



Blockchain Technology, Factors Limiting Its Adoption In Companies In The Tourism Sector In The Municipality Of Paipa, Boyacá - Colombia

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Abstract

The tourism sector in the municipality of Paipa, Boyacá - Colombia, faces challenges related to information security, accounting integrity and access to services due to technological advances and digitalization. Some companies may be exposed to vulnerabilities such as cyber attacks and data loss. Failure to identify and recognize appropriate technology, such as blockchain, can have a negative impact on financial analysis, decision-making and customer satisfaction, affecting the competitiveness of these companies. Therefore, this study aims to formulate guidelines and strategies that enable entrepreneurs to learn about and adopt this technology as a possible solution to these issues. The methodology integrated in the research process is qualitative, with a descriptive scope and an action research design. The results derived from the application of opinion surveys revealed that tourism entrepreneurs in the municipality of Paipa, Boyacá, do not have a wide knowledge to adopt and use this technology, which causes difficulties in the management of their organizational processes. In this sense, it is concluded that it is necessary to establish guidelines to recognize the advantages of implementing this technology and, in this way, generate competitive conditions in the tourism sector.

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Introduction

In today's society, blockchain technology has emerged as a promising technological tool that offers various benefits to improve the management of organizational processes in different industries (Chen et al., 2020; García et al., 2020; Pal et al., 2021). In this context, the hotel and tourism sector in the municipality of Paipa, Boyacá, Colombia, is also in the spotlight to take advantage of these opportunities. The adoption of this technology in this sector has significant advantages, such as increasing transparency and security in transactions, facilitating secure and traceable payments, optimizing the management and coordination of hotels or transports, and streamlining luggage management, among other aspects.

However, despite the undeniable benefits, it is worrying to note that the adoption of this technology in the hotel and tourism sector in the municipality of Paipa has been limited. This is largely due to two specific factors. Firstly, the lack of knowledge about blockchain technology has been a major obstacle to its implementation. Many entrepreneurs in this sector are completely unaware of the possibilities and

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applications of this technology, which has generated doubts and reluctance to link it to administrative processes.

Secondly, the economic aspect has been another determining factor. As Iansiti and Lakhani (2017) note, the adoption of emerging technologies entails implementation and maintenance costs that can be challenging for organizations, especially in a context where financial resources are limited.

However, this situation represents an opportunity for development and growth for the hotel and tourism sector in the municipality of Paipa - Boyacá, Colombia. In this sense, the purpose of this research is to explore and raise awareness among entrepreneurs in this sector about the possibilities and advantages offered by blockchain technology. Through a reasoned and reflective argumentation, it seeks to highlight how the adoption of this technology can transform and optimize various aspects of organizational management, providing both short and long term benefits.

Through an academic and proactive approach, the aim is to inspire and motivate entrepreneurs in the hotel and tourism sector in Paipa - Boyacá, Colombia, to seriously consider the adoption of blockchain technology as a key step towards modernization, process improvement and competitiveness in today's market.

Literature Review

The following sections expand on the knowledge inherent in blockchain technology and how it contributes to the development of hotel and tourism organizations.

Blockchain technology

Blockchain technology is similar to a digital ledger, which is distributed, stored and cannot be changed. In addition, it has the characteristic that it allows the parties involved to generate real and truthful exchanges or transactions without the need for a third party to validate the transaction (Plasencia and Tirso, 2021; Urioste, 2022).

This technology was born with the creation of Bitcoin as a backup that validates the transactions of this cryptocurrency. According to Dunogent, (2019) blockchain has a cryptographic script with public and private keys, so that third parties or unauthorized users cannot access and extract information, which translates into security. This cryptographic system uses the public key for encryption and the private key for decryption.

Colque and Vera (2021) define blockchain technology as the accounting detail that contains the characteristics to eliminate intermediation in operations and at the same time generates security as the blockchain is unmodifiable. In the same way, it offers trust and teamwork, since if an attempt is made to modify the records this would generate an alert for all participants in order to validate this operation, thus developing greater trust, security and transparency in the processes of organizations.

From this perspective, blockchain technology can be defined as a set of blocks containing data (accounting records, transactions, user information and organizational information).

Benefits and advantages of blockchain technology in the tourism sector.

In contemporary society, blockchain technology has gained recognition as an innovative and promising tool in various industrial branches, including the hotel and tourism sector. This technology is based on a secure and decentralized ledger, which allows for transparent and permanent recording and verification of transactions (Retamal et al., 2017). Its potential to improve efficiency, transparency and security has attracted the attention of numerous researchers and specialists.

Within the hotel and tourism sector, blockchain technology offers significant benefits, including:

Improved transparency and security of transactions: The decentralized nature of blockchain technology ensures that transactions are unalterable and transparent, thereby reducing the risk of fraud

and ensuring the integrity of records (Chen et al., 2020). This is particularly relevant in the tourism sector, where trust and security are key pillars of customer satisfaction.

Facilitating reliable, secure and traceable payments: Blockchain technology enables payments to be made quickly and securely, eliminating intermediaries and reducing transaction costs (Sharma et al., 2020). Furthermore, the traceability of payments enables real-time auditing and tracking, which adds greater transparency to financial transactions.

Optimizing management and coordination in hotels and transport: Blockchain technology can simplify and streamline the management of reservations and logistics in the tourism sector, through the implementation of smart contracts that automate processes such as reservations, cancellations and resource allocation, increasing operational efficiency (Chen et al., 2020; Cruz and Viera, 2022).

Streamlining baggage management: In the tourism sector, blockchain technology improves the traceability and management of baggage, enabling more accurate tracking of travellers' belongings and reducing the possibility of misplacement (Sharma et al., 2020).

Overall, these benefits and advantages demonstrate the transformative potential of blockchain technology in the management and operation of the hospitality and tourism sector, resulting in improved customer experience and operational efficiency. However, despite these advantages, it is pertinent to consider the barriers and challenges that businesses face when contemplating its adoption.

Factors limiting the adoption of blockchain technology in companies in the tourism sector.

The adoption of blockchain technology in companies in the tourism sector is limited by several factors that are important to take into account in order to understand the challenges faced by this industry in its implementation process. Some of the main obstacles identified in the academic literature are described below:

Lack of knowledge and understanding: One of the main limiting factors for the adoption of blockchain technology is the lack of knowledge and understanding among entrepreneurs and leaders in the tourism sector. This lack of familiarity with the technology can lead to doubts and reluctance about its adoption, as many may consider it complex or impractical (Daza, 2020). The lack of adequate information can hinder informed decision-making and, consequently, hinder its incorporation into tourism business management.

Economic costs and limited resources: The adoption of emerging technologies such as blockchain involves significant investments in infrastructure, training and staff development. This can be a challenge for tourism businesses, especially for those smaller or with limited financial resources (Iansiti and Lakhani, 2017; García et al., 2022). High costs may be perceived as a barrier to implementing this technology, even if its potential benefits are recognized.

Interoperability and standards: The lack of standards and low interoperability between different blockchain platforms and solutions can also hinder its adoption in the tourism sector (Mathivathanan et al., 2021). The lack of a unified framework may lead to incompatibility between existing systems, which could hinder the integration of blockchain with the current operations and systems of tourism businesses.

Legal framework and regulations: Blockchain technology is still at an early stage of development and legislation around its use, hence its application may vary in different jurisdictions. Legal uncertainties and changing regulations may raise concerns for tourism entrepreneurs, who may fear legal challenges or face regulatory risks if they adopt this technology (Cole et al., 2019).

Resistance to change and organizational culture: Resistance to change and the organizational culture of tourism companies can also be factors limiting the adoption of blockchain technology. Implementing a new technology requires a transformation in the way of working and may be met with resistance from employees and management (Balasubramanian et al., 2021).

Despite these limiting factors, it is critical for businesses in the tourism sector to understand that blockchain technology has the potential to revolutionize the way they operate and deliver numerous benefits in terms of efficiency, transparency and security. Overcoming these challenges requires a proactive and strategic approach, as well as a greater understanding and knowledge of the technology. Collaboration between academia, the private sector, government and other relevant stakeholders will also be key to facilitating the adoption and development of blockchain solutions in the tourism sector.

Materials and Methods

This research was framed within a qualitative approach, which, according to Denzin and Lincoln (2008), allows a deep understanding of social phenomena. It sought to analyze the perceptions, attitudes and motivations of the sample subjects in order to understand the process of adopting Blockchain technology in companies in the tourism sector in Paipa, Boyacá. In addition, the qualitative research facilitated the exploration of the individual experiences and perspectives of the entrepreneurs, providing a holistic and detailed view of the phenomenon under study.

The scope of the research corresponded to the descriptive method, supported by authors such as Aggarwal y Ranganathan (2019), who indicate that it provides an accurate and detailed description of the object of study. Through the descriptive scope, the uses, applications and limitations of Blockchain technology in the specific context of the region were analyzed in depth, as well as the identification of the factors that influence the decision of entrepreneurs to adopt or not this technology.

Regarding the design, an action research approach is used to address the issues related to the adoption of blockchain technology in tourism organizations in the municipality of Paipa, Boyacá - Colombia. This approach allows the formulation of concrete actions, such as guidelines and directives, that seek to facilitate the effective integration of blockchain technology in the tourism sector. According to Jefferson (2014), action research is characterized as a methodological approach that seeks the transformation of reality through the active participation of the subjects involved in the problems studied. This approach is not only limited to the description and analysis of the situation, but also proposes the implementation of concrete actions to address and solve the problems identified.

Unit of study

In this research, the participants are the active entrepreneurs in the hotel and tourism sector in the municipality of Paipa, Boyacá, with a total of 55 entrepreneurs in this universe or population. A purposive sample selected using the convenience sampling technique was used. The selection criteria include being part of the hotel and tourism chain of Paipa, Boyacá; facing challenges in the adoption of new technologies; managing organizational processes in a conventional manner; not using technologies in the provision of services to visitors. Based on these criteria, a purposive study sample of 70 entrepreneurs is configured.

Categories of study

For this research, having a predominantly qualitative approach, categories are proposed that allow understanding and interpreting the object of study. Through the analysis of each one of them, it is intended to elucidate the reasons or factors that have limited the adoption of blockchain technology by entrepreneurs in the tourism sector in the municipality of Paipa, Boyacá. Table 1 shows the operationalization of these categories.

Table 1.

Categories investigated to understand and interpret the object of study

CATEGORY	SUBCATEGORY	DIMENSION	INDICATOR
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	Lack of knowledge and understanding of blockchain technology.	Knowledge of tourism entrepreneurs about blockchain technology	Experiences in the use of blockchain technology.
Factors limiting the adoption of blockchain technology in companies in the tourism sector.	High economic costs and limited resources for the adoption of this technology.	Financial resources available to tourism entrepreneurs.	Economic readiness for the adoption of blockchain technology.
	Rules governing the use of this technology	Knowledge of the legal provisions to be considered when adopting blockchain technology.	Recognition of regulations for the integration of blockchain technology in Colombia
	Resistance to change and organizational culture	Entrepreneurs' openness to technological change to improve organizational culture	Opinions, arguments and reflections of entrepreneurs on the linking of a new technology, in the particular case of blockchain technology.

Note: The table systematically lists the categories, subcategories, dimensions and indicators from which the object of study is investigated.

The study of the subcategory "Lack of knowledge and understanding of blockchain technology" aims to identify the level of knowledge of entrepreneurs about this technology, as well as to determine whether they have considered its adoption in any management process and to assess the possibility of implementing it in the near future. In addition, it seeks to understand the learning process and experiences related to its use, applications, benefits and limitations, in order to establish possible lines of action.

The subcategory "High economic costs and limited resources for the adoption of this technology" aims to analyze the willingness of entrepreneurs to allocate a budget for the adoption of blockchain technology, either for training or for its implementation in general or in a specific process of their organizations.

The subcategory "Norms regulating the use of this technology" focuses on clarifying the degree of knowledge of entrepreneurs in the tourism sector in Paipa about the regulations and legal provisions in Colombia related to the integration and adoption of blockchain technology in their organizations.

Finally, the subcategory "Resistance to change and organizational culture" seeks to investigate the opinions, arguments and reflections of entrepreneurs and their collaborators in relation to the integration of blockchain technology in their organizations. We investigate whether there is any fear, ignorance or resistance on the part of executives or operators when adopting this technology in any of the organizational processes.

Stages of the research process

The research carried out was framed in 3 stages that respond to the objectives that direct the research process. In this sense, these stages are as follows:

- First stage: Diagnosis or characterization

This stage of the study focuses specifically on characterizing aspects inherent to the knowledge and understanding of blockchain technology possessed by the sample entrepreneurs. Likewise, to determine whether they have the economic resources to enable them to adopt it. On the other hand, we also sought

to determine the level of knowledge that the managers of the tourism companies have regarding the rules that regulate the use of this technology. Finally, to establish their openness or resistance to change and organizational culture. In order to fulfil this purpose, a survey was administered, structured in 15 open question items.

- Second stage: Action or improvement plan.

Based on the results of the diagnosis or characterization stage, and the possible existence of factors that limit the adoption and integration of Blockchain technology in the administrative processes of organizations in the tourism sector in the municipality of Paipa, Boyacá, this phase of the study seeks to formulate guidelines and guidelines that allow a solution to this problem.

Third stage: Reflection

In this stage, after having presented and discussed the improvement plan based on the guidelines for the adoption of blockchain technology, we sought to analyze the opinions, arguments and reflections of the entrepreneurs selected as a sample.

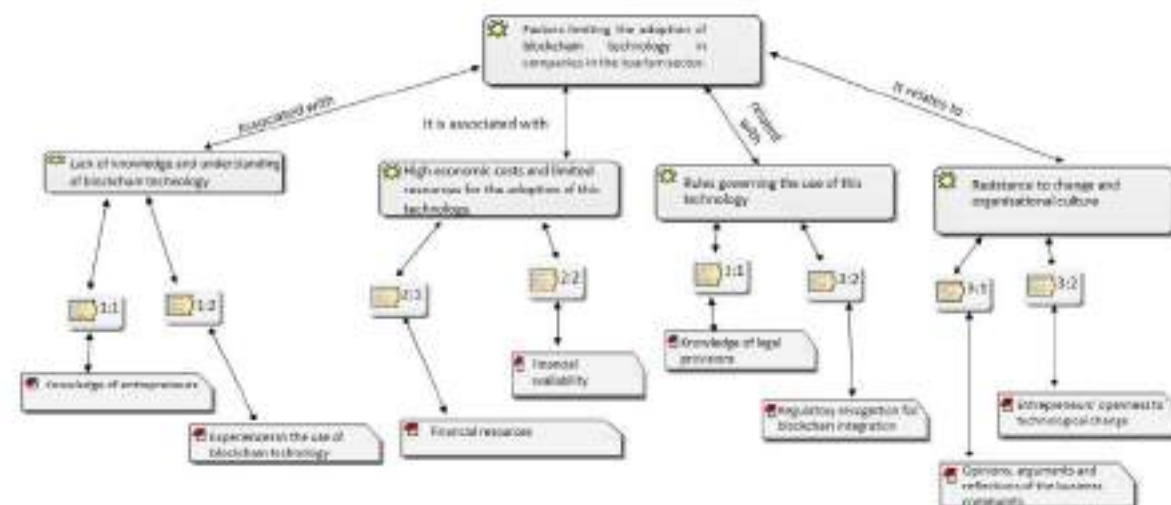
Results

The results of the study derive from the fulfilment of the formulated objectives and the development of the stages in which the methodological design is framed.

- Results of the Diagnostic or characterisation stage

In particular, the results of this stage emerge from the application of a survey structured in open questions through which the formulated subcategories of the study were analyzed.

The analysis of the surveys applied to the sample subjects was carried out through the qualitative research software Atlas TI, which led to the consolidation of a semantic network that frames the study categories and subcategories as shown in Figure 1.



• Subcategory: Lack of knowledge and understanding of blockchain technology

From the analysis of the subcategory "Lack of knowledge and understanding of blockchain technology," it has been observed that entrepreneurs who are part of the hotel and tourism chain in the municipality of Paipa, Boyacá - Colombia, possess a very basic level of knowledge in relation to blockchain technology. Their perceptions and understanding of this technological innovation are limited, which ultimately hinders the ability to fully exploit its potential and the benefits that this technology could bring to the tourism sector.

Testimonials from entrepreneurs show that they have little or no prior experience with blockchain technology. This lack of experience has resulted in a reluctance to explore and adopt this technology in their organizations. Entrepreneurs have expressed concerns about the complexity and unfamiliarity associated with implementing blockchain in their business processes.

This situation has created a significant barrier to the adoption of blockchain technology in the tourism sector. Organizations led by these entrepreneurs have failed to incorporate this technological innovation into their day-to-day operations, which has hindered process improvement and resource optimization at the organizational level.

Overall, entrepreneurs in the hotel and tourism sector in Paipa, Boyacá, face a critical challenge in terms of understanding and adopting blockchain technology. Their limited knowledge and lack of experience in this area has resulted in a missed opportunity to harness the potential of this technology in their organizations. Overcoming this knowledge gap and promoting a greater understanding of blockchain technology will be critical to drive innovation and competitiveness in the local tourism sector.

- **Subcategory: High economic costs and limited resources for blockchain adoption**

One of the key issues that has emerged from the responses of the surveyed entrepreneurs is the identification of high economic costs associated with the adoption of blockchain technology in the context of the hotel and tourism sector in Paipa, Boyacá. The testimonies of these entrepreneurs have revealed that the implementation of blockchain in their organizations entails a significant set of expenses, including not only the initial investment in technology and compatible systems, but also staff training and ongoing operational costs related to the maintenance and security of the technology.

It is important to note that several of the entrepreneurs have expressed that their organizations operate with limited financial resources. These resources are primarily compromised by existing operational expenses, such as maintenance of hotel facilities, staff salaries and other essential needs. As a result, allocating a significant budget for blockchain technology adoption has been perceived as a considerable challenge.

Entrepreneurs have expressed concerns about the financial viability of incorporating blockchain technology into their operations. Some have noted that while they recognise the technology's potential to improve efficiency and security in data and transaction management, they feel limited by existing financial constraints. This budgetary constraint has led to a dilemma where, despite the desire to adopt blockchain, the financial realities of their organizations have acted as a significant obstacle.

In itself, the analysis of the subcategory 'High economic costs and limited resources for blockchain technology adoption' reveals that entrepreneurs in the hotel and tourism sector in Paipa face considerable economic challenges when considering the adoption of this technology. The need to balance the potential benefits of blockchain with the limited financial resources available is a critical issue that requires strategic reflection and careful planning to ensure the success of technology adoption in their organizations.

- **Subcategory: Regulations governing the use of Blockchain technology**

One of the aspects that has emerged as a significant concern in the responses of entrepreneurs in the hotel and tourism sector in Paipa, Boyacá is the lack of knowledge and understanding of the regulations governing the adoption and use of blockchain technology in Colombia. The testimonies of these entrepreneurs reveal a notable gap in terms of awareness of the legal provisions related to this innovative technology.

Most entrepreneurs expressed that their knowledge in this area is limited, and many admitted to being unclear about the specific regulations governing the use of blockchain in the country. This gap in understanding legal regulations presents an additional challenge for those considering adopting blockchain in their operations.

It is important to note that blockchain technology is at a relatively early stage of development and regulation in Colombia and in many other parts of the world. Specific regulations related to its implementation may vary by jurisdiction and evolve over time. Therefore, lack of awareness of these regulations can have significant implications in terms of both legal compliance and risk management.

The lack of clarity on the legal regulations surrounding blockchain technology raises important questions for entrepreneurs, who are faced with the dilemma of how to move forward with the adoption of this technology in a safe and legal manner. It is critical to recognize that successful implementation of blockchain in Paipa's hotel and tourism sector will require a thorough and up-to-date understanding of the evolving regulations.

Overall, the subcategory 'Regulations governing the use of this technology' highlights the critical need for entrepreneurs to gain a deeper understanding of the legal regulations affecting the adoption of blockchain technology in Colombia. This understanding is essential to ensure that the implementation of this technology is compatible with existing laws and regulations, which in turn will contribute to a more secure and successful adoption that ensures benefits for Paipa's hotel and tourism sector.

- **Subcategory: Resistance to change and organizational culture**

The analysis of the subcategory 'Resistance to change and organizational culture' revealed that there is a high degree of reluctance towards technological innovation among the entrepreneurs involved in the study. The arguments and opinions expressed by them reveal a significant resistance to digital updating aimed at modifying the established organizational culture in their companies.

It is evident that, despite efforts to communicate the benefits and advantages that blockchain technology can bring to their operations, many entrepreneurs are reluctant to incorporate it into their organizational processes. This reluctance can be attributed to a variety of reasons, with uncertainty being one of the most prominent factors. Entrepreneurs often face a number of questions about how blockchain technology would impact their organizational culture, their employees and their overall business model. It is this lack of clarity and understanding that has led to resistance to change.

From their arguments, entrepreneurs have expressed that it is critical to recognize that resistance to change is a common phenomenon in the business context, as in their view organizations often cling to familiar practices and systems, and the adoption of new technologies can be perceived as a threat or a disruption. In addition, organizational culture, which has developed and taken root over time, may resist changes that could challenge its traditional values and norms.

However, some respondents felt that it is important to highlight that resistance to change is not insurmountable, as it is possible to address this resistance strategically. This could include training programmes, effective communication about the benefits of blockchain technology and creating a working environment that encourages innovation and continuous learning.

Overall, the subcategory 'Resistance to change and organizational culture' highlights the need for a comprehensive strategy that not only promotes awareness and understanding of blockchain technology, but also addresses the cultural and human aspects of technology adoption. Overcoming resistance to change and adapting the organizational culture are critical steps in the process of successful blockchain implementation in the hotel and tourism sector in Paipa.

- **Second phase**

Based on the emerging results of the diagnostic phase, a comprehensive action plan is proposed to address the established problems and promote the adoption and successful integration of Blockchain technology in the tourism sector in Paipa, Boyacá. This action plan includes the following guidelines and guidelines:

- **Training and awareness programmes:**

To address the lack of knowledge and understanding of Blockchain technology in the tourism sector in Paipa, the implementation of training and awareness programmes aimed at entrepreneurs and workers is proposed. These programmes should focus on increasing understanding and familiarity with Blockchain technology, highlighting its potential applications and the benefits it can offer to local hotel and tourism businesses.

According to Treiblmaier (2021), the lack of knowledge and understanding of Blockchain technology is a common barrier to its adoption in different sectors, including tourism. Therefore, it is suggested that, in the tourism sector, training programmes should be specifically geared towards providing knowledge to entrepreneurs so that they understand how Blockchain technology can improve transparency in transactions, increase the security of customer data and simplify booking and payment processes.

In the same vein, Zhu and Zhou (2016) note that training programmes should address both theoretical and practical aspects of Blockchain technology. This implies that participants should understand the fundamentals of the technology, such as decentralization and cryptography, as well as receive hands-on training in the implementation and use of Blockchain platforms specific to the tourism sector.

The implementation of training and awareness programmes will not only increase the level of knowledge about Blockchain technology among entrepreneurs and workers in the tourism sector, but also foster greater confidence and willingness to explore and adopt this innovative technology in their daily operations. Furthermore, training processes in the recognition of this technology can facilitate the development of an organizational culture oriented towards innovation and continuous improvement in local businesses in the tourism sector.

- Exploring alternative financing models:

Addressing the high economic costs and limited resources that may hinder the adoption of Blockchain technology in Paipa's tourism sector leads to exploring alternative financing models that can mitigate these financial barriers. These models may include public subsidies, strategic alliances or shared investment funds, thus providing additional resources to local businesses and facilitating their access to this innovative technology.

According to Wong et al., (2020), high economic costs are a common concern in the adoption of Blockchain technology in different sectors, including tourism. In this sense Perez suggests that, in the tourism sector, exploring alternative financing models may be critical to overcome this financial barrier. It is recommended that tourism companies seek funding opportunities through government grant programmes aimed at technological innovation in the sector, as well as consider strategic partnerships with technology companies or investors interested in supporting innovative initiatives in tourism.

Furthermore, according to Bu (2018), public-private partnerships and shared investment funds have proven to be effective financing models for large-scale tourism projects. These models allow for risk and cost sharing among multiple stakeholders, which can be particularly beneficial for smaller tourism businesses with limited financial resources. Exploring these alternative financing models will not only help local businesses in Paipa's tourism sector overcome the financial challenges associated with adopting Blockchain technology, but will also provide them with the opportunity to access additional resources and collaborate with strategic partners to drive innovation and competitiveness in the local tourism market.

- Legal advice and compliance

It is essential to provide specialized legal advice and compliance support related to the use of Blockchain technology in Paipa's tourism sector. This measure will help address concerns about legal compliance and the legal certainty of implementing this technology, providing local businesses with the confidence and certainty needed to adopt it effectively.

In line with the work of Melk  (2020), the lack of clarity in the rules and regulations governing the use of Blockchain technology is a significant barrier to its adoption in various sectors, including tourism. From

this perspective, it is advisable for the tourism sector to seek specialist legal advice to ensure compliance with existing regulations and anticipate possible future regulatory changes. This will help businesses to avoid legal risks and operate safely within the established legal framework.

Likewise, Willie (2019), argues that the successful implementation of blockchain technology requires a clear understanding of the specific regulations that apply to its use in different contexts. He therefore suggests that tourism businesses work closely with technology and regulatory lawyers to identify and understand the relevant regulations and develop effective compliance strategies.

The provision of specialized legal advice and regulatory compliance support will help businesses in Paipa's tourism sector navigate the complex regulatory environment related to Blockchain technology and ensure that their operations comply with current regulations. This, in turn, will promote a secure and trustworthy business environment for the adoption of this innovative technology in the region.

Promotion of a culture of innovation and adaptation to change:

It is suggested to promote an organizational culture oriented towards innovation and adaptation to change within enterprises in the tourism sector in Paipa. This can be achieved by creating incentives for experimentation and continuous improvement, encouraging staff participation in decision-making processes related to the implementation of Blockchain technology, and recognizing and celebrating innovation-related successes and achievements.

According to Tyan and Guevara (2020), resistance to change and organizational culture can be significant barriers to the adoption of emerging technologies such as Blockchain in the tourism sector. Perez recommends that in the tourism sector in Paipa, specific strategies should be implemented to address resistance to change and foster a culture of innovation. This may include training and awareness-raising programmes for staff, team-building sessions to generate innovative ideas, and the creation of spaces for the exchange of knowledge and best practices.

Furthermore, Irannezhad (2021) reports that companies that foster a culture of innovation and adaptation to change tend to be more receptive to the adoption of new technologies and experience greater success in their implementation. Smith and Johnson suggest that in the context of Paipa's tourism sector, it is important for companies to recognize and celebrate innovation-related efforts and achievements, which can motivate staff to actively participate in change and continuous improvement processes.

Promoting a culture of innovation and adaptation to change in companies in Paipa's tourism sector will not only facilitate the adoption of Blockchain technology, but will also contribute to strengthening the competitiveness and adaptability of local companies in a constantly evolving business environment.

Results stage three

During the third stage of the research, the proposal formulated to facilitate the adoption of blockchain technology in the tourism sector in Paipa, Boyacá - Colombia was presented to the entrepreneurs. To assess the feasibility and acceptance of this proposal, a focus group was conducted with the participation of local entrepreneurs.

During the focus group the entrepreneurs expressed a high degree of interest in the proposal presented. They highlighted the relevance and potential of blockchain technology to improve efficiency, security and transparency in their business operations. They saw in this technology an opportunity to differentiate themselves in the market, offering innovative services and improving the customer experience.

However, negative aspects and concerns were also raised by entrepreneurs. One of the main points of concern was the technical complexity associated with implementing blockchain technology. Many entrepreneurs expressed concerns about the learning curve and resources required to adopt and manage this technology effectively. In addition, some entrepreneurs expressed concerns about potential security and privacy risks associated with the use of blockchain, especially with regard to the management of sensitive customer data.

In addition to concerns, entrepreneurs also offered suggestions and recommendations to improve the proposal. They suggested the need to develop specific training programmes and technical support to help them better understand blockchain technology and overcome the technical challenges associated with its implementation. They also emphasized the importance of establishing clear standards and regulations regarding the use of blockchain in the tourism sector, to ensure the security and protection of customer data.

Overall, while there was widespread interest in the adoption of blockchain technology among entrepreneurs in the tourism sector in Paipa, Boyacá, significant concerns and challenges also emerged. However, the suggestions and recommendations provided by the entrepreneurs during the focus group offer opportunities to improve the proposal and address the concerns raised, paving the way for a successful adoption of blockchain technology in the local tourism sector.

Discussion

Blockchain technology has emerged as a catalyst for transformation in various sectors, including tourism, offering significant benefits in terms of security, transparency and operational innovation (Balasubramanian, 2022). In the context of the municipality of Paipa, Boyacá, this technology has not yet been fully adopted by some tourism entrepreneurs, mainly due to a lack of understanding about its applications and benefits.

To address this knowledge gap, it is crucial to implement training and awareness-raising initiatives that help entrepreneurs better understand the potential of blockchain technology in their operations (Frizzo-Barker et al., 2020). In addition, greater collaboration between stakeholders, such as local government and tourism associations, is required to create an enabling environment for technology adoption (Monrat et al., 2016).

The adoption of blockchain in the tourism sector in Paipa, Boyacá, not only promises to improve operational efficiency and customer experience, but can also drive the development of smarter tourism destinations tailored to the individual needs of travellers. However, to achieve this full potential, it requires a strong commitment from entrepreneurs to invest in education and the implementation of this technology in their businesses (Raluca, 2022). Ultimately, collaboration and active leadership are essential for a successful transition to more innovative and customer-centric tourism (Calvaresi et al., 2019).

Conclusions

This research is conclusive since it is indeed found that there is a low or scarce degree of knowledge on the part of tourism entrepreneurs in the municipality of Paipa, Boyacá, which is the main factor limiting the adoption of blockchain technology. In this order of ideas, the need to create actions and activities for the development of the understanding and functionality provided by the technology in each organization and in greater detail in each process of the company is evident, thus creating an opportunity for each entrepreneur to be able to establish the uses, applications and benefits that it brings.

To the same extent it is evident that entrepreneurs in this sector in the municipality of Paipa, Boyacá are limited in terms of economic and financial resources, which in turn generates fear and resistance to this new investment, which generates a paradigm as blockchain technology has the particularity of improving security and transparency in transactions, which makes it a relevant tool for the accounting management of organizations that also does not need a third party to generate a charge linked to the intermediation.

The adoption of blockchain technology allows companies to ensure data integrity, resulting in increased trust from both customers and business partners. The ability to verify and track transactions in real time provides a level of transparency that cannot be easily achieved with conventional systems.

Another crucial benefit is efficiency in data and process management. Blockchain enables the automation of tasks and processes, resulting in significantly reduced operational costs and increased productivity.

Optimizing baggage handling in airlines, inventory control in hotels and review management with verified users are just a few examples of how blockchain can improve efficiency in the tourism sector.

The findings of this research highlight the remarkable benefits and advantages that blockchain technology offers in the context of the hospitality and tourism sector. As this technology continues to evolve, its potential to transform and improve business management is undeniable. In sum, the study's findings underscore the urgent need for entrepreneurs in the hotel and tourism sector in Paipa, Boyacá, to engage in the adoption of blockchain technology. By doing so, they will be able to improve the security, efficiency and personalization of their services, allowing them to be more competitive and deliver exceptional travel experiences.

Collaboration between businesses, local government and other stakeholders is essential and crucial to create an enabling environment for the adoption of new technologies to ensure the continued growth and development of this important sector. Despite these clear and tangible benefits, entrepreneurs in the hotel and tourism sector in Paipa, Boyacá, still face challenges in adopting blockchain technology.

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