT elements that can generate internal administrative control, either through paid tools available on the market or by generating such applications through different programming languages. which, despite being an extremely difficult element, can at the same time represent an excellent investment to generate internal administrative control not only in commercial companies in Puebla, but also in industrial and service companies. However, to achieve this objective, the mindset of the business owner, entrepreneur, and/or professional who ventures into such an action plan needs to go against the resistance to change in the use of new technologies, that is, go against the traditional management of companies, which are regularly run using empirical techniques, which, in many cases, can be beneficial in the short and medium term, but in the long term causes serious problems such as exponential growth of the company without a corporate culture, within a specific market that can end in the bankruptcy of the business. Therefore, the corporate culture that 21st-century entrepreneurs and/or professionals should adopt is one focused on the structure and formal implementation of

businesses, without neglecting modern technological management tools, which are currently beginning to boom even more than computer programming languages, as artificial intelligence is advancing in terms of creation, standardization, and automation of processes not only in large companies but also in MSMEs.

For the vast majority of MSMEs, the migration from an empirical to a scientific business culture is a difficult process, in which fear and adaptation to a new way of working generate mistrust among entrepreneurs, as maladjustment could cause unnecessary costs that can be converted into expenses for the business, and these expenses in losses, which represents a risk that this type of employer would not want to take.

The above is entirely valid for an entrepreneur who does not have a vision for the future growth of an MSME business, as statistically, most of these types of companies do not last more than 10 years in the market. Therefore, it is important for employers to start thinking about the possibilities for developing their companies under a legal framework, as the latter is what will truly give them the opportunity to grow in the market. Under this concept, ERP and MRP software are an important option for this type of organization, as the comprehensive internal administrative control they exercise is not only limited to their daily operations, inventory control, finance, and accounting, but also generates a sufficient and adequate legal framework that will allow the business to be conducted within the demanding legal, commercial, and labor limits. Given current government policies, it is advisable to fall within these parameters in order to avoid reprisals from regulatory institutions such as the SAT, Finance, IMSS, etc.



**Figure 1.** *Conditions for the implementation of ERP and MRP systems in MSMEs in Puebla.*

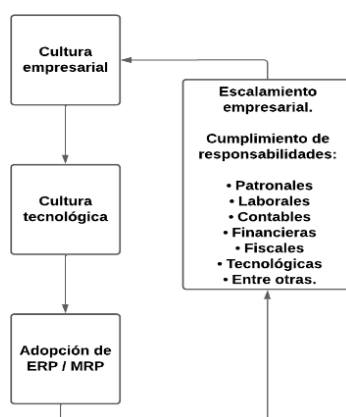
Source: Own elaboration (2025).

Finally, it is important to mention that current public policies on entrepreneurship for companies with potential for scaling up, which can benefit from considerable amounts of support, only benefit formalized private organizations that have operated within a time limit in the market with certain performance parameters, such as the payment of employer contributions for a period of 6 to 8 months, to cite one of several parameters. This forces entrepreneurs to change their paradigm when creating and scaling a business.

## ANALYSIS OF RESULTS

The importance of the adoption and/or creation, as well as the implementation, use, and launch of ERP and/or MRP software for commercial MSMEs in Puebla lies in the level of business and technological culture that their leaders possess, as this justifies the owner(s)' desire and interest in generating business scaling and permanence in the market in a responsible manner, controlling at all times the procedures that make up their operations derived from the different functional areas that make up the entity, as well as the costs and expenses incurred in the various activities, with full knowledge of the employer, labor, accounting, financial, tax, and technological obligations, among others, that their operation demands.

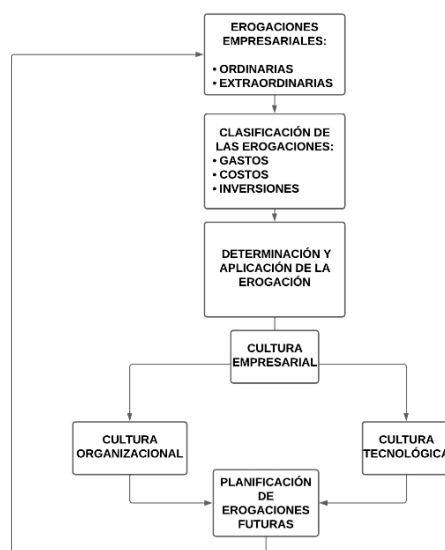
**Figure 2.** *Relationship between business culture and the adoption of information systems in MSMEs.*



Source: Own elaboration (2025).

It is important to note that the use of ERP and MRP software is conditioned by the level of knowledge possessed by employers, since, in the case of an informal company classified as an SME, where empirical knowledge of operations is usually high but there is a lack of a culture

solid business model that shows the entrepreneur their labor, accounting, tax, and other obligations, then adopting an ERP and/or MRP system is inconvenient, not because of the acquisition or installation, but because of the high costs and expenses that this decision would generate, in addition to the opportunity costs that would be left aside, such as investment in other types of assets that the organization needs for its traditional operation; Implementing ERP and/or MRP in a company without a business culture and without a technological culture will ultimately generate expenses such as: training the employee or employees responsible for using the software interfaces (it should be noted that these training courses have a high market price), expenses derived from the turnover of personnel trained in ERP and/or MRP who leave the company for better options, expenses for computer equipment and accessories that allow the software to run properly, expenditures for technical support services, specialized consulting for the initial configuration and implementation of the computer program, preventive and corrective maintenance of computer equipment, internal communication expenses, among many others. In addition, consideration must be given to expenses that may arise from errors or omissions in a failed implementation of the application. All expenditures arising from a company with a lack of business and technological culture will sooner or later turn into losses, which runs counter to the main objective that underpins the existence of a company.



**Figure 3.** Cycle of identification, classification, and application of expenditures in MSMEs. Source: Own elaboration (2025).

On the other hand, the technological culture that entrepreneurs and employees of MSMEs should possess to enable the use of ERP and/or MRP is limited. Companies in the state of Puebla are informal and have a traditionalist management style. At the same time, software development, which could be an alternative for MSMEs by generating applications with operations similar to ERP and/or MRP, is limited by the lack of technological culture that entrepreneurs should exercise. Unfortunately, this is not exercised due to little or no knowledge of basic-intermediate computer science, where programming, and especially object-oriented programming, plays an important role in the development of applications that allow for the standardization of processes, optimization of time, reduction of costs, improvement of internal communication, and future business scaling.

However, in addition to all of the above, it is important to emphasize that the knowledge that administrators must currently possess regarding ERP and MRP programs is essential if they are working for a company that uses them, since training in one of these programs is not simple, inexpensive, or quick. On the contrary, the training time for each module that makes up the software is extensive, ranging from 6 months to 1 year, and the costs are often high depending on the type of company where the software has been installed.

However, if the entity responsible for the acquisition, implementation, and/or development of an ERP and/or MRP is a company (micro, small, medium, or large, in any sector) with a solid corporate and technological culture that operates formally, then the following main benefits are generated for that entity:

- 1) Improved operational efficiency. Any company with an ERP and/or MRP will enjoy such efficient process integration that it will eliminate any bottlenecks that may arise.
- 2) Strategic decision-making. Decisions are based on the collection and analysis of comprehensive data from all areas of the company in real time, focusing on the just-in-time (JIT) philosophy.
- 3) Change management and organizational culture. It helps eliminate resistance to change, which creates barriers to the adoption of new technologies and fear of adopting new technological work systems that can promote organizational growth and development.

This research concludes that the future of business management will be increasingly linked to technological advances and mastery of the tools that come with them. Therefore, as professionals or future professionals, entrepreneurs, and businesspeople, it is necessary to receive sufficient and adequate training in each of the IT elements that can generate internal administrative control, either through paid tools offered by the market or by creating such tools (only in the case of interdisciplinary work, which would generate many more benefits for an entity, but this requires a solid business and technological culture). In other words, in the face of rapid technological evolution, business administrators in general must be willing to adapt and continuously generate knowledge and expertise that will enable them to prevent the risk of professional lag (in the case of entrepreneurs, acquiring such knowledge allows them to counteract all the factors that determine their exit from the market and limit their scalability), promoting at all times the generation of sufficient and adequate financial indicators, useful cost information, ethical and moral tax strategies that are applicable within a legal framework, efficiency in the processes of their integral areas, and sufficient coordination between them to facilitate internal and external audit processes.

**Table 1.**

*Comparative table between traditional management model and ERP/MRP management model.*

Element	Traditional management model	Management model with ERP/MRP
Process integration	Isolated operations with no effective communication effective between functional functional of the social organization	Processes integrated into a single platform that promotes the administrative process.
Operational times	More time spent on manual tasks and duplication of effort	Automation and reduction of times in operational activities
Operating costs	High costs generated by errors, duplication of functions and processes	Cost reduction through efficiency and automation

Real-time analysis capabilities in real time	Based on manual reports and fragmented data fragmented data	Generation of indicators in with accurate analysis
Flexibility and adaptability	Limited, difficult to modify and adapt to changes	High flexibility to modify and adjust processes according to needs.
Internal control	Limited, with difficulties in generating real-time monitoring	Better control and monitoring in real , facilitating audits.
Strategic decisions	Based based on fragmented fragmented and outdated data	Generate informed and timely decisions with integrated and updated
Resistance to change	High, derived from manual processes and corporate culture fragmented fragmented deep-rooted	Lower, if accompanied accompanied by technological and technological and training.

*Note:* This table shows the main characteristics of a traditionalist administrative model compared to one with a technological culture focused on ERP and MRP, so the elements presented are illustrative but not exhaustive. Source: Own elaboration (2025).

In addition, and so that the reader is aware of the relevance of the topic under discussion, it is important to mention that according to a quantitative study conducted by Benvenuto (2006), which focuses on the implementation of ERP systems in a universe of ninety companies, chosen at random in relation to their size and scale , where a simple random sample of 11 companies was extracted, and the selection criterion was convenience. This study showed that in 64% of the companies analyzed, the general manager is the one who decides on the implementation of an ERP system, while 9% of them consult the accounting and finance department to install such software. Meanwhile, 18% of decisions come from business owners, and only the remaining 9% have considered the opinion of employees in the area. Likewise, the aforementioned study showed that the duration of the implementation stage in ERP and/or MRP applications is variable, ranging from 1 year for 18.2% of the companies in the sample to 2 years for 72.7% of them, with only 9.1% of companies taking more than 2 years to adapt this type of software. the same study revealed that 91% of social organizations make greater use of financial management, planning, and

production, sales, and distribution control, while 82% of the same sample has integrated the materials management module, 73% integrates the quality control module into its operations, 55% the cost module, 36% the project management system, and only 27% the human resources module. **CONCLUSIONS**

The intention to adopt, implement, and/or generate a comprehensive electronic internal administrative control system, such as ERP (Enterprise Resource Planning) and MRP (Material Resource Planning) software, both aimed at micro, small, and medium-sized enterprises, requires, as a fundamental prerequisite, the adoption of a medium-high level of business and technological culture, which must be possessed by business owners as well as their employees, in order to guarantee the operational efficiency of the economic units and the long-term growth of the MSME in question, and, therefore, an exponential scaling in the market in which they operate.

The adoption and implementation of ERP and MRP software in commercial MSMEs in Puebla is an opportunity for scaling and financing for this type of organization, as more than 50% of companies in the state of Puebla are informal MSMEs and 99.8% of companies at the federal level are MSMEs (considering both formal and informal), Most of these companies operate with an empirical approach and face significant challenges, the most notable of which are high training costs, resistance to change, and a lack of adequate technological infrastructure.

Despite these challenges, companies with a strong business and technological culture (at a medium-high level) can experience significant improvements in activities such as: inventory control, aligned with just-in-time systems, purchasing planning (in the case of commercial MSMEs) and production planning (in the case of industrial MSMEs), hiring and assigning personnel, financial decision-making interrelated with fiscal strategies, strategic marketing and expansion decisions, customer loyalty, among many other operations aimed at decision-making and process optimization, which, as a result, generates a greater capacity to adapt to a constantly changing market.

It is essential that MSME entrepreneurs in the commerce sector in Puebla (although those in the industrial and service sectors could also be included) manage to bring about a paradigm shift, where the acceptance of new technologies and the activities involved in implementing them are considered obligations (as part of a new guiding culture without official government regulations).

apparent) for entrepreneurs, so that the benefits promoted by software such as ERP and MRP can be achieved, the main ones being: process integration, elimination of bottlenecks, cost reduction, the possibility of scaling up within a legal, tax, labor, and commercial framework, as well as the generation of efficiency in operational processes.

It is essential that businesses change their way of thinking about the activities they carry out in a traditional manner and adopt a modern mindset that involves new technologies on the market, so that, in addition to enabling the future scaling of the business within a legal framework, promote its competitiveness in the market in which it operates and generate strategies that guarantee its future permanence, without neglecting at any time the present and future economic benefits that the activities of the business itself can generate.

Finally, and in addition to the conclusions reached, it is also important to mention that according to the quantitative study conducted by Benvenuto (2006), which was used as a complementary document for this research and which focuses on the implementation of ERP systems in a universe of ninety companies, chosen at random in relation to their size and magnitude, where a simple random sample of 11 companies was extracted, and the selection criterion was convenience, this study states that:

91% of companies that implement an ERP system are able to manage information more efficiently and effectively, as expected. However, it should be noted that this system is a business management tool that only provides information, so it is necessary to have the right tools and knowledge to get the most out of these systems. This benefit has meant that 82.2% of companies have been impacted by changing their organizational structure.

## **FUTURE WORK**

This research will serve as the basis for a quantitative study to evaluate the computer and office automation tools that enable the integration of technologies into the management of MSMEs, in the context of the technological revolution and Industry 4.0, a trend that affects business operations not only nationally but also internationally.

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