

Technological Development and Benchmarking in Organizational Change

Keywords: Benchmarking, Technological Innovation, Organizational change.

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ABSTRACT

This paper addresses the impact of technological development and benchmarking on organizational change because both benchmarking and technological development significantly influence company management. This research aims to determine which factors linked to Technological development and Benchmarking impacted Organizational Change in commercial entities located in the Metropolitan Zone of Guadalajara (ZMG). A closed questionnaire was used as a study instrument, surveying the members of the businesses that underwent an organizational change. Those subjects who were consulted had to be part of the change procedure. The findings indicate that technological development and benchmarking contributed to the implementation of organizational taking advantage of demographic changes.

Keywords: Benchmarking, Technological Innovation, Organizational change.



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INTRODUCTION

The analysis of organizational change is paramount, as organizations must continually adapt and update themselves to remain competitive in dynamic markets (Mızrak, 2024). It is essential to understand markets' evolution and explore the underlying causes that determine whether changes are implemented effectively or not. This study seeks to identify the factors that influence organizational change, such as the uncertain environments that characterize the business environment, as well as the obstacles that must be overcome to achieve its implementation, such as the rejection of change that frequently occurs among personnel when an organization decides to carry out internal transformations. In this context, managers play a fundamental role in organizations, as they are responsible for defining the strategies to be followed (Alsharari, 2024). To do so, they must have a clear vision of the future and a precise understanding of the actions needed to achieve the proposed objectives.

The ability of organizations to innovate and renew themselves facilitates employees' adaptation to such changes, promotes a more agile response, and allows organizations to anticipate transformations (Thomas, 2024). Thus, the ability of companies to stay relevant through renewal processes has become a crucial factor in this constantly evolving business environment (Moşteanu, 2024). In this sense, benchmarking is a valuable tool, as it allows organizations to compare themselves with others that implement best practices to identify areas for improvement (Alsharari & Aljohani, 2024).

LITERATURE REVIEW

Change is a constant process in the life of organizations, especially in the commercial sector, where competition is increasingly fierce. Companies must adapt to these changes, using technological advances and tools that improve their decisions and practices. One key tool in this process is benchmarking, a comparative process that helps organizations improve by comparing their practices with those of leading companies. Benchmarking is crucial for organizational change (Tidd & Bessant, 2020; Márquez et al., 202).

Technological advances are one of the leading forces driving organizational change, as they provide new tools and approaches to improve management and adapt to a constantly changing environment. Researchers such as Avgerou (2001), Barrett et al. (2006), and Luca et al. (2021) have explored how technologies impact the structure and functioning of organizations.

The most successful companies are characterized by using methodological tools, such as benchmarking, which allows them to compare themselves with organizations that stand out for their management practices. Through this process, organizations implement consistent changes to improve their operational processes (Kouzmin et al., 1999; Mittelstaedt Jr., 1992). This approach allows companies to identify and adopt best practices that help them improve their competitiveness and operational efficiency.

Organizational change has been a central theme in research since the beginning of this century, especially in a context marked by globalization and trade openness. Market uncertainty has increased due to globalization, the world economy, and rapid technological advances (Siegel, 2016). The models proposed by Luca et al. (2021) highlight how companies need help to remain relevant in an environment of constant change.

Technological innovation is critical to organizational change (Tidd & Bessant, 2020). These innovations offer solutions to help companies face challenges and make successful changes (Roberts et al., 2021). However, implementing new technologies has been a major challenge, especially in countries where technology and innovation backwardness is a significant barrier (Márquez et al., 2022).

Technological advances affect not only operational processes but also organizational and cultural structures. Incorporating tools such as ICT has transformed how companies manage knowledge and information. This change directly affects organizational structure, corporate culture, and knowledge management processes (Čudanov et al., 2012).

According to Barrett et al. (2006), many technological interventions designed to bring about organizational change have had a significant impact, generating predictable and unexpected transformations. These changes are not always neutral; they can have direct or indirect effects on organizations, dynamically influencing different subsystems (Bertalanffy, 1973; Mingers, 2003; Amagoh, 2008).

Benchmarking is a valuable technique for organizations seeking to improve their processes. By comparing themselves with other companies that stand out for their good practices, organizations can learn from their experiences and improve their processes. Mittelstaedt Jr. (1992) highlights how benchmarking has been used successfully in research and development, purchasing, manufacturing, marketing, and sales. Companies can obtain valuable information to identify best practices and improve their procedures and processes through this process.

The proper use of benchmarking requires precise and well-defined criteria since the more precise these criteria are, the more effective the suggestions for improvement will be. Thus, benchmarking helps organizations to identify successful trends in their environment, allowing them to make informed decisions and improve their competitiveness.

In short, modern markets require companies to keep abreast of technological advances to adapt to change and remain competitive. The most successful organizations use methodological tools such as benchmarking, which allows them to compare their practices with those of leading companies and adopt the best strategies and procedures. Technological innovations and benchmarking are fundamental for successfully implementing organizational change and ensuring companies' survival in an increasingly complex and competitive business environment.

METHODOLOGICAL DESIGN

Three fundamental stages were carried out in the development of this research project; a review of the theoretical component was carried out, which involved an exhaustive survey of the theoretical framework related to the object of study. Subsequently, a bibliometric analysis focused on the relationship between the prevention of the future

and the adaptation. Finally, an empirical study was implemented, the objective of which was to collect data relevant to the research. For this purpose, a questionnaire composed of structured questions was designed to cover the possible response options to each of the issues raised. This questionnaire served as the main instrument for collecting information in the framework of this study.

The development of this research was carried out in two main phases, an exhaustive review of the relevant bibliography on the subject was carried out, which allowed us to establish the theoretical framework necessary for the analysis. Subsequently, we proceeded to the empirical phase, in which information was collected through a structured questionnaire to cover the various response options to each question posed in the study.

Unit of analysis

The unit of analysis consisted of micro, small, and medium-sized enterprises (MSMEs) with a range of between 1 and 250 employees located in the Guadalajara Metropolitan Area (AMG), which includes the municipalities of Guadalajara, San Pedro Tlaquepaque, Zapopan, and Tonalá and belongs to the commercial sector.

Sample

For this study, a non-probabilistic sample of 78 individuals was chosen. All of them were employed in businesses that had undergone organizational change. The participants were chosen based on their membership in the MSMEs of the commercial sector located in the AMG.

Operationalization of variables

The research variables were operationalized through a questionnaire based on the Likert Scale. The questions were formulated as statements reflecting the respondents' degree of agreement or disagreement regarding aspects of new technologies and benchmarking in the context of organizational change.

Problem statement

The main objective of this research is to explore how new technologies and benchmarking affect organizational change processes in commercial companies located in the Guadalajara Metropolitan Area. The study seeks to identify whether these elements are facilitators or obstacles in this process. The research questions formulated are as follows: What are the causes related to benchmarking and technological advances influenced organizational change in AMG's commercial companies? What consequences did benchmarking, and technological advances bring in these companies' organizational change processes?

Research objectives

The objectives established for this research were the following:

To determine which factors linked to Technological development and Benchmarking impacted Organizational Change in commercial entities located in the Metropolitan Zone of Guadalajara (ZMG).

To analyze the scope of benchmarking and technological advances in the organizational change processes of commercial companies located in the AMG.

Hypothesis

The following hypotheses were formulated to guide the data analysis:

H1: *Benchmarking favors the successful implementation of organizational change in commercial companies in the ZMG.*

H2: *Technological development contributes positively to organizational change in the commercial enterprises of the ZMG.*

The data collection process was based on the theoretical framework established at the beginning of the study, using a structured survey with Likert scale as the primary research tool. In order to evaluate the consistency and reliability of the instrument, Cronbach's alpha was calculated. In addition, the sample adequacy index (KMO) and Bartlett's test of sphericity were calculated, which allowed confirmation that the variables are adequately correlated to perform a factor analysis.

For the empirical analysis, analysis of variance (ANOVA) was used to determine the significance of the relationships between the variables (new technologies, benchmarking, and organizational change) and identify the factors that can positively or negatively influence this process.

The survey was designed considering the bibliographic sources consulted to identify the factors that participate in or influence organizational change processes. After obtaining the data, it was analyzed to get relevant conclusions for the analyses.

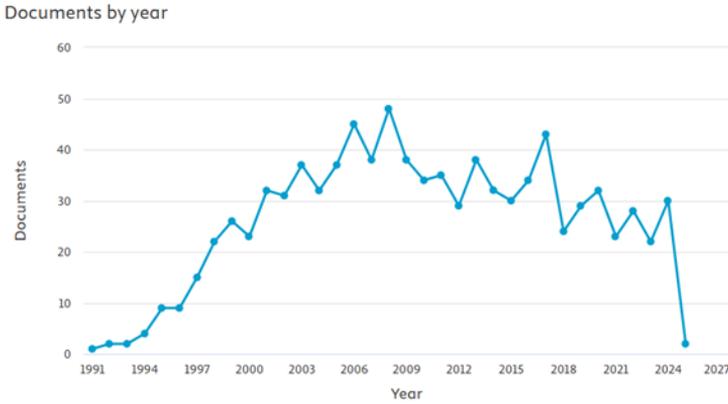
The Scopus database, with a query date of December 10, 2024, contains a total of 916 scientific papers related to the topics of Benchmarking and Organizational Change, of which 626 are articles, 133 are conference papers, 111 are reviews, 19 are book chapters, eight are conference reviews, six are books, six are short surveys, four are notes, one is an editorial, one is a data and 1 is a letter. These papers include the relevant terms in their titles, abstracts, or as keywords.

BIBLIOMETRIC ANALYSIS

The bibliometric analysis of these documents revealed several essential patterns in the scientific production around Benchmarking and Organizational Change. The results obtained from the data available in Scopus are presented below.

Figure 1 shows the evolution of scientific production on Benchmarking and Organizational Change in the Scopus database. The information reveals a significant increase in publications since the beginning of the 21st century, reaching its peak in 2008.

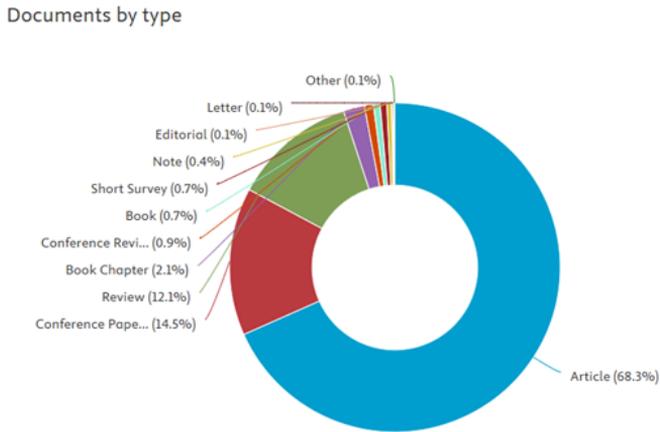
Figure 1. Scientific Production on Benchmarking and Organizational Change in Scopus.



Source: Own elaboration based on Scopus statistics.

Figure 2 shows the distribution of documents by type, which reflects the diversity in the formats of the works analyzed, from journal articles to conferences and books.

Figure 2. Publications by type of document.

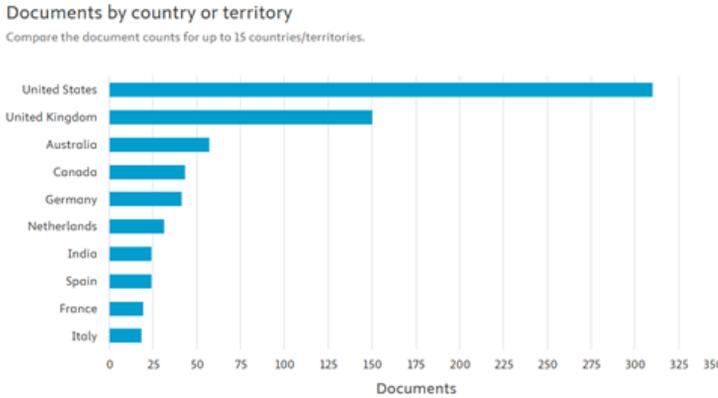


Source: Own elaboration with the results obtained from Scopus.

The Scopus database allows downloading bibliographic records in various formats, facilitating their analysis on multiple platforms. This study used the VOSviewer program to visualize the co-occurrence networks of terms extracted from the bibliographic records. This software, developed by Van Eck and Waltman (2010), generated visual maps of the information contained in the documents.

Regarding the geographical distribution of the scientific production on Benchmarking and Organizational Change, the results reveal that the leading countries that have contributed significantly to research in this field are the United States, United Kingdom, Australia, Canada, Germany, the Netherlands, India, Spain, France, and Italy. Figure 3 illustrates a visualization map of the countries that have produced the most papers on this topic.

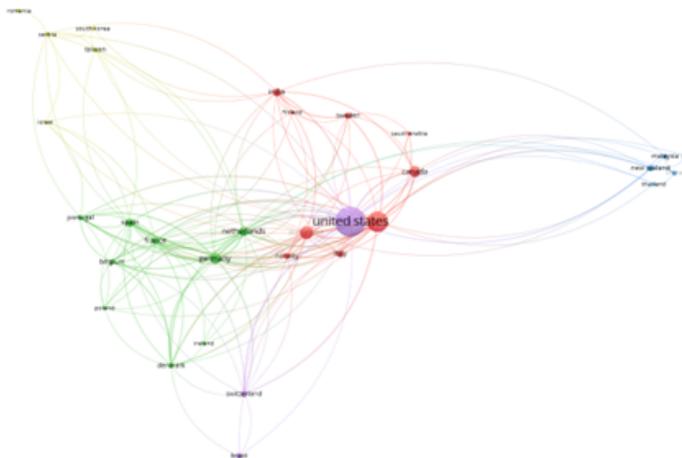
Figure 3. Map of Documents by country.



Source: Own elaboration with the results obtained from Scopus.

The countries are grouped into different clusters according to the work they have generated in this field. Cluster 1 comprises Australia, Canada, Finland, India, Italy, Norway, Saudi Arabia, Sweden and the United Kingdom. Cluster 2 includes Belgium, Denmark, France, Germany, Ireland, the Netherlands, Poland, Portugal, and Spain. Cluster 3 groups China, Iran, Malaysia, New Zealand, and Thailand; Cluster 4 includes Israel, Romania, Serbia, South Korea, and Taiwan; and Cluster 5 includes Brazil, Switzerland, and the United States.

Figure 4. Network visualization map by countries.



Source: Own elaboration with the results obtained from the Vos Viewer.

The most cited article is "Firm Characteristics, Total Quality Management, and Financial Performance" by Hendricks, K.B. and Singhal, V.R., published in 2001 in the Journal of Operations Management, with 400 citations. This study uses a sample of quality award-winning firms to empirically test hypotheses about changes in operating income resulting from effective implementation of Total Quality (TQM), analyzing characteristics such as firm size, capital intensity, diversification, the timing of TQM implementation, and program maturity. The results indicate that smaller firms achieve significantly more significant improvements than larger firms (Figure 4).

The second most cited article is "Benchmarking the Learning Capability of Organizations" by Goh, S. and Richards, G., with 364 citations, published in 1997 in the European Management Journal. In this paper, the authors argue that the implementation of organizational learning needs to be improved by a systematic approach to measuring learning capability. They propose a model that, by identifying and measuring key organizational characteristics, could generate a benchmark of learning capability, thus facilitating the design of interventions to overcome barriers in creating a learning organization.

The third most cited article is "Application of Statistical Process Control in Healthcare Improvement: Systematic Review," published in 2007 in Quality and Safety in Health Care by Thor et al. (2007), with 305 citations. This article discusses how statistical process control has been used to manage change and improve healthcare processes. (Table 1).

Table 1. Most cited articles on Benchmarking and organizational change in Scopus.

Autor	Título del artículo	Año	Nº de citas
Hendricks, K.B. & Singhal, V.R.	Firm characteristics, total quality management, and financial performance	2001	400
Goh, S. & Richards, G.	Benchmarking the learning capability of organizations	1997	364
Thor, J., Lundberg, J., Jakob, A., Olsson, J., Carli, C., Härenstam, K. P. & Brommels, M.	Application of statistical process control in healthcare improvement: Systematic review	2007	305

Source: Own elaboration based on Scopus statistics.

This study has allowed a comprehensive analysis of the relationship between Benchmarking and Organizational Change, using bibliometric tools to examine the scientific production on the subject. Using the Scopus database and the VOSviewer software, the publication trends, the geographical distribution of the countries that contribute most to this field of study, and the most influential articles have been visualized according to their number of citations. Benchmarking and Organizational Change are areas of growing interest, especially in quality management and organizational process improvement.

On the other hand, the analysis of the most cited articles has revealed that the most relevant research is focused on the relationship between organizational characteristics, quality management, organizational learning, and statistical process control, which is crucial for continuous improvement in various industries, including the health sector.

RESULTS AND ANALYSIS

This study analyzed benchmarking and new technologies and their impact on organizational change. For this purpose, a questionnaire was used to determine the relationship between these factors. The interviews were conducted with personnel from companies undergoing organizational change, ensuring the participants were involved. This instrument was used to analyze the hypotheses proposed.

Table 2. Cronbach's Alpha of New Technology variables.

Cronbach's Alpha	Number
.723	14

Source: Own elaboration according to SPSS results.

Reliability and validity of the instrument

First, Cronbach's alpha, Bartlett's test, and the KMO sample adequacy measure were calculated. The results obtained for Cronbach's Alpha for the new technologies variables were 0.723, indicating a high consistency in the instrument used (Table 2). In addition, Bartlett's Test and KMO confirmed that the data were adequate for performing a factor analysis. The KMO value was 0.610, which is considered an adequate value to proceed with multivariate analysis (Table 3).

Table 3. KMO and BARTLETT'S TEST- New Technologies and Organizational Change.

KMO		.610
Bartlett Test	Approximate chi-square	377.763
	Gl	91
	Sig.	.000

Source: Own elaboration according to SPSS results.

The lowest significance (p-value) (closest to 0) indicates that factor analysis can proceed. In this case, the p-value is 0.000, indicating that factor analysis can proceed since the variables are significantly correlated.

p< 0.05: H0 is rejected, meaning the data are suitable for factor analysis.

$p > 0.05$: H_0 is accepted, suggesting inappropriate factor analysis. In summary, the results of Bartlett's test with a p-value close to 0 (in this case, 0.000) indicate that the variables are suitable for factor analysis since their correlations are significant.

Commonalities and significant factors

Table 4. Commonalities.

	Group 1	Group 2	Group 3
Benchmarking intensity	0.895		
Frequency of Technological Delay	0.891		
Benchmarking frequency	0.880		
Information and communications technologies were definitive for the change to be made	0.876		
Intensity of Technological Delay	0.876		
New technologies were essential to make the change		0.744	
The implementation of the culture change resulted in a reduction in the number of employees		0.722	
Frequency of the globalization process		0.705	
The results of organizational change are calculated			0.680
The e-business was decisive in carrying out the organizational change			0.671
Intensity of the globalization process			0.645
There is a record of the information and the study of the change process			0.639
The company is increasingly aware of its knowledge base			0.636

Source: Own elaboration according to SPSS results.

The analysis of the commonalities (Table 4) showed that the most significant variables for organizational change were benchmarking intensity, frequency of technological backwardness, and frequency of benchmarking. These variables are closely linked to organizational change. In addition, information and communication technologies and e-business were also essential in the implementation of change. It was observed that, in general, new technologies, together with benchmarking, played a crucial role in the success of organizational change.

Hypothesis 1: *Benchmarking favors the successful implementation of organizational change in commercial companies in the ZMG.*

Table 5. Benchmarking and its relationship with Organizational Change. ANOVA.

		Sum of squares	gl	mean square	F	Sig.
THE GLOBALIZATION PROCESS	Between groups	13.688	3	4.563	6.049	.001
	Within the groups	43.748	58	.754		
	Total	57.435	61			
TRADE OPENING IN THE WORLD	Total	14.821	3	4.940	5.175	.003
	Between groups	55.373	58	.955		
	Within the groups	70.194	61			
DEMOGRAPHIC CHANGES	Total	14.061	3	4.687	5.069	.003
	Between groups	53.652	58	.925		
	Within the groups	67.694	61			
CONSUMER EXPECTATIONS	Total	31.845	3	10.615	21.705	.000
	Between groups	28.365	58	.489		
	Within the groups	60.210	61			
THE COMPETITORS	Total	10.527	3	3.509	4.944	.004
	Between groups	41.166	58	.710		
	Within the groups	51.694	61			

Source: Own elaboration according to SPSS results.

The relationship between benchmarking and organizational change was analyzed through an ANOVA (Table 5), and benchmarking was significantly related to factors such as trade openness, demographic changes, consumer expectations, the globalization process, and competition. These results suggest that benchmarking facilitates organizational change by allowing companies to adapt to the best practices and trends in the global market.

Hypothesis 2: *The development contributes positively to organizational change in the commercial enterprises of the ZMG.*

Table 6. Relationship of New Technologies with a Process of Organizational Change.

		ANOVA				
		Sum of squares	gl	mean square	F	Sig.
Information and communications technologies were definitive for the change to be made	Between groups	42.637	3	14.212	44.001	.000
	Within the groups	18.734	58	.323		
	Total	61.371	61			
The e-business was decisive in carrying out the organizational change	Between groups	21.181	3	7.060	10.458	.000
	Within the groups	39.158	58	.675		
	Total	60.339	61			
There is a record of the information and the study of the change process	Between groups	11.107	3	3.702	8.425	.000
	Within the groups	25.489	58	.439		
	Total	36.597	61			
Positive attitude of management	Between groups	6.199	3	2.066	5.201	.003
	Within the groups	23.043	58	.397		
	Total	29.242	61			

Source: Own elaboration according to SPSS results.

Regarding new technologies, the analysis showed that variables such as e-business, information and communication technologies, and the recording of change process information are determinants for organizational change (Table 6). Technological advances allow companies to adapt quickly to a constantly changing business environment, facilitating organizational change implementation. The positive attitude of management also proved to be an essential factor in this process.

DISCUSSIONS

Communalities lead to several theoretical contributions (Table 4). The intensity (0.895) and frequency (0.880) of benchmarking suggest that it is a key factor in organizational adaptation. Theoretically, this validates the literature that considers benchmarking a strategic process for continuous improvement and adopting good practices. The frequency (0.891) and intensity (0.876) of technological lag reinforce the idea that organizations must reduce technological gaps. Theoretically, this highlights the need to remain competitive through technological innovation and updating. Information and communication technologies (0.876) and new technologies (0.744) are essential to implement changes. This finding supports theories that link digital transformation with organizational adaptation capacity. The globalization process's frequency (0.705) and intensity (0.645) highlight its role in business restructuring. It reinforces theories describing globalization as a strategic and operational change driver. Concepts such as employee reduction (0.722) and new skill development (0.533) suggest dual effects (positive and negative) on human capital. It coincides with theories about organizational change that mention impacts on work culture.

The ANOVA analysis in Table 5 showed the different factors significantly influencing organizations. There are statistically significant differences between the groups regarding the impact of globalization ($F = 6.049$ and $\text{Sig.} = 0.001$). Theoretically, this confirms that the globalization process unequally influences organizations, supporting studies highlighting the need to adapt to global contexts.

There is a significant effect between the groups about commercial openness ($F = 5.175$ and $\text{Sig.} = 0.003$). The idea is reinforced by the theory that openness to international trade drives structural and operational changes in organizations.

Demographic changes have a statistically significant effect ($F = 5.069$ and $\text{Sig.} = 0.003$). This supports theories that maintain that population and social dynamics affect the demand for products and services and the composition of the workforce.

Another theoretical contribution concerns the influence of consumer expectations on innovation and organizational adaptation, which is a key factor in strategic decision-making ($F = 21.705$ and $\text{Sig.} = 0.000$).

It is confirmed that the competition has significant differences between the groups ($F = 4.944$ and $\text{Sig.} = 0.004$). Theoretically, it supports studies on how competitive pressure

forces organizations to innovate and improve their performance.

In relation to Table 6, the theoretical contributions are the following: Theories of digital transformation are reaffirmed that position ICT as facilitators of innovation, automation, and improvement in decision making ($F = 44.001$ and $\text{Sig.} = 0.000$). The theory supports the literature highlighting how e-business facilitates organizational efficiency and adaptation to digital environments ($F = 10.458$ and $\text{Sig.} = 0.000$).

Documenting change processes has a relevant impact between groups ($F = 8.425$ and $\text{Sig.} = 0.000$). Theoretically, this reinforces the importance of knowledge management as a fundamental tool for evaluating, improving, and replicating successful change processes. Top management attitude significantly affects ($F = 5.201$ and $\text{Sig.} = 0.003$). Theoretically, this coincides with studies that highlight the role of positive leadership in implementing and sustaining organizational change.

CONCLUSIONS

The results obtained validate both hypotheses of the research. Benchmarking favors the successful implementation of organizational change in commercial companies in the ZMG since it allows companies to compare themselves with the best in their sector and adopt advanced practices. Likewise, technological development, such as information technologies and e-business, is essential for the modernization and adaptation of organizations to the demands of the globalized market.

Organizational change, driven by benchmarking and new technologies, enables companies to improve their competitiveness and provides them with the tools to respond effectively to market demands and challenges from globalization and technological innovation. The study confirms that benchmarking and technological development are key factors in successful organizational change.

Global markets are in constant transformation. Rapid technological evolution has given rise to a supply of new options that allow consumers to satisfy their needs and desires in more diverse ways than ever before. This expansion of options has increased consumers' demands, who are now more selective when purchasing products or services. As a result, companies have been driven to improve their processes to meet these demands more efficiently, surpassing the competition in time and quality.

From the findings obtained in this research, it was possible to validate the proposed objectives, which consisted of 1) Determining which factors linked to Technological development and Benchmarking had an impact on Organizational Change in commercial entities located in the Metropolitan Zone of the city of Guadalajara (ZMG), and 2) Analyzing the scope of these factors in the process of organizational change within the same geographical context.

The study analyzed the impact of benchmarking and technological advances on organizational change processes, and the results indicated a significant relationship between information and communication technologies (ICT), e-business, information management, and the organizational change process. These factors and management's positive attitude during change are essential for the transformation's success. In this regard, companies need to deeply understand their consumers' preferences, enabling

them to anticipate trends and facilitate the successful implementation of organizational change.

In addition, a significant relationship was identified between benchmarking and several key factors, such as demographic changes, the globalization process, consumer expectations, trade openness, and competition. These findings indicate that benchmarking is key to achieving effective organizational change.

Based on this, it is accepted that the two hypotheses formulated in this study are valid:

H1: *Benchmarking favors the successful implementation of organizational change in commercial companies in the ZMG.*

H2: *Technological development contributes positively to organizational change in the commercial enterprises of the ZMG.*

Consequently, it is concluded that it is essential to record information and study the organizational change process since the appropriate use of new technologies contributes to the organization's development.

The practical implications derived from the work are that Organizations face scenarios that require intensifying benchmarking to adopt best practices and close competitive gaps. It is crucial to implement strategies that combat technological backwardness by updating infrastructure and training. This requires that ICT be a central pillar in organizational transformation plans, facilitating innovation and process improvement. Reducing employees and developing new skills require talent management strategies, avoiding negative impacts on workplace morale.

Organizations need to understand changes in population dynamics, adjust their product and service offerings, and promote a diverse workforce adapted to new realities. It leads to constantly monitoring customer expectations, adapting products and services, improving the consumer experience, and driving innovation to meet market demands.

When integrated into transformation strategies, e-business allows for process automation, expansion into new markets, and improvement in operational efficiency. It is essential to keep a detailed record of the information and processes related to organizational change. This allows you to evaluate results, identify areas for improvement, and replicate successful practices in the future.

A positive management attitude is essential to inspiring confidence, motivating staff, and ensuring the success of change processes. Leadership skills must be developed at management levels to implement organizational transformations effectively.

Despite the results obtained, this study has some limitations that should be considered for future research. The information collected is based exclusively on the responses of the interviewees who participated in the organizational change processes of the companies analyzed. In addition, because non-probabilistic sampling was used, the results are

not representative of the entire population, which limits their generalizability. Similar research should be carried out in other productive sectors and SMEs located in different geographic regions to broaden the scope of the findings.

In future research, it would be helpful to explore further the implications of new technologies and benchmarking in accelerating organizational change processes and how different benchmarking approaches and methodologies can be integrated into strategic decision-making processes at a global level.

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