



Analysis of the influence of artificial intelligence on SMEs in the commercial sector of Guayaquil

Análisis de la influencia de la inteligencia artificial en las PYMES del sector comercial de Guayaquil

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ABSTRACT

In Guayaquil, artificial intelligence has advanced in SMEs in the commercial sector, showing competitiveness and efficiency in constant evolution. Its use in local companies could increase efficiency and evaluate its impact on competitiveness. The methods used in the research are both quantitative and qualitative analysis, obtained from 50 small and medium-sized companies that were surveyed, in addition interviews were organized with 5 specialists. in artificial intelligence. The findings of this study indicate that many companies, 61.54%, are using artificial intelligence in key areas such as customer service, sales, marketing and operations. Although most companies have seen notable progress in efficiency and customer satisfaction, they are also faced with significant obstacles such as a shortage of qualified employees and opposition to organizational change. The study's conclusions indicate that the implementation of

AI in Guayaquil is in an early stage, showing key opportunities to increase efficiency and competitiveness. However, SMEs face challenges due to implementation costs and the need for specific training.

RESUMEN

En Guayaquil, la inteligencia artificial (IA) ha avanzado en las Pymes del sector comercial, mostrando competitividad y eficiencia en evolución constante. Su uso en las empresas locales podría aumentar la productividad y evaluar su impacto en la competitividad. Los métodos utilizados en la investigación son tanto de análisis cuantitativos y cualitativos, obtenidos de cincuenta pymes que fueron encuestadas, además se organizaron entrevistas con cinco especialistas en IA. Los hallazgos de este estudio indican que la gran mayoría de las empresas, un 61.54%, están utilizando IA en áreas clave como atención al cliente, ventas, marketing y operaciones. A pesar de que la mayoría de las empresas han experimentado notables avances en cuanto a la eficacia y satisfacción de los consumidores, también se ven confrontadas por obstáculos importantes como la escasez de empleados calificados y la oposición al cambio en la organización. Las conclusiones del estudio indican que la implementación de estas herramientas tecnológicas en Guayaquil está en una etapa inicial, mostrando oportunidades clave para aumentar la eficiencia y competitividad. Sin embargo, las pymes enfrentan desafíos debido a los costos de implementación y la necesidad de capacitación específica.

Keywords / Palabras clave

Artificial intelligence, SMEs, technology, chatbots, trade business

Inteligencia artificial, PYMES, tecnología, chatbots, sector comercial.

Introduction

In today's society, artificial intelligence (AI) has become a key tool in process optimization. AI has proven to be a disruptive technology that changes conventional lifestyles, from the way people go about their daily lives to how they work and do business. It also has a significant impact on economic and social growth in Latin America and the Caribbean. (Gómez et al., 2020).

It is also necessary to highlight the potential of AI to address challenges in various areas, such as social, economic, and environmental. This has created international competition for dominance of the technology, gradually establishing AI as a global phenomenon, with estimates that it could be worth nearly \$16.5 trillion by 2030. (IDB, 2020), an event that occurred in the wake of the global COVID-19 pandemic, which intensified the need for digitization and drove the use of advanced technologies such as AI due to the economic and labor crisis that the world was experiencing. (Useche et al., 2021; Lamiña and Cueva, 2024).

The adoption of AI in Guayaquil reflects an upward trend, with positive peaks in the commercial sector. Through the introduction of technologies such as virtual assistants, chatbots, and workflow automation applications, which are expanding their influence in local SMEs. However, the latest research indicates that many of these tools have not yet reached their full potential (Ramires and Valle, 2022). There has also been a significant increase in the integration of digital platforms into the commercial operations of SMEs in Guayaquil (Sancho et al., 2023). Research conducted by Margalina et al. (2024) showed that user confidence in the fashion industry in Ecuador is directly related to transparency and service quality, areas where AI could play a significant role.

Despite these advances, gaps in knowledge about the real impact of AI remain, and SMEs in Guayaquil face both significant opportunities and substantial challenges in the application of these technological tools. (Proaño et al., 2020). Lack of knowledge about how emerging technologies, such as AI, significantly affect the productivity and adaptability of organizations is perceived as a key barrier to the application of artificial intelligence in their day-to-day operations.

The main objective of this research is to analyze how artificial intelligence influences SMEs in the commercial sector of Guayaquil, in order to understand its scope and effects, which will allow identifying the areas in which AI is obtaining the greatest benefits, as well as the challenges faced by SMEs in its integration.

AI is emerging as a technology with the potential to replace human labor in accelerating processes and is now considered an important tool in the world. Due to its growing acceptance and ability to integrate and apply principles from various disciplines, such as

mathematics, statistics, computational neurobiology, and computer science, it is becoming a multidisciplinary field. The combination of these disciplines aims to mimic the cognitive abilities of human beings, such as learning, reasoning, perception, and creativity, through a precise design that enables their execution in computer systems.

AI has revolutionized efficiency in the workplace, becoming an important tool in the optimization of organizational processes. In addition, the initial concept of AI has evolved over time, as its implementation has shown that machines can perform functions such as voice detection, decision-making, semantic search, and various methods of machine learning (Cuervo, 2021).

SMEs comprise a group of organizations that differ in terms of sales volume, share capital, number of employees, and level of production or assets. However, in the Ecuadorian context, SMEs encompass a variety of economic sectors, including activities such as wholesale and retail trade, among others. In Ecuador, any company with fewer than 200 employees is considered an SME (Pinargote and Díaz, 2021). SMEs are categorized by the number of companies and employees. Small companies have between 10 and 49 employees, while medium-sized companies have between 50 and 199 employees.

SMEs play an important role in the Ecuadorian economy, which is why understanding their classification is essential (Cervantes et al., 2024). Shows the most relevant AI tools applied in different areas or departments, verifying their capacity to optimize various processes. It is recommended to apply these tools due to market updates and competitiveness.

SMEs face many challenges in implementing digitalization. Generally, a lack of understanding of new technologies, a shortage of resources for adoption, and resistance to change are key challenges. In addition, the changing digital marketplace demands innovative and flexible leadership, as well as a corporate culture that values risk-taking. To effectively address these challenges, SMEs need to create tactics that incorporate the latest technologies in a timely manner, quickly adjust their ways of operating, promote cooperation between workers and customers, and foster a culture of continuous learning. (Del do et al., 2023; Cueva and Sánchez-Bayón, 2024).

In Guayaquil, a study conducted by (Sánchez et al., 2024) found that various aspects, such as technological, organizational, innovation,

and transactional factors, affect the implementation of e-commerce in SMEs. During the COVID-19 pandemic, these companies faced significant challenges and opportunities in their adaptation, highlighting the importance of information, technical assistance, training, and access to credit to grow in the global market.

Customer satisfaction can be significantly improved through the effective implementation of chatbots. As evidenced in a study conducted by Lubbe and Ngoma (2021), these computer programs can operate 24 hours a day, simulate human conversations with precision, and offer highly accurate service, meeting or exceeding customer expectations through personalized suggestions, effectively identified with AI.

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In a similar study, Ramos (2024) determined that, in leading companies in Colombia, Peru, and Ecuador, chatbots significantly increase customer satisfaction in logistics by solving problems and providing important data on products and services. He also noted that these virtual assistants in major companies significantly increase customer satisfaction in the logistics process, highlighting their effectiveness in solving problems and their in-depth knowledge of products and services. On the other hand, (Nazmus et al., 2024) present ChatGPT as a generative AI tool that is transforming human resource management and marking a significant change in the market.

Nicolescu and Teodora (2022) thoroughly examined the interaction between individuals and computers through chatbots in the field of customer service, highlighting an increase in interest since 2016. Chatbots have significantly improved the quality of customer service by providing quality information, solving problems effectively, and improving the user experience. (Misischia et al., 2022) explore in detail how these virtual assistants can meet customer expectations and improve service quality through personalization and trend analysis. In addition, the potential of ChatGPT to change the consumer experience, mainly in terms of digital marketing and customer service, is thoroughly examined (Damaševičius and Zailskaitė-Jakšė, 2024).

Machine learning (ML), as a subfield of AI, plays a role in interactions between organizations and customers. The use of this technology allows SMEs to enter and compete effectively in the digital market, significantly improving the marketing of products and

services (Fernández et al., 2019). Thus, the implementation of advanced techniques in multimedia content and video synthesis provides effective solutions for data analysis, benefiting decision-making and organizational efficiency (Payal et al., 2024).

The performance of companies in the Nigerian banking industry highlighted improvements in work efficiency through the adoption of AI (Okonji et al., 2023). This emerging technology can significantly optimize decision-making, but it also presents challenges in terms of coordination within the organization. Another study pointed out that AI has a positive impact on the efficiency, performance, satisfaction, and commitment of employees in international companies (Prasad et al., 2023).

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In the province of Guayas, Ecuador, it was found that exporting SMEs improve their innovative capacity through the use of advanced technologies, including AI. Its application allows for more effective resource management. The study highlighted the importance of applying advanced technologies to enhance the competitiveness and export capacity of these companies. Another study in Saudi Arabia examined how AI has had a transformative effect on accounting processes, finding significant direct relationships between knowledge and efficiency. (Mahfoudh , 2024)

Methodology

The research is descriptive in scope, as it seeks to explain how AI influences SMEs in the commercial sector of Guayaquil. To achieve the objective of this study, a non-experimental bibliographic research was carried out, with a quantitative and qualitative approach, combining data collection through surveys and structured interviews. In addition, documentary research was used, as information was collected from scientific journals to create a contextual framework and better understand AI.

Fifty surveys were administered to SMEs online through the Question Pro program, and five interviews were conducted with experts from the commercial sector in Guayaquil.

Results

The classification of 50 SMEs surveyed. Of these, 53.85% were small businesses and the remaining 46.15% were medium-sized businesses. The data reveals the predominance of retail trade with 61.54%, while 38.46% are classified as wholesalers.

This percentage (61.54%) indicates a notable inclination towards the integration of AI technologies in the commercial sector, demonstrating growing acceptance and application to improve operational efficiency and competitiveness.

These data show a relatively recent implementation of AI among SMEs, evidencing that a significant portion of companies have begun to apply this technology in recent years.

These findings indicate that business productivity is significantly affected by the application of AI.

In Guayaquil, SMEs in the commerce sector are beginning to use AI moderately, through predictive analysis to significantly improve customer service.

There is no fluidity due to challenges such as high costs, the need for specialized training, and the lack of an organizational mindset and planning clearly focused on long-term digital transformation. Therefore, while SMEs show considerable interest in the advantages of artificial intelligence, they are affected by budget constraints that negatively impact their sustainability and competitiveness.

Another point to address is the lack of appreciation of the importance of the role of the CIO (Chief Information Officer), which also represents a significant obstacle. SMEs face considerable obstacles when implementing AI, such as a lack of worker preparation and training, high costs, and the obligation to invest significant amounts in technology. The combination of current systems with AI technology and the challenges in data engineering are significant challenges.

Therefore, they must also consider what is to come by carrying out adequate long-term strategic planning.

They concluded that the most effective AI tools are: chatbots for customer service, predictive analytics for inventory optimization and sales forecasting, and virtual assistants for streamlining customer service. Therefore, social media analysis was generated, in addition to

tools for optimizing SEO and user experience, which are extremely useful. However, it is important to assess the current situation and develop a thorough strategic plan before deciding on the type of company, sector, and management model.

Before selecting the right AI tools, SMEs should analyze their specific needs and the operational challenges they want to address. To do so, it is essential to assess the quality of data in the industry and analyze the return on investment in artificial intelligence. Therefore, planning time management and corporate change is crucial. In addition, it is recommended to conduct careful pilot tests of different implementation options to identify those that truly optimize processes. SMEs can therefore take advantage of specialized guidance on digitization and innovation to identify specific internal needs and relate the choice of AI tools to their future goals and projects.

AI can offer SMEs a number of advantages in terms of operational efficiency and competitiveness. One of the many benefits includes the effective automation of repetitive tasks, a significant reduction in human error, and the provision of advanced analytics for more agile and informed decision-making. In addition, AI can significantly reduce operating and logistics costs, drive technological integration, and empower and strengthen teams. Market reach, customer service, and consumer loyalty can also be significantly improved, while increasing efficiency, profitability, and shareholder value.

Small businesses face ethical and privacy challenges when implementing AI, such as ensuring compliance with data protection regulations and thoroughly understanding the effects of collecting personal data. Therefore, it is essential to accurately manage transparency when using information and ensure fairness in algorithms, particularly in automated decisions that directly affect employees or consumers. For this reason, it is recommended that SMEs ensure and properly manage data, train their employees to stay up to date with skills, and address job losses caused by automation. Another relevant point is that updating hardware and software, as well as data protection, are additional challenges.

SMEs considering incorporating AI into their operations are advised to follow these tips:

Prepared management team: have competent management personnel who are aware of artificial intelligence, with well-defined strategic and operational planning.

Organizational structure: have an appropriate organizational structure to foster innovation and have the required intellectual capital at strategic and operational levels.

Management decision: choose to invest in artificial intelligence by hiring a specialized advisor or consultant.

Conclusions

After a comprehensive analysis of the influence of AI on SMEs in Guayaquil, considerable improvements were found in important areas such as customer service, sales, and operations, despite the fact that AI is still in its early stages. In addition, the data obtained reveals that 61.54% of SMEs in Guayaquil use AI, and most have noticed moderate to significant improvements in efficiency and customer satisfaction.

Indeed, the results obtained in the study by Chávez (2021), which examines the sustainability and implementation of AI in SMEs, highlight the importance of analyzing costs and benefits before integrating new technological tools. It also emphasized that after integration, there must be an evaluation that aligns with the expected results. Therefore, it is considered that these points do not guarantee the expected future success in the implementation of AI, as it would not be possible to perceive all the emerging opportunities and risks. For this reason, it is suggested that a flexible mindset be adopted after analyzing its impact on organizational competitiveness and productivity.

García et al. (2023) comment on the impact of AI on accounting and the effective functioning of SMEs in Ecuador, highlighting the need to overcome technological and regulatory obstacles. Research improves understanding of how AI can benefit various sectors, similar to the present study, where AI has had a significant impact on decision-making and economic stability.

Therefore, García's suggestion to incorporate AI into curricula highlights the importance of being prepared to address these challenges, a relevant factor for the reality of Guayaquil. Cisneros et al. (2023) expand on this point by discussing the relevance of AI training to boost competitiveness and increase efficiency in SMEs,

in which they point out the need to manage the decline in the workforce responsibly, a challenge that reflects the results of my research regarding the need for training and adaptation in Guayaquil companies, highlighting the importance of incorporating AI in an ethical and strategic manner, prioritizing worker training and staff relocation rather than focusing solely on cutting costs.

(Acosta et al., 2022) highlights how emerging technologies such as artificial neural networks and blockchain contribute significantly to SMEs. It also comments that by overcoming technological challenges and making strategic investments, SMEs can experience improvements in efficiency and competitiveness. Therefore, despite the favorable arguments, it is considered that in practice many SMEs are limited by significant barriers in their quest to apply AI.

In conclusion, the study indicates that the use of AI in SMEs in Guayaquil is on the rise, with benefits in efficiency and customer satisfaction, but also presents significant obstacles. Companies are therefore advised to invest in training and strategic planning to optimize the advantages. It is also necessary to further investigate the specific barriers and effective strategies to overcome them, as well as to analyze the long-term impact of AI on the competitiveness of SMEs in various sectors.

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