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Artificial Intelligence Systems in Microenterprises in Popayán

Sistemas de Inteligencia Artificial en las Microempresas de Popayán

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Summary

Artificial intelligence (AI) is transforming everyday activities, driving companies to innovate in their operational and communication processes. In this context, customer service represents an area for applying intelligent technologies in micro-enterprises, where direct contact with consumers can determine commercial success. However, barriers remain in terms of knowledge, infrastructure, and the adaptation of these solutions to business realities. For this reason, this study was developed to explore AI systems in business, analyzing their potential to optimize customer service in micro-enterprises in the city of Popayán . To this end, a qualitative methodology with a descriptive method was adopted, through a focus group composed of 17 female entrepreneurs and interviews with three experts to gather their experiences and perceptions regarding the implementation of these systems. The results of AI adoption seek to improve service personalization, the balance between human-AI interaction, and the importance of maintaining warmth in customer relations, which identified benefits and challenges to be considered for effective integration.

Key words: Artificial Intelligence, micro-enterprises, entrepreneurship, customer service

Resumen

La inteligencia artificial (IA) transforma las actividades cotidianas, impulsando a las empresas a innovar en sus procesos operativos y comunicativos. En este contexto, la atención al cliente representa un área para aplicar tecnologías inteligentes, en las microempresas, donde el contacto directo con los consumidores puede determinar el éxito comercial. Sin embargo, persisten barreras de conocimiento, la infraestructura y la adaptación de estas soluciones a realidades empresariales. Por esta razón, se elabora este estudio que propone explorar los sistemas de IA en los negocios, analizando su potencial para optimizar el servicio al cliente en las microempresas de la ciudad de Popayán. Para ello, se adoptó metodología cualitativa con método descriptivo, a través de grupo focal integrado por 17 emprendedoras, y entrevista a tres expertos para recoger sus experiencias y percepciones frente a la implementación de estos sistemas. Los resultados en la adopción de la IA, buscan mejorar la personalización del servicio, el equilibrio entre interacción humana-IA y la importancia de conservar la calidez en el trato con los clientes, que identificaron beneficios y desafíos para ser considerados en la integración efectiva.

Palabras claves: Inteligencia Artificial, microempresas, emprendimiento, servicio al cliente

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1. Introduction

In a digital world, micro-enterprises must adapt to new technologies to remain competitive and meet customer expectations. AI is a powerful innovation and transformative tool in the business world (Gates, 2023). This technology offers the potential to increase productivity and foster innovation across various economic sectors (OECD 2024).

AI in the Colombian microenterprise sector remains in its early stages, presenting challenges that require attention. CONPES (2019) projects that the implementation of this technology in the country could generate a minimum annual growth of 4.5% in Gross Domestic Product (GDP) (p. 36). This outlook represents progress but also entails challenges that entrepreneurs face (López and Lancheros, 2025).

Based on the above, it is noteworthy that Colombia is developing a political and ethical framework for the adoption of AI. According to Cabrera and Yánez (2023), the country is concerned about technological advancements and, specifically regarding AI, is creating frameworks of responsibility.

The study promotes research and the proper application of technologies for economic and social change that drives the digitalization of the microenterprise sector (Guío et al., 2021). This approach seeks a fair and social balance in the transformation of AI for the development of the business ecosystem. Security measures are the responsibility of the government and institutions.

Continuous learning is a priority for communities, in order to know their rights, take advantage of technological innovations and protect their data (Martínez, 2019).

This research proposes to explore AI systems in business, analyzing their potential to optimize customer service in microenterprises in the city of Popayán, focusing on an economic and social shift that promotes the digitalization of these businesses. This includes analyzing their characteristics to enhance customer service and generate competitive advantages.

This is a topic of interest for the economy, because micro-enterprises constitute the economic engine of the region and face gaps that demand new ways to be sustainable in the market (Guío et al., 2021).

In turn, the strengthening of microenterprises is constantly changing and evolving, highlighting customer service as a differentiator. Traditional models focus on the conventional transaction of communication and are now evolving towards improving the customer experience and generating added value (Martínez and Ordoñez, 2024).

Furthermore, customer service is evolving into a complex ecosystem of interactions. Companies that have achieved success understand that their excellence requires integrating product quality, service personalization, responsiveness, and alignment with the needs and expectations of their market segments (Jejen , 2021).

Microenterprises in Popayán are uniquely positioned to leverage emerging technologies. Their simple organizational structure and direct customer relationships give them advantages for flexibly implementing AI solutions. Furthermore, their size allows entrepreneurs to manage various business tasks.

Therefore, technology requires an approach that considers the technical, human, organizational, and cultural aspects of the Popayán microenterprise ecosystem. This is necessary to develop adoption strategies that respect local characteristics, integrate the knowledge of entrepreneurs, and generate value from the initial implementation stages.

It should be added that the above presents an opportunity with challenges related to the availability of technical, financial, and human talent training resources (Zamora-Morantes and Oviedo, 2023). Furthermore, the integration of technologies with existing organizational processes, along with the socioeconomic and cultural characteristics of customers, influences service expectations and preferences in the region.

Although there is a favorable consensus on the value of technology, obstacles are identified among micro-entrepreneurs in Popayán. These difficulties affect the development of the region, its economic transformation, access to trade, the creation of new employment models, and the strengthening of businesses, which are calling for equitable progress for their community (UN n.d.).

Furthermore, the relationship between technology and the human factor is highlighted, raising concerns about maintaining warmth and personalization in customer service. This indicates the need for hybrid models that combine AI efficiency with human empathy. The key to these strategies is prioritizing the customer experience while remaining mindful of the resources and capabilities of micro-enterprises.

This leads us to consider and analyze solutions implemented in other contexts, such as chatbots and automated systems, that improve the speed and effectiveness of customer service. These tools should not replace human skills, especially in areas where empathy and emotional understanding are highly valued.

In this context, micro-enterprises in Popayán have the opportunity to leverage AI as an ally to strengthen their competitiveness, optimize processes, and offer better experiences to their customers, focusing on an adoption that considers the sector's own limitations and fosters an inclusive and beneficial digital transformation for businesses.

2. Theoretical Framework

To understand the context concerning the integration between AI and micro-enterprises, it is necessary to relate to the following topics:

2.1. Artificial intelligence (AI):

AI is a fundamental field of study in the technological and business sectors. Initially, its development focused on describing human intelligence, with the goal of enabling machines to represent it in a similar way. This approach was called "Generic AI" and aimed to replicate human cognitive abilities.

Subsequently, the field evolved towards the study of human learning processes, seeking to have machines simulate these mechanisms (Porcelli , 2021).

AI is defined as a branch of computer science dedicated to the development of systems capable of performing tasks that, until recently, required human intelligence. These tasks include speech recognition, complex data analysis, decision-making, automation of organizational processes, and user interaction (Ocaña-Fernández et al., 2019).

Furthermore, AI has a wide range of uses, but lately it has been most focused on robotics and computer science. This extends beyond the social sciences and offers support to the business sector due to its data analysis capabilities (Vázquez et al., 2018).

According to Arango (2021), AI is not represented in machines or robots as is commonly thought, but rather as the set of solutions that arise from the data provided by humans, which act as an essential basis for its operations.

In this way, the impact of AI has been recognized as one of the most influential technologies in the transformation of business models, internal operations and customer relationships in many sectors (Muñiz, 2023).

Its evolution and application in the business context has sparked interest in increasing operational efficiency, reducing costs, and stimulating innovation. Microenterprises, despite facing limitations in its implementation, have access to options, including free ones, that provide results when used appropriately (Silva et al., 2023) .

2.2. Emerging Technologies and AI Systems

The ecosystem of emerging technologies linked to AI comprises tools and methodologies that highlight machine learning algorithms , natural language processing (NLP), computer vision, virtual assistants, and predictive analytics. These facilitate the automation of repetitive tasks, information analysis, and real-time responses to customers (Amaro and Robles, 2020; Rodríguez et al., 2023).

Therefore, the integration of technologies has demonstrated results in optimizing processes and supporting decision-making. AI algorithms provide predictive and prescriptive analyses that reduce uncertainty and human bias, improving strategic accuracy and enabling workflow reconfiguration, which increases efficiency and reduces labor times.

According to customer experience, technologies can facilitate service personalization, immediate responses to inquiries via chatbots , and the anticipation of needs through behavioral analysis. To achieve this, it is important to understand how to formulate questions for AI. This process, known as prompts , involves interactions designed to clearly indicate the user's intent or expected outcome (Pepinosa , 2023).

A well-defined prompt determines whether information is generated to produce sustainable competitive advantages and strengthen business strategies (Lalaleo-Analuisa et al., 2021). In this regard,

Abdul et al. (2025) explain that AI technology acts as a predictive element in aspects such as the individualization of the customer experience and customer well-being.

These factors are crucial for consumer satisfaction, so care must be taken in the use of these tools.

From an organizational perspective, the implementation of AI strategies has evolved towards collaborative and adaptive work models (Contreras and Olaya, 2024) . In this way, it facilitates organizational knowledge management, optimizing the allocation of human and financial resources.

They also provide real-time metrics that support evidence-based decision-making, in order to increase competitiveness in digitized markets.

2.3. Artificial Intelligence (AI) in the Microenterprise Sector

As mentioned earlier, microenterprises face difficulties adopting technologies due to limited resources, poor connectivity, and insufficient training in new digital skills. However, their importance in the economy represents an opportunity for the business environment (González and Llanes, 2024). This motivates efforts to facilitate their access and develop digital skills within communities.

Recent studies show that AI contributes to customer service, inventory management, accounting, and supply planning, enabling companies to improve their efficiency and market differentiation. AI frees up resources and generates fast and consistent service, which in turn becomes a tool for changing process management and strengthening market position (Angulo Bustinza and Tantalean Lam, 2025).

Therefore, micro-enterprises do not need large budgets, since current platforms and software support the start of digitization for free or at low cost. They adapt to the requirements of micro-enterprises, are easy to use, and provide solutions to improve customer service, communication, and administrative processes (Adanet et al., 2022).

2.4. Benefits of AI for Microenterprises

AI offers benefits that transform the management of micro-enterprises through automated customer service systems with immediate responses based on pattern recognition. Furthermore, it facilitates automation, reduces errors in repetitive tasks, and increases operational efficiency.

Another benefit is informed decision-making through predictive analytics, which anticipates demand and adapts offerings based on market behavior. It strengthens the structure of microenterprises by optimizing the management of human and financial resources that support planning and control (Macías, 2021) .

The benefits contribute to the sustainability, growth, and differentiation of micro-enterprises from their competitors. They create opportunities for entrepreneurs to leverage their creativity, skills, and analytical abilities.

2.5. Challenges and Barriers in the Implementation of AI

There are obstacles that limit the adoption of AI in microenterprises, primarily the perception of resource limitations, followed by a lack of adequate technological infrastructure and a shortage of human capabilities (VIU, 2024; Ferrer-Dávalos, 2021). Many microenterprises are unaware of the applications and benefits or hold misconceptions about their use.

In Colombia, connectivity and internet access problems exist due to the poor quality of the digital infrastructure (Zapata, 2023) . There is also resistance to change, a deeply rooted factor in most of the country, motivated by fear of automation, potential job losses, and distrust of new technologies (Salas, 2025) . Ethical and privacy risks related to data use are also considered (Abdul et al., 2025) .

In the country, the implementation of public policies, training programs and an approach that balances technological innovation with the human dimension is required, in the context of the microenterprise sector (Minciencias, 2024) .

Thus, the integration of AI in micro-enterprises presents an opportunity for growth, improved communication, and enhanced sustainability (Alonso, 2025) . In this regard, an approach is needed that considers the sector's limitations in order to integrate AI with other tools to foster competitive business development.

3. Methodology

The research employs a qualitative design with an exploratory-descriptive scope, grounded in the phenomenological-interpretive paradigm. Its purpose is to understand, analyze, and interpret the perceptions, experiences, and meaning-making processes developed by micro-entrepreneurs and experts regarding the adoption of AI systems to optimize customer service processes.

The choice of this approach is based on the need to capture the subjectivity, experience, and understanding of the participants. There is a recognition of the understanding of reality, constructed through practices that the actors attribute to their experiences and approaches that are relevant for technological adoption, considering the limitations and resources of small businesses (Hernández et al., 2018) .

design facilitates the exploration of the particularities of the microenterprise ecosystem, with all its characteristics and decision-making dynamics that differ from those of large companies. This understanding is necessary to generate knowledge applicable to the reality of microenterprises.

Consequently, the exploratory nature of the study is based on the novelty of the phenomenon being investigated in the local context. This requires an approach that identifies patterns, categories, and dimensions not considered in the local literature.

3.1. Research Design

The design is structured in one phase, using qualitative data collection techniques such as semi-structured interviews and focus groups. These techniques facilitate discussion spaces where participants freely express their perceptions, obstacles, expectations, and fears about the use of AI in customer service.

The process begins with the planning and design of instruments, followed by the collection, analysis and interpretation of data, and the process delves deeper into the findings (Guevara et al, 2020) .

3.2. Sample

The study was conducted at the Red Emprendedoras Popayán Foundation (Cauca, Colombia), which comprises 55 members and their respective microenterprises. Seventeen entrepreneurs from the Foundation were selected using non-probability, purposive sampling.

Selection criteria include: prior experience in the sector, willingness to embrace technological innovation, and interest in adopting or having implemented some type of AI or digital tools in their customer service processes.

Additionally, interviews were conducted with three experts in AI and customer service, selected for their academic and professional backgrounds. The inclusion of these participants enriches the analysis, contrasts perspectives, and provides a specialized frame of reference that contextualizes the entrepreneurs' perceptions.

3.3. Restrictions or limitations

Limitations of this research include response bias, given that participants may have different levels of familiarity with AI.

On the other hand, communication barriers, time constraints, and difficulty accessing knowledge affect the analysis. Therefore, the qualitative nature of the study limits the generalizability of the findings to other contexts or similar populations.

3.4. Techniques

Qualitative techniques, such as semi-structured interviews, were used to explore the perceptions, knowledge, experience, and expectations of AI and customer service professionals. These interviews were based on a validated, flexible script that connects thematic axes to adapt the questions according to the development of the conversations and the contributions of each interviewee (Rodriguez et al., 2021) .

A focus group was conducted with women micro-entrepreneurs in sessions where participants discussed topics related to the advantages, barriers, conditions, and challenges associated with adopting AI in their customer service processes. The objective was to promote interaction, the exchange of

experiences, and the construction of meaning among the participants, generating nuanced data and perspectives that emerged from the dynamics of the discussion.

Both techniques complement each other: interviews provide in-depth technical expertise, while focus groups contribute the user perspective. This methodological triangulation strengthens the validity and reliability of the findings.

3.5. Procedures

The process begins with the development and validation of interview guides and focus group materials through pilot testing with a select group of participants. Interviews and focus group sessions are conducted on virtual platforms, with authorized recording and verbatim transcription of the dialogues. It was necessary to code and analyze the transcripts to organize and categorize the information in order to identify perceptions, obstacles, needs, and expectations related to the implementation of AI in customer service.

3.6. Categories

Due to their qualitative nature, the variables are: communication, technological adaptation, organizational benefits, implementation challenges, and customer perception.

Well, the analytical dimensions are technical aspects of AI implementation and elements of customer service.

3.7. Information Processing

In qualitative research, the analysis is based on interpretation, through the coding of transcripts (Cohen et al., 2018) . An analysis of patterns and trends is conducted, identifying categories and relationships between them, to construct a narrative about the participants' perceptions and experiences regarding the integration of AI in customer service in micro-enterprises. The findings are validated through contrast and triangulation of the collected information.

4. Results

The analysis identifies the advantages and disadvantages of AI:

Table 1. *Advantages and disadvantages of AI*

Advantages	Disadvantages
Massive data processing	Violation of rights
Personalized care	The difficulty of accessing the data
Advance prediction	The lack of qualified professionals

Advantages	Disadvantages
Complement to human talent	The cost of its development
Task automation	Job losses
Higher productivity	Technology dependence
Focus on complex cases	Lack of empathy and ethics
Improving the quality of interactions	The lack of personalization

Source: Prepared using information from VIU (2024)

Implementing AI in customer service offers benefits to the consumer experience. However, some systems lack personalized adaptability in complex customer service situations.

Furthermore, the information gathered in the focus group identifies the implementation of AI systems in customer service and improvements in management. Among the key findings are:

Table 2. *Categories of Artificial Intelligence in micro-enterprises for customer service*

Category	Sub categories	Findings
Communication	Digital interaction	Using WhatsApp and Facebook
	Personalization	Main benefit of AI
	Direct contact	Facilitates campaign optimization
Technological Adaptation	Generational Gap	Appeal varied by age
	Technological Knowledge	It depends on prior knowledge
	Technological Difficulty	Problems with technology for seniors
Organizational Benefits	Operational Efficiency	Streamlining processes
	Boost to Microenterprises	Skills strengthening
	Innovation	Perception of an innovative tool
Implementation Challenges	Loss of Warmth	Reduction of personal contact
	Human-AI Balance	Need for balance
	Creativity	Risk of creative loss

Category	Sub categories	Findings
Customer Perception	General Provision	Agreement with implementation
	Knowledge Dependency	Influence of prior knowledge
	Perceived Reality	Assessment of the type of AI

Source: Own elaboration

Customer-company interaction demonstrates the digital transformation of their communication processes. WhatsApp and Facebook are predominant, leading to technological adoption aligned with tools used by entrepreneurs and customers.

There is also tension in technological adaptation due to the generational and cognitive challenge, which emerges as a factor in the management of AI from age-related and experiential aspects.

Regarding organizational benefits, AI is a catalyst for growth, as a business development tool that generates efficiency in processes.

Therefore, the skills strengthening proposes that participants perceive AI as a tool and mechanism for training, development and innovation.

The challenges of implementing automation and humanization highlight the concern about reducing personal contact. These challenges affect the core values of micro-enterprises, proving to be a key factor for harmonious integration.

Customer perception is paramount in the adoption process, as agreement with the implementation is positive. However, customer insights and assessments of AI indicate uneven acceptance. Differentiated strategies are required, depending on the customer profile and the type of technology implemented.

Next, the triangulation of the analysis determines:

Table 3. *Triangulation of the analysis*

Dimension	Sub categories	Aspects	Triangulation
Communication	Challenges	Personal contact and personalization	Consistent need for personalized and direct communication
	Digital interaction	Predominance of WhatsApp and	

Dimension	Sub categories	Aspects	Triangulation
		Facebook	
	Benefits of AI	Direct communication	
Technological Adaptation	Challenges	Difficulty for elderly people. Displacement of labor.	Generational gap
	Customer Reaction	Dependence on prior knowledge	
Perception of Value	Benefits of AI	Streamlining processes Customization	Recognition of the transformative potential of AI
	Customer Reaction	Importance of the type of AI	
	Provision	Total consensus on implementation	

Source: Own elaboration

The main findings from triangulation show three areas:

- Customer-centric communication emphasizes the importance of personalized communication, preserves the human factor, and strengthens relationships.
- The complexity of technology adoption demonstrates the generational variability in the acceptance of new technologies . It highlights the importance of knowledge, user training, and the need for inclusive strategies in technology implementation.
- In the strategic value of AI, there is a consensus of transformative potential, recognizing its benefits in efficiency, process improvement, and experience.

The results of interviews with experts address the topic of AI and its integration into micro-enterprises. Benefits for adapting systems are highlighted, including improved customer segmentation, market analysis, streamlined processes, reduced turnaround times, and increased productivity.

However, these benefits can only be achieved if the following is taken into account:

- The transformation of organizational culture, in order to create habits of orderly data collection and implement actions that are the basis and feed of AI systems.

- A commitment to continuous learning and staff training prevents data mishandling and ensures accurate information. For effective data management, prompts— clear instructions or questions— are used to obtain the desired data.

- Implementing the systems in a progressive and scalable manner achieves adaptation to the systems, greater control over actions and decisions regarding their use.

- Strengthening a balance between AI systems and human essence preserves warmth with the customer.

4.1. Current state of customer service

The data obtained in the focus The group work and interviews reveal the current state of micro-enterprises and their level of implementation of AI systems. This highlights informality, limitations in time, resources, knowledge, and perception regarding the topic.

There is also an initial to intermediate level of technological adoption, as many are willing to implement this technology. Effective adoption is led by a small group that uses AI-powered systems such as WhatsApp Business , Canva (for image and content enhancement), and chatbots ; others are in the exploration or early implementation stages.

The above demonstrates a potential for growth in technological adoption, a trend towards greater use of technologies that optimize efficiency and communication.

4.2. AI systems currently in use

Due to the interest of micro-enterprises in the implementation of AI, the systems currently used in business are identified in different literary sources:

Table 4. *Studies on the use of AI systems in customer service management*

Author	Types of AI Systems	Results
Cervantes et al. (2022)	Customer Management Systems Centric	Proposal for the implementation of a customer-centric system.
Flores et al. (2024)	Chatbot	Improvement in the management of technical support bookings.
(Cordero et al. (2022)	Chatbot , Machine Learning System	Improvement in customer satisfaction
Caicedo et al. (2023)	AI algorithms based on socio-behavioral profiles	Intelligent customer segmentation.
Vivas and Cueva (2024)	Chatbot	Optimization in order management, and customer satisfaction.
Murillo et al. (2024)	Chatbot	Analysis of AI use in micro-enterprises
Daza et al. (2020)	Machine Learning	Competitive advantages in SMEs.

Source: Own elaboration

Initially, three types of AI systems are detected:

- Chatbots , most commonly used in micro-enterprises .
- Machine learning systems: learn and improve without being regularly programmed
- Customer-centric systems: analyze customer behavior and needs.

Challenges such as economic and knowledge limitations, which hinder the effective adoption of AI, are also acknowledged. Even so, most of these studies offer solutions such as training programs and collaborations to generate AI's impact on customer satisfaction.

4.3. AI systems for micro-enterprises

Various cross-cutting AI systems are discovered to boost customer service management in micro-enterprises, identifying their cost and acquired benefit:

Table 5. *AI Systems Trends for Microenterprises in 2025*

AI System	Cost	Benefit
Dialogflow (Google)	Free plan available	Automated customer service , improving response times
Hugging Face	Open source and free	Analyze customer reviews, automate responses, and personalize communication.
Rasa	Open source and free	Automated customer service without relying on third-party platforms.
OpenAI GPT-2	Open source and free	Supports in the creation of content for social media, automated messages and customer service.
TensorFlow	Free and open source	It offers tools to create customized solutions.
Zendesk	Starting at $5 USD per agent/month	Organize and automate customer service and case tracking.
Salesforce Einstein	Subscription required	It helps make data-driven business decisions and improves customer management.
Microsoft Azure AI	Pay-per-use model	It allows scaling up support and analysis services according to the needs and capacity of the microenterprise.

Source: Own elaboration

These systems are designed to improve performance and facilitate results. They can be applied in any area or function to address contexts where businesses constantly experience common limitations in time, resources, and technical capabilities, which hinder their evolution and growth.

Customer service systems include tools such as WhatsApp Business API, ChatGPT for Customer Service, Rappi Business , Google My Business, Facebook Messenger Business, and Instagram Direct. These are low-cost or free systems, and are well-known to local businesses.

With the information provided by the participants, the tools are combined: according to the type of business, consumer behavior, expected interaction, product or service offered and its communication.

One of the most notable tools is WhatsApp Business, due to its ease of use, market reach, and ability to offer immediate, automated, and personalized support . It complements other tools and impacts the purchasing process and effective communication.

5. Discussions

The findings confirm the correlation between AI's theoretical foundations and its application in microenterprises, validating transformative opportunities and implementation challenges. Arango's (2021) conceptualization of AI as a set of solutions derived from business data reaffirms the existence of behaviors and uncertainties surrounding the implementation of new technologies.

Furthermore, the predominance of WhatsApp and Facebook as customer-business interaction platforms demonstrates a pragmatic technological adoption. Therefore, this validates the assertion by Silva et al. (2023), who affirm that conscious and appropriate adoption in micro-enterprises leads to protected and solid growth in the market.

Selective adoption contradicts Muñiz's (2023) expectations of radical transformation, with more disruptive incremental patterns, because micro-entrepreneurs prioritize functionality over technological sophistication, maximizing impact with minimal operational complexity.

Thus, the literature emphasizes the capacity for mass customization of AI (Lalaleo-Analuisa et al., 2021; Abdul et al., 2025), but micro-entrepreneurs perceive the lack of customization as a disadvantage, and this suggests that it does not equate to the traditional relational customization of micro-enterprises.

This reinforces the importance of the correct formulation of " prompts " according to Pepinosa (2023), to cover the need to preserve the human essence in commercial interactions.

According to VIU (2024), age-related limitations necessitate differentiated implementation strategies and challenge the prospects for homogeneous adoption. Furthermore, the reliance on prior knowledge reinforces the importance of training programs proposed by Minciencias (2024) to strengthen technical skills and address the predispositions of different age groups.

Thus, the results validate Contreras and Olaya's (2024) proposal regarding AI as a complement to human talent, adding that a human-AI balance is imperative for acceptance and sustainability. In contrast to the total consensus on implementation, the authors highlight resistance to change and suggest a willingness to embrace contextualized AI, which is also perceived as an innovative tool.

There are points of agreement with Macías's (2021) projections regarding the benefits being contingent upon prior organizational cultural transformation. This entails cultural evolution and data collection that contribute to organizational changes enabling systemic transformation.

6. Conclusions

It is concluded that this study contributes to scientific knowledge by identifying patterns for AI adoption in microenterprises. The findings discuss how personalization, human-AI balance, and transformation enrich the theoretical understanding of the topic.

The results point to lines of research such as the development of implementation frameworks, considering generational, cultural, and relational dimensions, differentiated training methodologies, and human-AI balance metrics.

Similarly, the implementation of AI improves efficiency and productivity in customer service through fast and personalized responses, provided that prompts are used appropriately , training is provided, and its limitations are understood, in order to maximize benefits and ensure effective communication.

Likewise, the risks of data reliability and loss of human contact require supervision and ethical regulation, for a change in organizational culture oriented towards continuous learning.

Previous research confirms that AI acts as a support tool, not a replacement for humans, enhancing innovation, customer satisfaction, and sustainability. The use of these tools requires development in analytical and critical thinking skills.

Finally, entrepreneurs demonstrate an understanding of technology and prioritize hybrid approaches that preserve the human dimension as a characteristic of their ventures.

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