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Quality and digitization in the SMES of the sector commercial: impact and strategies

Qualidade e digitalização nas PME do setor comercial: impacto e estratégias

Calidad y digitalización en las PYMES del sector comercial: impacto y estrategias

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Abstract

This study examines the influence of digitalization on the perception of quality in SMEs in the commercial sector, highlighting its relevance in improving products and services through effective digital strategies. The objective of this article is to analyze how digitalization impacts the quality perceived by customers. An explanatory methodology with a quantitative approach was used, employing a questionnaire applied to a sample of 359 SMEs in the commercial sector. Aspects such as the implementation of digital strategies, technological integration, and quality processes were evaluated. The results revealed a positive correlation between the adoption of advanced technologies, such as artificial intelligence, and the perception of high quality. Additionally, most companies reported improvements in operational efficiency and service quality, underscoring the importance of training in digital technologies. However, challenges were identified, such as a lack of digital skills and high implementation costs. This analysis suggests that effective technological integration is crucial to improving customer satisfaction and market competitiveness.

Keywords: Quality. Competitiveness. Digitalization. Artificial Intelligence. SMES.

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Technologies Advanced.

Resumo

Este estudo examina a influência da digitalização na percepção da qualidade nas PMEs do setor comercial, destacando sua relevância na melhoria de produtos e serviços por meio de estratégias digitais eficazes. O objetivo deste artigo é analisar como a digitalização impacta a qualidade percebida pelos clientes. Foi utilizada uma metodologia explicativa com abordagem quantitativa, empregando um questionário aplicado a uma amostra de 359 PMEs do setor comercial. Foram avaliados aspectos como a implementação de estratégias digitais, integração tecnológica e processos de qualidade. Os resultados revelaram uma correlação positiva entre a adoção de tecnologias avançadas, como inteligência artificial, e a percepção de alta qualidade. Além disso, a maioria das empresas relatou melhorias na eficiência operacional e na qualidade do serviço, ressaltando a importância do treinamento em tecnologias digitais. No entanto, foram identificados desafios, como a falta de habilidades digitais e os altos custos de implementação. Esta análise sugere que a integração tecnológica eficaz é crucial para melhorar a satisfação do cliente e a competitividade no mercado.

Palavras-chave: Qualidade. Competitividade. Digitalização. Inteligência Artificial. PMES. Tecnologias Avançadas.

Resumen

Este estudio examina la influencia de la digitalización en la percepción de la calidad en las pymes del sector comercial, destacando su relevancia en la mejora de productos y servicios a través de estrategias digitales eficaces. El objetivo de este artículo es analizar cómo la digitalización impacta la calidad percibida por los clientes. Se utilizó una metodología explicativa con enfoque cuantitativo, empleando un cuestionario aplicado a una muestra de 359 pymes del sector comercial. Se evaluaron aspectos como la implementación de estrategias digitales, la integración tecnológica y los procesos de calidad. Los resultados revelaron una correlación positiva entre la adopción de tecnologías avanzadas, como la inteligencia artificial, y la percepción de alta calidad. Además, la mayoría de las empresas informó mejoras en la eficiencia operativa y en la calidad del servicio, subrayando la importancia de la capacitación en tecnologías digitales. Sin embargo, se identificaron desafíos, como la falta de habilidades digitales y los altos costos de implementación. Este análisis sugiere que la integración tecnológica eficaz es crucial para mejorar la satisfacción del cliente y la

competitividad en el mercado.

Palabras clave: Calidad. Competitividad. Digitalización. Inteligencia Artificial. PYMES. Tecnologías Avanzadas.

Introduction

The definition of quality is not a single and universal concept; there are diverse contributions from researchers who have dedicated their efforts to studying this concept, which is associated with compliance with specified characteristics established by the organization (Escobar & Mosquera, 2013). Since the 19th century, greater importance has been given to inspection in the production process, initially focused on industry. In this century, the application and study of quality have extended to all organizational processes, considering that quality must be embedded as an integral part of institutional philosophy (Abá & González, 2023).

According to NTC ISO 9001:2015, an organization that bases its actions on quality guidelines can transform its culture towards customer satisfaction, addressing the needs and expectations of customers and stakeholders. Managing quality in organizations, regardless of economic activity, size, location, and number of workers, involves improving the qualification of products, services, and processes, enhancing communication between areas, increasing effectiveness, and equipping the organization and its human talent to achieve set objectives. This grants added value and tools to compete in a highly globalized market (Caballé & Rodríguez, 2020).

During the 1990s, quality management became a common term among organizations worldwide. Many companies were compelled by their clients to implement quality models and seek certification of their processes as a prerequisite to entering different markets. This was driven by global competition, consumer awareness of quality, and the pursuit of status and worldwide recognition. This perspective aligns with Romeu et al. (2019), who emphasize technological evolution as a driver of new competitiveness based on business dynamism and flexibility, not only in product production processes but also in management structures.

Some organizations pay little attention to quality, which is not part of their corporate strategy, a situation described as an "absence of quality" by Lapina & Aramina (2015). In the current era dominated by unprecedented technological advances, companies face the constant

challenge of adapting to a rapidly evolving digital environment. Digitalization has radically transformed how organizations operate and how customers interact with services offered.

Integrating new technologies into business operations, alongside the efficiency and effectiveness of digital strategies, plays a significant role in shaping this perception of quality (Pacheco & Rodriguez, 2019). As the market becomes more competitive and user expectations evolve, companies need to implement advanced technological solutions and ensure these innovations translate into added value for customers. Understanding how technological integration affects quality has become a strategic priority (Perez et al., 2018).

According to Zayas et al. (2015), companies today face the need to integrate advanced technologies to maintain competitiveness and meet consumer expectations. Artificial intelligence (AI) has become a critical component in this process, transforming how organizations interact with customers and optimize operations. AI not only enables efficient process automation but also improves decision-making, personalizes the customer experience, and enhances operational efficiency. By integrating these systems, companies can analyze large volumes of data in real-time, identify patterns, predict market trends, and personalize services to meet customers' specific needs.

Digitalizing operations in organizations allows significant improvements in operational and administrative efficiency, processing feedback, and behavioral data more quickly and accurately than traditional methods. This results in a substantial improvement in service quality, as companies can rapidly adjust strategies and operations in response to user expectations and preferences, contributing to ongoing innovation in products and services (Pacheco & Rodríguez, 2019).

However, the adoption of digital technologies in SMEs can be analyzed through the Technology Acceptance Model (TAM), emphasizing perceived usefulness and ease of use as key determinants of technological adoption (Yong et al., 2010). Recent findings corroborate this model, indicating broader and more satisfactory adoption of digital technologies in companies perceiving significant improvements in efficiency and service quality thanks to these technologies (Yong, 2004).

The document structure begins with a literature review situating the study within the framework of previous research, followed by a detailed methodology description. The results are then presented and discussed in the current context of the digital transformation of SMEs in the commercial sector. Finally, conclusions summarize the main findings and propose future research directions to continue exploring the interaction between digitization and

quality in commercial companies.

Theoretical Framework

Managing quality involves a series of systematic and structured activities aimed at ensuring that products or services meet customer expectations and requirements. Alvarez et al. (2014) highlight that the primary goal of these activities is the continuous improvement of the effectiveness and efficiency of internal organizational processes to enhance customer satisfaction and profitability.

Bayazit & Karpak (2013) present quality management as a systematic and strategic approach to organizational administration that seeks to meet or exceed customer and other stakeholder needs and expectations. Complementing this vision, Benzaquen & Convers (2015) emphasize the active participation of all organization members in the continuous improvement process and effective implementation of quality management.

Cruet et al. (2020) define quality management as a strategic approach focused on ensuring that offered products or services meet customer requirements and expectations through continuous planning, control, improvement, and evaluation of organizational performance in terms of quality.

Significant developments in quality management models provide a structured framework to assess and improve organizational performance in quality. These models include principles, criteria, and practices that help organizations establish efficient processes, improve customer satisfaction, and achieve consistent results. Notable models include:

Total Quality Management (TQM): Management philosophy that emphasizes continuous improvement of quality in all aspects of the organization, focusing on customer satisfaction customer and the stake of all the employees (Benzaquen, 2018)

Six Sigma: Methodology that focuses on continuous improvement and reduction of variability in processes, with the aim of minimizing defects and errors and achieving tall levels of performance (Herrera et al, 2017)

Lean Manufacturing: Approach that seeks to eliminate waste and improve efficiency in production processes, originating in the Toyota production system and applied in various industries to maximize value for the client (Palange & Dhatrak, 2021).

ISO 9001: International standard that establishes the requirements for a management system effective quality control, applicable to any type of organization and focused on

improvement keep going and satisfaction the client's (ICONTEC, 2015).

On the other hand, it is important to note that, in the current digital economy, small and medium-sized companies (SMEs) face the constant challenge of transformation digital and innovation to remain competitive. Faridi & Malik (2020) highlighted how Al- Rumman Pharma have overcome these challenges by emphasizing the need for a management of change effective and a adaptability technological in the chain of supply. This approach strategic is essential for the quality and the differentiation in a market crowded. Parallel, Chaudhary & Suri (2021) analyzed the influence of the platforms of and- commerce in he marketing agricultural, it which can be a lesson valuable for the SMEs in other sectors. They identified critical factors such as trust, cost and ease of use that can be essential for SMEs when adopting new technologies.

These investigations highlight the importance of a holistic approach in the acquisition and management technological, underlining that the technology no only has to be adopted, but integrated of shape that align the operations with the strategies commercial further wide of the company. The ability of a SME for implement and sync up are digital tools with your business vision will determine your ability to innovate and grow (Bricio et al, 2018).

On the other hand, digitalization offers SMEs opportunities to improve efficiency operational, increase the satisfaction of the customer and create new Models of business, in this sense, the research of (Estrada et al, 2019; Roque et al, 2017) provide a frame to better understand how the SMEs they can and they must adapt to rapid technological innovations and underline the importance of facilitating conditions and adequate support so that SMEs can take advantage indeed he potential of the e- commerce and others tools digital for he development and the expansion commercial.

Finally, the SMEs they must consider the digitization as a initiative comprehensive strategy, not only to survive but to thrive in the digital age. This it implies a change of mindset from the high management until the employees, focusing in training, change management and investment in appropriate technology, aligned with long-term business objectives (Faridi & Malik, 2020; Chaudhary & Suri, 2021). With this strategic and operational approach, SMEs can transform the challenges of digitalization in advantages sustainable competitive.

Methodology

The study adopted an explanatory research design, which provides insight comprehensive and detailed description of how a phenomenon occurs and exploring the reasons why originate (Gaucchi, 2017). This method was used to quantify and analyze the influence of digital strategies on the perception of quality in SMEs, through this approach, it was possible to carry out a detailed and precise evaluation of the impact of said variables, which significantly facilitated the identification of patterns and trends relevant in the commercial sector.

A representative sample of 359 companies was selected from a total of 5,320 SMEs in the commercial sector of Ocaña, Colombia, ensuring statistical representativeness with a 95% confidence level and a 5% margin of error. The distribution and collection of questionnaires were conducted electronically, optimizing respondent participation and data collection.

The structured surveys were designed to assess various aspects, including the implementation of digital strategies to improve product and service quality, technological integration, barriers and challenges to implementation, and the need for investment in digital training. These instruments were rigorously validated by field experts, ensuring relevance and accuracy. Cronbach's Alpha was 0.89, confirming the reliability of the scales used, ensuring robust and reliable results.

Results and Discussions

In the research conducted on the quality and digitalization of SMEs in the commercial sector, significant results have been obtained that describe the most commonly used digital strategies to improve the quality of products and services. The study highlights the importance of investment in training and developing human resources, the main challenges and barriers faced by the organizations under study, and their perception of the contribution of new technologies to customer satisfaction. The findings provide a rigorous assessment of technological implementation and its effect on organizational efficiency, offering essential perspectives to understand areas of strength and opportunities for improvement in commercial companies as they navigate digitalization with quality standards.

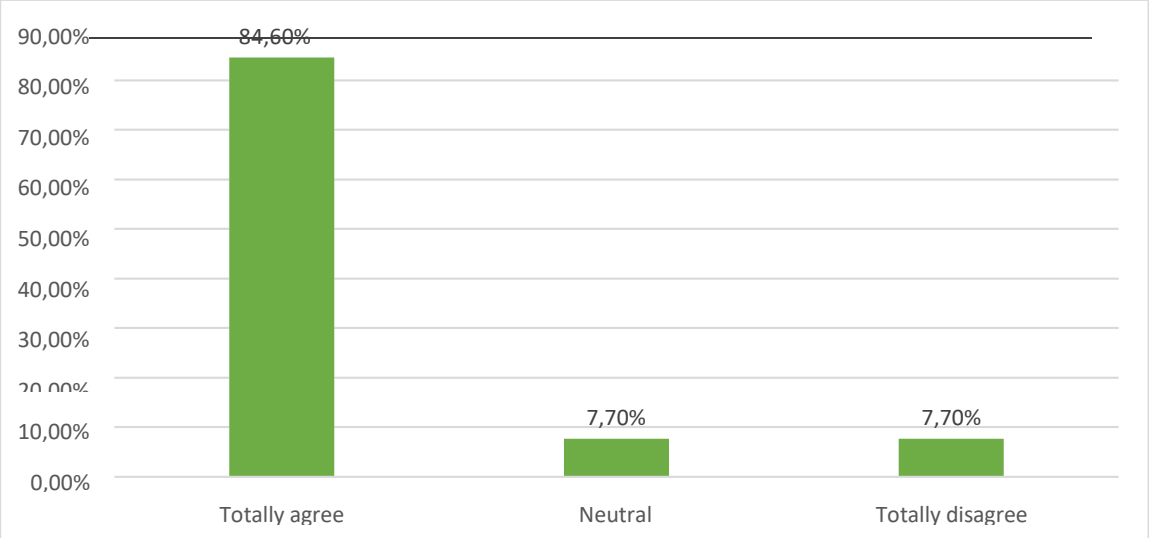
4.1 Effectiveness of The Strategy Digital Implemented by the Company for Keep and Improve the Quality of their Products and Services

With regard to the correlation between the digital strategies implemented by the companies and their internal perception of the quality of the services offered, a positive correlation was observed between the development and implementation of robust digital strategies and the perception of high quality. The companies reported a positive assessment of their own operations, demonstrating a clear commitment to digitization, evidenced by the adoption of advanced technologies and the personalization of the customer experience.

Furthermore, the importance of efficient technological integration within digital strategies was highlighted. Companies that successfully implemented new technologies, especially in the realm of digital marketing and, to a lesser extent, artificial intelligence, in their operational processes not only managed to improve their operational efficiency but also experienced a notable increase in the quality of the services they provide.

Figure 1

Use of strategies digital for improve the quality of the products and services



Source: Authors' own work

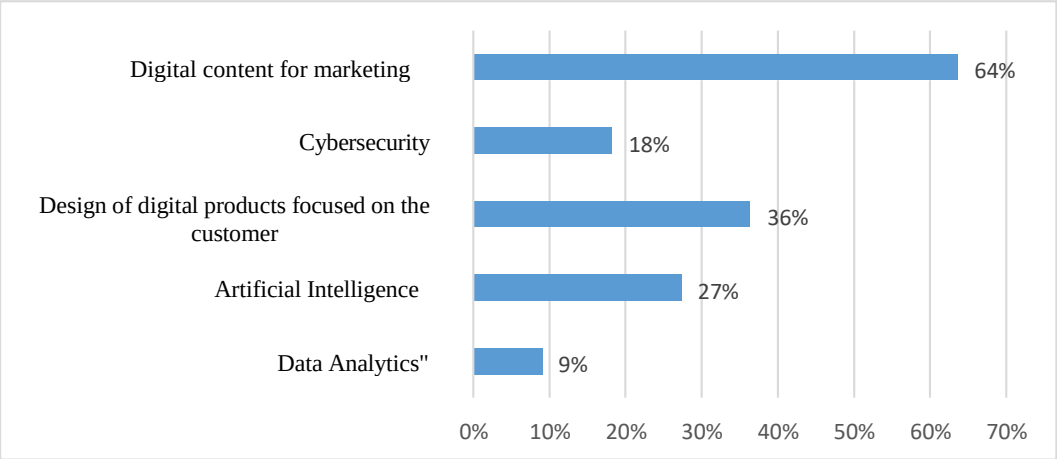
As seen in figure 1, the majority of respondents (84.6%) are completely in agreement that the companies have a clear digital strategy to maintain and improve the quality of their products/services. This indicates a very positive perception of the digital policies and strategies of the companies surveyed. Only a small percentage of respondents, 7.7% for each

of the categories "Neutral" and "Completely in disagreement," are not convinced or are unsure of the effectiveness or clarity of these strategies. This suggests that almost everyone has a formed opinion about the strategy, whether positive or negative, with very few undecided.

Given the previous results regarding the perception of digital strategies, management can consider this as validation of their current efforts. However, it is also crucial to address the concerns of the small group that disagrees or is neutral to understand their perceptions or criticisms, which could provide valuable information for ongoing improvement.

Figure 2

Strategies implemented in the companies commercial



Source: Authors' own work

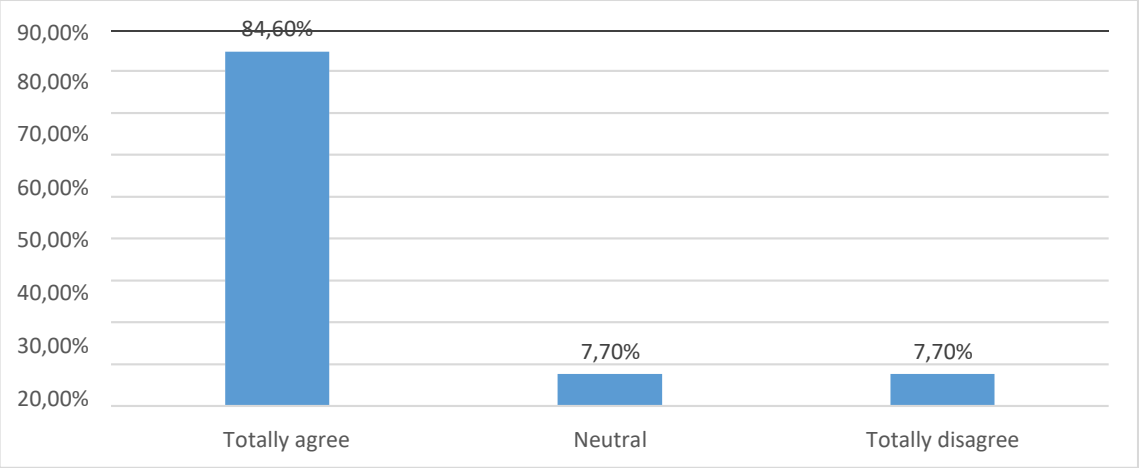
Figure 2 reflects the distribution of strategic approaches in the companies studied, highlighting that most resources are channeled towards digital content for marketing, occupying a dominant 64%. The design of digital products that take into account the customer also receives considerable attention with 36%, evidencing a user-centered strategy in which e-commerce communication platforms and mobile applications are highlighted to optimize the purchasing process. Artificial intelligence and cybersecurity are also relevant aspects, with 27% and 18% respectively, indicating an investment in advanced technology and the protection of digital infrastructure. Surprisingly, data analytics seems to be less prioritized, with only 9%, suggesting an opportunity to strengthen data-driven decision-making within the organization.

4.2 Impact of the Integration of New Technologies in the Operations of SMEs in the Sector Commercial

In the current era of digital transformation, small and medium-sized businesses (SMEs) in the commercial sector face the constant challenge of adapting to rapid technological innovations. The integration of new technologies not only promises to improve operational efficiency but also enhances the quality of the products and services offered, a critical factor in the competitiveness and sustainability of these companies.

Figure 3

Impact of the integration of digital technologies in the operations of the companies.



Source: Authors' own work

In the analysis of the effectiveness with which companies integrate digital technologies into their operations, Figure 3 highlights that a considerable majority, 84.6%, affirm with conviction their competence in this area with conviction, evidencing significant alignment with modern digital practices. A smaller number, 7.7%, abstains from a definitive judgment, remaining neutral, while another 7.7% disagree, which could indicate a lack of full integration or challenges yet to be overcome. These data reinforce the idea that most entities recognize and capitalize on the benefits of digital technologies to optimize their workflows and services.

It was found that the integration of advanced technologies optimizes the operational processes of companies, resulting in faster and more reliable product delivery. This operational efficiency was identified by the companies as a key indicator of quality, positively influencing the overall perception of their own operations.

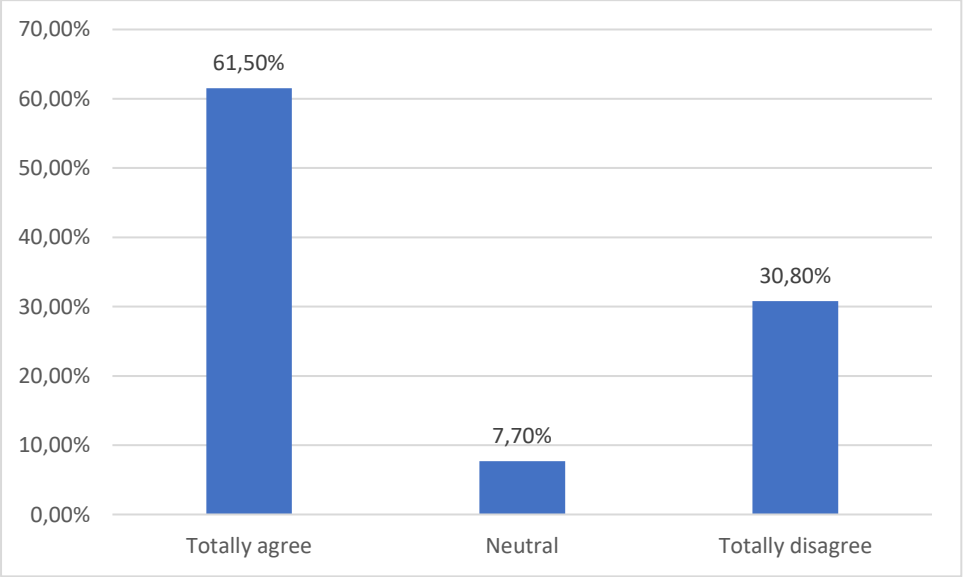
4.3 Investment in the Training and Training of your Employees to Adapt to the Technologies Digital

In a market increasingly influenced by digitalization, a company's ability to remain competitive crucially depends on its investment in the training and development of its employees. As digital technologies evolve and are integrated into all aspects of business operations, it is essential that human capital is not only familiar with these tools but can also use them effectively to optimize processes and improve customer service. This approach not only increases operational efficiency but also empowers employees, fostering an innovative and receptive work environment.

It is important to highlight that investment in training and professional development in the use of digital technologies can transform an organization's capabilities, increasing its adaptability and success in a dynamic commercial environment. This strategy promotes the development of dynamic capabilities, allowing the company to not only respond efficiently to rapid changes in the market but also to anticipate and capitalize on emerging opportunities. By enhancing their skills, organizations become more agile and proactive, improving their long-term competitiveness and sustainability.

Figure 4

Investment in training



Source: Authors' own work

The analysis of figure 4 indicates that a significant majority, corresponding to 61.5%

of the companies, state with certainty that their organization makes considerable investments in the training of their human capital for qualification, updates, and adaptation to digital technologies. On the other hand, 30.8% consider that such efforts are insufficient or non-existent, highlighting an area of potential improvement for a not insignificant proportion of the companies evaluated. A smaller segment, 7.7%, remains undecided, which could suggest an ongoing transition or evaluation. These results suggest that, despite a positive trend towards the development of digital skills within the workforce, there remains a notable group of entities that recognize the need to strengthen these training initiatives.

4.4 Challenges and Barriers that They Have Faced the SMEs in the Implementation of Strategies Digital

The integration of digital strategies into the operational fabric of small and medium-sized companies (SMEs) in the commercial sector is a complex and multifaceted process, presenting both unprecedented opportunities and significant challenges. In the quest for efficiency, innovation, and an improved customer experience, these companies embark on a path towards digital transformation that requires considerable investment in resources, time, and strategy. From the digital skills gap to organizational resistance, each challenge has the potential to slow progress and affect the quality of service or the final product. This exploration seeks not only to identify common problems but also to highlight priority areas for development and future investment, ensuring that the digital strategies implemented are both effective and sustainable.

Table 1

Challenges and barriers that they have faced the SMEs in the implementation of strategies digital

Challenges	Never (%)	Rarely (%)	Occasionally (%)	Frequently (%)	Very Frequently (%)
Lack of digital skills within the staff	5	15	15	35	30
High implementation and maintenance costs	5	15	20	30	25
Resistance to change by employees	15	15	15	30	25
Technical difficulties with digital tools or platforms	10	25	30	25	10
Cyber insecurity or data privacy issues	10	20	25	25	20
Poor integration with existing systems	10	10	20	35	25

Source: Authors' own work

In table 1, it can be seen that the challenge most frequently reported by commercial SMEs in the digitalization process is the lack of digital skills among personnel, with 50% of the companies experiencing it frequently or very frequently. Elevated costs of implementation and maintenance also represent a significant concern, with 45% of responses in the same frequency categories. Resistance to change on the part of employees appears to be less common, but still notable, with 20% of companies experiencing it frequently or very frequently. Technical difficulties with digital tools or platforms are the second most common challenge, with 35% of companies surveyed. Regarding cyber insecurity or data privacy issues, and poor integration with existing systems, these challenges are distributed more evenly along the scale, although 35% and 20%, respectively, still report facing these problems frequently or very frequently. Overall, these data suggest that, although SMEs are committed to digitalization, there are significant areas of challenge that require attention, with digital skills and costs being the most notable.

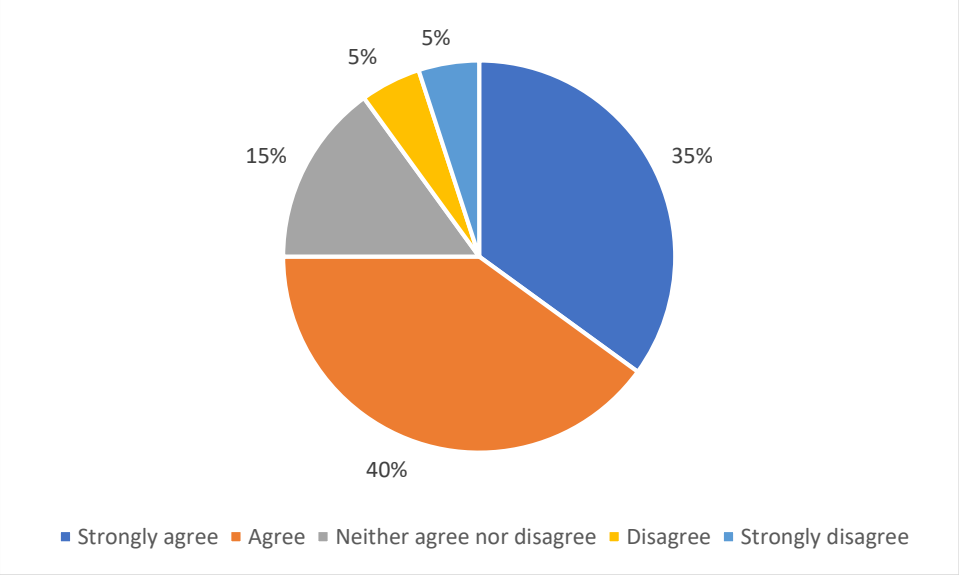
4.5 Integration of New Technologies and His Contribution to the Improvement of the Satisfactionthe Client's

In the era of digitalization, the adoption of new technologies by SMEs in the commercial sector has become a cornerstone for the continuous improvement of customer experience. The accelerated pace of technological innovation promises to transform business

interactions, offering opportunities to personalize service, optimize response times, and increase efficiency at all customer touchpoints. However, the true measure of success in these initiatives is reflected in customer satisfaction, a critical indicator that drives long-term loyalty and growth. By investigating this dimension, we aim to offer a deeper understanding of how digitalization strategies can be a catalyst for strengthening customer relationships and improving their overall experience.

Figure 5

Contribution of the new technologies for improve the satisfaction of the customer



Source: Authors' own work

Figure 5 indicates a positive trend in the perception of SMEs in the commercial sector regarding the contribution of digital technologies to improving customer satisfaction. A significant majority, 75% of those surveyed, express agreement with the statement, divided between those who are "Totally Agree" and those who are simply "Agree". This suggests that a large proportion of companies perceive a direct and favorable link between digitalization and customer experience. Only a small percentage, 10%, disagree with this statement, which could reflect specific challenges or unmet expectations regarding the effectiveness of the technology. The "Neither Agree Nor Disagree" category represents 15% of the participants, which could indicate neutrality possibly due to mixed or insufficient results in the implementation of technologies that affect customer satisfaction. Overall, these results emphasize the relevance of technological integration as a perceived factor of improvement in customer relationships within the commercial sector.

The findings of this study indicate that the adoption of robust digital strategies is perceived internally as synonymous with high quality, which aligns with greater customer satisfaction and loyalty. Most companies agree that having a clear digital strategy reflects a positive assessment toward digitalization as a central axis for the improvement of products and services.

However, the challenges are not limited to the implementation of digital tools but also to their effective integration into daily operations. The study highlights the importance of a smooth transition to digital marketing, customer-focused digital product design, and artificial intelligence to improve operational efficiency and the quality of products and services. A considerable percentage of companies confirm their ability to successfully incorporate these technologies, highlighting the importance of a solid digital infrastructure for current market competitiveness. This aligns with Bernal and Rodriguez (2019), who argue that the adoption of information and communication technologies (ICT) is invaluable, allowing organizations to add value to their operations and gain essential competitive advantages in a globalized commercial environment.

The training of human talent emerges as a fundamental pillar in this process of digital transformation. More than half of the surveyed organizations recognize their investment in training employees in digital technologies, highlighting a commitment to developing the necessary competencies for adapting to and maximizing new tools. This approach aligns with Castellanos et al. (2009), who maintain that achieving greater competitiveness and sustainability in the knowledge society requires adopting new technological skills. However, there remains considerable room for improvement, as some respondents pointed out the absence of such investment, indicating a key opportunity for enhancement.

Regarding the challenges during the implementation of digital strategies, the main barrier identified is the lack of digital skills within human capital, followed by the costs associated with the implementation and maintenance of these strategies. Additionally, resistance to change and technical difficulties present significant obstacles that require strategic attention for effective integration.

Improvement in customer satisfaction is recognized as a direct result of digitization, with a high percentage of participants stating that the integration of new technologies has had a positive impact in this aspect. This indicator reinforces the need for a digital strategy that not only focuses on technology adoption but also on value creation and customer experience.

To confront these findings with existing theories, we can refer to the Technology

Acceptance Model (TAM), which suggests that perceived usefulness and ease of use influence technology adoption. Accordingly, our study evidences that the perception of digital technologies as tools that improve efficiency and service quality not only positively influences their adoption but also promotes deeper and more satisfactory integration within business operations, aligning with Yong et al. (2010).

Conclusion

The findings reveal that a clear and well-defined digital strategy is fundamental for the successful implementation of technologies that enhance the quality of products and services. A large majority of respondents confirm that their commercial companies have robust digital strategies, correlating with an internal perception of high quality and greater customer satisfaction.

The effective integration of new technologies such as digital marketing, digital product design, and AI has resulted not only in improvements in operational efficiency but also in the quality of the services offered. This integration, when carried out smoothly, is directly associated with significant improvements in organizational processes. Additionally, it has been identified that investment in training and professional development in digital technologies is crucial, with more than half of the companies surveyed affirming they have made significant investments in training their human capital, indicating a positive trend toward strengthening digital capabilities within the workforce.

Despite the observed benefits, the study also highlights several challenges, including the lack of digital skills among staff and the high costs associated with the implementation and maintenance of digital strategies. Resistance to change and technical difficulties also present significant obstacles that need to be overcome to achieve effective digital integration. Despite these challenges, most companies recognize that digitalization has positively contributed to customer satisfaction, underlining the importance of adopting technologies that optimize internal operations and enrich the customer experience.

In this sense, commercial sector SMEs must persist in the adoption and refinement of digital strategies to improve quality and customer satisfaction. Although the results are positive, it is essential that companies address the identified challenges to fully leverage the opportunities that digitalization offers. The continuous training of human capital and more holistic technological integration could be keys to future success in a highly competitive and

constantly changing market.

Limitations

The study's main limitations are the sample's representativeness and the reliance on respondents' self-perception. While a significant number of SMEs were covered, the results may not reflect the entire commercial sector accurately. Respondents might have biased views, presenting their companies more favorably. Future research should consider longitudinal and qualitative studies to provide a deeper and more accurate understanding.

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