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The works must be unpublished and refer to topics of Production systems design, product quality management, operations research, computer simulation, supply chains, quality certification, hydrometeorology and other topics related to Engineering and Technology.

Presentation of Content

In the first article we present, *Digital tools for SMEs in Mexico. Systematic review* by Jiménez-García, Martha, Pérez-Castillo, América Nohemí, Gómez-Miranda, Pilar and Tavera-Cortes, María Elena, with adscription in Instituto Politécnico Nacional - UPIICSA, as the next article we present, *Factors and strategies for improving organizational productivity: A theoretical analysis* by Eliseo-Dantés, Hortensia, Castro-De la Cruz, Jucelly, Pérez-Pérez, Iris Cristel and García-Reyes, David Antonio, with adscription in TecNM-Instituto Tecnológico de Villahermosa and TecNM-Instituto Tecnológico de Ciudad Madero, as the next article we present, *Administrative audit of the administrative office of a multinational industrial company in the beverage sector in the State of Veracruz* by Balderrabano-Briones, Jazmín, Martínez-Gutiérrez, Rodolfo and Pérez-Garmendia, Gloria, with adscription in TecNM / Instituto Tecnológico de Úrsulo Galván, TecNM / Instituto Tecnológico de Tijuana and TecNM / Instituto Tecnológico de Mérida, as the next article we present, *Entrepreneurial perspective on the use of IT as a challenge in rural territory: Magical Town Izamal, Yucatan* by González-Herrera, Karina Concepción, Olivares-Contreras, Rodrigo Alejandro and Rodríguez-Valencia, Nery Elena, with adscription in Universidad Tecnológica Metropolitana, as the next article we present, *Military conduct model to strengthen civil military relations as a strategic operational change* by Moreno-García, Blanca Verónica & Moreno-Cuahtecontzi, Francisco Javier, with adscription in Instituto Tecnológico de Chetumal, as the next article we present, *Learning Unit: "Tourism and Environment", dual, socioformative, and sustainable education for international tourism and environmental management* by Niño-Gutiérrez, Naú Silverio, with adscription in Autonomous University of Guerrero, as the last article we present, *ICT as a model for the creation of digital academic environments* by Mejía-Salazar, Gilberto, Gómez-Campos, Sinahí Gabriela, Granados-Magaña, Javier Alejandro and Félix-Pérez, Sirigui Garibeth with adscription in Universidad Autónoma de Nayarit.

.

Content

ECORFAN Journal Mexico 16[34]1-11: e11634111
Article

Digital tools for SMEs in Mexico. Systematic review

Herramientas digitales para las Pymes en México. Revisión sistemática

Jiménez-García, Martha *[a], Pérez-Castillo, América Nohemí [b], Gómez-Miranda, Pilar [c] and Tavera-Cortes, María Elena [d]

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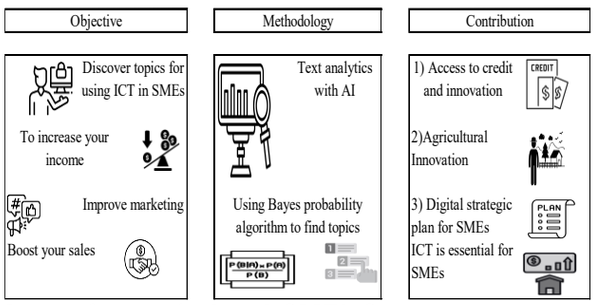
Abstract

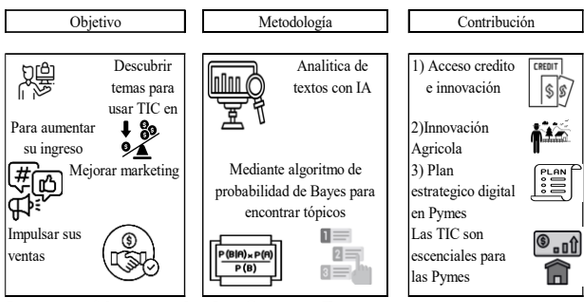
A systematic review was conducted using the PRISMA methodology, the objective was to discover topics related to the use and implementation of ICT that support SMEs to increase their income and improve their digital marketing processes and boost their sales. 45 documents were analyzed with a text analysis through natural language with a Python language library and a Bayes probability algorithm. As a result, three topics were found: 1] Access to credit and innovation as inclusion factors for SMEs, 2] Innovation in the Agricultural sector: The impact of IoT on small farmers, 3] Strategic plan to implement digital tools in SMEs. Finally, it was concluded that tools such as digital platforms, e-commerce, the website, email, IoT, and the smartphone, accompanied by a strategic plan and training are essential for Mexican SMEs.

Resumen

Se realizó una revisión sistemática utilizando la metodología PRISMA, el objetivo fue descubrir temáticas relacionadas al uso e implementación de TIC que apoyen a las Pymes para aumentar sus ingresos y mejorar sus procesos de marketing digital e impulsar sus ventas. Se analizaron 45 documentos con una analítica de textos a través de un lenguaje natural con una librería de lenguaje Python y un algoritmo de probabilidad de Bayes. Como resultado se encontraron tres tópicos: 1] Acceso al crédito e innovación como factores de inclusión para las Pymes, 2] Innovación en el sector Agrícola: El impacto del IoT en pequeños agricultores, 3] Plan estratégico para implementar herramientas digitales en las Pymes. Finalmente se concluyó que herramientas como las plataformas digitales, el e-commerce, la página web, el correo electrónico, IoT, y el teléfono inteligente, acompañados de un plan estratégico y capacitación son esenciales para las Pymes mexicanas.



Innovation, Agricultural, SME´s Sector



Innovación, Agrícola, Sector Pymes

Area: Development of strategic leading-edge technologies and open innovation for social transformation

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Introduction

Currently, small and medium-sized enterprises represent a fundamental pillar for Mexico's economic growth and development. It should be noted that according to statistics from the INEGI [2023] in Mexico there are a total of 4,221,603 MSMEs [micro, small and medium-sized enterprises]. This sector contributes more than 52% of the Gross Domestic Product [GDP] and generates around 70% of formal employment, particularly in sectors such as commerce, services and manufacturing, making it important to study MSMEs.

In this sense, a decisive period of time for these companies was from 2019 to 2023, due to the fact that 1.7 million new MSME establishments were born during this period. This represents significant growth for these companies in a challenging context, which was the COVID-19 pandemic. This crisis highlighted the imperative need for these companies to innovate and adapt emerging technologies in order to remain competitive [Leong, 2022; INEGI, 2023], to carry out a digital transformation of SMEs, which is defined as the process of change and implementation of technological tools in the activities and functions of the company. This process of digital transformation and innovation has important repercussions for SMEs, including the revitalisation of global markets, the creation of new jobs that contribute to poverty reduction, the empowerment of communities and an increase in inclusive economic growth and development [Leong, 2022; Malodia, 2023].

In this sense, the main function of digital transformation in SMEs is the automation of tasks and the optimisation of internal processes, to achieve a reduction in operating times and the elimination of human error, thus improving efficiency and effectiveness within the company. Furthermore, this breaks down geographical barriers and offers new business opportunities that were previously unattainable for small companies [Ghobakhloo and Iranmanesh, 2021].

In this context, the adoption of technological tools has proven to be a key factor in boosting the competitiveness and efficiency of SMEs. However, many of these SMEs are still exposed to barriers that prevent their implementation, such as digital illiteracy and financial inclusion [UNESCO, 2023].

In addition to the fact that ICT in SMEs boosts economic growth [Kusuma et al., 2020] and is of great support to SMEs in rural areas [Fanelli, 2021; Khorshed et al., 2022; Ndimbo et al., 2023], with the support of the Internet of Things [IoT] [Horváth, 2023], and achieve a digital transformation in SMEs in the agricultural sector [Ndimbo, et al., 2023], as well as in the manufacturing sector, as IoT is a pillar of Industry 4.0. [Peláez & Aguirre-álvarez, 2024].

Similarly, ICTs help SMEs with e-commerce [Kumar, Syed and Pandey 2020]. It is also necessary to generate government policies that support the use of ICT [Shahadat et al., 2023] and support strategic plans for the implementation of ICT in SMEs in any sector [Rozak et al., 2023]. This includes the education sector, as these should promote a technological and digital environment to strengthen expansion into a globalised market [Benavides et al., 2025].

In this research, the topics most used worldwide by SMEs and which can be implemented in these companies are added as value, which are explained in the results section and the most important is considered to be the use of IoT in agriculture.

For this reason, the objective of this research was to carry out a systematic review to detect topics related to the use and implementation of ICT that support SMEs in achieving economic growth and improvement in their digital marketing processes and boosting their sales. To this end, the research questions formulated were: Does innovation through the use of ICT help SMEs to grow? Does innovation through the use of ICT help SMEs to perform better financially? How do ICTs help SMEs? Is it necessary for the government sector to support SMEs? These questions will be answered with the discussion of results.

Methodology

In this research, a systematic review was carried out using the PRISMA methodology, with the aim of detecting the current state of ICT in SMEs and detecting issues related to the use and implementation of ICT that support SMEs in achieving economic growth and improvement in their digital marketing processes and boosting their sales. The introduction justifies the systematic review and the research questions are indicated.

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Database of documents

In order to form the database of evaluated scientific articles, the inclusion and exclusion criteria were applied so as not to consider those that would not be suitable for the objectives of this systematic review and to be able to eliminate some that had adequate information but did not meet the objectives of this systematic review.

Searches were carried out in the databases of Web of Science, Scopus and Google Scholar, searching with equation 1, i.e. that the terms SMEs, technology and ICT appeared at the same time [‘SMES’ AND ‘Technology’ AND ‘ICT’], the Boolean operators OR and NOT were not used, similarly in the advanced search a filter was applied so that only scientific articles were included and they were within the time period from 2019 to 2023.

Inclusion criteria

The inclusion criteria were that only scientific and academic articles indexed in the Web of Science, Scopus or Google Scholar databases from the dates in the proposed period and specifically containing the words SMEs, Technology and ICT would be used.

$$Y = SMES + Technology + ICT \quad [1]$$

Table 1 summarises the criteria used for each database.

Box 1

Table 1

Inclusion Criteria

Databases	Period	Documents found
Web of Science	From 2019 to 2023	569
Scopus		273
Academic Google		18400

Source: Own elaboration

Document análisis

The search found 19242 records, then a review of the title, abstract and conclusions was carried out and most of the documents were discarded as they did not fit the topic of study and most of them were from academic Google which includes grey literature. Forty-five papers were reviewed for abstract and conclusions.

The analysis was carried out through a Python software program, using text analytics, through the natural language toolkit, as well as "stopwords" or words without content, then the data of the words were vectorised and the words were assigned using a Bayes algorithm and 3 topics were assigned to obtain the number of most important words per topic in the conclusions of the selected documents.

By having the words per topic, a thematic proposal is made that can be approached jointly or interdisciplinary, as the analysed documents use the words of the topics separately.

Results

In this research, articles were consulted within the period of time from 2019 to 2023, as shown in figure 1. Similarly, the analysed articles are mostly of quantitative research type, followed by qualitative and finally a minimum percentage of mixed type, as can be seen in figure 2.

Box 2

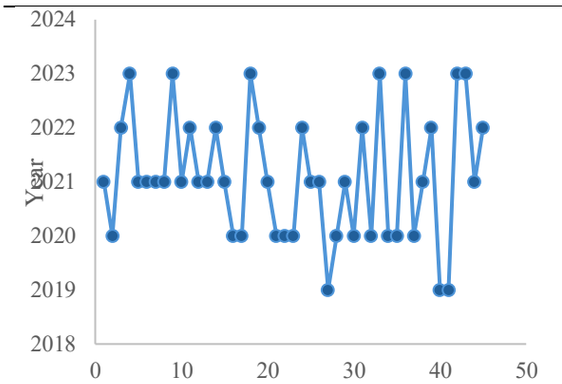

Figure 1

Year of publication of articles

Source: Own elaboration

Box 3

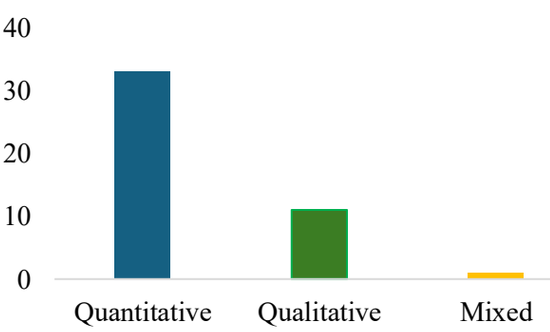

Figure 2

Type of research

Source: Own elaboration

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Box 4

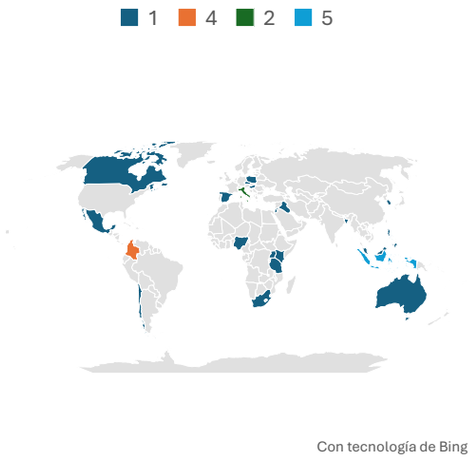

Figure 3

Geographical area

Source: Own elaboration

Also derived from the documentary analysis, the articles were categorised into 3 topics. First, as explained in table 2, are the topics found in the abstract of these articles. Followed by the topics found in the conclusions of the articles, as shown in table 3.

Box 5

Table 2

Topics found in the summary.

Abstrac	Found words	Thematic
Topic 1	Changes, performance, global, economic, implementation, performance, innovation, performance, innovation	Impact of global economic changes on the performance of SMEs.
Topic 2	Technologies, framework, MSMEs, capacity, municipalities, adoption, alignment	Implementation of technologies in MSMEs to improve productive capacity in municipalities.
Topic 3	Farmers, capacities, productivity, agricultural, small, access, sector, access, sector	Improving the capacities of small farmers to increase agricultural productivity.

Source: Own elaboration

Box 6

Table 3

Topics found in the conclusions

Conclusions	Found words	Thematic
Topic 1	Credit, innovation, access, access, inclusion, SMEs	Innovation in SME Credit; Access to Credit for SMEs; Financial Inclusion of SMEs.
Topic 2	Farmers, agricultural, innovation, small, IoT, innovation, small, IoT	The Future of Agriculture: IoT Applications for Smallholder Farmers.
Topic 3	strategic, plan, communication, digital, implementation	Strategic Communication Plan: Digital Tools for Efficient Implementation.

Source: Own elaboration

Consequently, based on this categorisation in table 3, three new topics were constructed, which are described below, and a brief analysis of the conclusion of the articles according to the topics is presented.

Topic 1: Access to credit and innovation as inclusion factors for SMEs

The analysis of ICT in SMEs is relevant, as ICT is one of the outstanding forces driving economic growth. Therefore, SME owners or managers can take priority measures to support the adoption of ICT in their organisations by identifying the most appropriate technology and considering the most important acceptance factors. Given the important role played by SMEs and the challenges posed by Industry 4.0, the Indonesian government must make a strong commitment to support SME entrepreneurs by building e-commerce platforms for SMEs and creating technology banks to improve their ability to acquire technology. and providing mentoring support to boost innovation, specific ICT tools should also be used, such as internet-based technology and social networks [Kusuma et al., 2020].

The performance of SMEs depends on the ICT capabilities to which they have access, as well as on product innovation [Gaviria-Marin et al., 2021].

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In this sense, companies with ICT-trained personnel are more likely to facilitate and implement innovation, given that start-ups and companies in the incubation stage have not established the necessary ICT resources, skills and processes required for technology-driven innovation. Similarly, the size of SMEs has a positive association with overall financial performance, so start-ups in rural areas lack ICT management, finance and innovation skills [Khorshed et al., 2022]. Therefore, rural SMEs that experience job creation as a result of technology adoption are likely to generate more revenue, such that greater regulation and limited support from local policymakers is required for greater business profitability [Fanelli, 2021].

On the other hand, ICTs play an important role in transforming the agricultural sector and rural livelihoods in Tanzania, mainly by helping to access agricultural knowledge and technologies and providing information on markets, climate and financial services to small farmers. The convenience of obtaining agricultural information, communications and money transfers makes it easier for small farmers to use mobile phones than any other technological tool. In this way, by strengthening the ICT infrastructure, small farmers will increase their capacity to obtain timely and adequate agricultural information and expand the market through online marketing platforms, which are booming in many parts of the developing world [Ndimbo et al., 2023].

Similarly, in terms of innovation, e-commerce is made possible by the inclusion of the Internet and other resources, so the owner should encourage employees to use technology to achieve better financial performance. To this end, it must be considered that during the pandemic, both the owner and the employees realised the perceived usefulness of adopting technology as it helped them to continue operating the company in the absence of physical interaction [Kumar et al., 2020].

It is also necessary to consider that among the main obstacles suffered by e-commerce are the mistrust of users due to cyber fraud and theft of personal data, as well as mistrust of payment methods and lack of knowledge to carry out this activity [Béjar-Tinoco et al., 2022].

Similarly, it is necessary to measure the risks of a project for SMEs, such as lack of financial capacity, lack of ICT infrastructure, lack of knowledge of IoT [Parra & Guerrero, 2020]. On the other hand, innovation in ICT infrastructure must be adapted to the internal environment of the company and must also take into account the market environment [Horváth, 2023]. Likewise, technological innovation is the basis for a competitive advantage in SMEs as this is useful for new business owners, policy makers and government agencies in the private sector or governments, societies and other institutions [Her et al., 2020]. Therefore, investment in the development of intellectual capital, learning capacity and technological orientation allows for a better use of the innovation capacity of companies [Siahaan & Tan, 2020].

In such a way that technological inclusion among SMEs encourages financial inclusion as their probability of accessing external credit increases, likewise the use of the Internet through a website and email effectively encourages financial inclusion, as SMEs have access to credit services. Therefore, credit providers can take advantage of the technological conveniences available to reduce their exposure to the risk of granting credit to SMEs in emerging markets. However, it is not yet clear how long it takes for a company to reach a level of financial inclusion after implementing these technological services [Agyekum et al., 2022]. Likewise, the adoption of ICT increases the likelihood that banks will grant loans and finance projects and the working capital needs of innovative SMEs, such that SMEs with greater access to and use of new technologies are more likely to acquire financial resources from banks [Mushtaq et al., 2022].

The technological context has been important, as it has been the most important determinant influencing the intention of SMEs to adopt ICT in developing countries such as South Africa [Jere & Ngidi, 2020]. In the same sense, there is a positive relationship between process, product and management innovations and the performance of Jordanian pharmaceutical SMEs, as organisational performance related to social, economic and environmental responsibility is improved [Al-Momani et al., 2023].

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Topic 2 Innovation in the Agricultural sector: The impact of IoT on small farmers

The process of digital transformation in small and medium-sized enterprises should be guided by the implementation of business solutions in the Internet of Things [IoT], so it is necessary for staff to be trained in IoT technologies.

On the other hand, in terms of industrial sectors, rural SMEs are more likely to generate jobs from the adoption of technology in the primary and tertiary sectors than in the secondary sector, as approximately 63% of rural SMEs generate profits after implementing new technologies [Fanelli, 2021].

Similarly, the search for agricultural knowledge forces most small farmers to opt for ICT tools as an alternative source of agricultural information. For example, with the increasing access to and use of mobile phones, most farmers in Tanzania use mobile information through the IoT to access agricultural information rather than other ICT tools such as radio, television and the Internet [Ndimbo et al., 2023].

Topic 3 Strategic plan for the implementation of digital tools in SMEs

Regarding the effectiveness of a policy, the technological environment in general must be well defined, as institutional capacities are controllable parameters that have an impact on SMEs and are measured in terms of the availability of the latest technology: the absorption of technology at the business level, the transfer of technology, individuals using the Internet, fixed broadband Internet subscription and international Internet bandwidth. However, external capacity is a parameter that cannot be controlled [Das et al., 2020].

With regard to the performance of SMEs, this is influenced by IT business alignment factors [communication, governance, competition, partnership] and, as such, SMEs should consider it as a useful marketing tool in Iraqi SMEs [Slim et al., 2021]. Therefore, some relevant aspects must be taken into account, such as: 1] The adoption of emerging technologies improves the productivity of SMEs. 2] A strategic alliance is a crucial route for SMEs to accept new technologies of the 4th Industrial Revolution.

Therefore, the government must consider a variety of policy measures, such as personalised consulting services, tax benefits or training [Hwang & Kim, 2022]. Similarly, in Bangladesh, competitive pressure and government support are two valuable environmental factors for ICT adoption in SMEs [Shahadat et al., 2023].

Similarly, platforms are socially viable tools, as the same SME workers who are lagging behind other industries in the use of advanced ICTs are using even more advanced tools in their private lives, provided by platforms such as Facebook, Uber, Teams, among others [Turk 2023].

Similarly, in the digital and post-pandemic era, all members of SMEs must also possess digital skills, from staff to leaders, managers or owners, to strengthen the digital strategic plan that consists of the use of ICT, participation in social networks and organisational agility. Furthermore, it is also an effort to minimise the negative impact of interacting with social networks. This implementation of the digital strategic plan in the use of ICT will help companies to reduce their costs, as well as improve communication skills with national and international customers and suppliers. Meanwhile, the implementation of the digital strategic plan in the field of participation in social networks helps SMEs to participate in information exploration, entertainment, socialisation and incentives both internally and externally [Rozak et al., 2023].

Likewise, digital innovation in SMEs has several outcomes, including profitability, competitiveness and internationalisation [Ramdani et al., 2022].

As such, the adoption of technology is much more in demand in SMEs, and after COVID-19, the intensity of technology adoption is much higher. A systematic review spanning 20 years found that managers face different types of challenges and obstacles in technology adoption, namely data security, low technical skills, efficiency, high infrastructure cost, training cost, adoption challenges, less government support, less organisational support, local sources, administrative challenges, organisational challenges, attitude problems and several other issues [Shaikh et al., 2021].

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It should be noted that when technology SMEs implement product innovation, they achieve positive innovation results, so innovation in processes should also be sought, in order to obtain better results [Alzamora-Ruiz, del Mar Fuentes-Fuentes, and Martínez-Fiestas 2021].

Thus, SMEs seeking growth through digital innovation need to develop a set of capabilities, specifically with regard to partnership, customer relations and business process management, as well as investing in ICT resources and cyber resilience [Westerlund, 2020].

In the hospitality sector, SME managers and owners should consider the implementation of ICT as a source of competitive advantage that will facilitate the implementation of corporate social responsibility practices in hotels, which will improve the performance of SMEs, which can benefit both their company and society [Santos-Jaén et al., 2022].

The most important thing is to make ICT value propositions for SMEs, in terms of improvements in business operations and efficiency, as the use of ICT significantly influences economic benefits, user confidence and ease of use [Kyakulumbye & Pather, 2022].

Therefore, more research should be carried out on the current development of business and management communication in a broader geographical context, from the perspective of ICT departments, focusing on how they see the situation and what they suggest as possible improvements [Pikhart & Klimova, 2020].

With regard to economic growth, information technology has an influence on the economic development of SMEs, although the use of information technology is still limited to the use of computers and the Internet in the management of their businesses.

However, the importance of the use of information technology in all categories of SMEs has been established, in order to have a positive impact on organisational performance [Mukhtar et al., 2020].

It should be added that the adoption of Information and Communication Technologies [ICT] is crucial for the growth, productivity and competitiveness of small and medium-sized enterprises [SMEs], in addition to the fact that SMEs play an important role in the economy, and their ability to take advantage of ICT effectively can have a profound impact on their performance and success, by expanding market reach, improving decision-making and thriving in a digital economy. Governments can help SMEs overcome barriers, improve their competitiveness and boost innovation through investment in training, infrastructure and incentives for ICT implementation [Orjuela et al., 2022]. Similarly, support is needed for SMEs that sell digital access, as they not only provide access to ICT but also foster economic opportunities and self-sufficiency within marginalised communities [Uy-Tioco, 2019].

Discussion of Results

To answer the question, 'Does innovation through the use of ICT help SMEs to grow?', the answer is 'yes' they help to achieve growth, because using ICT makes companies competitive [Leong, 2022] and boosts economic growth [Uy-Tioco 2019; Kusuma et al. 2020; Westerlund,2020, Mukhtar et al. 2020].

In relation to the question 'Does innovation through the use of ICT help SMEs to perform better financially?', the answer is 'Yes', as UNESCO has indicated that financial inclusion is a barrier to growth [UNESCO, 2023], and financial management makes SMEs competitive [Khorshed et al., 2022], it helps smallholder SMEs [Ndimbo et al., 2023], it helps in financial management processes [Kumar, Syed & Pandey 2020]; [Béjar-Tinoco et al., 2022]. It also strengthens financial capacity [Her et al., 2020]. It also strengthens the likelihood of access to credit [Agyekum et al., 2022].

To answer the question, 'How do ICTs help SMEs?', there is a wide range of support for SMEs, among which the most prominent are aspects of innovation for digital marketing [Slim et al., 2021] and aspects of product or service logistics [Béjar-Tinoco et al., 2022]. As well as in product innovation [Gaviria-Marin et al., 2021], job creation [Fanelli, 2021], e-commerce [Kumar et al., 2020], and secure operations without leaving home [Béjar-Tinoco et al., 2022].

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In relation to the question 'Is it necessary for the government sector to support SMEs?', the results indicated that technological environment policies must be aligned with the internal capacities of SMEs and with external capacities [Das, Kundu and Bhattacharya 2020], likewise the government must support ICT use policies [Hwang & Kim, 2022] and support the strengthening of platforms that SMEs can use [Turk, 2023].

Conclusions

Based on the systematic review and the classification of the articles by topic, it can be concluded that digital transformation based on the digital tools that SMEs can use represents a vital instrument for Mexican SMEs. Because it facilitates access to credit, it promotes innovation and, with this, expansion into new markets through the use and strengthening of ICT infrastructure such as digital platforms, e-commerce and technological tools such as websites and email.

In this sense, the agricultural sector has benefited from the use of ICTs, as the adoption of innovative technologies such as the Internet of Things [IoT] has managed to position itself as a key tool for maximising production and thus increasing the competitiveness of SMEs. In addition to tools such as smartphones, with which entrepreneurs can access information in real time, have effective and instantaneous communication, carry out business management tasks, sell and advertise products and services online, among others.

Finally, for this implementation of technologies in SMEs in Mexico to bear fruit in the digital economy, it must be based on a comprehensive strategic plan, which, in addition to contemplating the use of digital tools such as those mentioned above, must also emphasise the importance of implementing a good training process in digital skills for all members of the company.

Declarations

Conflict of interest

The authors declare that they have no conflict of interest.

Authors' Contribution

The contribution of each researcher to the points developed in this research is specified below in this section.

Jiménez-García, Martha: Contributed to the idea of the Project, the documentary review, methodology, analysis of the results and conclusions.

Pérez-Castillo, América: Contributed to the documentary review, theoretical framework and conclusions.

Gómez-Miranda, Pilar: Contributed to the introduction and the analysis of the results.

Tavera-Cortes, Maria Elena: Contributed to the methodology and the analysis of results.

Availability of data and materials

The articles analysed in this research are found in the Web of Science, Scopus and Google Scholar databases.

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Abbreviations

COVID-19	Pandemic caused by the coronavirus SARS-CoV-2
e-commerce	Electronic commerce
INEGI	National Institute of Statistics and Geography
IoT	Internet of Things
MSMEs	Micro, small and medium-sized enterprises
GDP	Gross Domestic Product
PRIMA	Preferred Reporting Instrument for Systematic Reviews and Meta-Analysis
SMEs	Small and medium-sized enterprises
IT	Information Technology
ICT	Information and Communication Technology

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UNESCO	United Nations Educational, Scientific and Cultural Organisation

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Article

Factors and strategies for improving organizational productivity: A theoretical analysis

Factores y estrategias para la mejora de la productividad organizacional: Un análisis teórico

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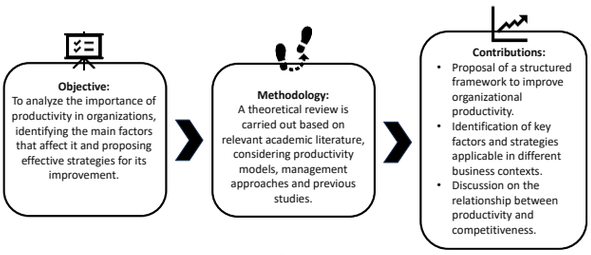
Abstract

Organizational productivity is a determining factor in the efficiency, competitiveness and sustainability of companies. Its optimization not only impacts profitability and business growth, but also influences employment generation, innovation and economic development. Productivity is affected by multiple factors, including human talent management, the adoption of innovative technologies, organizational culture and strategic leadership. This article analyzes the importance of productivity in the organizational environment, exploring the main elements that condition it and the most effective strategies for its improvement. Through a theoretical review, management models and approaches that have proven to be successful in different productive sectors are examined. It also discusses the relationship between productivity and competitiveness, emphasizing how efficient management allows organizations to improve their market positioning and adapt to a dynamic and globalized environment.



Productivity, Efficiency, Competitiveness

Resumen

La productividad organizacional es un factor determinante en la eficiencia, competitividad y sostenibilidad de las empresas. Su optimización no solo impacta en la rentabilidad y el crecimiento empresarial, sino que también influye en la generación de empleo, la innovación y el desarrollo económico. La productividad se ve afectada por múltiples factores, entre los que destacan la gestión del talento humano, la adopción de tecnologías innovadoras, la cultura organizacional y el liderazgo estratégico. En este artículo, se analiza la importancia de la productividad en el entorno organizacional, explorando los principales elementos que la condicionan y las estrategias más efectivas para su mejora. A través de una revisión teórica, se examinan modelos de gestión y enfoques que han demostrado ser exitosos en distintos sectores productivos. Asimismo, se discute la relación entre productividad y competitividad, enfatizando cómo una gestión eficiente permite a las organizaciones mejorar su posicionamiento en el mercado y adaptarse a un entorno dinámico y globalizado.

Productividad, Eficiencia, Competitividad

Area: Strengthening the scientific community

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Introduction

Organisational productivity is a key factor for the success and sustainability of companies in a competitive environment. According to Fontalvo [2018], understanding the factors that influence productivity and strategies for its improvement is essential to maintain competitiveness and ensure operational efficiency.

Various theoretical approaches have highlighted the importance of productivity in organisational management. From classical management perspectives to modern theories of innovation and technology, it has been shown that productivity improvement not only increases profitability, but also influences job satisfaction and long-term sustainability [Drucker, 2007; Porter, 1990].

In this article, the main determinants of organisational productivity are analysed, addressing human talent management, innovation and technology, organisational structure, organisational culture, leadership, and time and resource management. It also explores strategies to optimise productivity and its impact on firm competitiveness.

Furthermore, the qualitative approach of the study consists of a theoretical review of recent academic literature to provide a frame of reference on organisational productivity. Through the analysis of specialised sources, the relevance of productivity in the current context is argued and practical strategies for its optimisation are presented.

Methodology

As mentioned above, a documentary research design was used with a critical analysis of secondary sources, including books, scientific articles and specialised studies on management, human talent management, innovation, leadership and organisational culture. In addition, literature selection criteria were determined to ensure the validity and depth of the analysis, which are as follows:

- Thematic relevance: Studies addressing key factors of organisational productivity from different theoretical and practical perspectives were included.
- Recency and timeliness: Priority was given to publications from the last 10-15 years to reflect contemporary trends, although classic references such as Drucker [1954, 2007], Porter [1985, 1990] and Herzberg [1968] were considered due to their impact on the field.
- Academic rigour: Articles indexed in recognised databases such as Scopus, Web of Science and Secihti were selected, as well as books and institutional reports with scientific backing.

Analysis Technique

A content analysis was used to identify, classify and synthesise the main factors influencing organisational productivity. From this analysis, findings were grouped into five main categories:

1. Human talent management
2. Innovation and technology
3. Organisational structure
4. Organisational culture
5. Leadership, time and resource management

The analysis was carried out following a thematic coding process based on the approaches of Strauss and Corbin [1998] in grounded theory, which allowed for the identification of patterns and relationships between the different elements that impact organisational productivity.

This methodology allows a deep and argued understanding of the factors that influence productivity, providing a solid theoretical framework for the discussion and formulation of improvement strategies at the organisational level.

Thematic coding process

The analysis followed the three phases of coding mentioned above: open coding, axial coding and selective coding.

1. Open coding:

- An exploratory reading of the selected texts was conducted to identify key concepts related to organisational productivity.

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- Recurrent terms and phrases were highlighted, such as 'human talent management', 'automation and digitalisation', 'organisational culture', 'leadership strategies', 'business competitiveness', among others.
- Preliminary codes were generated by grouping similar terms under emerging categories.

2. Axial coding:

- Relationships between codes identified in the previous phase were analysed by grouping them into broader categories.
- For example, concepts such as 'training', 'motivation' and 'professional development' were unified under the category 'Human talent management'.
- Sub-categories such as 'training strategies' and 'work incentive models' were established for a more structured understanding.
- In this phase, interactions between factors were examined, identifying causal patterns, such as the influence of organisational culture on talent retention or the impact of digitalisation on operational efficiency.

3. Selective coding:

- Findings were integrated into a consolidated theoretical structure, identifying the relationship between organisational factors and productivity.
- A conceptual model was developed summarising how key factors affect organisational efficiency and competitiveness.
- Final categories were validated through cross-analysis with previous studies and relevant theories.

The use of thematic coding allowed not only to organise the data in a structured way, but also to delve deeper into the relationships and dynamics that influence organisational productivity.

Definition and relevance of organisational productivity

Organisational productivity refers to a company's ability to optimise its resources and maximise its results [Ramírez et al., 2022]. In a globalised context, where market demands change rapidly, it is essential that organisations implement effective strategies to improve their performance.

According to Porter [1985], a firm's competitive advantage depends largely on its ability to improve its productivity by optimising resources and processes. This assertion is reinforced by recent studies that have shown that companies that invest in the digitisation of their operations achieve significant improvements in their productivity levels [Brynjolfsson & McAfee, 2014]. From an economic perspective, Porter [1990] highlights that productivity is a fundamental pillar for the development of countries, as more productive companies generate employment, promote innovation and strengthen competitiveness in global markets. At the organisational level, higher productivity translates into lower operating costs, higher quality products and services, and sustainable competitive advantage [Kaplan & Norton, 1996].

Organisational productivity has been the subject of many studies in management and economics. According to Drucker [2007], it is understood as the ability of an organisation to generate goods and services efficiently, maximising the use of its resources. This definition has evolved over time, incorporating approaches that include innovation, technology and human talent management as key determinants of productive performance [Chiavenato, 2019; Franco, 2021].

Factors affecting Organisational Productivity

1. Human talent management: Robbins and Coulter [2018] emphasise that continuous training and professional development of employees increase their level of commitment and efficiency in their tasks. Herzberg [1968] highlights the importance of work motivation as a determining factor in productivity, arguing that factors such as recognition, personal development and autonomy at work can significantly increase employee performance.

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Human talent is a strategic resource for productivity [Balderrabano, 2024]. Continuous training and competence development influence employee performance, increasing their motivation and commitment [Chiavenato, 2019]. Companies that invest in professional training tend to experience significant improvements in their productive performance. [Cabrera et al., 2024].

2. Innovation and technology: Brynjolfsson and McAfee [2014] highlight that digitisation and automation have significantly transformed productivity in companies. The integration of tools such as artificial intelligence and data analytics allows for more agile and accurate decision-making [Davenport, 2018]. The incorporation of new technologies enables process automation, reduced operating costs and increased organisational efficiency [Brynjolfsson & McAfee, 2014]. Models such as Industry 4.0 have demonstrated the positive impact of digitisation and artificial intelligence on business productivity.

3. Organisational structure: Mintzberg [1993] points out that a flexible and well-defined structure facilitates communication and decision-making, which improves operational efficiency. Agile management models, such as scrum and lean management, have proven to be highly effective in optimising processes and fostering innovation within organisations [Sutherland, 2014].

4. Organisational culture: Schein [2010] argues that a strong corporate culture aligned with the company's strategic objectives fosters greater employee engagement and performance [Acosta, 2021]. Organisational culture directly influences productivity by defining the values, norms and behaviours within the company. A strong culture can improve internal communication, team cooperation and employee satisfaction. Kotter [2012], emphasise that an adaptive and innovation-oriented organisational culture enables firms to respond more effectively to changes in the business environment.

Hofstede [2001] emphasises that cultural values influence decision-making, conflict resolution and human talent management, which can positively or negatively impact organisational productivity. To strengthen organisational culture, companies can implement onboarding programmes, foster transformational leadership and promote employee participation in decision-making [Cameron & Quinn, 2011]. A positive work environment and an organisational culture based on excellence foster employee engagement and efficiency [Schein, 2017]. Organisations with a culture of continuous improvement have higher levels of productivity and job satisfaction.

5. Leadership and management of time and resources: The implementation of methodologies such as management by objectives [Drucker, 1954] and the use of key performance indicators [KPIs] allow companies' performance to be continuously evaluated and improved. Recent studies highlight that the use of cloud-based business management platforms facilitates remote collaboration and reduces production times [Davenport, 2018; Zapata & Tovar, 2024]. Telework and flexible working have emerged as key strategies for maintaining high levels of productivity in dynamic and changing environments [Eurofound, 2020]. Effective leadership is crucial for the implementation of productive strategies. According to Kotter [2012], leaders who set clear goals and align their teams towards common objectives achieve higher organisational performance.

6. Working conditions: Factors such as ergonomics, work climate and work-life balance directly affect staff efficiency [Herzberg, 1966]. The quality of the working environment influences the motivation and well-being of employees, impacting the overall productivity of the company.

Strategies to improve productivity

To increase organisational productivity, various strategies based on best business management practices can be applied:

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Automation and Digitalisation

The use of technological tools makes it possible to optimise processes, reduce production times and improve the precision of operational tasks. Models such as Lean Manufacturing and Six Sigma have proven to be effective in improving industrial productivity.

Human Talent Development

Training and continuous learning are key elements to enhance workers' performance. Training programmes in technical and leadership skills contribute to the improvement of human capital and organisational innovation [Noe et al., 2018].

Time management and agile methodologies

Techniques such as the Eisenhower matrix or the Pomodoro method can optimise time management at the individual and organisational level, reducing unproductive time and increasing operational efficiency.

Motivation and recognition culture

Rewarding effort and fostering an organisational culture based on performance recognition promotes productivity and talent retention. Performance management models, such as the Balanced Scorecard, help align incentives with the company's strategic objectives [Kaplan & Norton, 1996].

Evaluation and continuous improvement

The use of key performance indicators [KPIs] allows productivity to be measured and strategies to be adjusted to maximise efficiency. Data-driven management and informed decision making are essential for continuous improvement in organisations.

Impact of productivity on organisational competitiveness

Organisations with high levels of productivity can offer higher quality products and services at more competitive prices, allowing them to gain market share and expand globally [Porter, 1985]. In addition, internal efficiency improves profitability and ensures long-term sustainability.

In a dynamic and changing environment, adaptability and innovation are key elements for business competitiveness. Companies that prioritise productivity achieve a sustainable competitive advantage and contribute to overall economic development.

Discussion

One of the most prominent factors in the literature is human talent management. Robbins and Coulter [2018] emphasise that training and professional development not only increase workers' efficiency, but also foster their organisational commitment. These results are consistent with the findings of the present study, where it was found that firms with strong training programmes have higher levels of productivity. Furthermore, Herzberg [1968] argues that work motivation, derived from factors such as recognition and autonomy at work, has a direct influence on performance. This idea is reflected in the importance of establishing incentive mechanisms and transformational leadership within organisations [Chiavenato, 2019].

From a structural approach, Mintzberg [1993] highlights that organisational flexibility is key to facilitating decision-making and improving operational efficiency. In this sense, the implementation of agile management models, such as lean management and scrum [Sutherland, 2014], has been identified as an effective strategy to optimise workflow and productivity.

Innovation and Technology: Keys to Efficiency

The increasing digitisation of business has revolutionised the way productivity is conceived. Brynjolfsson and McAfee [2014] argue that automation and the use of digital tools can improve operational processes, reduce costs and increase competitiveness. Along these lines, the results obtained in this study confirm that the integration of advanced technologies, such as artificial intelligence and data analytics, represents a critical factor in improving organisational performance.

Furthermore, Davenport [2018] argues that data-driven decision-making contributes significantly to business efficiency, as it allows for greater precision in strategy planning and execution.

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This perspective is reinforced by the observations of Kaplan and Norton [1996], who highlight the role of key performance indicators [KPIs] in measuring and optimising productivity.

Organisational Culture and Leadership as Strategic Factors

Organisational culture is another factor that affects productivity. Schein [2010] argues that a strong corporate culture facilitates the alignment of employees with the company's strategic objectives, promoting a more collaborative and efficient work environment. In line with this approach, Kotter [2012] emphasise that an innovation-oriented culture enables companies to better adapt to changes in the environment.

Likewise, Hofstede [2001] points out that cultural values influence decision-making and human talent management. In the present study, it was identified that organisations with a culture of continuous improvement have higher levels of productivity, as their employees develop a sense of belonging and intrinsic motivation towards work. This observation is consistent with Cameron and Quinn [2011], who argue that companies with well-defined organisational cultures achieve superior performance in the long run.

In terms of leadership, Drucker [1954] emphasises the importance of setting clear goals and aligning them with the strategic vision of the firm. This principle is supported by Kotter [2012], who argues that effective leaders not only manage resources, but also inspire their teams to achieve high performance. In this study, it was identified that organisations with transformational leadership tend to have higher levels of productivity due to their leaders' ability to generate commitment and foster innovation.

Impact of Productivity on Organisational Competitiveness

Porter [1985] defines competitive advantage as a firm's ability to differentiate itself through efficiency and resource optimisation. This approach is reaffirmed in this study, where it was found that more productive organisations can offer higher quality products and services at lower costs, allowing them to expand and strengthen their market position.

Furthermore, Porter [1990] argues that productivity is a key pillar for the economic development of countries, as it generates employment and fosters innovation. In this sense, the study's findings are consistent with this perspective, demonstrating that firms that prioritise productivity not only achieve higher profitability, but also contribute to the growth of the sector in which they operate.

Conclusions

Productivity is a central element in organisational management and a key determinant of business success. Factors such as human capital, technology, organisational culture and leadership have a direct impact on its development. To improve productivity, it is essential to implement strategies focused on process optimisation, staff training and employee motivation.

The research reviewed highlights that companies that adopt a holistic approach, combining talent management, innovation and technology, achieve sustainable productivity improvements. As the business environment continues to evolve, it will be crucial for organisations to adapt and adopt new practices to remain competitive in the global marketplace. Successful productivity improvement requires a long-term commitment, a culture of continuous improvement and a willingness to adopt new technologies and management methodologies.

In such an increasingly competitive business environment, productivity is not only an indicator of efficiency, but also a strategic factor that allows organisations to remain relevant and sustainable over time.

The results obtained in this study allow us to conclude that organisational productivity is a multidimensional phenomenon in which human, technological, structural and strategic aspects converge. While the existing literature has addressed these factors individually, this analysis highlights the interrelationship between them and their impact on organisational performance.

It also highlights the need for a holistic approach to productivity management, combining technological innovation with efficient human talent management and strategic leadership.

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Productivity should not be seen only as an efficiency metric, but as a central axis in the long-term sustainability and competitiveness of companies.

In future research, it would be relevant to explore how digitalisation and telework impact productivity in different sectors, as well as to analyse the role of artificial intelligence in optimising organisational processes.

Declarations

Conflict of interest

The authors declare that they have no conflicts of interest. They have no known competing financial interests or personal relationships that might have appeared to influence the article reported in this paper.

Authors' contribution

Eliseo-Dantés, Hortensia: Idea and conceptualisation, Literature review, Review and adjustments, Oversight and final validation.

Castro-De la Cruz, Jucelly: Methodology

Pérez-Pérez, Iris Cristel: Application of the analysis [thematic coding].

García-Reyes, David Antonio: Drafting, Proofreading and referencing

Availability of data and materials

Given the nature of the research, the data collected were available.

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Abbreviations

KPI: Key Performance Indicator

References

Background, Basics, Discussions, Differences

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Article

Administrative audit of the administrative office of a multinational industrial company in the beverage sector in the State of Veracruz

Auditoria administrativa a la oficina administrativa de una empresa industrial multinacional del sector de bebidas en el Estado de Veracruz

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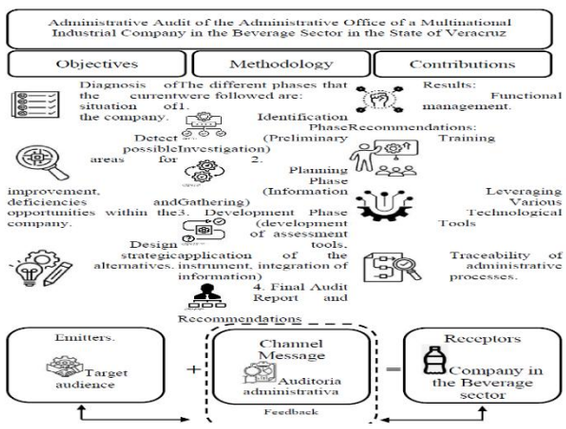
Abstract

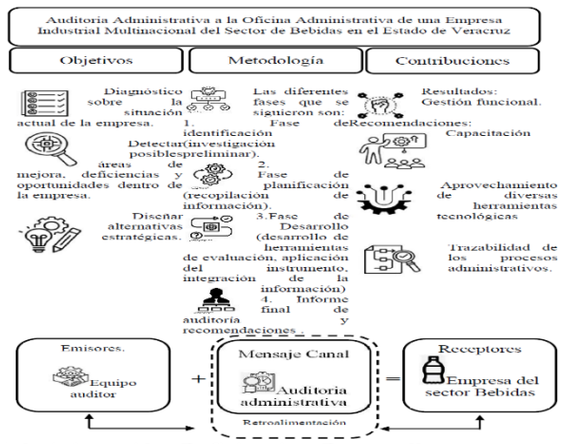
The administrative audit carried out on the administrative office of a multinational industrial company in the beverage sector in the state of Veracruz aimed to evaluate the efficiency, effectiveness and regulatory compliance of its internal processes. It is a field, descriptive and documentary research; through instruments and interviews with the accounting, operational and administrative departments; on the management of their administrative processes. The results showed that, although the administrative area operates effectively, deficiencies were identified in the application of some processes, derived from the lack of knowledge of the company's philosophy, its organizational structure and the lack of continuous training. This can lead to inconsistencies in decision-making and affect the strategic alignment of the organization. The administrative office has a functional management, but the strengthening of organizational knowledge and the training of personnel are key to achieving greater levels of efficiency and strategic alignment within the company.

Resumen

La auditoría administrativa realizada a la oficina administrativa de una empresa industrial multinacional del sector de bebidas en el estado de Veracruz tuvo como objetivo evaluar la eficiencia, eficacia y cumplimiento normativo de sus procesos internos. Es una investigación de campo, descriptiva y documental; a través de instrumentos y entrevistas a los Departamentos de contabilidad, operativo y administrativo; sobre la gestión de sus procesos administrativos. Los resultados evidenciaron que, si bien el área administrativa opera de manera efectiva, se identificaron deficiencias en la aplicación de algunos procesos, derivadas del desconocimiento de la filosofía de la empresa, su estructura orgánica y la falta de capacitación continua. Esto puede generar inconsistencias en la toma de decisiones y afectar la alineación estratégica de la organización. La oficina administrativa presenta una gestión funcional, pero el fortalecimiento del conocimiento organizacional y la capacitación del personal resultan claves para alcanzar mayores niveles de eficiencia y alineación estratégica dentro de la empresa.



Administrative, Deficiencies, Development



Administración, Deficiencias, Desarrollo

Area: Promotion of frontier research and basic science in all fields of knowledge.

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Introduction

The administrative audit is a comprehensive process that allows for an analytical and systematic evaluation of organizational performance, identifying opportunities for improvement to strengthen operational efficiency, innovation, and competitiveness. Through this evaluation, it seeks to ensure that administrative activities are executed effectively, aligned with the company's strategic objectives and in compliance with established regulations.

The evaluation instruments used were Questionnaires, Relevant Aspects Cards, Documentary Analysis Cards and Formulation of the Administrative Diagnosis. These were applied and answered by three employees from each horizontal line of the organizational structure. The company is multinational and belongs to the beverage sector, the branch is located in the State of Veracruz.

The purpose of this diagnosis is to carry out a preliminary investigation that allows companies to be provided with strategic information to obtain a complete and objective vision of their organization, thus facilitating the beginning of a process of business reconversion and professionalization of management. The aim is to improve operational efficiency, increase competitiveness and strengthen its position in the global market.

The results showed that the direction of the organization is clear, that there is a hierarchy, the procedures are carried out correctly, the employees are carried out in a respectful way, although there is a lack of motivation, training and awareness so that the staff is up to date and knows the philosophy of the company.

It is important to raise awareness among employees about the risks and consequences of not fulfilling their responsibilities, as this can affect productivity, quality of service, regulatory compliance and even the reputation of the company.

Methodology

The methodology for the research is graphically represented in Figure 1, where the different phases that were followed are listed:

1. Identification Phase [Preliminary Investigation]
2. Planning Phase [Information Collection]
3. Development Phase [Development of Assessment Tools, Implementation of the Instrument, Integration of Information]
4. Final Audit Report and Recommendations

Box 1

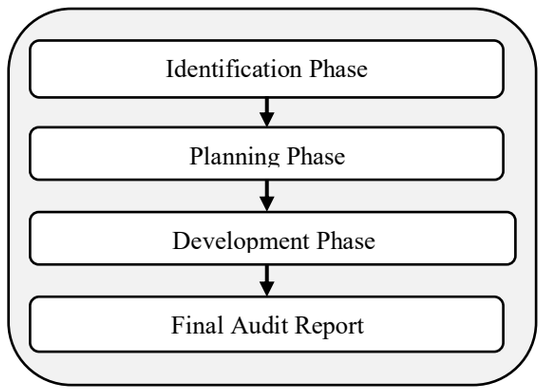

Figure 1

Methodology for research

Note: The image indicates the methodology used in the research.

Instrument to be used

The purpose of the evaluation instruments used for this research is to obtain information related to the activities and functions of the Administrative area of the company.

The preliminary questionnaire consists of 10 items with open-ended questions. The audit questionnaire consists of 40 items with open-ended, multiple-choice, and Likert questions. The relevant aspects and document analysis sheets are filled with information about the company obtained through observation, survey, interview, findings and evidence, and then the Final Audit Report is generated.

Box 2

Table 1

Assessment Tool

Administrative process	Maximum Points
Planning	300
Organization	300
Address	200
Control	200

Note: The figure indicates the scoring criteria chosen for the audit

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Box 3

Table 2

Performance Measurement

Likert scale	
Score	**Interpretation**
801-1000	Excellent
601-800	Very Good
401-600	Well
201-400	Regular
0-200	A Little

Note: The figure indicates the scoring criteria chosen for the audit

Results

This methodology helps to decide specific aspects of the organization, which can be positive or negative. With the results obtained, recommendations are made that, if implemented, bring improvement and growth to the company.

The results are as follows:

Box 4

Table 3

Relevant aspects ballot.

Stage	Specific Element	Result of the analysis
Planning	Mission-Vision	Employees know the mission and vision and direction of the company.
	Objectives	They are clear about the objectives.
	Procedures	They are carried out in a correct and systematized way.
Organization	Organizational Structure	The organizational chart is well detailed.
	Organizational Culture	They are clear about their functions and have a good organizational culture.
	Human Resources	There is a good working environment.
Dirección	Leadership & Communication	Communication is good and there is leadership, aunque puede mejorar.
	Motivation and Work Teams	They have no motivation, they work under any stimulus.
	Technological information	They have experience in the management of Information and Communication Technologies.
Control	Systems	They have their own systems.
	Distribution of space	They have adequate space to perform their functions.
	Strategies and fixes	Some are presented for implementation

Note: The Cédula indicates relevant aspects by Stage of the administrative process

Box 5

Table 4

Document Analysis Certificate.

Document	Result of the analysis
Storage Procedure Manual	The various procedures involved in the storage of goods are indicated. The person responsible must be specified.
Organization Manual	It shows the company's personnel regulations. They should be kept informed of their roles and responsibilities.
Policy Manual	They are narrowly defined to differentiate the types of policies that the company has. It is of restricted use.

Note: The Cédula indicates relevant aspects by Stage of the administrative process

Box 6

Table 5

Maximum Points Earned.

Stage	Specific Element	Maximum Points	Points Earned	%
Planning	Mission-Vision	100	100	**24**
	Objectives	100	70	
	Procedures	100	70	
	Total	300	240	
Organization	Organizational Structure	100	90	**28**
	Organizational Culture	100	90	
	Human Resources	100	100	
	Total	300	280	
Direction	Leadership & Communication	100	70	**12**
	Motivation and Work Teams	50	30	
	Technological information	50	20	
	Total	200	120	
Control	Systems	50	50	**20**
	Distribution of space	50	50	
	Strategies and fixes	100	100	
	Total	200	200	
	Total by Processes	**1000**	**840**	**84%**

Note: The image shows the maximum points obtained from the administrative stages

The institution are in the "EXCELLENT" which reflects a high level of performance in the management of its administrative, operational and strategic processes, but not in the optimal one.

Conclusions

The following is a description of the data provided by the evaluation instruments applied in the administrative area of the multinational beverage company by stage of the administrative process.

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Planning: Planning exists, employees who know the mission and vision know how to use it in their daily activities, they are governed by the company's policies, there are no flaws in the procedures.

Organization: There is a good organizational, they have a good work environment, being a small organizational chart there are not so many failures that affect the operational process, the human resources area fulfills its functions well.

Management: There is leadership, the head of the area fulfills his functions.

Control: Through technologies, information is streamlined and tasks are simplified.

The administrative audit carried out in the administrative area of the multinational company in the beverage sector made it possible to evaluate the performance of its processes through the analysis of each stage of the administrative process. From the data obtained with the evaluation instruments, it can be highlighted that the company operates with high standards of efficiency and organization, highlighting the use of strategic planning, a well-defined organizational structure and the implementation of technological tools to improve process management.

Recommendations

Based on the results obtained in the administrative audit, the following recommendations are suggested to strengthen the administrative area of the multinational company in the beverage sector and optimize its performance:

It is recommended in Planning and Organization: Continuous training in the business mission and vision, carry out a periodic evaluation of internal procedures; Optimization of the organizational structure and strengthening of the work environment.

In Management and Control, leadership development and management skills, encourage more efficient communication; technological updating and automation of processes and implementation of internal audits.

Among current technologies, artificial intelligence [AI] systems have a high level of importance in the teaching and Learning process. An example of this is ChatGPT, a language model developed by OpenAI that uses neural networks to generate human responses and realistic conversations [Eliseo-Dantés, García-Reyes, Castro-De la Cruz, & López-Valdivieso, 2024].

The implementation of biannual administrative audits allows to guarantee effective control over organizational processes. This not only contributes to improving the company's performance and competitiveness, but also drives a culture of continuous improvement and operational excellence.

It is important to raise awareness and consider the risks of not performing the functions that are their responsibility, and thus generate the necessary strategies for the fulfillment of institutional objectives [Balderrabano-Briones, Martínez-Gutiérrez, & Utrera-Velez, 2024].

Declarations

Conflict of interest

The authors declare no interest conflict. They have no known competing financial interests or personal relationships that could have appeared to influence the article reported in this article.

Author contribution

Balderrabano-Briones, Jazmín: Writing the draft version of the manuscript

Martínez-Gutiérrez, Rodolfo: Carefully proofread and revise the final version following the format and guidance; and

Perez-Garmendia, Gloria: Fill out the required forms to submit the article

Availability of data and materials

The data obtained in the investigation are available in the final report of the administrative authority.

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Abbreviations

AI: Artificial Intelligence

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As it is a field research, only basic references are taken where the methodology is consulted, the data of this article were taken from the administrative audit.

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Article

Entrepreneurial perspective on the use of IT as a challenge in rural territory: Magical Town Izamal, Yucatan

Perspectiva empresarial en el uso de las TI como retos en territorio rural: Pueblo Mágico Izamal, Yucatán

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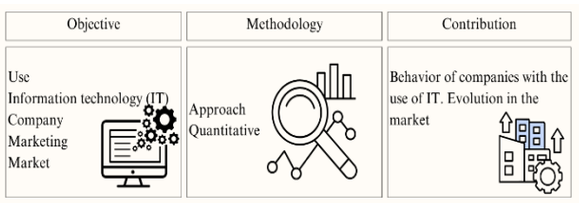
Abstract

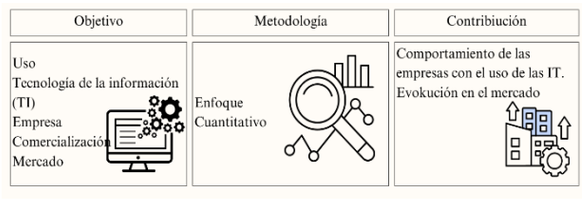
Companies in tourist territories, especially in the Magical Towns of Mexico, faced challenges during the pandemic and post-pandemic, however, their association with information technologies played a strategic role. The objective of this work was to analyze the results generated using information technologies [IT] for the marketing of their products as a challenge for their permanence in the market. The methodology has a quantitative approach, with a 92% confidence sample of the questionnaires applied, which were applied in the municipality of Izamal Yucatán. The results indicated that entrepreneurs adapted to market conditions to communicate, move and market products initially in and with locals [residents] and then with occasional tourists who traveled in the municipality of Izamal Yucatán. The above affected its permanence and continuity in the market, but the challenge was to have prior financial solvency that would allow this IT integration.



Businessman, Companies, Tourist territories, Magical Town.

Resumen

Las empresas en territorios turísticos, especialmente en los Pueblos Mágicos de México, enfrentaron desafíos durante la pandemia y post pandemia, sin embargo, su asociación con las tecnologías de la información jugó un papel estratégico. El objetivo de este trabajo fue analizar los resultados que genera el uso de las tecnologías de la información [TI] para la comercialización de sus productos como un desafío para su permanencia en el mercado. La metodología tiene un enfoque cuantitativo, con una muestra de 92% de confianza de los cuestionarios aplicados, los cuales fueron aplicados en el municipio de Izamal Yucatán. Los resultados indicaron que los empresarios se adaptaron a las condiciones del mercado para comunicar, trasladar y comercializar los productos inicialmente en y con los locales [residentes] y luego con los turistas ocasionales que se desplazaban en el municipio de Izamal Yucatán. Lo anterior afectaba su permanencia y continuidad en el mercado, pero el desafío era contar con una solvencia financiera previa que permitiera esta integración de TI.



Empresario, Empresa, Territorios turísticos, Pueblo Mágico

Area: Promotion of frontier research and basic science in all fields of knowledge

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Introduction

Tourism enterprises refer to the group of services and/or products that are part of the tourism value chain, whose business can be profitable or not [United Nations [UN], 2008].

They are an entity that provides a service in a territory classified as having a high tourist attraction, where tourist attractions are found.

Economic initiatives linked to tourism and the incorporation of Information Technology [IT] were driven to new markets, successfully selling products and services available in rural and urban areas [World Tourism Organization [World Tourism Organization [UNWTO], 2017; Ukpabi and Karjaluoto, 2017; Cruz, et al, 2019], a situation that accelerated in the post-pandemic scenario. Tourism activities are conceived as the set of actions implemented by companies for tourism and recreation purposes aimed at visitors Secretaría de Turismo [SECTUR, 2008].

In such a way that, the tourist territory is part of and configures the tourist practice and whose changes are generated by it [Bertoncello, 2002], where tourist spaces are classified according to their attractions such as: beaches, seas, archaeology, history, culture, religion through their churches and others [Boullon, 2006], These spaces also have a low population density [Rubio, 2025], but in its growth it does not in all cases establish ethical procedures [Rogel and Esquivel, 2025]. Starting from the absence of spaces to enter the workforce, considering the size of the territory and the economic units [Fernández-Costales, 2024] and that among the main needs detected in the companies are economic resources, which have an impact on the aesthetic improvement of the spaces destined to exalt the image of the tourist sites, and investment in IT is an essential part of the position of tourist companies in local, national and international markets, as well as the constant updating of their image [Sancho, n/d; González, et al, 2021]. Associated with this is tourism advertising and the presence of the tourist site in the desires of tourists to visit it, on which the permanence of companies in tourist areas depends.

The company is considered to be the engine of the economy in the tourist territories and in the localities of the regions [Juajibioy and Aguiño, 2025].

The tourist territories suffer from the lack of interest of the authorities for their validity, since they are a reference in the participation in state, national and international events, positioning the image of these spaces, being an important form of tourist attraction for the rural and urban localities, which converge in the demand of products and services being a direct benefit for the companies.

Other factors that influence the influx of tourists to the territories are: access and/or available roads, lack of awareness, empowerment and training of companies providing or generating tourism services, security, weather conditions, as well as the use of IT, which limits the positioning and demand by tourists [Ayala, 2024]. Information is fundamental for the development of economic activities and society as a whole, driven by the use of IT with the dissemination of products and services for a virtual position in new markets to current and potential buyers [Weber and Zink, 2014; Rodríguez, 2018].

Especially in Izamal, businesses faced challenges such as the closure of tourism activities, which accelerated the creation of business initiatives, these being informal during the pandemic, which influenced the choice of IT as tools for the dissemination of products and services, to places that differed from the usual territory, this being a new form of business, which improved the initial conditions of the villagers.

The aim of this paper is to examine the effects of the implementation of information technologies [IT] on the sale of their products, considering it as a challenge for their consolidation in the market.

Literature review

The companies in terms of their emergence in the market represented an option to reduce transaction costs, they also contribute to the incorporation of labour, strengthening local economies in the territories.

Knowledge, as an essential element for any organization, supports decision-making and its proper management can make the difference between success or failure. In this sense, for any company, information management is essential to reach competitive levels in the market and acquire a greater capacity for development.

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This determines the future of the organization, thus consolidating its position as a successful company in the marketplace and providing a greater opportunity for expansion and growth [Pacheco y Rodríguez, 2020].

Likewise, information management makes it possible to recognize the organization's areas of opportunity, in order to plan in advance, the strategies aimed at the market, considering the means to direct it, the channels and the use of IT for this purpose, in order to achieve visualization and demand.

Technological progress has left an important mark on organizations, offering new possibilities and, simultaneously, proposing essential challenges to maintain their competitiveness in an ever-changing global environment [Olarte, et al, 2023].

Information technologies become an essential resource in organizations, as they stimulate the improvement of the organization's performance by raising the degrees of productivity and efficiency in operations [Sánchez and De la Garza, 2018].

While technology is boosting competitiveness, there is still a lack of technology use among SMEs [UNESCO, 2023]. With respect to business initiatives and the intentions behind their emergence, they are related to economic needs, followed by family and social environment and socioeconomic status, three of the most representative factors as a result of a study conducted (Martínez, et, al, 2021). Some authors state that business initiatives arise from desire, relating the economic part to this, but for (Urbano and Álvarez, 2014; García-Macias, et al, 2018) the latter specify that in Mexico conditions such as skills, motivation, environmental conditions and characteristics of the territory are required.

Regarding entrepreneurship in Mexico, a decrease of 0.6 % was detected with respect to the year 2019 and 2020 on the item 'ease of entry: market burdens and regulations' occupying the 33rd place in the Global Entrepreneurship Monitor [GEM], this means that entrepreneurs presented a greater number of limitations and barriers to circulate their products and services to the market [Hill, et al, 2021].

It is noteworthy that in Chile, the reduction of the actions of single women and heads of household is emphasised [Rodríguez-Garcés and Muñoz-Soto, 2017].

Being that entrepreneurship during the pandemic was a key driver for people who became unemployed, went through a reduction in income and thus was required by the socio-economic situation faced.

Paz-Calderón and Espinosa-Espíndola [2019] argue that entrepreneurial initiatives are driven by exogenous elements that influence it, whose gender approach especially promotes the classification as follows:

1. Environment in which it is carried out, in addition to the external nature and its impact, are:
   a. Macroeconomic
   b. Social
   c. Technological
2. Access to sources of financing; in this situation, the financing is economic through credit institutions and other public and private bodies.
3. Government support policies; entrepreneurial initiatives are boosted when public policies emerge that encourage them in the countries. However, not everything is based on the establishment of policies; the processes intrinsic to this are also considered.

Among the qualities of personality in entrepreneurship that stand out are 'responsibility and discipline', which are more strongly emphasised in the women researched, according to Fuentes-García and Sánchez-Cañizares [2010].

On the other hand, the Organization for Economic Co-operation and Development [OECD, 2016] indicates that there is still a gender gap in relation to factors for entrepreneurship, but once entrepreneurship has started, women respond with confidence and security equivalent to that of men in relation to their businesses.

It is noteworthy that the Pueblos Mágicos, or Magic Towns, denote heritage, wealth and culture, characteristics that distinguish them from other municipalities in Mexico [SECTUR 2016].

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The programme was created in 2001 and its purpose is to promote local tourism, preserve traditions and create employment Secretaria de Turismo, [SECTUR, 2014]. Currently in Yucatan there are a total of 7 Magical Towns [Espita, Izamal, Maní, Motul, Sisal belonging to the municipality of Hunucmá, Tekax and Valladolid] and integrating the neighbourhoods of Mérida named Ermita, San Sebastián, Xcalachén as Magical Neighbourhoods], being Izamal a distinctive municipality considering the Franciscan Convent, which attracts Catholics and people of other religions, taking up the history and architecture of the place. At the same time, the territory possesses archaeology, highlighting the Kinich Kakmó pyramid, which allows one to climb to the top and glimpse the entire city Secretaría de Turismo [SECTUR, 2019].

In turn, 16,895 economic units [UE] are established in the Magical Towns of Yucatan, equivalent to 12% of the total number of UE of the Yucatan entity, in Izamal there are a total of 2734 UE National Institute of Statistics and Geography [INEGI 2024], table 1 and table 2.

Box 1

Table 1

Territorial context

Territory	Number of companies	Territorial extension
Mexico	5,862,752	1,964,375 km^2
Yucatan	140,421	38,402 km^2
Magic Towns of Yucatan	16,895	6416.94 km^2
Izamal	2,734	275.92 km^2

Source: Instituto Nacional de Estadística y Geografía [INEGI], [2024; Secretaría de Relaciones Exteriores [SRE], n.d.; Gobierno del Estado de Yucatán [Government of the State of Yucatán], [2024; Secretaría de Relaciones Exteriores [SRE], n.d.]

Box 2

Table 2

Magical Towns of Yucatán

Magic Town	Number of companies	Territory
Espita	1415	496.91
Izamal	2734	275.92
Peanuts	805	85.59
Motul	2056	297.63
Sisal	186	496.05
Tekax	3289	3819.61
Valladolid	6593	945.22
Total	17078	6416.93

Source: Government of the State of Yucatan, [2024]

Methodology

The research approach used is quantitative, based on the information collected, the variables were related for interpretation [Bernal, 2010], and the data are presented statistically and as a percentage [Hernández, et al., 2014; Hernández-Sampieri and Mendoza, 2018]. A sample of 92 % confidence, p and q [0.5 respectively], considering a margin of error of e2 = [0.08]2 and a population of N = 2,734 companies in Izamal, Yucatán are established:

$$n = \frac{\sigma^2 NP[1-q]}{e^2(N-1)+\sigma^2 P[1-q]} = 150 \quad [1]$$

The present study analysed the 150 data collected through the research instrument used, a questionnaire with 55 items, addressed to business owners and/or representatives in Izamal, Yucatán. The period of application of the instrument was from January to October 2023. Cronbach's alpha was determined to validate the content of the data collected, with a high internal reliability of 0.93.

$$\alpha = \frac{k}{k-1}\left[1 - \frac{\sum Vi}{Vt}\right] = \frac{40}{40-1}\left[1 - \frac{\sum 35.8}{378.2}\right] = 1.026\,[1 - 0.095] = 1.026\,[0.905] = 0.93 \quad [2]$$

$\alpha = Cronbach's\ alpha$
$k = Number\ of\ items = 40$
$Vi = Variance\ of\ each\ item = 35.8$
$Vt = Variance\ of\ the\ total = 378.2$

Results

The findings reflected that 61% of the sample was female and the remaining 39% male. Similarly, it was determined that the profile of the subjects studied has a preponderant academic background of high school, followed by secondary school and bachelor's degree with the same proportion [figure 1].

Box 3

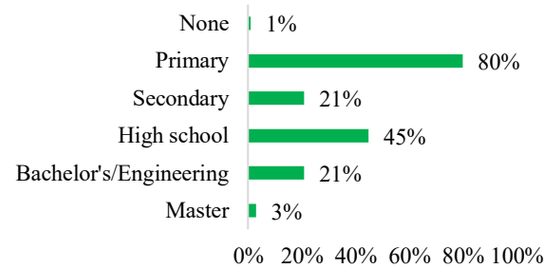

Figure 1

Educational background of interviewees

Source: Own elaboration

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Among the main activities carried out, we find commerce with 63%, services represent 29% of the cases, mainly focused on tourism, 2 companies with industrial activities were detected, among other economic activities [figure 2].

Box 4

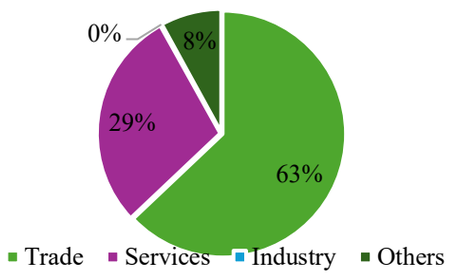

Figure 2
Economic activities
Source: Own elaboration

Based on the size of the company and the income obtained, it was observed that 77.3% are micro, 10.6% nano and 10% small companies, with an approximate income of between $5000 to $10,000 pesos with 26.7% per month [table 3]. These data provided that 56% of these economic actions are complementary and 44% indicated that it is a main activity. It was also found that 38% carry out their activities under the informal labour mode, i.e. without registering their economic activities with the Ministry of Tax Administration, and 62% carry out these activities under the legal regulations of Mexico.

Box 5

Table 3
Firm size and average monthly revenues

Size / Income	$1 - $5,000	$ 5,001 - $10,000	$10,001 - $15,000	$15,001 - $20,000	Over $20,000	Total
Nano	3	9			4	16
Micro	34	30	21	13	18	116
Small	2	1	2	4	6	15
Medium					3	3
Total	39	40	23	17	31	150

Source: own elaboration

Based on the perception of the interviewed entrepreneurs, it was found that the marketing strategies used paid off in 90% of the cases with a perspective of agreement and total agreement. Also in the dimension Distribution channels and digital media 93% of the respondents were of the opinion that the effectiveness on the business and the dynamic flow of this space had an impact on the better image of the business.

Regarding IT and promotional strategies, 84% of the respondents reported that they carried out targeted actions, however, there is still a segment of the population that is unaware of their use and resists this.

Box 6

Table 4
IT and its effectiveness as perceived by the employer 1

Scale	MKT strategies and assertiveness		Distribution channels and digital media		TI y Promotion strategies	
	Quantity	%	Quantity	%	Quantity	%
Strongly disagree	4	3%	0	0%	4	3%
Disagree	3	2%	3	2%	12	8%
Indifferent	7	5%	7	5%	9	6%
Agree	98	65%	89	59%	82	55%
Strongly agree	38	25%	51	34%	43	29%
Total	150	100%	150	100%	150	100%

Source: own elaboration

With regard to IT and advertising and the impact on income improvement, 80% perceive this as favourable, but there is a greater number of entrepreneurs who did not focus on their segment of the population to disseminate the products and services offered, which resulted in lower income, also despite the fact that mobility and displacement were encouraged post-pandemic, the population still faced the fear of contagion and economic activation was gradual, i.e. it did not affect income immediately after the lifting of the mobility restriction. With regard to the growth in sales, through social networks, this reflects 76%, a palpable result in the transition between the pandemic and post-pandemic periods [Table 5].

Box 7

Table 5
IT and its effectiveness from an employer's perspective 2

Scale	IT and advertising = +Income		Growth Sales [social networks]	
	Quantity	%	Quantity	%
Strongly disagree	2	1%	1	1%
Disagree	16	11%	21	14%
Indifferent	13	9%	13	9%
Agree	77	51%	62	41%
Strongly agree	42	28%	53	35%
Total	150	100%	150	100%

Source: own elaboration

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Conclusions

By way of conclusions, we can highlight that the human element associated with business activities, which were reactivated during the pandemic, did not always manage to continue, much associated with the social security benefits that a business in the form of a nano or micro enterprise can offer the entrepreneur. It is worth highlighting the present and pre-pandemic situations, which give us a reference of the current dynamics and their evolution.

- Before the pandemic, 2 out of 10 businesses had social networks [2019].
- Post-pandemic 6 out of 10 businesses already had social networks [2022]
- Today [2024] 8 out of 10 businesses have social networks and online sales
- IT readiness and the burgeoning need to increase sales and take advantage of the digital marketplace is what has motivated today's businesses.
- New positions for social media managers are available, however, they have to comply with administrative and operational actions, which reduces media monitoring.
- In the municipality of Izamal, women are the ones who make the most use of online sales for the trade of products and foodstuffs.

It should be noted that the current financial risks are detrimental to the evolution of businesses in rural areas. At the same time, the flow of tourism in the Magical Town of Izamal is fluctuating positively, but it is even more important to offer regional products and traditional services that revive the culture, in the face of the growing demand for imports. Another challenge for company employees is the income [wages], since, according to the income of our country, the minimum wage in force in 2023 and 2024, is the first offer for their hiring.

Declarations

Conflict of interest

The authors declare that they have no conflicts of interest.

They have no known competing financial interests or personal relationships that might have appeared to influence the article reported in this paper.

Authors' contribution

González-Herrera, Karina Concepción: Contributed to the project idea, research method, information analysis and technique.

Olivares-Contreras, Rodrigo Alejandro: Contributed to research methods, information analysis, technique and conclusions.

Rodríguez-Valencia, Nery Elena: Contributed to the research method, information analysis, technique and conclusions.

Availability of data and materials

Data are available on request.

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Article

Military conduct model to strengthen civil military relations as a strategic operational change

Modelo de conducta castrense para fortalecer las relaciones civiles militares como un cambio estratégico de operación

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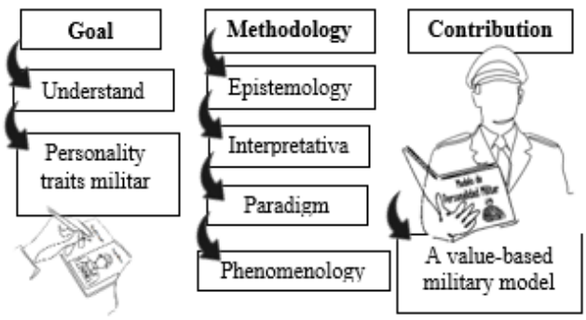
Abstract

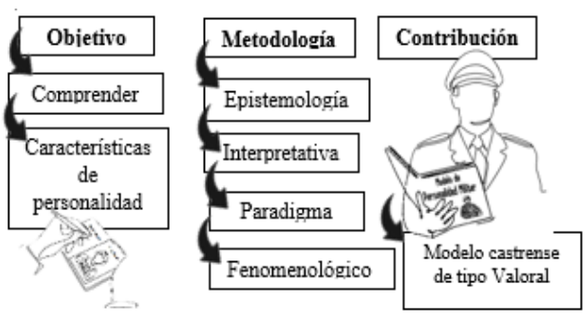
The armed forces carry out permanent tasks in favor of society; however, military activities, values, and behaviors can be misinterpreted, damaging their image and generating public rejection. The objective was to understand specific characteristics of military personality that could be developed to strengthen civil-military relations. The research was based on human development under the concepts of Frankl and Rogers; individual behavior, grounded in Allport's trait theory; and social behavior, based on Tajfel and Turner's social identity theory. A critical interpretative epistemology was used, with a phenomenological paradigm; a retrospective cross-sectional design involving five civilians and five military members; the main instrument was the narrative autobiographical interview, whose pragmatic coding allowed the identification of leadership opportunities, to develop a value-based model with spiritual and social values that translate into social well-being.



Human development, Armed forces, Social interaction

Resumen

Las fuerzas armadas realizan tareas permanentes a favor de la sociedad; sin embargo, actividades, valores y comportamientos militares pueden ser malinterpretados, dañando su imagen y generando rechazo ciudadano. El objetivo fue comprender características específicas de la personalidad militar que pudieran desarrollarse, para fortalecer las relaciones civiles militares. La investigación se fundamentó en el desarrollo humano bajo la concepción del hombre de Frankl y Roger; la conducta individual, con base en la teoría de los rasgos de Allport; y el comportamiento social, basado en la teoría de la identidad social de Tajfel y Turner. Se utilizó epistemología interpretativa critica, con paradigma fenomenológico; diseño transversal retrospectivo a cinco civiles y cinco elementos del ejército; el instrumento principal fue la entrevista autobiográfica narrativa, cuya codificación pragmática permitió identificar áreas de oportunidad en el liderazgo, para elaborar un modelo de tipo valoral, con valores espirituales y sociales que se traduzcan en el bienestar social.



Desarrollo humano, Fuerzas armadas, Interacción social

Area: Advocacy and attention to national problems

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Introduction

The armed forces in Mexico have played a fundamental stabilizing role; a role that has evolved from original social action within the ideology of the revolution to a task of pacification and containment of violence [Cortés, 2016], which is why they have not been spared from being questioned by the stigma that civilians associate with respect to the symbolic load that links the military with the use of force [Quintero, 2021; Fernández & Miron, 2023].

According to Schütz Schütz [1972, cited by Pissette & Furtado, 2024], the social image of the military is derived from beliefs, stereotypes and observed attitudes, generating inferences and a priori judgements; which are determinants according to Piuzzi [2017], Schütz [1972] y Bartolomé et al. [2023] to establish the type of civilian-military link. In this sense, civilians may have two possible impressions of the military personality: the first may be associated with an image or belief in authoritarianism, induced dogmatism, rigidity and tyranny or linear thinking, due to the symbolic burden of the use of violence in the exercise of their functions, which generate rejection and alienation towards the military; and the second, associated with the recognition of the military for their love of country, righteousness, loyalty, commitment, sacrifice, honour, and this generates social validation, as well as gratitude, since it is recognised and perceived, as Bueno et al [2025] comments, within their martiality, discipline and professionalism, thus generating inferences that determine the closeness and acceptance of army personnel.

Although the term military personality can be questioned by academics of personality psychology, who, like Allport [1974] define it as 'the dynamic formation of the psychophysiological systems that decree a way of acting and thinking, which is unique to each person in the process of adjusting to his or her environment' [p.28]. This definition shows that personality is of a changing nature as it is identified as dynamic and, being internal, it is unique and not of external appearance. These characteristics, which society considers to be characteristic of the army and evident in military behaviour, are what this research refers to as the military personality, which the authors believe have become the army's identity in the mental representation of the society of which it is a part.

The army changes its role and the social perception of it is modified [Ortiz, 2023], given that the execution of the role changes from saviour to persecutor, and the population from protected victim to rebel victim, above all, as Sotomayor [2023] and Galleguillos [2023] explain, due to the constant presence of media influences and political use by government bodies, The military seeks to justify itself by portraying an image of an overbearing army that abuses its power and, as Carbonell [2002] comments, threatens the security and integrity of an unprotected civilian population.

It is important to highlight that the Mexican armed forces are in a stage of transformation to humanise and bring the military closer to society [Presidency of the Republic, 2019; 2024], making their presence more evident in infrastructure construction, as well as in social programmes, thus contributing to the National Development Plan [PND], from which the National Defence Sector Programme is derived [Ministry of National Defence [SEDENA], 2020], where one of the priority objectives is to strengthen civil-military relations.

The fact that the military take on countless tasks and functions [Sibylle, 2024], forces them to immerse themselves in a process of constant adaptation to new situations [Fernández et al., 2023], which may raise questions on the part of Mexican society, in terms of efficiency and the relevance of their participation for each of them. In this sense, the study of the military personality is necessary and important because from its development a permissive model can be obtained, consisting of: Strengthening civil-military relations and the skills of SEDENA members in the social interactions in which they must participate. Defining roles outside the armed forces, based on an analysis of the implications of the expansion of the mission and its functions, especially those that involve direct interaction with civilians.

Strengthening civil-military relations is a first step, because as Evans et al [2023] and Sutil et al [2025], explain, history itself has shown that the deployment of strategic actions and force is not enough to solve the problems of insecurity and other problems afflicting Mexico.

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In the present analysis, the investigation of military personality was considered to be the key factor in fostering solid trust between civilians and the military, considering that it is an issue that reflects the impressions/beliefs that ordinary people have about the military and thus the acceptance, approach, contribution and facilitation of the tasks of military personnel, which determine the limits of their interaction and understanding.

As well as, strategies to modify the social impressions of the military personality if they do not suit him/her, and develop impressions that contribute to improve communication between the two sides of society [military and civilian], because as mentioned by Pascaline & Sébastien [2024] there are cultural and social divisions between the members that are not entirely realistic.

Theoretical framework

From the point of view of Human Development [HD], it is necessary to redefine the model that has historically followed the military behaviour known as military personality, due to the emerging circumstances that we are living today, especially due to the new assignments of functions that military personnel must carry out both inside and outside the barracks [Ayala et al, 2024].

The attitude of submission to personnel of higher ranks, endurance in the face of bad treatment, obedience to orders received, are currently being questioned in the face of the need to maintain transparent and incorruptible conduct [Pansters & Serrano, 2024].

In military schools and barracks, the learning of habits that imply rudeness as a synonym for strength, belligerence as a manifestation of bravery, abuse as an emblem of power, insensitivity as an expression of temperance and arrogance as a mark of dignity, have made a career in the armed forces a career of arms, have made the career of arms in general [Malesic, & Garb, 2024], a world that is difficult to share and accept in contexts outside of it, which has generated a certain type of mistrust and incomprehension towards the military profession [Yogaswara et al, 2024].

While it is true that talking about the arms race implies, in Freudian terms, involving the death instinct, or destructiveness [Thanatos], in no way can it be considered to be a given per se; for this reason, in this work the focus in DH is based on Frankl [1991], Austrian psychoanalyst of Jewish descent, prisoner in the Auschwitz concentration camp, creator of logotherapy whose aim is to give meaning to the self, when this has been lost, broadening his perspective to a metaphysics of everyday life; and Rogers [1985] psychologist of the third force, in function of his optimistic ideology of the nature of man; for Rogers [1982] human nature is totally worthy of trust, so he has a conception as a psychotherapist based on a genuine trust towards people's nature; that is, the increase of the range of options and possibilities among which a human being can choose, linked to the freedom to choose or the alternatives that are presented for it; understanding by options, everything that human beings value or long for with an important reason, which is based on reasonable and morally valid arguments.

In order to talk about specific characteristics of action, which are specific to the military and to be able to establish a proposed personality model, the work was based on the Trait theory of Gordon Allport, a psychologist from the United States, considered a pioneer of personality psychology. Allport [1974, p. 65] states that 'Personality is the dynamic organisation within the individual of those psychophysical systems which determine his unique adjustments to his environment'. By dynamic organisation, it is understood that personality is more than a set of behaviours. It is therefore organised and constantly developing and changing in its motivation and self-control. Psychophysical systems means that man is both body and brain [Allport, 1974, p. 67]. Psychophysical systems; these are behavioural habits, particular and general attitudes, cognitions and affects [Allport, 1937]. Deterministic; means that the personality is something and does something of itself, by itself and for itself, which dispels the concept that personality is simply a complement to others. Peculiar; means that every human being is unique in time, place, person and quality of adjustment and is differentiated from all others by these characteristics [Allport, 1974, p.69]. Adjustment to the environment; means that the individual's personality has a way of surviving within the context in which the individual finds him/herself [Allport, 1985].

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According to the Social Identity theory first developed by Tajfel [1981] and later complemented by Turner & Bourhis [1996]; it is based on the idea that a subject's membership in a group or social category provides him/her with important knowledge for his/her personal identity. Membership of groups and the relationship with them determines to a large extent who the individual is, who one is individually, since it influences one's personal identity. A person's self-concept is largely determined by social identity. In the words of Tajfel & Turner [1979], identity is an individual's knowledge that he or she belongs to certain social groups, together with the emotional significance and value that this membership has for him or her. The authors consider that social behaviour encompasses a wide range of activities, including verbal communication: this includes speech, conversation, expression of ideas, opinions and feelings through spoken language; non-verbal communication: this includes body language, facial expressions, eye contact, gestures and postures, which convey information and emotions without using words; social norms: these are rules and patterns of behaviour accepted in a particular society, which guide and regulate the interaction between people.

These norms may vary according to culture and social context; empathy: the ability to understand and share the feelings and perspectives of others, which facilitates emotional connection and mutual understanding; in the same vein Moscovici [2000], mentions cooperation: the joint action of people to achieve common goals, working as a team and coordinating efforts; competition: rivalry and striving to outdo others in areas such as work, sports or academic achievement; helpfulness and altruism: the willingness to provide support, assistance and care to others, without expecting anything in return; attachment and relationship building: the pursuit of emotional connections and the formation of affective bonds with other individuals, such as friends, family members or romantic partners; conflict resolution: the ability to handle disagreements, disagreements or problematic situations constructively and peacefully; social adaptation: the ability to adjust and adapt to different social contexts and situations, showing flexibility and appropriate interaction skills.

These are just a few examples of social behaviour, and it was important for the authors of this study to bear in mind that social behaviour can vary in different cultures and social contexts, in this particular case, the military environment. individual behaviour, based on Allport's trait theory; and social behaviour, based on Tajfel &Turner [1979] social identity theory.

Unlike previous research related to the armed forces, which has been developed by civilians, whose limitation lies in the little or no familiarity with the context; or by the military, who have prioritised the study of the mental health of combat personnel; the present study is distinguished by integrating the complementary perspectives of a researcher with 12 years of experience as health personnel in a military hospital; and a civilian researcher, whose clinical career of more than four decades has given her access to military personnel. This combination enriches the analysis of civil-military dynamics, laying the groundwork for a solidly grounded theoretical model.

Methodology

A qualitative approach with a phenomenological design was adopted. The methodological approach was divided into three phases:

1] Preparatory phase; during the reflective stage, the study scenario was identified, which would be a unit of a special services group of the Mexican Army; while, in the design stage, wandering was carried out as indicated by Strauss & Corbin [2016], which allowed the informal approach to the research scenario to collect previous information and identify both: the gatekeepers [key informants] who would allow understanding the social reality of the phenomenon studied [military personality], and the study subjects who would be interviewed.

During this same stage, the autobiographical narrative method was selected, and a guide was designed for the semi-structured in-depth interview with the civilian population and another for the military.

For the collection and recording of information, Apple Dictation was used, which allowed the interviewer to focus his attention on the gestures, gestures and intonation of the subjects of study, considered by Bateson [2000], the hidden part of the language that gives meaning to the content.

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In order to analyse the information, the following suggestions were made Drisko [2025], the triangulation strategy to ensure the credibility, reliability and transferability of the study, whose iterative analysis made data saturation possible.

Simultaneously, a documentary review was carried out in different physical and digital media, mainly in books and journals, with the aim of providing a solid theoretical context and substantiating the findings of the study, as well as identifying patterns and trends in the existing literature that could enrich the understanding of the researched phenomenon, which would be the basis for designing the military personality model.

2] Analytical phase; as suggested by Strauss, & Corbin [2016], coding and integration of the information was carried out, based on the grounded theory method for the reduction and transformation of data, from pragmatic decoding, whose open and axial coding allowed the interpretation of the information. Similarly, inspired by the theoretical current of Husserl [2015], we analysed intersubjectivity and everyday experiences, exploring how the self relates to the other self, in order to study the impact of the social image of the military on this interaction.

3] Informative phase; based on the findings derived from the interviews and documentary analysis, the proposal to improve the interaction between military and civilians was presented.

Five military personnel and five civilians were selected from the study subjects. For the military personnel, the inclusion criteria was that they were attached to the special services group whose main characteristic was the rapprochement with civil servants; excluding those who did not belong to the unit, or who did belong but had chronic degenerative illnesses, had been in military prison, or were under psychiatric treatment.

In relation to civilians, the inclusion criteria was that their interaction was indirect or direct, but continuous, with military personnel; excluding people who were detained in social rehabilitation centres, or rehabilitation centres, with chronic degenerative illnesses, or with psychiatric and psychological conditions.

Box 1

Table 1

Categories and subcategories of analysis

Category of analysis	Subcategories of analysis
Military Social Behaviour: Military Personality	Beliefs and values
	Behaviours
	Cognitions
	Self-perceptions
	Performance
Civil-military interaction	Congruence vs Incongruence
	Empathy vs Ecpathy
	Acceptance vs Rejection
	Openness vs intolerance
	Transparency vs opacity
	Respect vs disrespect

Conceptual definition of the categories of analysis:

1. Personalidad militar. Comportamiento social castrense caracterizado por rasgos y tendencias adaptativas de comportamiento adquiridas en el desempeño de la actuación militar y que identifican al elemento castrense, estableciéndose a partir de una serie de creencias sobre sí y el mundo que le rodea, acompañándole durante y después de la interacción con la población civil. Military personality. Military social behaviour characterised by adaptive behavioural traits and tendencies acquired in the performance of military actions and which identify the military element, establishing itself on the basis of a series of beliefs about itself and the world around it, accompanying it during and after interaction with the civilian population.
2. Civilian-military interaction. A link established through dialogue and accompaniment between civilians and the military in order to reach shared goals, and which is impacted by mutual perceptions.

Operational definition of the categories of analysis:

1. Military Personality. Constant behavioural traits and tendencies that identify them as members of the Army and Air Force, which they take on as their own and distinguish them from the civilian population.

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2. Civil-military interaction. Repeated series of interpersonal operations shared in a complementary manner, through which civilians and military relate to each other, to generate a reciprocal process of social influence and indicators of congruence, empathy, acceptance, openness, transparency and respect, or lack thereof, can be found.

Results

Documentary analysis. The most historically significant activities in which the Mexican Army has participated, which have generated well-being and sympathy, as well as unease and rejection in Mexican society, are presented.

Box 2

Table 2

Data obtained from the triangulation of sources on the activities of the Mexican Army.

Well-being and friendliness	Discomfort and rejection
1810: The Insurgent Army led by Hidalgo and Allende begins the struggle for Mexican independence.	Forced recruitment during the Porfiriato. The Federal Army, under the Porfirio Díaz regime, carried out recruitments through repression, generating social discontent.
1821: Agustín de Iturbide enters Mexico City with the Ejército Trigarante, consolidating independence and establishing the national colours.	Assassination of Rubén Jaramillo and his family [1962].
1821-1848: National Army defends Mexico against Spanish reconquest attempts, the Pastry War and US invasion.	Repression of the Railway Strike [1958-1959. The Armed Forces repressed railway leaders such as Valentín Campa and Demetrio Vallejo, violating labour and human rights.
1862: Battle of Puebla, the Mexican Army wins a symbolic victory against French forces on 5 May, strengthening national pride...	Tlatelolco massacre [1968], repression of the student movement, resulting in hundreds of deaths and disappearances, marking one of the darkest episodes in Mexico's modern history.
1910-1920: Mexican Revolution, key participation in the struggle for social justice and the fall of the Porfirian regime, albeit with internal divisions and violence.	Militarisation in Chiapas [1994]. The presence of the army in the conflict with the EZLN generated criticism for human rights violations and a process of militarisation in the region.
1966: First execution of Plan DN-III-E during Hurricane "Inés", with evacuation, medical care and security.	War on drugs [2006-present]. The military deployment has resulted in numerous civilian and military deaths, as well as allegations of human rights abuses and violations.
1985: Plan DN-III-E during the 8.1 Richter earthquake, with rescue and reconstruction support.	Tlatlaya case [2014]. A confrontation between soldiers and armed civilians in Tlatlaya, State of Mexico, resulted in the death of 22 civilians, with allegations of extrajudicial executions.
2017: 19 September earthquake - The Army responds quickly to the emergency, reinforcing its image as a crisis support institution.	Ayotzinapa case [2014]. Military, police and organised crime were accused of collaborating in the forced disappearance of 43 normalistas from Ayotzinapa, Guerrero.
2020-2021: Pandemic COVID-19 - Involvement in vaccine distribution and logistical support, although criticised for militarisation of civilian tasks.	

In-depth interview with military personnel.

Table 3 shows that, despite the fact that military personnel perceived themselves as having more positive than negative traits, areas of opportunity were identified that have an impact on an unfavourable perception of their performance, particularly in aspects related to openness, such as social awkwardness, distrust, tension, traditionalism and dogmatism, factors that influence a less favourable image in the eyes of society.

Box 3

Table 3

Attitudes and behaviors identified by military personnel in relation to military personality

Civil-military interaction	Positioning area: Perceived close relationship	Area of opportunity: Perceived medium/low ratio	Areas of opportunity: Perceived distant relationship
Dialogue	Receptive Sensitive Respectful of opinions Active listening	Negotiation Emotional intelligence	Concrete thinking
Openness	Affiliation Controlled Teamwork Collaborative	Self-motivation	Social turpitude Distrustful Tense Traditionalist Dogmatic
Transparency	Attentive to standards Honesty Reliable Confident Empathetic Humble	Interpersonal relations	Suspicious
Respect	Patriotism Discipline Kind-hearted Professional Admirable Formal Loyal Committed	Analysis Personal values	Authoritarian Strict

In-depth interviews with civilians.

Table 4 identified that civilians perceived more positive than negative traits in the military; however, areas of opportunity were detected that influence an unfavourable perception of their performance, particularly in aspects related to openness, such as social awkwardness, distrust, tension, traditionalism and dogmatism. These elements can affect the military's image in society.

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Box 4

Table 4

Attitudes and behaviors identified by civilians in relation to military personality.

Civil-military interaction	Positioning area: Perceived close relationship	Area of opportunity: Perceived medium/low ratio	Areas of opportunity: Perceived distant relationship
Dialogue	Respectful of opinions Affable/ prudent Receptive	Emotional intelligence Interpersonal relations Communication skills Conflict negotiation	Mental toughness
Openness	Obedience Teamwork Selective Empathetic	Emotional intelligence Social responsibility	Inhibited Traditional-nalistic Authoritarian Dogmatism Insensitive Distant Uptight Repressed Low creativity
Transparency	Attentive to standards Honesty Reliable Confident Empathetic Humble	Interpersonal relations	Emotional coldness Exhibitionism Vain
Respect	Organised Respectful Admirable imposing Punctuality Formality Group cohesion Loyalty	Personal values Self-awareness Social commitment	Dogmatism Intolerant Strict

Box 5

Table 5

Stereotypes identified through pragmatic coding related to military personality.

Subjects	Positive Stereotype [Highlighted]	Negative Stereotype [Highlighted]
Civilians	Generous Disciplined	Rigid Linear thinking Dogmatic
Military	Slaughter Adaptation Leadership	Intolerant Rigid

Analysis and discussion

The results show that military personality traits such as empathy, sensitivity, openness to change and cooperation strengthen civil-military interaction, while authoritarianism and rigidity weaken it.

This suggests the need for a training programme for future military leaders, focused on developing social skills and modifying negative behaviours, based on Bandura [1975], social learning theory, which stresses the importance of observational learning

Professionalisation must go beyond obedience, integrating personal and institutional values that promote ethical and committed leadership [Bunge, 2008]. Skills such as active listening, empathy and authenticity, supported by theories of Rogers [1985; cited by Robbins & Haase, 1985] and Gadamer et al [2001], are key to fostering genuine and enriching dialogue. Language plays a central role in constructing meaning and interpreting experiences, facilitating interaction.

The Mexican armed forces have strengthened their image through civil protection operations and social programmes, although their participation in the fight against drug trafficking and media coverage present challenges. In this sense, it is important to recall Goffman [1989], who compares social life to a theatrical representation, where interactions are performances that are perceived as real while they last, and masks or social roles are adaptations to pre-existing norms. This perspective highlights the importance of performance and perception in the construction of social reality. Goffman [1981] defines the façade as the stereotypical expression an individual uses to define a situation, including elements such as appearance, manners and settings, which may vary according to context and status. In military environments, for example, specific uniforms, insignia and behaviours are used to reinforce hierarchical roles and distinctions. Although appearance and manners may contradict each other, congruence between the two is generally expected.

Therefore, the training of leaders with social and ethical skills is essential to consolidate a new military paradigm, aligned with social demands and national security, promoting a more transparent and respectful relationship with the citizenry.

After the Revolution, civil-military relations in Mexico evolved, allowing for greater military intervention in areas such as the fight against drug trafficking and police functions, at the request of the executive branch.

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This has generated a dual perception: on the one hand, key skills are recognised in military leaders, such as empathy, teamwork and conflict management, essential for effective leadership according to Zenger & Folkman [2019]; on the other hand, strict and authoritarian behaviours, typical of the military, have generated rejection in civil society [Llorens, 2025]. Heider's [1958] attribution theory explains that perceptions of the military are based on their appearance, behaviour and context, which can reinforce negative stereotypes.

To improve these relationships, it is crucial to strengthen the development of military leaders with social skills, critical thinking and effective dialogue, aligned with transformational leadership principles that foster trust and mutual respect.

In addition, Frankl [2011] theory of human development suggests that finding meaning and making authentic connections are fundamental to personal and professional satisfaction. Implementing experiential teaching methods and promoting genuine dialogue, based on transparency and respect, can improve public perception and strengthen civil-military interaction, in line with the objectives of the Ministry of National Defence Sector Programme 2019-2024.

Conclusions

Improving the civil-military link is an emerging global concern, considering it necessary to address the interrelationship that has to be established for the achievement of objectives that are of collective interest and benefit, such as national security and the performance of activities and works for the common good, thus contributing to the welfare of the nation. If the members of the Mexican Army act under the criteria of Human Development, they will have the acceptance and support of the civilian population, which is why it is necessary to develop in future commanders dialogic competencies of openness, transparency and respect, as part of a social commitment, which translates into the welfare of the community and the preamble of freedom, this approach will not only strengthen the trust between military institutions and society, but also promote ethical and humanistic leadership, aligned with the values of justice, equity and service.

Thus, the foundations will be laid for harmonious coexistence and sustainable national development, where dialogue and collaboration are fundamental pillars for building a more inclusive and secure future for all; for social transformation and peacebuilding begin with a profound change in the mentality and values of individuals; as the United Nations Educational, Scientific and Cultural Organization [UNESCO, 1946] points out, 'Since wars begin in the minds of men, it is in the minds of men that the defences of peace must be constructed' [p. 6].

The proximity between military forces and citizenship contributes to human development, on the basis that reciprocity establishes harmonious relations, generating well-being and hope; this last element, according to Fromm [1980], is a determining factor in seeking changes of a social nature that are aimed at higher levels of action and a higher state of consciousness, but refers to the hope that articulates expectations and action, and not a contemplative state of waiting as an act of faith that things will happen because they have to happen. Hope in opening the door to new possibilities and not waiting for them to open on their own, by commission, chance, miracle or good luck.

Contribution

The military personality model takes up the ideas of Goffman [1981], who argues that people, when playing a role, seek to make others accept the image they project as authentic, believing in the properties and results they portray. The aforementioned author's distinction between sincere actors, who fully believe in their portrayal, and cynics, who act without conviction, but seek to convince their audience for other purposes, is relevant insofar as confidence in the performance depends on the individual's inner security; insecure actors resort to masks or facades to validate their role to the public.

The proposed military personality model is a conceptual, value-based one, where symbolism must be understood and internalised in order to achieve a result. For a long time, military leadership focused on command and obedience for the fulfilment of the mission; however, Mexico is going through a stage of social transformation in which military leadership must evolve into something more profound, such as HR.

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This means that it is imperative to develop spiritual and emotional competencies, such as cordiality, equality, respect, consideration, trust and transparency; these are attitudes and behaviours that must be based on the conviction of commanders, which should emerge as part of the military's integral training.

A military personality model, as an emerging resource in the face of the new reality that Mexico is experiencing, must characterise the military beyond weapons, uniform and pre-established values; where weapons are the books and trenches are the efficient work, as part of the dialogic competence that empowers the military and motivates the civilian population to support the actions that emanate from the military profession. Spiritual and social values will allow the military to identify with the civilian population of which it forms part, avoiding, as far as possible, attributional biases that limit frank, open and respectful dialogue; away from masks or facades, as sincere actors, with a single objective, well-being.

Declarations

Conflict of interest

The authors declare no interest conflict. They have no known competing financial interests or personal relationships that could have appeared to influence the article reported in this article.

Author contribution

Moreno-García, Blanca Verónica: Contribution with introduction, methodology, conclusions and proposal; in-depth interview with military personnel, pragmatic coding,

Moreno-Cuahtecontzi, Francisco Javier: Contribution with writing of theoretical foundation, methodology, results, analysis, discussion and conclusion; in-depth interviews with civilians.

Availability of data and materials

The head of the military unit authorised access to the study context, under the condition of maintaining the confidentiality of the institution, the military personnel and the data provided.

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Abbreviations

DH	Human Development
PND	National Development Plan
SEDENA	Secretariat of National Defence
UNESCO	United Nations Educational, Scientific and Cultural Organisation

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Article

Learning Unit: "Tourism and Environment", dual, socioformative, and sustainable education for international tourism and environmental management

Unidad de Aprendizaje: "Turismo y medio ambiente", educación dual, socioformativa y sostenible para el turismo internacional y la gestión ambiental

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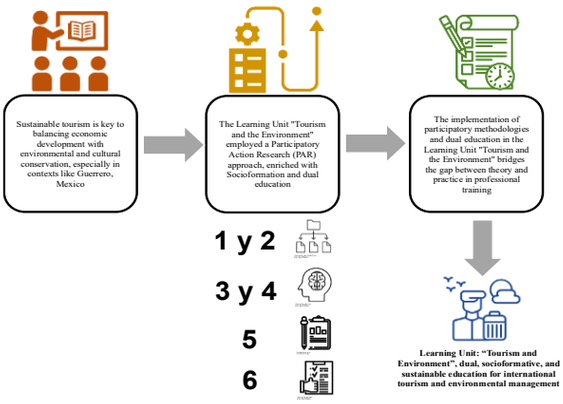
Abstract

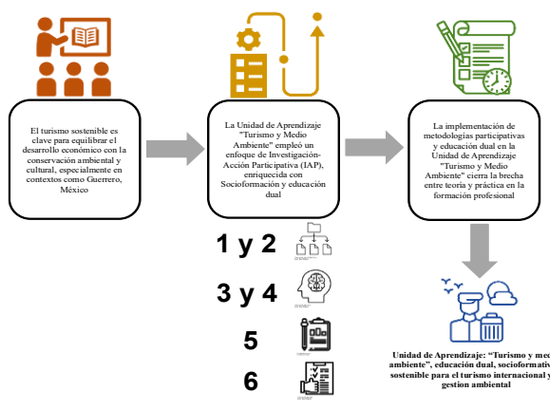
Sustainable tourism represents both a challenge and a key opportunity in professional training, especially where environmental management and economic development converge. This research focuses on the innovative design of the "Tourism and the Environment" Learning Unit, integrating socioformation and dual education to address the demands of sustainability in the tourism sector. Using a Participatory Action Research [PAR] methodology, an academic program was developed to bridge theory and practice, fostering technical, social, and ethical competencies essential for environmental management. Through workshops and training sessions, practice-oriented content was designed, focusing on regenerative tourism, applied technologies, and climate change. The participatory approach identified gaps in previous programs, leading to a design validated by educators. The conclusions emphasize that active and socioformative methodologies enhance learning relevance in local and global contexts, offering a replicable model to train professionals equipped to tackle the challenges of sustainable tourism.

Resumen

El turismo sostenible es un desafío y una oportunidad clave en la formación profesional, especialmente donde convergen la gestión ambiental y el desarrollo económico. Esta investigación aborda el diseño innovador de la Unidad de Aprendizaje "Turismo y Medio Ambiente", integrando socioformación y educación dual para responder a las demandas de sostenibilidad en el sector turístico. Con una metodología de Investigación-Acción Participativa [IAP], se desarrolló un programa académico que conecta teoría y práctica, formando competencias técnicas, sociales y éticas esenciales para la gestión ambiental. Mediante talleres y capacitaciones, se diseñaron contenidos prácticos enfocados en turismo regenerativo, tecnologías aplicadas y cambio climático. El enfoque participativo identificó vacíos en programas previos, resultando en un diseño validado por docentes. Las conclusiones subrayan que las metodologías activas y socioformativas fortalecen el aprendizaje en contextos locales y globales, ofreciendo un modelo replicable para formar profesionales preparados para los retos del turismo sostenible.



Dual education for sustainable tourism management, environmental management in tourism development, sustainable tourism practices in education



Educación dual para la gestion del turismo sostenible, gestion ambiental en el desarrollo turístico, prácticas de turismo sostenible en la educación

Area: Advocacy and attention to national problems

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Introduction

Sustainable tourism has become a crucial component on the global agenda due to its potential to balance economic development with environmental and cultural preservation. In countries like Mexico, which boasts a vast wealth of natural resources, responsible tourism management is fundamental to ensure that these resources are maintained for future generations. According to the World Tourism Organization [WTO, 2022], sustainable tourism seeks to reduce negative impacts on the environment and local communities, fostering a development model that respects ecological limits.

The importance of this topic lies in the growing pressure on natural resources due to the increase in mass tourism [Niño-Gutiérrez et al., 2023], especially in coastal destinations and protected areas. Such is the case in Mexico, where regions like the Riviera Maya and Acapulco face significant challenges related to environmental degradation caused by unregulated tourist development [Rodríguez-Robayo & Berkes, 2020]. This scenario has created an urgent need to implement environmental management strategies that guarantee the conservation of the country's natural heritage, as well as the long-term sustainability of its tourism industry.

The central problem lies in the disconnect between tourism management academic programs and the specific needs of Latin America, resulting in insufficient training to address the environmental and cultural challenges of tourism in the region. Although there are robust theoretical frameworks, such as sustainable tourism and territorial planning, and participatory methodologies like socioformation, the lack of integration of these approaches into educational programs limits the ability of future professionals to manage tourism responsibly.

This issue is further exacerbated by the lack of studies that adapt didactic planning to local realities, creating a gap in the development of competencies relevant to the Latin American context. This mismatch not only affects the quality of professional training but also limits the capacity of communities and organizations to implement sustainable tourism models that protect the region's natural and cultural heritage.

The context of this issue is framed by the General Tourism Law and the General Law of Ecological Balance and Environmental Protection [DOF, 2024], which provide the legal framework for tourism planning in Mexico. These laws establish the foundations for the conservation of natural and cultural heritage through proper territorial planning and the rational use of resources. However, the challenge lies in the effective implementation of these regulations, which has led to a series of environmental problems, ranging from water pollution to biodiversity loss in areas of significant tourist interest [García-Cruz & Gutiérrez, 2021].

Parallel to this, dual university education officially began in Germany in 1969 with the enactment of the Federal Vocational Training Act. In 2009, Mexico's National Council for Professional Technical Education [CONALEP] established a cooperation agreement with Germany's Federal Institute for Vocational Education and Training [BIBB].

In 2016, Switzerland advanced dual education through the State Secretariat for Education, Research, and Innovation [SERI], launching the "Swiss Alliance for Dual Education." In 2019, Mexico approved the new General Education Law, with Articles 44 and 45 referring to dual education with training both in schools and workplaces [SEP, 2019].

In 2022, the Secretarial Agreement Number 20/10/2022 came into effect, providing guidelines that conceptualize and define higher education options [SEP, 2024]. In 2024, the Autonomous University of Guerrero adopted this dual model through a pilot implementation in the Tourism Management and Mathematics Teaching degree programs. The essential elements of higher-level dual education in Mexico are expressed as follows: *a]* training plan, *b]* student-centred approach, *c]* teacher supervision, *d]* curricular impact, *e]* competency certification, *f]* necessary conditions in the economic unit, *g]* formalization of agreements, and *h]* theoretical-practical phases [timing].

The primary objective of this work is to document the content of the "Tourism and Environment" Learning Unit for the fifth semester of the Tourism Management Bachelor's Degree at the Autonomous University of Guerrero.

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This unit is a cornerstone of academic training for future tourism professionals, addressing the challenges and opportunities of integrating sustainable practices in destination management.

The analysis focuses on how students acquire the competencies necessary to understand and apply the principles of environmental sustainability in the tourism context, contributing to the development of a more responsible and environmentally conscious industry.

This work aims not only to present the curricular aspects of the unit but also to offer a critical reflection on its relevance and impact on students' comprehensive education amidst the growing demand for tourism strategies aligned with sustainable development principles.

Theoretical framework, innovation in higher education for sustainable tourism management, the focus of this theme lies in how universities are adapting their academic programs to train innovative professionals who are aware of the environmental challenges in the tourism sector. Emphasis is placed on the integration of socioformation and other emerging pedagogical approaches that promote the development of critical, creative, and adaptive competencies to address the challenges of sustainable tourism and dual education [Tobón, 2017; Ramírez-Montoya et al., 2022].

Innovation in analytical programs with a Theoretical-Practical [Dual] Approach, the development of analytical programs with a dual approach is fundamental for training professionals capable of addressing the dynamic challenges of the tourism sector. In the Tourism Management Bachelor's Degree at the Autonomous University of Guerrero [UAGro], this process of educational innovation responds not only to the need to update content and pedagogical approaches but also to the goal of training individuals with critical, creative, and adaptive skills that allow them to lead in a globalized and competitive environment.

The integration of technological tools, sustainable approaches, and the strengthening of digital competencies are some of the key aspects to ensure that graduates are prepared to face the challenges of 21st-century tourism.

According to Lozano-García & Tello-García [2022], innovative educational programs must adapt to current labour market demands, especially in sectors like tourism, which are constantly evolving due to social, environmental, and technological changes.

Context of higher education in Mexico, in Mexico, innovating academic programs has been a priority over the past decade, particularly in fields like tourism management, where the country is positioned as a globally significant destination. Recent reforms driven by the 21st Century Educational Model [SEP, 2021] have underscored the importance of competency-based education, flexible learning, and the use of digital technologies. These reforms aim to meet the demands of both national and international contexts, fostering the development of professionals who are not only technically skilled but also socially responsible and committed to sustainable development.

This approach seeks to address the demands of both national and international contexts by promoting the education of professionals who are not only technically competent but also responsible citizens committed to sustainable development. Ramírez-Montoya et al. [2022] emphasize that higher education in Mexico has started integrating pedagogical models that prioritize innovation and problem-solving—an essential shift to tackle global challenges in areas like tourism and sustainability.

In recent years, various studies have explored the relevance of analytical programs and the need to innovate methodologies in higher education, particularly in undergraduate programs. Research by Hernández-Mendoza & Solano-Cueto [2021] evaluated the impact of updating content and pedagogical approaches in university curricula in Mexico. Their findings concluded that, although efforts exist to adapt these programs to labour market demands and technological advancements, traditional models still dominate and fail to fully address the current challenges of the tourism sector.

Castellanos-Reyes [2022] has proposed the inclusion of new methodologies, such as project-based learning and gamification, to encourage active student participation and foster competencies better aligned with 21st-century needs.

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However, the adoption of these innovations has been slow, highlighting the need for a deeper transformation in didactic planning and the structure of educational programs. This lag demonstrates the urgency of integrating cutting-edge pedagogical strategies to ensure that graduates are equipped to face contemporary challenges in tourism and sustainability.

Despite these advancements, there is a notable lack of studies and publications analysing the innovation of analytical programs from a Latin American perspective that comprehends and values the region's cultural particularities. While the need to transform educational models has been widely discussed, few works address how these transformations should reflect the social, economic, and cultural realities of Latin America.

In this context, the experience of tourism management in regions like Guerrero, where social and economic challenges intertwine with cultural and natural wealth, underscores the urgency of incorporating educational approaches that consider these dynamics. Moreno-Villavicencio [2023] highlights that many models imported from Europe or North America fail to account for the unique dynamics of Latin American societies, resulting in educational programs that are not always relevant or effective for the regional context. This issue is further reflected in the dominance of academic literature on higher education innovation originating from foreign studies, emphasizing the need for approaches that integrate local worldviews, values, and needs. In contexts such as the Tourism Management Bachelor's Degree at the Autonomous University of Guerrero, these reflections are particularly relevant for designing educational programs that not only address the challenges of sustainable tourism but also empower students through comprehensive training that mirrors local realities and potential.

In this context, socioformation has gained traction as an emerging approach aimed at overcoming these limitations by integrating social and cultural aspects into professional training. According to Tobón [2017], this pedagogical model emphasizes solving social problems and developing comprehensive competencies, fostering a more contextualized learning experience aligned with the needs of the Latin American environment where dual education is implemented.

Despite its growing popularity, particularly in Mexico and other countries in the region, there are still few studies exploring how socioformation can transform didactic planning in universities.

While progress has been made in applying this model in some educational sectors, such as teacher training, its implementation in the renewal of analytical programs in fields like tourism management remains insufficiently documented. This represents a significant gap in the current literature that must be addressed to promote a meaningful transformation in higher education.

Methodology

I. *Work sessions in Acapulco [July 1–18, 2024*]. Three work sessions were conducted involving all faculty members of the Faculty of Tourism at UAGro.
II. *Formation of working groups*. Groups were formed with faculty members sharing similar expertise to structure specific Learning Units. For the "Tourism and Environment" Learning Unit [UAp], experts in related topics were invited.
III. *Training and learning unit design*. Faculty members participated in training sessions focused on designing multiple Learning Units.
IV. *Provision of base materials*. Materials such as the theoretical framework, regulatory guidelines, and examples of similar programs were provided to guide the process.
V. *Theoretical-practical approach synthesis.* A synthesis was created, highlighting the theoretical-practical approach in higher education for tourism.
VI. *Guided discusión.* A guided discussion identified strengths and weaknesses in the current curriculum.
VII. *Plan 2022 review*. Two in-person sessions were held to review the 2022 curriculum plan, followed by a virtual third session.
VIII. *Introduction to Dual Education principles*. An introduction to the principles of dual theoretical-practical education was provided to participants.
IX. *Practical workshops*. Two practical workshops were held to fill out the template for the Learning Unit program.

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X. *Key program components*. During the third session, participants worked on the key components of the program: objectives, competencies, content, and evaluation.

XI. *Standardized program template*. A completed template consolidating all information was provided in a standardized format.

XII. *Proposal sharing*. The "Tourism and Environment" Learning Unit program proposal was shared with educational authorities for feedback and approval.

Results

Focusing on the relationship between tourism and the environment, the literature review topics in the "Tourism and the Environment" Learning Unit address the interactions between tourism management and environmental sustainability, emphasizing recent and relevant trends in higher education and professional development [Niño-Castillo et al., 2020].

Sustainable tourism and natural heritage conservation: This theme highlights sustainable tourism management to protect natural resources [Niño-Gutiérrez, 2022], covering concepts such as ecotourism, biodiversity conservation, and protected area management [Gössling & Higham, 2020].

Higher education and sustainable tourism: This section analyzes innovative approaches in tourism professional training, emphasizing methodologies that promote sustainability, such as problem-based learning and situated learning [Hernández-Mendoza & Solano-Cueto, 2021].

Impact of tourism on local ecosystems: Studies reviewed explore the positive and negative effects of tourism on vulnerable ecosystems, focusing on risk management and the implementation of responsible practices [Rodríguez-Robayo & Berkes, 2020].

The Tourism Management Bachelor's curriculum sections reviewed include context, issues, needs, competencies, and graduate profiles. These are vital for addressing the eight sections of the program format, including: *i]* Learning Unit identification details [Table 1]; *ii]* Contribution to the graduate profile; *iii]* Competencies; *iv]* Pedagogical-didactic guidelines; *v]* Didactic sequences; *vi]* Learning resources; *vii]* Teacher competencies; and *viii]* Evaluation criteria for teacher competencies.

Box 1

Table 1

Identification of the Learning Unit

Code of the Learning Unit	
School [s]	
Faculty/ School/ Campus	Faculty of Tourism
Educational Program	Bachelor's Degree in Tourism Management
Knowledge Area of the Learning Unit within the Educational Program	Administration and Accounting
Modality	On-site ☐ Blended ☐ Distance Learning ☐
Stage of Training	ITS ☐ EFP-NFBAD ☐ EFP-NFPE ☒ EIyV ☐
Period	Annual ☐ Semestral Based ☒ Quarterly ☐
Type	Mandatory ☒ Elective ☐ Selective ☐
Prerequisite Learning Unit[s]	▪ Research Methodology ▪ Tourism Legislation ▪ Sustainability for Tourism Development Study of the Tourism Market
Required Previous Generic Competencies	▪ Information and Communication Technologies [ICT] ▪ Familiarity with the General Law of Ecological Balance and Environmental Protection Familiarity with the General Tourism Law
Number of credits	***6***

Source: own elaboration

Planning with real-time allocation based on the number of in-class and independent hours is crucial to ensuring meaningful and balanced learning for students. This approach effectively structures time for both direct instruction and autonomous activities, maximizing the impact of the educational process. Its importance can be outlined in the following aspects:

1. *Balance between theory and practice,* a design that accounts for in-class and independent hours ensures students can apply the concepts learned in the classroom through exercises, assignments, and projects outside of it. This approach helps students connect theory with practical experiences, consolidating their learning.

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2. *Promotion of autonomy,* proper planning of independent hours fosters the development of self-management skills essential for academic and professional performance. Activities such as content review, practical exercises, or project preparation encourage responsibility and critical thinking.

3. *Optimization of time,* a well-distributed schedule prevents task overload and ensures students have adequate time to delve deeper into topics. This also helps educators evaluate progress continuously, identifying potential difficulties in a timely manner.

4. *Development of key competencies,* appropriate hour distribution ensures sufficient time is dedicated to activities that reinforce technical, social, and ethical competencies. These competencies are developed through tasks that strengthen skills such as critical analysis, problem-solving, and independent research.

5. *Alignment with educational objectives*, real-time planning ensures that activities inside and outside the classroom align with course objectives, guaranteeing that students meet the program's expectations. This is particularly relevant in educational contexts requiring students to be prepared for real-world scenarios.

6. *More accurate evaluation,* by planning independent hours, educators can design more balanced evaluation strategies that reflect both classroom learning and students' autonomous efforts. This allows for a comprehensive measurement of academic performance. In conclusion, real-time planning not only optimizes the teaching-learning process but also ensures that students have a clear and organized structure to manage their time. This is indispensable in an educational model aimed at forming competent, autonomous professionals committed to their academic and personal development [Table 2].

Box 2

Table 2

Number of hours of the Learning Unit

Number of hours	Hours of student work under academic supervision	Hours of independents student work	Total hours
Per Week	***4***	***2***	***6***
Per Semester	***64***	***32***	***96***

Source: own elaboration

The Learning Unit "Tourism and Environment" is an essential component of the curriculum for the Tourism Management Bachelor's Degree at the Faculty of Tourism, Autonomous University of Guerrero, strategically positioned in the fifth semester of the educational program. Its inclusion addresses the need to train professionals capable of integrating principles of sustainability and environmental management into the development and administration of tourist destinations.

Within the context of a renewed educational plan, this unit tackles key topics such as the conservation of natural heritage, the mitigation of environmental impacts caused by tourism, and the implementation of regenerative practices in tourist destinations. Additionally, it aims to strengthen technical and social competencies, enabling students to lead sustainable tourism initiatives in both local and global settings.

Positioned at the core of the program, this unit acts as a bridge between the theoretical foundations acquired in previous semesters and the practical application needed to face contemporary challenges in the tourism sector. Through a theoretical-practical approach, supported by dual education and active methodologies, students are equipped with the tools to analyse, propose, and implement environmental management strategies that contribute to the sustainable development of tourist destinations.

In summary, "Tourism and Environment" not only reinforces the comprehensive vision of the educational program but also positions graduates as agents of change capable of meeting the demands of the labour market and the Sustainable Development Goals [Table 3].

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Box 3

Table 3

Learning Unit Competency

Knowledge	Skills	Attitudes and values
Recognizes and values Mexico's natural heritage	Reflects on the sustainable tourism use of natural resources based on the application of qualitative and quantitative techniques	
Identifies the steps for planning the environmental and tourism management of a natural resource	Develops a territorial tourism zoning plan	Responsibility and Social Inclusion
Identifies opportunities and proposes improvement actions in the sustainable tourism management of natural heritage	Designs a basic tourism-environmental management process for the sustainability of a tourism product based on a natural element	

Source: own elaboration

The Learning Unit "Tourism and Environment" aims to develop key competencies in students, divided into knowledge, skills, and attitudes-values. Regarding knowledge, students are expected to understand the principles of sustainability applied to tourism, identify the environmental impacts of tourism activities, and master the regulations related to environmental management.

Among the skills, the focus is on the ability to design sustainable strategies for tourist destinations, apply technological tools for environmental management, and conduct critical analyses of sustainable tourism cases. In terms of attitudes and values, the unit fosters a commitment to conserving natural heritage, social responsibility toward local communities, and professional ethics in implementing sustainable practices.

These competencies ensure comprehensive training, preparing students to lead in the tourism sector with a responsible and sustainable approach [Table 4].

Box 4

Table 4

Didactics Sequences

Competency Element	Sessions	Hours with the facilitator	Independent hours
Recognizes/relates the different processes of managing natural heritage resources	**8**	**16**	**8**
Builds a territorial tourism planning plan	**12**	**24**	**12**
Designs a basic tourism-environmental management process for the sustainability of a tourism product based on a natural element	**12**	**24**	**12**
Total	**32**	**64**	**32**

To achieve the Applied Didactic Competencies in the Learning Unit "Tourism and Environment," it is necessary for students and the facilitator to engage in the following:

A. Design of sustainable strategies: Students develop tourism management plans to minimize environmental impacts in local destinations.
B. Use of applied technologies: Students utilize digital tools, such as geographic information systems, to assess and monitor tourism resources.
C. Problem-solving: Students analyze real cases of environmental conflicts in tourist destinations and propose practical solutions.
D. Collaborative work: Students participate in multidisciplinary teams to develop regenerative tourism projects in local communities.
E. Critical analysis: Students evaluate public policies related to tourism sustainability and their impact on regional development.
F. Field practices: Students visit protected areas to identify environmental issues and design conservation proposals.

The most significant finding of the study lies in the feasibility and effectiveness of integrating a dual education model, based on participatory and socioformative methodologies, into higher education in tourism, specifically in the "Tourism and Environment" Learning Unit.

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This model bridges the gap between theory and practice by providing students with tools to address real challenges in the tourism sector, such as environmental sustainability and responsible destination management.

The study demonstrates that this approach not only increases student motivation and engagement but also strengthens key competencies, such as designing sustainable strategies, using applied technologies, and solving environmental problems. Moreover, it highlights the importance of adapting educational programs to both local and global realities, positioning graduates as agents of change capable of leading in a competitive labour market aligned with the Sustainable Development Goals [SDGs].

The main limitation of the study lies in the fact that the development of the dual education and socioformation program applied to the "Tourism and Environment" Learning Unit was carried out within a specific context, limited to the Faculty of Tourism at the Autonomous University of Guerrero. This specificity may restrict the generalization of the results to other educational institutions with different sociocultural, economic, or technological realities. Finally, the implementation of the model faces challenges related to technological infrastructure, resistance to change in certain academic sectors, and the need for greater engagement with stakeholders in the tourism sector—factors that could affect the full adoption of the model in other contexts.

A general suggestion for the dual and socioformative program of the "Tourism and Environment" Learning Unit is to strengthen strategic connections with the local and regional tourism sector, including partnerships with businesses, communities, and governmental organizations related to environmental management and sustainable tourism. Such connections would allow students to participate in real projects, gaining practical experience and enhancing their competencies in a professional environment.

Additionally, it is recommended to incorporate emerging technologies, such as geographic information systems, artificial intelligence, or big data analysis tools, to enable students to develop technological skills applicable to environmental management in tourist destinations.

Finally, implementing a continuous evaluation system would be valuable to measure the program's impact on students' training and its application in the professional field, ensuring its relevance and adaptability across different contexts.

Continuing this line of research is crucial to consolidating, expanding, and comprehensively evaluating the impact of the dual and socioformative educational model in the training of tourism professionals. The initial research offers promising results in terms of student motivation, acquisition of practical competencies, and bridging the gap between theory and practice; however, it is necessary to delve deeper into several key aspects:

- *Long-term evaluation*: Conducting longitudinal studies will allow for an analysis of how graduates apply the competencies acquired in real work contexts and whether these effectively contribute to sustainability in the tourism sector.
- *Adaptability to other contexts*: Investigating how this model can be implemented in different educational institutions with diverse sociocultural, economic, and technological realities will validate its versatility and encourage its broader adoption.
- *Integration of emerging technologies*: Research should explore how to incorporate tools such as artificial intelligence, big data, or augmented reality into the dual model framework, enhancing its relevance in an increasingly technologized tourism sector.
- *Collaboration with the productive sector*: Expanding partnerships with key stakeholders in tourism, such as companies and communities, will ensure that the model addresses real labor market needs and promotes sustainable solutions.
- *Sociocultural and environmental impact:* Assessing how this educational model contributes to the sustainable development of tourist destinations and strengthens students' social and environmental responsibility.

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Continuing this line of research will not only enrich academic literature on dual education and socioformation but also drive the development of professionals better prepared to lead the challenges of 21st-century tourism in a global and sustainable context.

Conclusions

The collaborative design and documentation of the "Tourism and Environment" Learning Unit program demonstrate that the implementation of participatory methodologies and dual education can bridge the gap between theory and practice in professional tourism training. Through structured meetings and focused training, faculty and experts identified weaknesses in existing programs and co-created an innovative proposal aligned with both local and global needs. This approach not only fosters the development of technical and social competencies in students but also promotes a more contextualized education that addresses the challenges of sustainability and environmental management in the tourism sector.

The methodology, based on Participatory Action Research [PAR], combined with systematization and validation techniques, ensured the relevance and applicability of the program designed for the "Tourism and Environment" Learning Unit. Results from the pilot implementation reveal a significant increase in student motivation and their ability to apply theoretical knowledge in real-world contexts. This model is not only replicable in other higher education institutions but also underscores the importance of integrating local perspectives and active methodologies to strengthen the connection between academia and the tourism industry. By doing so, it effectively addresses labour market demands and aligns with the objectives of sustainable development.

Declarations

Conflict of interest

The author of this article declares that there are no financial, personal, academic, or professional conflicts of interest that could have influenced the research, results, or interpretation of the data presented in this study. All procedures and analyses were conducted independently and objectively, without the influence of external entities that could compromise the integrity of the scientific work performed.

Author contribution

Niño-Gutiérrez, Naú Silverio: The author of this article has played an integral role in all phases of the research, from the conception and design of the study to the collection, analysis, and interpretation of the data. The combination of these contributions ensures that the work presented is not only a significant contribution to the field of tourism and environment but also a reflection of the author's commitment to rigorous research and the advancement of knowledge in this area.

Availability of data and materials

Availability of data: The collected data as well as supplementary materials accompanying the publication of this research are accesible to other users. Trough request to the author.

Availability of materials: The author specify that the materials are freely available for the users to use without any restrictions or conditioned associated with Access to them.

This means that the materials, such as data sets, or other resources, can be accessed and utilized by anyone interested in the research without requiring permission or facing any limitations.

This commitment to open Access promotes transparency, reproductibility, and collaboration in research, allowing others to verify findings, replicate experiments, or build upon the work without barriers.

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Abbreviations

PAR= Participatory Action Research
PBL= Project-Based Learning
UAGro= Autonomous University of Guerrero
WTO= World Tourism Organization

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Annex

Learning Unit: Tourism and the Environment

1. Identification of the Learning Unit

Code of the Learning Unit	

School [s]	
Faculty/ School/ Campus	Faculty of Tourism
Educational Program	Bachelor's Degree in Tourism Management
Knowledge Area of the Learning Unit within the Educational Program	Administration and Accounting
Modality	On-site ☐ Blended ☐ Distance Learning ☐

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Stage of Training[1]	ITS ☐ EFP-NFBAD ☐ EFP-NFPE ☒ EIyV ☐		
Period	Annual ☐ Semestral Based ☒ Quarterly ☐		
Type	Mandatory ☒ Elective ☐ Selective ☐		
Prerequisite Learning Unit[s]	▪ Research Methodology ▪ Tourism Legislation ▪ Sustainability for Tourism Development ▪ Study of the Tourism Market		
Required Previous Generic Competencies[2]	▪ Proficiency in Information and Communication Technologies [ICT] ▪ Familiarity with the General Law of Ecological Balance and Environmental Protection ▪ Familiarity with the General Tourism Law		
Number of credits:	*6*		
Number of hours	**Hours of student work under academic supervision**	**Hours of independents student work**	**Total hours**
Per Week	*4*	*2*	*6*
Per Semester	*64*	*32*	*96*
Prepared by	***Preparation Date***	***Modified by***	***Modification date***
Dr. Naú Silverio Niño-Gutiérrez	***July 16, 2022***	***Dr. Naú Silverio Niño-Gutiérrez***	***July 19, 2024***

Source: own elaboration

2. Contribution of the learning unit to the graduate profile

In the Learning Unit "Tourism and the Environment," which belongs to the Professional Training Stage within the Core of Specific Professional Training, it contributes to building skills for developing environmental management in sustainable tourism processes involving natural resources within public, private, and social organizations, aiming at achieving tourism sustainability and viability.

3. Learning Unit competency

Develop a tourism-environmental management plan based on the General Tourism Law and the General Law of Ecological Balance and Environmental Protection, aimed at enhancing the sustainable tourism use of natural heritage and management within public, private, and NGO organizations, with a focus on responsibility and social inclusion.

Knowledge	**Skills**	**Attitudes and values**
Recognizes and values Mexico's natural heritage	Reflects on the sustainable tourism use of natural resources based on the application of qualitative and quantitative techniques	Responsibility and Social Inclusion
Identifies the steps for planning the environmental and tourism management of a natural resource	Develops a territorial tourism zoning plan	
Identifies opportunities and proposes improvement actions in the sustainable tourism management of natural heritage	Designs a basic tourism-environmental management process for the sustainability of a tourism product based on a natural element	

The above will be developed based on the following integrative axes [thematic content]:

a. Introduction to Tourism-Environmental Management of natural heritage
b. Interpretation of the Territorial Tourism Zoning Model
c. Design of a Participatory Action Research Project in Sustainable Tourism-Environmental Contexts

4. Pedagogical-Didactic Guidelines

4.1 Pedagogical guidelines

Based on the pedagogical orientations and principles of the Educational Model of the Autonomous University of Guerrero, the educational process and the development of university students' competencies must be fostered through a comprehensive education. This approach should be student-centered, focused on learning, flexible, competency-based, relevant, innovative, and socially committed.

- The teacher serves as a facilitator of meaningful learning to develop competencies.

[1] **ITS**: Institutional Training Stage; **EFP-NFBAD**: Professional Training Stage-Core of Professional Training by Disciplinary Area; **EFP-NFPE**:Professional Training Stage-Core of Specific Professional Training; **EIyV**: Integration and Liaison Stage.

[2] Competencies Expected for the Student to Master in Order to Successfully Develop the learning Unit

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The professor must act as a facilitator of meaningful learning for the construction of competencies and to promote in students the development of critical thinking, skills, and values that enable them to act consistently with their context.

- The self-managed and proactive student.

The student is responsible for taking on a self-managed and proactive role in learning and developing their competencies. To achieve this, they must cultivate the three dimensions of knowledge: **knowing how to be**, **knowing how to know**, and **knowing how to do**, across various contexts of action, with an ethical mindset, sustainability, critical perspective, and respect.

4.2 Didactic guidelines

In alignment with the above, **the didactic orientations and strategies for implementing the learning, development, and assessment of competencies** in this learning unit must be carried out collaboratively by the teacher and the student through interconnected activities. That is, the training activities conducted by the student with the teacher and those carried out independently must integrate the three dimensions of knowledge that define competencies. This integration aims to ensure that the learning process extends beyond the educational context into the professional and workplace context, with an ethical approach.

- Learning activities and competency assessment

The learning, development, and competency assessment activities will be conducted based on a methodology centered on the student and their learning, rather than on teaching. Learning environments—whether face-to-face or virtual, group or individual—will be created to foster the development and investigative capacity of the participants.

Carrying out learning and assessment exercises: *systematic and well-argued presentations to the group of the evidence defined in the didactic sequences [essays, conceptual, cognitive, or mental maps, and the portfolio] for critical group and individual evaluation*

It is essential to implement processes of self-assessment, peer assessment, and hetero-assessment [facilitator's judgment]. Additionally, diagnostic and formative evaluations must be conducted.

Without losing sight of the relationship between **evaluation, accreditation, and grading,** the level of proficiency achieved in the development of the learning unit's competency will be expressed in a numerical grade.

The grade should be understood as the synthetic expression of the evaluation and the level of competency development in the learning unit.

5. Didactic sequences

Below is the summary of the didactic sequence that makes up the program:

Competency Element	Sessions	Hours with the facilitator	Independent hours	Total hours
Recognizes/relates the different processes of managing natural heritage resources	**8**	**16**	**8**	**24**
Builds a territorial tourism planning plan	**12**	**24**	**12**	**36**
Designs a basic tourism-environmental management process for the sustainability of a tourism product based on a natural element	**12**	**24**	**12**	**36**
Total	**32**	**64**	**32**	**96**

6. Learning resources

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7. Teacher's profile and competency

7.1 Profile

The teacher delivering the "Tourism and the Environment" learning unit should have the following:

- Bachelor's degree in Tourism, Geography, or Environmental Sciences
- Master's degree in Tourism, Geography, or Environmental Sciences
- Ph.D. in Tourism, Geography, or Environmental Sciences
- 3 years of professional experience in teaching and scientific research

7.2 Teaching competencies

1. Organizes their continuous professional development throughout their career.
2. Mastery and structuring of knowledge to facilitate meaningful learning xexperiences.
3. Plans the facilitation of learning processes based on a competency-based approach, situating these processes within disciplinary, curricular, and broad social contexts.
4. Effectively, creatively, innovatively, and appropriately applies learning processes in their institutional context.
5. Evaluates learning processes with a formative approach.
6. Creates environments that foster autonomous and collaborative learning.
7. Contributes to generating an environment that facilitates the healthy and holistic development of students.
8. Participates in continuous improvement projects at their school and supports institutional management.
9. Communicates ideas effectively.
10. Incorporates technological advancements into their practice and effectively manages information and communication technologies in their teaching.

8. Evaluation criterio for Teacher competencies

It is proposed to apply the institutional performance evaluation format for teachers.

9. Dual training plan

Performance	Job position	Theoretical knowledge	Learning strategy	Evaluation strategy

NOTE: See Section 2. Learning Unit Programs, related to the development of the UAp programs, in the book Implementation of EFI with the Competency-Based Approach [Methodological Guidelines], UAGro 2014.

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Article

ICT as a model for the creation of digital academic environments

Las TIC como modelo para la creación de entornos académicos digitales

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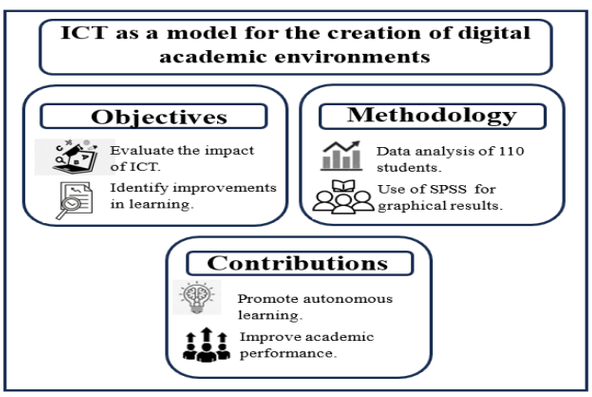
Abstract

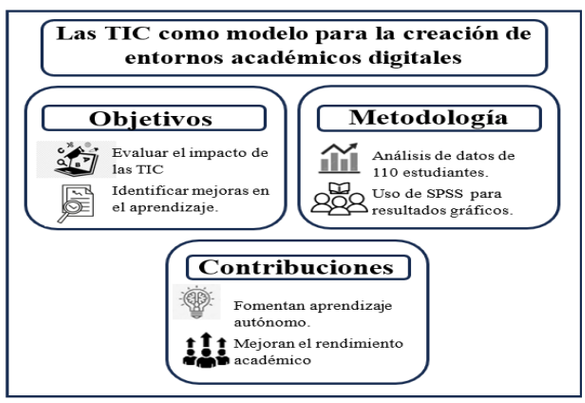
The primary objective of this study is to assess the effectiveness of Information and Communication Technologies [ICT] by analyzing the academic activities of students in the Bachelor of Management program. Based on this objective, the research question is: How do Information and Communication Technologies impact and enhance the academic activities of students in a school-based Bachelor of Management program, and what key factors demonstrate their usefulness in improving learning and training? Most participants agree that technological tools enhance school practices, yet some express varying degrees of disagreement, emphasizing the need to consider diverse perspectives in educational technology implementation. Additionally, the findings indicate that students generally possess good skills and knowledge in ICT, feeling comfortable and competent in their use. However, there are areas of disagreement, as a small group of students do not fully recognize some ICT benefits, highlighting the necessity of addressing different viewpoints in academic settings.



Teacher training, training needs, higher education

Resumen

Este estudio evalúa la efectividad de las Tecnologías de la Información y las Comunicaciones [TIC] en las actividades académicas de los estudiantes de la Licenciatura en Administración. La pregunta de investigación es: ¿Cómo impactan las TIC en las actividades académicas y qué factores clave demuestran su utilidad para mejorar el aprendizaje? La mayoría de los estudiantes considera que las herramientas tecnológicas mejoran las prácticas escolares, aunque algunos muestran desacuerdo, resaltando la importancia de considerar diversas perspectivas en su implementación. Los resultados indican que los estudiantes tienen buenas habilidades en TIC y se sienten competentes en su uso, pero un pequeño grupo no reconoce completamente los beneficios de estas tecnologías. Esto subraya la necesidad de abordar diferentes puntos de vista en los entornos académicos para optimizar su integración.



Capacitación docente, necesidades de formación, educación superior

Area: Development of strategic leading-edge technologies and open innovation for social transformation

Citation: Mejía-Salazar, Gilberto, Gómez-Campos, Sinahí Gabriela, Granados-Magaña, Javier Alejandro and Félix-Pérez, Sirigui Garibeth. [2025]. ICT as a model for the creation of digital academic environments. ECORFAN Journal Mexico. 16[34]1-9: e71634109.

Introduction

The integration of technology has brought significant benefits to higher education, the implementation of computerized methods stands out as integral tools for students, facilitating effective strategies for teaching and promoting continuous learning in various areas of higher education. In recent years, these tools have experienced remarkable progress, bringing significant meaning and impact to those who interact with them. This progress has led to a solid convergence between education and technology, generating a synergy that strengthens the educational experience and optimizes teaching and learning processes.

Thus, we live in a digital world that affects practically all aspects of human life, including the educational sphere [Santistevan et al., 2023]. In addition, it is mentioned that technology is becoming a mechanism for educational reform by transforming teaching practices and technological training processes. In sum, digitization and technological advances are significantly influencing the way people learn and teach.

The key role played by ICTs lies not only in their ability to improve efficiency and accessibility, but also in their capacity to adapt to the changing needs of the educational environment. In this context, it is necessary to explore how this integration can redefine the dynamics of education and provide fertile ground for innovation and continuous development of higher education.

Thus, the objective of the present research is to evaluate and understand the effectiveness of Information and Communication Technologies [ICT] through a detailed analysis of the academic activities performed by students in the Bachelor of Management program in a school-based environment, from which the research question derives How do Information and Communication Technologies [ICT] influence and benefit the academic activities of students within the Bachelor of Management program in a school-based system, and what are the key aspects that highlight their usefulness in enhancing learning and training in this educational context?

Likewise, the interaction of ICT has not only transformed traditional teaching methods, but has also opened new perspectives for the personalization of learning, global collaboration and the acquisition of skills necessary to face the challenges of the 21st century. Thus, it embarks on the task of exploring and understanding the complexity of this convergence, analyzing how ICTs influence and benefit academic activities within the Bachelor of Management program in a school-based environment, and highlighting the key aspects that delineate their usefulness in enhancing learning and training in this specific educational context. It is worth mentioning that, the introduction of ICT has transformed education by affecting how learning takes place, the role of teachers, study content and assessment practices [Gordón, 2020]. This impact encompasses different aspects of the educational process and contributes to the continuous evolution of the educational system. Therefore, the intervention of technology has contributed to fostering autonomy in student learning and has improved their digital skills and competencies, which is fundamental in an educational and work environment that values the ability to adapt to emerging technologies [Del Carpio et al., 2023].

Technology in the educational context

In various countries, educational centers are equipped with technological gadgets and artifacts, assuming that the technology itself, the equipment, will be immediately integrated into the educational activities of the center, thus improving the quality of education [Aretio, 2019]. That is, educational centers have been equipped with technological devices and artifacts with the expectation that the mere presence of this technology will automatically lead to an effective integration into educational activities. The underlying premise is that the introduction of this equipment will immediately contribute to the improvement of the quality of education.

Therefore, the introduction and use of ICTs in education does not follow a fixed trajectory, but is subject to different variables that can be categorized in terms of their impact and type. This interpretation highlights the complexity and dynamics involved in the successful integration of ICTs in the school context [Sánchez, 2019].

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Likewise, the interpretation highlights the versatility of ICTs in encompassing a wide range of tasks related to information management in virtual contexts [Mamani and Alvites-Huamaní, 2021]. These tools not only facilitate efficient data management, but also enable the creation, distribution and manipulation of diverse information in the digital environment. In essence, ICTs are presented as fundamental digital tools to enhance education in cyberspace, offering opportunities for teaching, learning and collaboration in virtual environments.

In addition, the latest ICTs encompass the most current technological developments. As people become familiar with these emerging advances, their ability to generate, share and access knowledge is enhanced. Over the past few decades, innovative ICT tools have fundamentally transformed the way people interact and conduct business. These advances have generated significant changes in various sectors such as industry, agriculture, medicine, management, engineering and education.

However, curriculum development is moving towards new learning methods and the incorporation of competencies and other curricular elements, allowing educational technology to address aspects of interest to the educational and scientific communities, such as research on the digital competencies of teachers, students and institutions [Sánchez, 2023]. Furthermore, this involves analyzing how people and educational organizations use technology, how digital skills are integrated into the educational process, and how technology can effectively contribute to the achievement of educational and scientific goals. Technology plays a fundamental and indispensable role in educational systems. It suggests that the presence and integration of technology are essential components for the functioning and effectiveness of teaching and learning systems [Marín et al., 2020].

Therefore, technology provides the opportunity to carry out learning activities not only within conventional classrooms, but also in places specifically intended for knowledge, such as libraries. This extension implies that learning can occur in a more flexible and diversified way, using technological resources that transcend the physical limitations of a conventional educational space [Navarrete, 2021].

Therefore, educational technology is conceived as a tool that arises from the reflective application of educational theories to address specific problems and situations in the field of teaching and learning [Zapata-Gallegos et al., 2021], being supported by ICTs and hoping to improve the quality and effectiveness of education by applying grounded pedagogical approaches.

Digital learning

Digital learning refers to the elements that have had an impact on the incorporation and overall status of education that is carried out through technologies [Palacios-Díaz, 2020]. In this context, it involves recognizing the various components and factors that influence the way in which technology has been integrated into the educational process, as well as assessing the overall state of education in the digital environment. More broadly, it refers to the set of circumstances, tools and conditions that affect education in the context of digital technology.

Technological advances have succeeded in establishing the essential means to connect individuals and groups, facilitating the exchange of messages, videos, files and everything related to the digitization of data. It is noted that the learning process is profoundly affected by the intensive use of technology, suggesting that this tool has a significant impact on the way people acquire knowledge [Garzozi-Pincay et al., 2020]. Likewise, connectivism seeks to explain the transformations in the knowledge era caused by ICTs. According to this approach, it is argued that learning is not generated solely by individuals in isolation, but is the result of interaction and connection between society and various groups [Carrillo, 2021]. In other words, connectivism suggests that knowledge is constructed through active participation in social networks and collaboration with different communities, emphasizing the influence of society and groups in the learning process in the digital era.

It is worth mentioning that, the Internet offers a wide range of possibilities for communication and interaction between people, thus facilitating learning, work and leisure environments by simply accessing some of the available applications [Herrera-Pérez and Ochoa-Londoño, 2022].

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This statement suggests that the Internet provides diverse opportunities and options for communication. In other words, it highlights that the World Wide Web offers a wide variety of ways and tools through which people can communicate with each other.

These possibilities may include e-mail, social networks, videoconferencing, instant messaging and other online platforms that facilitate interaction and information exchange between individuals around the world. Similarly, these technological tools are available to both teachers and students, who can take advantage of them in a variety of ways. They constitute a novel approach to the development of the educational process and promote significant changes in classroom dynamics [Granados et al., 2020].

Their integration not only demands training in their management, but also the willingness to abandon pre-existing schemes and previous conceptions about educational methods. This implies a reconfiguration of the relationship between the individual and the object of learning, transcending the conventional interaction between people. It is fair to say that, ICTs are not simply technological tools, but represent a set of innovations that, when used, have the potential to redefine the functioning and dynamics of society at multiple levels [Doria et al., 2014].

This change can affect daily life, the economy, education and other aspects of social life. Therefore, technological innovations and ICTs are tools that have the power to reshape the way society functions.

This involves changes in the way people communicate, access information, work, learn and participate in everyday life, ICTs can influence social, economic and cultural structures.

Main Objective

The main purpose of this research is to evaluate and understand the effectiveness of Information and Communication Technologies [ICT] through a detailed analysis of the academic activities performed by students in the Bachelor of Management program in a school-based environment.

Research question

In accordance with the main objective, the following research questions are derived: How do Information and Communication Technologies [ICT] influence and benefit the academic activities of students in the Bachelor of Management program in a school-based system, and what are the key aspects that highlight their usefulness in improving learning and training in this educational context?

Methodology

In the development of the research, a quantitative approach was adopted, involving statistical analysis of the data collected. The main purpose of this approach is to describe, explain, predict and objectively control the reasons related to the object of study. This approach seeks to confirm conclusions through a rigorous and systematic application of the methodology, thus contributing to a deeper and more grounded understanding of the phenomena involved [Sánchez, 2019].

The research was carried out with groups of the Bachelor's Degree in Administration belonging to the Academic Unit of Accounting and Administration of the Autonomous University of Nayarit, Mexico. To determine the sample, the non-probabilistic convenience sampling technique was used, selecting participants according to the ease of access [Pineda, 2018] and the availability of students to be part of the sample, the result was a sample composed of 110 students. Consequently, the processing and analysis of the information were performed using the SPSS statistical program. During this process, frequency tables were generated. Subsequently, the analysis and interpretation of the information was carried out by means of visual representation through graphs, which allowed a more effective understanding of the data collected.

Results

These findings not only contribute to the understanding of the interaction between students and ICTs in the educational environment of the Bachelor's Degree in Management, but also provide valuable information for the formulation of future strategies with the objective of perfecting the integration of ICTs in the educational process.

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Accordingly, we present below the essential findings derived from this study.

The interpretation of these data suggests that most of the participants tend to show a favourable attitude towards the evaluated topic. Thus, the following results are presented: totally disagree 8.2%, disagree 5.5%, neither agree nor disagree 12.7%, agree 45.5%, totally agree 28.2% [figure 1].

Box 1

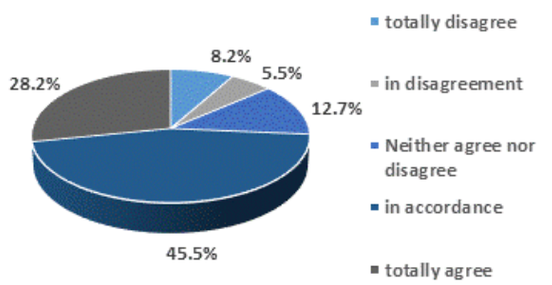

Figure 1

Used technological tools for developing learning strategies

Source: own elaboration

I combine technological tools to improve school practices, 8.2% totally disagree, disagree 4.5%, neither agree nor disagree 10.9%, agree 47.3%, totally agree 29.1% [figure 2].

Box 2

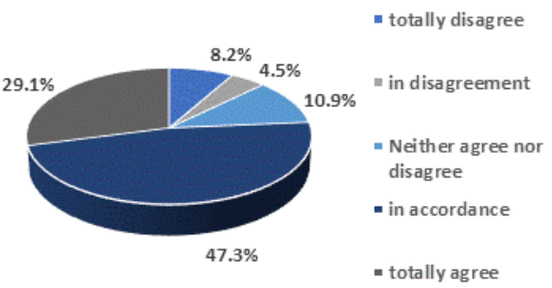

Figure 2

I combine technological tools to improve school practices.

Source: own elaboration

Through the use of technologies helps to develop critical thinking, 1.8% totally disagree, disagree 8.2%, neither agree nor disagree 29.1%, agree 40%, totally agree 20.9% [figure 3].

Box 3

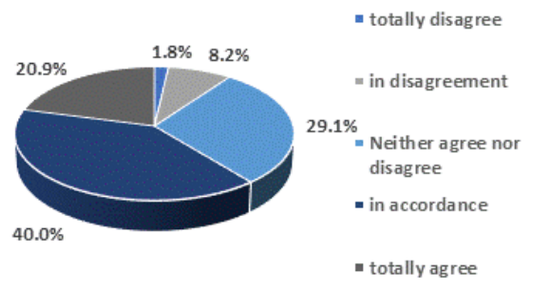

Figure 3

Using technologies helps to develop critical thinking.

Source: own elaboration

I have access to programs and ICTs for my educational training, 6.4% totally disagree, disagree 7.3%, neither agree nor disagree 9.1%, agree 42.7%, totally agree 34.5% [figure 4].

Box 4

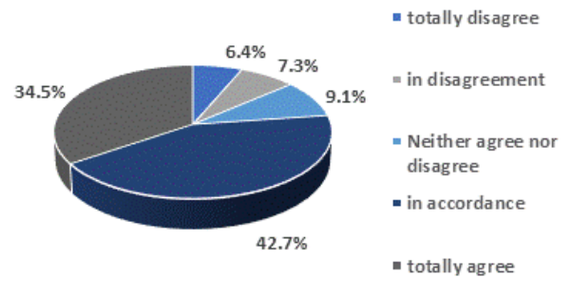

Figure 4

Access to programs and ICTs for my educational training.

Source: own elaboration

I solve practical problems through technologies, 6.4% totally disagree, disagree 4.5%, neither agree nor disagree 20%, agree 30.9%, totally agree 38.2% [figure 5].

Box 5

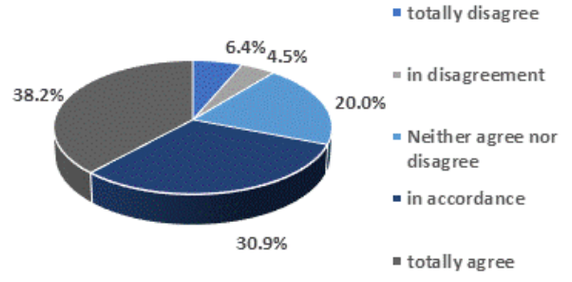

Figure 5

I solve practical problems using technology.

Source: own elaboration

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Development of educational projects through ICT for knowledge generation, 7.3% totally disagree, disagree 4.5%, neither agree nor disagree 16.4%, agree 37.3%, totally agree 34.5% [figure 6].

Box 6

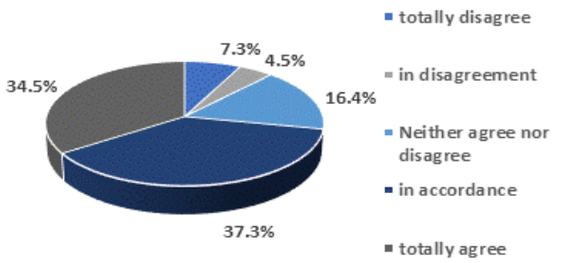

Figure 6

Development of educational projects using ICTs for knowledge generation.

The use of ICTs motivates autonomous learning, 4.5% totally disagree, disagree 6.4%, neither agree nor disagree 17.3%, agree 32.7%, totally agree 39.1% [figure 7].

Box 7

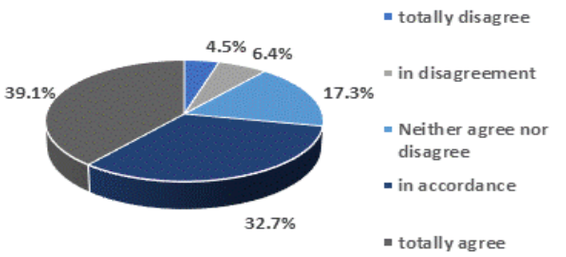

Figure 7

The use of ICTs motivates autonomous learning.

I search for information that is available on the internet, 10% totally disagree, disagree 2.7%, neither agree nor disagree 0.9%, agree 26.4%, totally agree 60% [figure 8].

Box 8

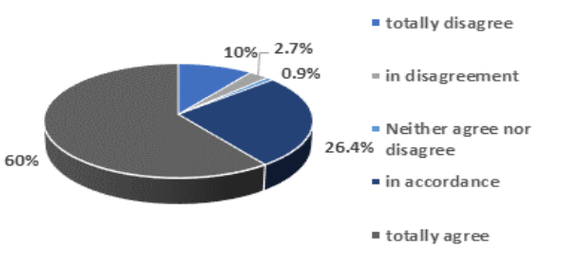

Figure 8

I search for information that is available on the internet

The integration of ICT helps my academic performance, 9.1% totally disagree, disagree 3.6%, neither agree nor disagree 9.1%, agree 37.3%, totally agree 40.9% [figure 9].

Box 9

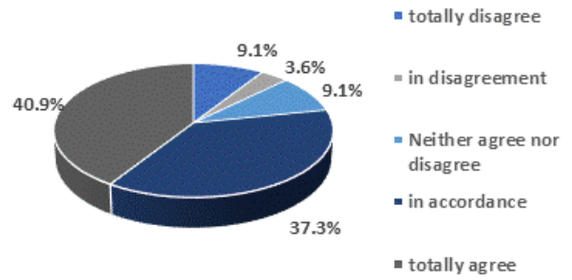

Figure 9

The integration of ICT helps my academic performance

Your knowledge and skill with ICT is favourable, 1.8% totally disagree, disagree 8.2%, neither agree nor disagree 17.3%, agree 48.2%, totally agree 24.5% [figure 10].

Box 10

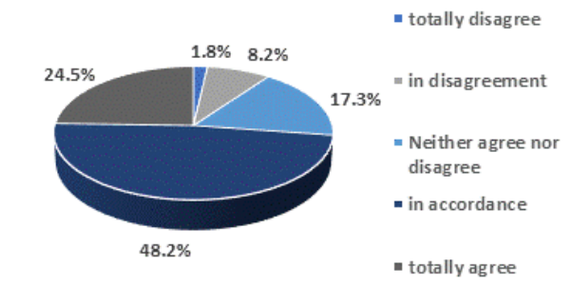

Figure 10

Your knowledge and skill with ICT are favourable.

Discussion

In turn, the majority of participants support the idea of combining technological tools to improve school practices, although there is a segment that shows disagreement in various degrees, highlighting the importance of considering different perspectives in the implementation of technologies in the educational field. On the other hand, 9.2% show disagreement in various degrees. Specifically, 1.8% totally disagree, 8.2% disagree, and 29.1% fall into the category of neither agree nor disagree. These data indicate a diversity of opinions on the influence of technologies in promoting critical thinking.

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Within this context, there is a positive attitude towards access to Information and Communication Technologies [ICT] for their educational training. In total, 77.2% are in the categories of agree or totally agree, suggesting significant support for the use of programs and ICT for educational purposes. On the other hand, 13.7% express some degree of disagreement. Specifically, 6.4% totally disagree, 7.3% disagree, and 9.1% fall into the category of neither agree nor disagree. These data reveal a diversity of opinions, although the general trend indicates a positive inclination towards access to programs and ICT for educational training. Thus, although the majority perceive those technologies are useful for solving practical problems, there is a segment that does not fully share this perspective, highlighting the importance of considering various opinions and experiences in the integration of technologies to address practical challenges. On the other hand, participants showed positive attitudes towards the use of ICT to develop educational programs and generate knowledge. This highlights the favourable perception of ICT as a tool to facilitate the creation of educational programs in this context. Therefore, the respondents [71.8%] also believe that the use of ICT can promote autonomous learning. This suggests that ICT is seen as a driver of autonomy in the learning process and as a motivational tool. 86.4% of respondents expressed a positive attitude towards searching for information on the Internet, demonstrating the high dependence and use of ICT as a source of information in the academic field.

In turn, 78.2% recognize that the integration of ICT contributes positively to their academic performance. This finding suggests that ICT is perceived as beneficial tools for performance in the academic field. Similarly, 72.7% claim to have favourable knowledge and skills in the use of ICT. This indicates that a significant proportion of respondents feel competent in handling these technologies.

SECIHTI Axis: Development of Cutting-Edge Strategic Technologies and Open Innovation for Social Transformation

The integration of Information and Communication Technologies [ICT] in educational environments, as demonstrated in this study, significantly contributes to improving academic performance and fosters autonomous learning among students.

By promoting open innovation and the development of advanced technologies, these benefits extend to a broader context, generating an impact that transcends the educational sphere. This transformation not only modernizes teaching methods but also positively influences the social and economic structure, promoting more inclusive and sustainable development.

Conclusions

In conclusion, the results obtained through the evaluation of the students' perception of the use of Information and Communication Technologies [ICT] in the Bachelor's Degree in Administration reveal a generally positive trend. The participants show a favorable predisposition towards the integration of ICT in various academic dimensions. It should be noted that students recognize the usefulness of ICTs for the development of educational projects, motivation for autonomous learning, searching for information on the Internet and improving academic performance. These findings suggest that ICTs are not only perceived as useful tools in the educational process, but also play a key role in creating a dynamic and enriching academic environment.

Technology adoption is seen as an inherent solution to improve educational standards without necessarily considering implementation processes, teacher training, or specific strategies to effectively integrate technology into educational settings. This approach can pose challenges because the effectiveness of technology in education often depends on how intentionally it is integrated into the instructional environment. Technology can range from electronic devices, such as computers and tablets, to educational software, online platforms, digital resources and other technological tools. The underlying idea is that technology not only complements, but also transforms the way education is delivered, information is accessed and learning activities are carried out. This statement recognizes the importance of incorporating technology effectively to improve the quality and efficiency of educational processes.

Finally, the study showed that students' skills and knowledge in the use of ICTs were mostly good, indicating that participants felt comfortable and competent in the use of these technologies in academic settings.

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However, it is worth noting that there are areas of disagreement, such as a small proportion of students disagreeing with some of the benefits of ICTs. This highlights the importance of understanding different perspectives and personal experiences in the use of ICT.

Declarations

Conflict of interest

The authors declare that they have no conflict of interest. They have no financial interests or relationships that may have influenced the article reported in this article.

Author contribution

Mejía-Salazar, Gilberto and Gómez-Campos, Sinahí Gabriela: They contributed with the main idea and the realization of the project, as well as the first draft. carried out theoretical framework and methodology of investigation.

Granados-Magaña, Javier Alejandro and Félix-Pérez, Sirigui Garibeth: Carried out the analysis of data, as well as graph review and correction comments. All authors contribute to the preparation of the summary, Results and contributions of the document.

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The research did not receive any funding.

Abbreviations

CONAIC	National Council for Accreditation in Informatics and Computing
ICT	Information and Communication Technologies
RIED	Ibero-American Journal of Distance Education
SPSS	Statistical Package for the Social Sciences

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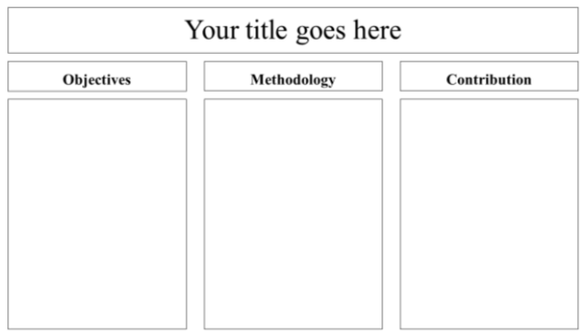

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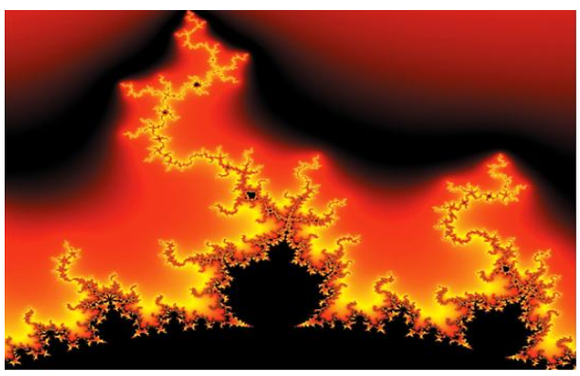

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