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THE FOURTH INDUSTRIAL REVOLUTION AND STRATEGIC PLANNING IN SMES IN CAMPECHE: A CASE STUDY

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Abstract: The objective of this research is to analyze the impact of the Fourth Industrial Revolution on the strategic planning of MSMEs in Campeche. To this end, a comprehensive literature review was conducted to identify key concepts, theories, and models related to Industry 4.0 and strategic planning, assessing how the adoption of advanced technologies can improve operational efficiency and decision-making in these types of companies. The study employs a descriptive, exploratory, documentary, and qualitative approach, recognizing the existence of multiple realities that vary in form and content. The results show that the integration of Industry 4.0 technologies into strategic planning contributes to optimizing resource allocation, increasing operational efficiency, and strengthening the competitiveness of MSMEs in Campeche. However, resistance to change and limited technological training are critical barriers that must be overcome through ongoing training programs and strengthening institutional support.

Keywords:: Fourth Industrial Revolution, Industry 4.0, Strategic Planning, MSMEs.

INTRODUCTION

(Schwab, 2016)The Fourth Industrial Revolution, also known as Industry 4.0, has transformed production processes through the integration of advanced technologies such as artificial intelligence, the Internet of Things (IoT), automation, and big data analysis . However, micro, small, and medium-sized enterprises (MSMEs) face significant challenges in adopting these technologies, including limitations in technological infrastructure, digital capabilities, and resistance to organizational change (Lasi, Fettke, Kemper, Feld, & Hoffmann, 2014) .

At the organizational level, strategic planning continues to be an essential tool for anticipating scenarios, setting objectives, and coordinating efforts. However, in a context characterized by the speed of technological change, the integration of Industry 4.0 tools represents a challenge that conditions the survival of organizations (Paucar, Morales, & Altamirano, 2017) .

In Mexico, micro, small, and medium-sized enterprises (MSMEs) are already the engine of the economy, representing 99.8% of economic units and generating 52% of the national Gross Domestic Product (GDP) (Ministry of Economy, 2024) . It should be noted that in Campeche, these companies are essential for local economic development, but their integration into Industry 4.0 is limited. Previous studies indicate that, although some MSMEs have adopted digital technologies, barriers such as lack of training and financial resources for effective digital transformation persist (Buenrostro, 2022) .

The present study aims to analyze how the Fourth Industrial Revolution impacts strategic planning in MSMEs in Campeche, identifying barriers, opportunities, and levels of digital maturity. Through a descriptive and qualitative approach, it seeks to generate knowledge that contributes to both academic development and regional business practice, promoting a more efficient and sustainable digital transition for local MSMEs.

THE FOURTH INDUSTRIAL REVOLUTION AND ITS IMPACT ON MSMEs

In the first quarter of the 21st century, digital transformation has established itself as a highly complex, dynamic, and global process. This phenomenon affects not only individuals but also organizations, which face the challenge of adapting to an environment characterized by the speed of technological change ( ). (Pérez, 2020)In this context, Industry 4.0 emerges as a disruptive paradigm that redefines production and business management processes, driving new forms of competitiveness in an increasingly interconnected and agile society .

The time difference between the Third Industrial Revolution (based on automation and information technology) and the current Fourth Industrial Revolution is barely five decades, reflecting the acceleration of technological progress. (Schwab, 2016) points out that *"the uniqueness of the fourth industrial revolution lies in the coexistence of a wide variety of converging technologies, which blur the boundaries between the physical, digital, and biological, generating a fusion between these three planes and causing a true paradigm shift."*

Similarly, Neugebauer et al. (2016 cited in Cabaña and Galbusera, 2019) conceive of Industry 4.0 as "the integration of human resources, physical elements, and systems in a dynamic, self-organized, real-time manner with autonomously optimized value-added systems." (Beltrán, Parra, & Olivares, 2020) .

Industry 4.0 is based on the development of systems, the Internet of Things (IoT), the Internet of People, and the Internet of Services, along with technologies such as additive manufacturing, 3D printing, reverse engineering, *big data*, and advanced analytics, as well as artificial intelligence. When integrated together, these tools are generating far-reaching transformations not only in the manufacturing industry, but also in consumer behavior and the way business is done. At the same time, they contribute to the development of capabilities that enable companies to adapt more flexibly to market changes (Ynzunza, Izar, Bocarando, Aguilar, & Larios, 2017) .

However, the degree of adoption of these technologies varies significantly depending on the size, resources, and geographic location of organizations. In particular, micro, small, and medium-sized enterprises (MSMEs) face greater challenges due to limitations in infrastructure, financing, and specialized human capital, which conditions their level of digital maturity and effective integration into Industry 4.0.

In short, Industry 4.0 represents an unprecedented paradigm shift that redefines the way organizations plan and execute their strategies. For MSMEs, understanding its fundamentals and possibilities is an essential step toward sustainability and competitiveness in a highly digitized global environment.

STRATEGIC PLANNING IN THE DIGITAL AGE

Today, strategic planning faces a context characterized by volatility, uncertainty, complexity, and ambiguity, resulting from accelerated digitization, globalization, and technological transformation. In this scenario, strategic planning is no longer a rigid

and linear process but has become a flexible, dynamic, and adaptive practice capable of responding to disruptive and constantly changing environments (Grant, 2016) .

Strategic planning is the tool that helps keep the board of directors of organizations involved in establishing the mission, vision, and strategies for efficient results, fostering cooperation and commitment from all members of the organization. The goal is to achieve what is desired in the future by developing detailed plans to ensure the implementation of strategies (Steiner, 2017) .

According to the authors (Ordoñez, Orosco, & Pulla, 2025) , strategic planning has been a crucial element in organizational management, enabling companies and public bodies to define long-term objectives and distribute resources effectively. However, the emergence of the digital economy has dramatically changed the operating environment, creating new challenges for conventional strategic planning methods.

In this sense, digitization and the adoption of Industry 4.0 technologies are forcing MSMEs to reconsider how they formulate and execute their strategies. Strategic planning can no longer be conceived as a linear or rigid process, but rather as an interactive cycle that integrates data analysis, artificial intelligence, and digital tools to monitor performance, anticipate scenarios, and make timely decisions (Quispe, Franco, Paredes, & Mendoza, 2024).

Therefore, digital strategic planning combines the analysis of internal and external factors, the definition of measurable objectives, and the implementation of adaptive strategies, allowing MSMEs to:

- Identify opportunities and threats in the digital environment.
- Evaluate and optimize their internal resources and capabilities.
- Agilely reconfigure processes and business models.
- Develop digital skills in human capital.

According to (Macías, et al., 2024) , "integrated strategic planning facilitates the management of organizational change, enhancing adaptability, operational efficiency, and technological innovation," which is crucial for MSMEs seeking to remain competitive in the context of the Fourth Industrial Revolution.

Therefore, strategic planning in the digital age is not limited to setting goals and allocating resources, but requires a proactive vision based on digital information that allows MSMEs to adapt to technological changes, improve their operational efficiency, and strengthen their competitive position in the local and global market.

BARRIERS TO TECHNOLOGY ADOPTION BY MSMEs

We are on the threshold of a new era marked by accelerated digital transformation. However, much of society, and especially MSMEs, are facing this change as if it were a passing storm, under the mistaken belief that once it is over, they will be able to return to their previous ways of working. There are still entrepreneurs who believe that the same tools that previously generated value, employment, and social welfare will be sufficient in the new context, which represents an outdated vision (Guilera & Garrell, 2019) .

Evidence shows that this perception is incorrect: while certain macroeconomic indicators reflect growth, inequality and job insecurity have intensified, at the same time as the replacement of human tasks by automated and intelligent systems has increased. This creates a scenario where the jobs created do not always guarantee wages in line with the real cost of living (OECD, 2019) .

First, one of the main constraints is the restriction of financial resources. MSMEs tend to operate with low profit margins and limited access to credit and financing instruments, which makes it difficult to invest in digital infrastructure, training, or specialized consulting (OECD, 2019)

Second, barriers related to human capital and digital training have been identified. The lack of technical skills in areas such as data analysis, cybersecurity, automation, or artificial intelligence creates a gap between the demands of the digital environment and the internal capabilities of the company (Guilera & Garrell, 2019) .

Thirdly, there are cultural and management limitations. Many MSMEs maintain traditional organizational structures and resistance to change, which translates into partial or superficial adoption of technologies, without real alignment with business strategy (Tarute & Gatautis, 2014) .

Another significant obstacle is technological infrastructure. Factors such as limited digital connectivity in certain regions, high hardware and software costs, and a lack of specialized suppliers reduce the possibility of effectively integrating Industry 4.0 solutions (Schumacher, Erol, & Sihn, 2016) .

Together, these barriers condition the level of digital maturity of MSMEs, placing them in a vulnerable position compared to large companies with greater resources and capabilities. However, overcoming these limitations is key to ensuring the sustainability, resilience, and competitiveness of these organizations in the digital economy.

METHODOLOGY

This study was developed using a qualitative, descriptive approach and exploratory documentary research, seeking to understand how the Fourth Industrial Revolution impacts the strategic planning processes of micro, small, and medium-sized enterprises (MSMEs) in the state of Campeche ( ). The exploratory approach is relevant as this is an emerging phenomenon that has been little studied in the regional context.

MSMEs were selected from sectors such as commerce, services, and manufacturing, with the criterion of representing the state's business diversity. The inclusion criteria were:

- Having formal or informal strategic planning processes.
- Have some level of use of digital tools in their operations.

Likewise, for data collection, a documentary review of academic literature, institutional reports, and official data on Industry 4.0, strategic planning, and the role of MSMEs in Mexico was carried out. Similarly, interviews were conducted with executives and those responsible for strategic planning in the selected companies in order to learn about their perceptions, experiences, and barriers to digital transformation.

It is worth mentioning that, as a complement, a diagnostic questionnaire was

applied, designed to measure the level of digital maturity of organizations in areas such as technological infrastructure, human capital training, and adoption of digital tools.

The information collected was processed through thematic content analysis, identifying patterns, categories, and relationships between elements linked to strategic planning and technology adoption. A comparison was also made between the empirical findings and the literature reviewed in order to contrast the main barriers and opportunities detected in MSMEs in Campeche.

RESULTS

The study's findings show that most of the MSMEs analyzed in Campeche have a low or medium level of digital maturity, which limits their ability to integrate technologies associated with the Fourth Industrial Revolution into their strategic planning processes.

According to the diagnosis applied, three key dimensions that condition technological adoption were identified (table 1).

It was also found that companies with an average level of digital maturity have made progress in digitizing administrative and internal communication processes, although the adoption of advanced technologies (such as artificial intelligence, big data, or automation) remains in its infancy.

A relevant finding is the perception of the executives interviewed: most recognize the importance of digital transformation to improve their competitiveness, but they have doubts about the tangible benefits of investing in advanced technologies. This situation reflects a knowledge gap between the discourse of Industry 4.0 and the actual capabilities of local companies.

In contrast to international studies (OECD, 2019) (Pérez, 2020) , which emphasize the role of financing and innovation as catalysts for digitization, the case of Campeche shows that limited institutional coor-

Dimension evaluated	Low (%)	Medium (%)	High (%)	Main observations
Technological infrastructure	55	35	10	Limited connectivity and use of basic software
Human capital training	60	30	10	Poor training in data analysis, AI, and cybersecurity
Organizational culture and management	50	40	10	Resistance to change and traditional structures

Table 1. Levels of digital maturity in MSMEs in Campeche

Source: Prepared internally based on interviews and questionnaires (2025).

dination (support programs, financing, and training) constitutes an additional obstacle for MSMEs.

In short, the results confirm that, although there is awareness of the importance of Industry 4.0, strategic planning in Campeche's MSMEs does not yet fully integrate digital tools, which limits their ability to adapt and be sustainable in highly competitive environments.

CONCLUSIONS

The research leads to the conclusion that the Fourth Industrial Revolution represents a strategic opportunity to strengthen the competitiveness of MSMEs in Campeche. However, its adoption faces significant limitations related to technological infrastructure, human capital formation, and organizational culture.

In practical terms, the study shows that digital strategic planning is a key element in the transition to more efficient, flexible, and innovation-oriented business models. However, for this planning to be effective, it is necessary to:

1. Promote continuous training programs that strengthen the digital skills of entrepreneurs and employees.

2. Promote public policies and specific financing schemes for the digital transformation of MSMEs.

3. Foster an organizational culture that is open to change and oriented toward technological innovation.

The main contribution of this study lies in offering a framework for analysis applied to the regional context of Campeche, which allows for an understanding of the local particularities of digitization and generates recommendations for future research and business practices.

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