

EFFECTIVIDAD DE LA IA EN EL MARKETING PARA MEJORAR PROCESOS INTERNOS EN LAS PYMES DE CHIMBORAZO

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Resumen

La investigación se centró en la problemática de la baja adopción de la inteligencia artificial en las Pymes de Chimborazo lo que limitó la optimización de procesos internos de marketing. Ante ello, el objetivo del estudio consistió en analizar la efectividad de la IA en marketing para optimizar los procesos internos en pequeñas y medianas empresas. Para esto, se empleó un enfoque cuantitativo con alcance correlacional, utilizando como técnica principal la encuesta aplicada a una muestra de 333 pymes. El instrumento presentó adecuados niveles de confiabilidad de 0,941. Los resultados mostraron que más de 80% de los participantes perciben la IA como una herramienta útil y fácil de emplear, destacando su rol en la simplificación de tareas, toma de decisiones y respuesta ágil al cliente. En cuanto al análisis factorial confirmó cuatro componentes principales que explicó el 76% de la varianza, mientras que el modelo SEM evidenció relaciones significativas, en especial la influencia de la intención de adopción sobre la digitalización de procesos con coeficientes de ($\beta = 0,50$; $R^2 = 0,18$) y el impacto positivo de la digitalización sobre la rentabilidad con datos de ($\beta = 0,52$; $R^2 = 0,37$). El estudio concluye en que se comprobó que la efectividad de la IA depende netamente de la interacción entre percepciones tecnológicas, capacidades internas y decisiones estratégicas que fortalecen tanto los procesos internos como el desempeño empresarial.

Palabras clave: Inteligencia artificial, marketing digital, procesos internos, pymes, decisiones estratégicas

Abstract

This research focused on the problem of low adoption of artificial intelligence (AI) in SMEs in Chimborazo, which limited the optimization of internal marketing processes. Therefore, the study aimed to analyze the effectiveness of AI in marketing to optimize internal processes in small and medium-sized enterprises (SMEs). A quantitative, correlational approach was used, employing a survey as the primary data collection method, administered to a sample of 333 SMEs. The instrument demonstrated a high level of reliability (0.941). The results showed that more than 80% of the participants perceive AI as a useful and easy-to-use tool, highlighting its role in simplifying tasks, facilitating decision-making, and enabling agile customer response. Factor analysis confirmed four main components, explaining 76% of the variance, while the SEM model revealed significant relationships, particularly the influence of adoption intention on process digitalization ($\beta = 0.50$; $R^2 = 0.18$) and the positive impact of digitalization on profitability ($\beta = 0.52$; $R^2 = 0.37$). The study concludes that the effectiveness of AI depends on the interaction between technological perceptions,

internal capabilities, and strategic decisions, which strengthen both internal processes and overall business performance.

Keywords: Artificial intelligence, digital marketing, internal processes, SMEs, strategic decisions

Introduction

Artificial intelligence (AI) has now revolutionized corporate procedures, radically changing marketing tactics in small and medium-sized enterprises. This technology facilitates the automation of tasks, the analysis of large amounts of information and the generation of decisions based on consumption patterns, which has a direct impact on the efficiency of internal operations (Oliveros Medina et al., 2018). Through AI-powered digital marketing, small and medium-sized businesses have the ability to refine processes such as customer segmentation, content personalization, and behavioral prediction, reinforcing their competitive benefits and optimizing their operational performance.

Despite the potential for change in artificial intelligence, many small and medium-sized companies still do not incorporate this technology into their internal digital marketing processes. This lack of adoption is due to several factors: ignorance about its true advantages, resistance to change, budgetary constraints and shortage of qualified personnel (Basri, 2020). As a result, these entities continue to employ conventional techniques that are inefficient, making it difficult to increase their effectiveness, reduce costs, and create data-driven decision-making.

In Ecuador, the digitalization process still encounters considerable barriers in small and medium-sized enterprises. According to information from the National Institute of Statistics and Census (INEC, 2023), only 18.4% of small and medium-sized enterprises in Ecuador have integrated cutting-edge technologies such as artificial intelligence, machine learning, or Big Data. The lack of technological infrastructure, ignorance about digital instruments and the lack of public policies that promote innovation hinder its execution. This means that many companies continue to operate manually, without taking advantage of the potential of digitalization to optimize their business processes.

In the province of Chimborazo, the circumstance becomes more critical, although small and medium-sized enterprises constitute more than 90% of the business fabric, most do not have technological strategies to improve their internal management (Cordero, 2024). This situation not only restricts its expansion at the local level, it also places it at a disadvantage against competitors from more advanced regions in digital terms.

With the above, the general purpose of the study will be to analyze the effectiveness of artificial intelligence in marketing to optimize internal processes in small and medium-sized companies in Chimborazo. To this end, the perceptions of the effectiveness of AI in the marketing of SMEs will be described through a descriptive analysis. After that. Key dimensions of AI adoption in SMB marketing will be identified using exploratory factor analysis. Finally, the relationships between AI effectiveness and improvement of internal processes in SMEs will be determined by applying the SEM model.

Theoretical development

Artificial intelligence

AI is a computer technology that allows machines to understand and mimic human communication and behavior. From the data provided, an intelligent machine is created that thinks, reacts, and performs tasks in a similar way to humans. The goal of this tool is to develop intelligent machines that can think and act like humans, offering enormous opportunities for a wide variety of industries (Farias Mendoza, 2023).

Need for artificial intelligence in marketing

AI is a fascinating and cutting-edge technology where it complements a company's current content strategy (Vasquez et al., 2021a). This technology is a broad term that encompasses a wide range of technologies, such as natural language processing, machine learning (ML), deep learning, computer vision, and many others. ML significantly impacts the digital marketing landscape thanks to its ability to analyze data and provide analytical tools. As a result, it helps marketing teams conduct needs-based analysis. Companies that use AI tools save time by focusing on other aspects of digital marketing, representing a broad and continuous technological evolution with far-reaching consequences.

Business management

Business management is a comprehensive procedure through which an entity plans, organizes, directs, and supervises its resources in order to achieve effective and sustainable results. This approach includes both internal operations and external strategies, with the goal of improving the performance of each functional sector, from manufacturing to marketing to finance (Ramírez-Avalo, 2016). Business administration focuses on increasing competitiveness, adjusting to environmental variations, and creating long-term value, particularly in changing environments of small and medium-sized enterprises.

Automating administrative tasks

The automation of administrative tasks applies technologies that facilitate the performance of repetitive and daily tasks without continuous manual intervention, thus increasing operational efficiency and reducing human errors (Abdul Wahab & Radmehr, 2024). In the context of small and medium-sized enterprises, this procedure is particularly useful, given that many of these entities operate with scarce resources and limited staff, resulting in a large volume of work for tasks such as invoicing, inventory management, payroll management, and customer service.

Methodology*Quantitative approach*

This analysis opted for a quantitative approach, which facilitated an unbiased analysis of the connection between the implementation of artificial intelligence in marketing tactics and the optimization of internal processes in small and medium-sized enterprises in the province of Chimborazo. Numerical data were collected through structured tools, which made it possible to detect patterns, form alliances and assess the degree of effectiveness in the application of smart technologies in the corporate environment (Kivunja, 2019).

Correlational Scope

This analysis had a correlational scope, since it was aimed at discovering and examining the relationship between the effectiveness of the implementation of artificial intelligence in marketing tactics and the optimization of the internal processes of small and medium-sized companies in the province of Chimborazo. The correlational method, as indicated, makes it possible to determine if a change in one variable is related to alterations in another, without affecting the natural conditions of the environment without manipulating them (Pérez et al., 2015).

Population

The study population was composed of 2491 small and medium-sized SMEs registered in the province of Chimborazo, according to updated information from the business cadastre and relevant institutional records. These companies operate in areas such as commerce, industry and service, with a level of relationship with digital marketing processes (Peralta, 2020).

Sample

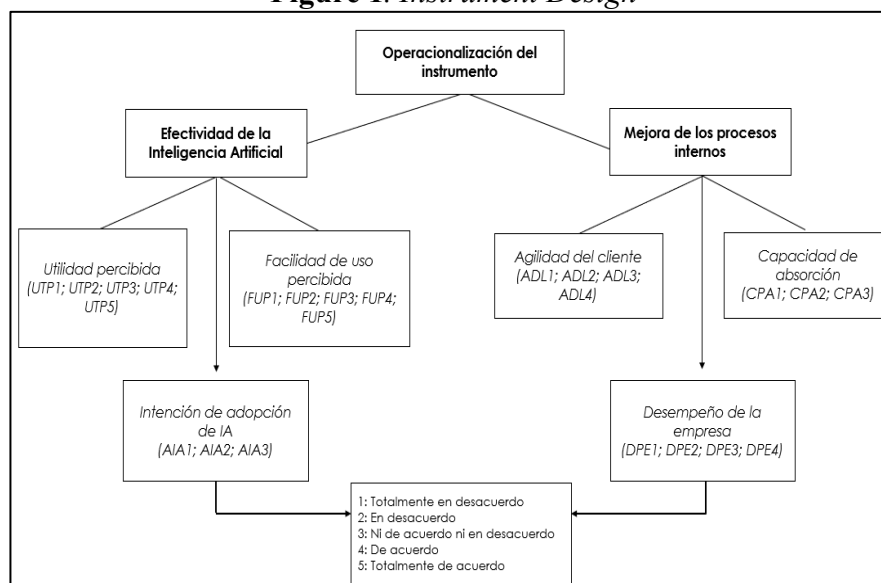
In this study, we worked with a group of 333 small and medium-sized SMEs located in the province of Chimborazo, which were linked to the implementation of digital marketing strategies that included artificial intelligence technologies. The selection of the sample was based on criteria of accessibility

and relevance, taking into account companies that actively operate in the commerce, industry or service sectors and that have some level of digitalization in their processes.

Data collection - Survey

Data collection was carried out in a structured survey aimed at small and medium-sized SMEs in the province of Chimborazo. This instrument made it possible to acquire measurable data on the degree of effectiveness of artificial intelligence in marketing strategies and its link with the optimization of the organization's internal processes. A proposed Likert scale was used (Mendoza & Ramírez, 2020), which facilitated the collection of quantifiable and comparable data.

Figure 1. Instrument Design



Note: Authors.

Instrument reliability

Cronbach's alpha was used according to Pérez et al. (2015) a statistical coefficient to assess the reliability or internal consistency of the data collection method used in this research. It made it easier to establish the relationship between the elements that constituted each of the scales, checking if they measured the same construct consistently. A value above 0.70 was considered acceptable, indicating that the questionnaire showed an acceptable level of consistency. This parameter became essential to guarantee the statistical validity of the instrument and the reliability of the answers obtained.

Table 1. Cronbach's alpha

	Cronbach's Alfa	N of elements
Perceived profit	,926	5
Perceived ease of use	,941	5
AI Adoption Intent	,924	3
Customer agility	,900	4
Absorption Capacity	,571	3
Company Performance	,800	4
Total	,941	24

Note: Authors.

Cronbach's alpha showed that the instrument used demonstrated a high overall reliability 941, which indicated that the scales remained coherent with each other. The dimensions of perceived ease of use ,941 perceived utility ,926 and intention to adopt AI ,924 achieved outstanding levels of internal constancy. On the other hand, the assimilation of AI .590 and absorption capacity .571 achieved coefficients below the suggested limit, which made a future analysis of these elements necessary. This behavior is consistent with what was indicated by the fact that values above .70 ensure acceptable reliability in research (Mendoza & Ramírez, 2020).

Results

The results made up the segment of the research where the data collected through the use of the survey collection instrument were shown in a clear and organized manner. According to the quantitative method, the results made it possible to meet the formulated objectives and served as a basis for the development of the discussion.

Table 2. *Sociodemographic profile*

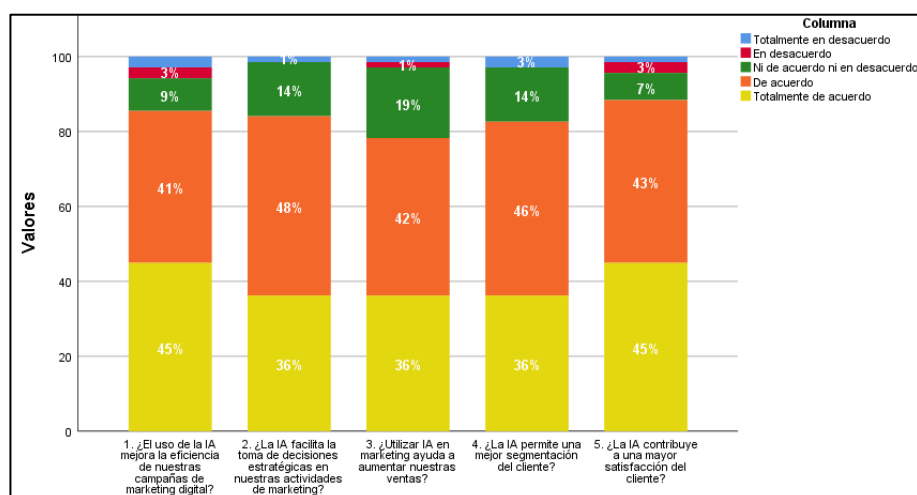
		Frequency	Percentage
Sex	Female	169	50,7
	Male	164	49,3
Age	Under 28 years old	131	39,4
	From 29 – 33 years old	122	36,6
	From 34 – 39 years old	57	16,9
	Over 40 years old	23	7,0
Remuneration	Less than \$700	160	47,9
	From \$701-\$1000	154	46,5
	From \$1001-\$1300	5	1,4
	Greater than \$1300	14	4,2
Total		333	100,0

Note: Authors.

The sociodemographic profile showed a balanced distribution by gender, with a slight preponderance of women, 50.7% with respect to age, the young population predominated, 39.4% were under 28 years of age and 36.6% were between 28 and 33 years old, which evidenced a considerable presence of young adults related to the digital environment. In relation to salary, 47.9% received less than \$700 and 46.5% between \$701 and \$1000, which evidenced flexible economic conditions. This composition is in line with those who stressed that young companies in Latin American environments are usually headed by young adults with low incomes, but with a great predisposition to adopt developing technologies (Enshassi et al., 2025).

To describe the perceptions about the effectiveness of artificial intelligence in the marketing of SMEs in Chimborazo through a descriptive analysis

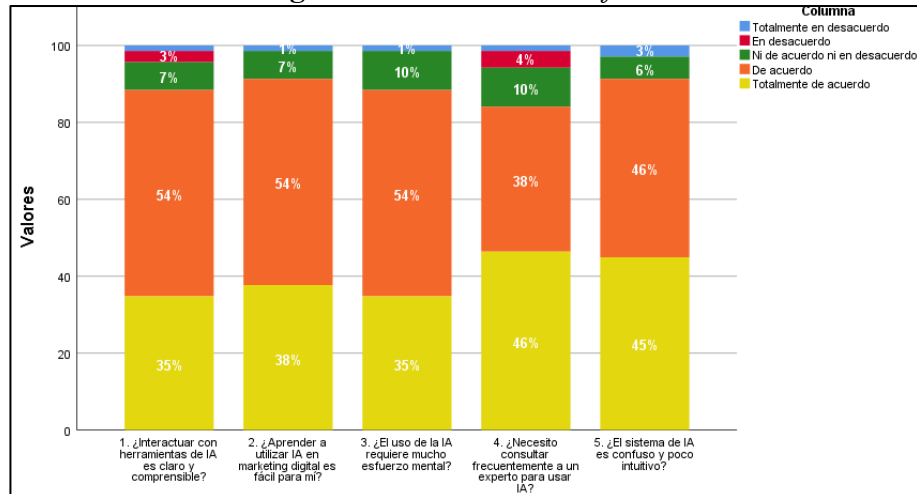
Figure 2. *Perceived profit*



Note: Authors.

In all the elements evaluated, a large number of responses were observed in "agree" and "strongly agree", which indicated that participants saw artificial intelligence as an effective resource to optimize their marketing actions. For example, 86% of the total (41% agree and 45% strongly agree). Likewise, in the section that asked if Artificial Intelligence simplified strategic decision-making, 84% expressed their agreement (48% in agreement and 36% in total agreement). This discovery showed that entrepreneurs identified the function of Artificial Intelligence as a support in marketing decisions, which makes it possible to anticipate trends and reduce the probability of error.

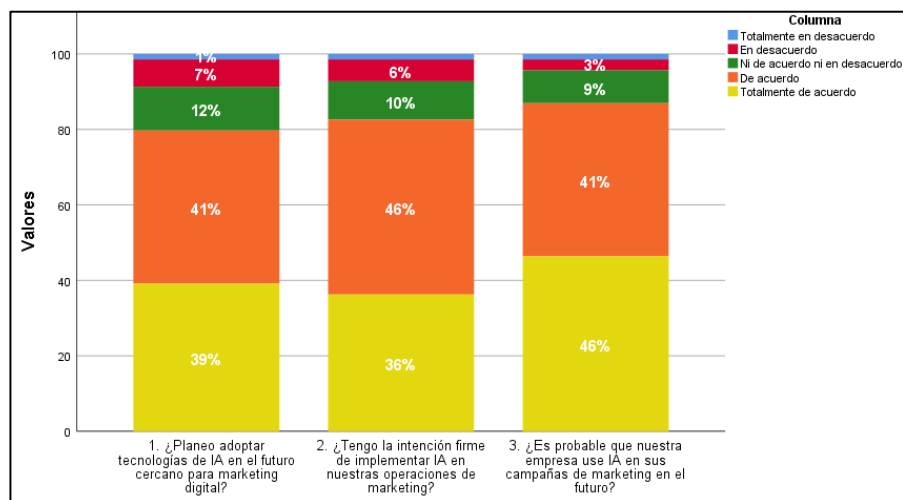
Figure 3. Perceived ease of use.



Note: Authors.

In the first three points, related to understanding, ease of use and mental effort required, an evident trend towards the categories "agree" and "strongly agree" was noted, achieving a cumulative 89% in each situation. Specifically, 54% of the participants agreed and 35% completely agreed. In relation to the statement "Learning to use AI in digital marketing is easy for me", 54% expressed their agreement and 38% expressed their total agreement, which indicated a marked perception of technological self-efficacy. In the section "I need to consult an expert frequently to use AI" only 38% agreed and 46% completely agreed.

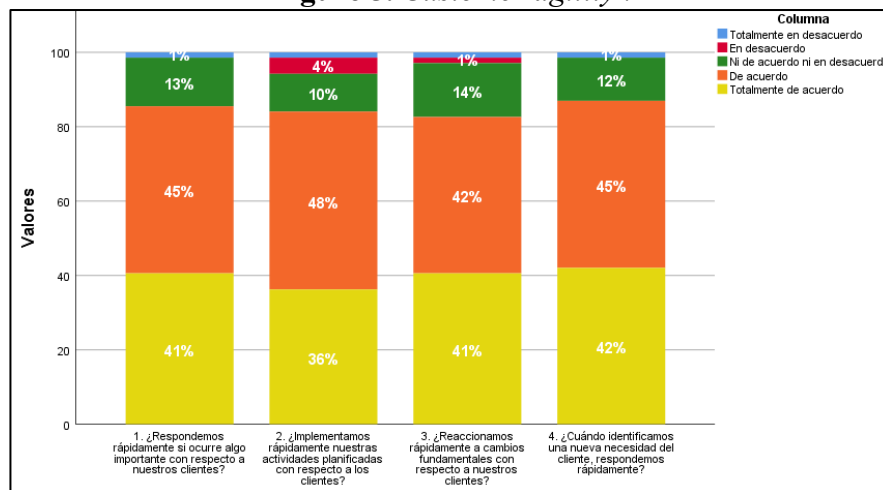
Figure 4. AI Adoption Intent



Note: Authors.

One of the most relevant aspects was linked to the lack of transparency in algorithms, 48% expressed their agreement that this feature hindered the implementation of artificial intelligence, and 29% expressed their total agreement. Regarding the absence of technological standards, 45% of the participants in the survey agreed and 26% completely agreed that this lack hindered implementation. In contrast, when asked if their organizations did not have strategies for the implementation of AI, 36% agreed and 14% strongly agreed, while 16% even expressed disagreements.

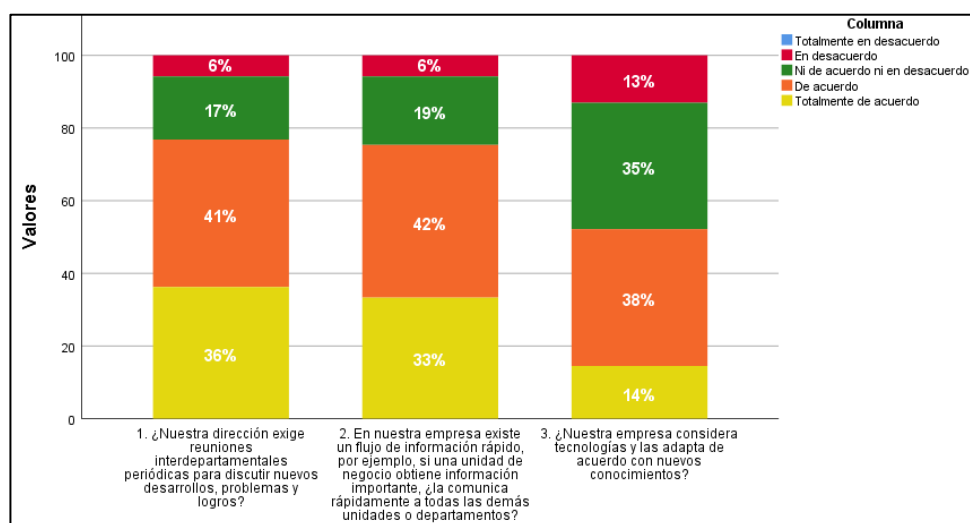
Figure 5. Customer agility .



Note: Authors.

SMEs exhibited a high degree of speed in reacting to circumstances related to their customers. On the first point, 45% of survey participants agreed and 41% strongly agreed that they responded promptly when something significant happened with customers. In the second and third years, 84% said they had quickly carried out scheduled actions in relation to their customers and 83% admitted that they responded quickly to essential changes in their needs. The statement about responding to new customer needs received 87% agreement and complete agreement.

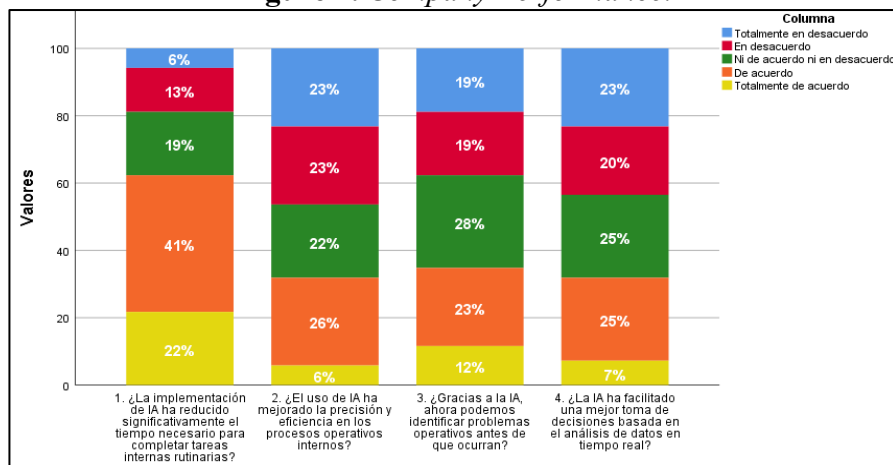
Figure 6. Absorption capacity.



Note: Authors.

The item evaluated whether the management of SMEs promoted interdepartmental meetings to discuss progress, challenges and achievements. 36% of the participants in the survey strongly agreed, 41% agreed, which reflected a majority that appreciated organizational communication as an instrument of collective learning. In item 2, 42% responded to agree and 33% totally agree. However, the third statement, regarding the ability to adapt technologically based on new knowledge, showed a greater dispersion. Only 14% strongly agreed, while 35% remained impartial and 13% disagreed.

Figure 7. Company Performance.



Note: Authors.

The first item showed 41% of participants agreed and 22% strongly agreed that AI significantly decreased the time required to carry out usual internal tasks. With regard to the accuracy and effectiveness of internal procedures, the degree of consensus was more varied, with 26 per cent agreeing and 6 per cent strongly agreeing, while 23 per cent expressed disagreement. The aspects related to the prior detection of problems and the adoption of decisions in real time showed a more favorable trend. In the third item, 28% agreed and 23% remained neutral, while in the fourth point 25% agreed and another 25% neutral.

Identify key dimensions of AI adoption in the marketing of SMEs in Chimborazo using exploratory factor analysis

As can be seen in Table 3, the value obtained in the KMO test was .876, which showed that the data collected are adequately consistent, therefore, they are appropriate for applying factor analysis. In practical terms, the result indicated that the relationships between the questions are strong enough to identify common factors. This index reflects that the participants responded coherently to the elements raised, which guaranteed the quality of the information.

Table 3. KMO and Bartlett Sphericity Test

Kaiser-Meyer-Olkin Measure of Sampling Adequacy		0,876	
Bartlett's sphericity test	Approx. Chi-square	1642,929	
	Gl	276	
	Gis.	0,000	
Component	Sums of Charges Squared of Rotation		
	Total	% variance	Cumulative %
Perceived profit	9,041	37,670	37,670
Perceived ease of use	5,018	20,909	58,579
AI Adoption Intent	2,880	11,999	70,579
Customer agility	1,323	5,512	76,090

Note. Results obtained from the statistical software Spss.

Likewise, four components were revealed that explain 76% of the total variance, which indicated an adequate capacity for synthesis of the information, the highest proportion was found in the perceived utility dimension with a percentage of 37.37%, followed by ease of use with 20.90% while adoption intention obtained 11.99% contributing in a complementary way. These percentages showed that perceptions of usefulness and ease of use are influential factors in the adoption of AI in SMEs in Chimborazo (Díaz, 2020).

Components in Rotated Space

In the dimension called perceived utility, the items with the highest factor loads, such as UTP1 (0.870) and UTP5 (0.865), indicated that entrepreneurs consider artificial intelligence as a valuable resource to optimize internal processes. This result confirmed that perceived utility is the most important factor for the acceptance of new technologies, which is consistent with the findings of the Technology Acceptance Model (MAT) Haleem et al. (2022), where perceived utility is considered the strongest predictor of the acceptance of new technologies.

In terms of perceived ease of use, items such as CPA1 with 0.822 and CPA2 with 0.777 are surprising, as they reflect how participants perceive the simplicity and clarity of using AI-based systems. The high factor loads of these items showed that the learning curve is not a significant obstacle. This is therefore in line with the findings of Delgado et al. (2022), who argue that perceived ease of use increases confidence in the integration of new technologies.

Table 4. Components in Rotated Space

	Perceived profit	Ease of use	Intent to Adopt	Customer agility
UTP1	0,870	0,216	0,027	0,054
UTP2	0,796	0,359	0,004	0,111
UTP3	0,734	0,385	0,074	0,004
UTP4	0,677	0,329	0,001	0,110
UTP5	0,865	0,187	-0,034	0,199
FUP1	0,837	0,208	-0,169	0,061

FUP2	0,857	0,206	0,084	-0,051
FUP3	0,778	0,436	0,084	-0,002
FUP4	0,845	0,293	-0,077	0,119
FUP5	0,841	0,273	0,092	-0,048
AIA1	0,649	0,481	-0,022	0,183
AIA2	0,778	0,439	0,038	0,045
AIA3	0,811	0,331	0,065	-0,044
ADL1	0,446	0,762	-0,031	0,053
ADL2	0,278	0,773	0,101	0,019
ADL3	0,401	0,770	0,023	-0,008
ADL4	0,360	0,719	0,013	-0,055
CPA1	0,277	0,822	-0,098	0,015
CPA2	0,296	0,777	-0,059	0,038
CPA3	0,107	0,100	0,464	0,704
DPE1	0,101	-0,037	0,064	0,888
DPE2	0,027	-0,060	0,929	0,136
DPE3	0,057	0,010	0,903	-0,021
DPE4	-0,073	-0,007	0,941	0,122

Note. Results obtained from the statistical software Spss.

Regarding the intention to implement AI, the predominant coefficients were DPE2 with 0.929 and DPE4 with 0.941, which indicated a strong commitment from SMEs to adopt these technologies in the short term. With these results, it is evident that, in addition to the perceived benefits and ease of use, there is also an active willingness to embrace digital transformation. Zúñiga et al. (2023) argue that expressed intent is a crucial step before actual implementation, and the results of this study confirm this relationship in the context of Chimborazo.

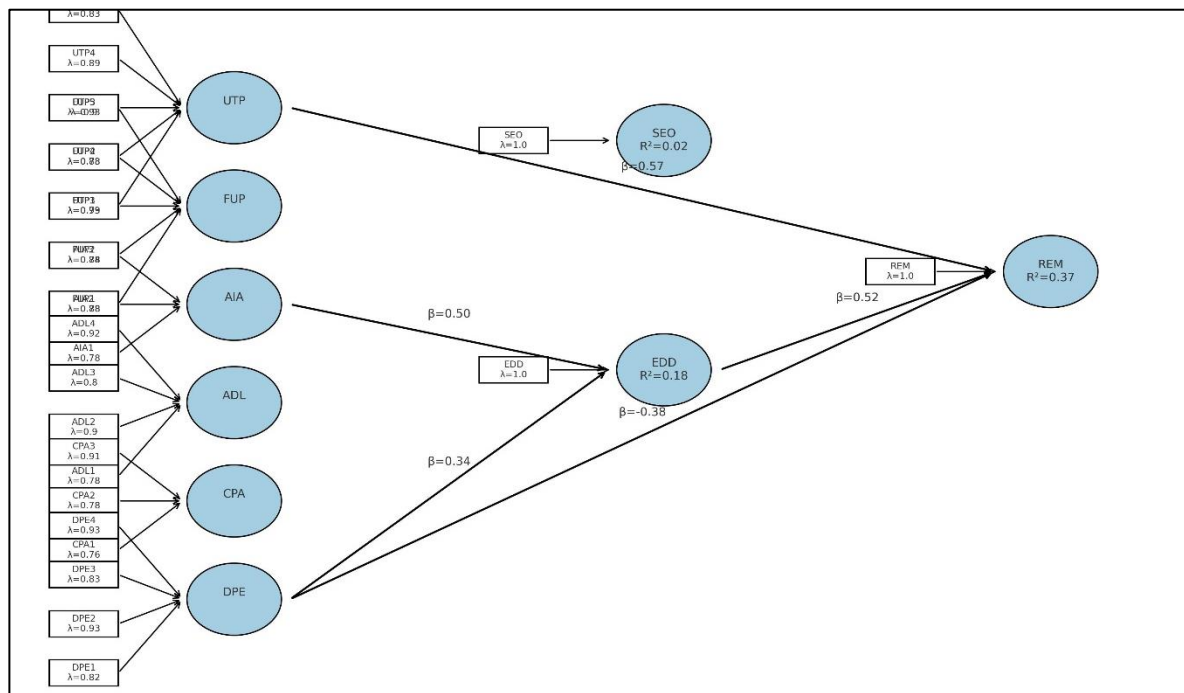
Ending with the customer-oriented dimension, the DPE1 factor obtained a coefficient of 0.888, which presented a higher load, reflecting the ability of companies to respond immediately to customer needs thanks to AI. It is worth mentioning that this adaptability is in line with the findings of Rodríguez & Proaño (2024), who highlight that artificial intelligence improves responsiveness, strengthens customer relationships and provides a competitive advantage in dynamic markets.

Determine the relationships between the effectiveness of artificial intelligence and the improvement of internal processes in SMEs by applying the SEM model

The resulting SEM model revealed significant relationships that helped understand how artificial intelligence drives internal process improvements in SMBs. Perceived utility (TU) partially explained satisfaction and organizational effectiveness (EF) with a coefficient $\beta = 0.57$, although its explanatory power is low with an $R^2 = 0.02$). This showed that, although business leaders recognize the usefulness of AI, this alone is not enough to guarantee stable internal results. As they point out Pilay & Rodriguez (2025), perceived utility is necessary, but not sufficient; it must be complemented by other moderators.

Intent to use had a strong influence on the success of the digital transformation of internal processes (DTP) with a $\beta = 0.50$) and a moderate explanatory power of $R^2 = 0.18$. This finding confirmed the theory of planned behavior (Reyes et al., 2018), which stated that intention is the best predictor of behavior. For SMEs, a clear intention to use effective digitalisation measures and thus paves the way for process innovations.

Figure 8. SEM Model



Note. Created via Smart PLS software

Enterprise performance (DPE) negatively influenced digital transformation readiness $\beta = -0.38$, but positively on enterprise performance (REM) with a coefficient of $\beta = 0.34$. Therefore, this contradiction is explained by the fact that companies face transition costs and internal resistance in the initial phase of technology adoption, which limits the immediate impact of digitalization. However, in the medium term, these investments strengthen competitiveness and financial performance (Bist et al., 2022).

The REM construct had an explanatory power of $R^2 = 0.37$, based on both business performance and digitalization with $\beta = 0.52$. However, improvements in internal processes using AI generate measurable results in terms of profitability. This confirms the findings of Pawar (2022), who emphasize that the strategic use of AI in SMEs translates innovations into economic benefits.

Discussion

The study showed a favorable view of the effectiveness of artificial intelligence in the marketing tactics of SMEs in Chimborazo, particularly in elements such as content adaptation, customer identification, and resource optimization. 86% of survey participants believed that artificial intelligence increased the efficiency of campaigns, which is in line with (Ramírez-Avalo, 2016) who emphasize that AI facilitates the automation of processes, the analysis of large amounts of information and the creation of more effective interactions with customers. This level of acceptance corroborates overcoming the initial obstacles, artificial intelligence is perceived as an instrument that enhances the value of strategic and operational decisions (Santosh, 2024).

In terms of perceived ease of use, the results revealed a high appreciation of entrepreneurs, with 89% considering the use of tools based on artificial intelligence understandable and simple. This perception is crucial according to (Abdul Wahab & Radmehr, 2024) their model of technological acceptance, simplicity of use has a considerable impact on the choice to adopt emerging technologies. Although some tasks required the assistance of specialists, most of them believed that learning and using these tools was not a major impediment. This corroborates the relevance of continuing education to simplify the transition to digitalization in situations of scarce resources (Leite & Azevedo, 2017).

Despite the advantages, significant obstacles were also identified in the implementation of artificial intelligence, including a lack of clarity in algorithms, a lack of technological standards, and the low

quality of available data. These restrictions were cited by (Pavón et al., 2019) who argue that small-scale companies face technical and organizational barriers that restrict the effective incorporation of cutting-edge technologies. In this research, more than 75% of the interviewees aligned that these obstacles complicate implementation, thus highlighting the importance of public policies that strengthen the technological ecosystem and encourage digital literacy in the business environment (Naz & Kashif, 2025).

Finally, it was noted that the incorporation of artificial intelligence and its impact on the company's performance were more evident in operational areas than in strategic processes such as innovation or incursion into emerging markets. This is in line with (Wagobera Edgar Kedi et al., 2024b) who point out that, in the early stages of adoption, artificial intelligence is generally used in everyday tasks before being integrated into more complex functions. However, small and medium-sized companies exhibited organizational agility and ability to respond to customer demands, which can be further enhanced with the implementation of predictive AI and optimal internal knowledge management. These results demonstrate a gradual path towards a complete digital transformation.

Conclusions

Regarding the first objective, it was concluded that SME owners in Chimborazo consider artificial intelligence as a valuable tool to optimize their marketing processes. Therefore, artificial intelligence facilitated strategic decision-making, simplifies workflows and allows the prediction of trends, which consolidated it as a valuable resource for internal management and to increase operational efficiency. The factor analysis of the second objective concluded that, key factors for the implementation of artificial intelligence, such as perceived utility, ease of use, intention to implement and customer orientation, these factors demonstrated a high explanatory power and confirmed the validity of the proposed model, as well as the importance of subjective and organizational factors in the acceptance of new technologies.

Finally, with respect to the third objective, it was concluded that the SEM model confirmed the significant relationships between the effectiveness of artificial intelligence and the improvement of internal processes. Therefore, the intention to implement turned out to be a decisive factor for digital transformation, and profitability of the company demonstrated a high level of explanation in relation to digitalization. Therefore, these results showed that the effectiveness of artificial intelligence depends on the interaction between perception, competition and strategic decisions, thus directly contributing to improving internal processes by increasing corporate performance.

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