

From stimuli to adoption: an S-O-R approach to blockchain use in tourism

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Abstract

Purpose – This study aims to: firstly, it analyzes how external stimuli, privacy, security and government support influence tourists' internal perceptions (trust, attitude and usefulness) in relation to blockchain adoption in the tourism sector; secondly, to assess the effect of these internal processes on the intention to use the technology, this study broadens the understanding of consumer behavior in digital environments linked to tourism; and thirdly, exploration of the differentiating role of each stimulus to determine which stimuli have the greatest impact on the formation of perceptions and adoption behavior.

Design/methodology/approach – Based on the stimulus-organism-response (S-O-R) model, this study empirically examines how external stimuli (perceived privacy, perceived security and government support) influence internal evaluations (perceived trust, perceived usefulness and attitude) and, in turn, the intention to use blockchain-based solutions. Data were collected through an online survey in Spain using stratified sampling, obtaining 544 valid responses. The model was tested using partial least squares structural equations complemented with predictive analytics (PLSpredict).

Findings – The results show that perceived privacy positively affects usage intention, whereas government support and perceived security shape users' psychological processes. Additionally, attitude shows a powerful mediating effect.

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Originality/value – The S-O-R model, which is more flexible and useful in the context of rapid technological innovation, applied with variables from classic models and more current variables (government support), has helped to reformulate some traditional theoretical relationships and explain the effect of government support on technology adoption.

Keywords Blockchain adoption, Tourism, Privacy and security, Government support, Stimulus-organism-response (S-O-R) model

Paper type Research paper

从刺激到采纳：基于S-O-R模型的区块链在旅游中的应用研究

摘要

研究目的 – 区块链技术作为一项具有颠覆潜力的创新，有望通过提升透明性、安全性与效率来重塑旅游业的数字互动。然而，尽管学界与业界关注不断增加，其在旅游领域的采纳研究仍较为有限，尤其缺乏对隐私、安全与政府支持等外部刺激因素的系统考察。本研究旨在弥补这一研究空白。

研究设计/方法/路径 – 基于刺激—有机体—反应 (Stimulus-Organism-Response, S-O-R) 模型，本文实证分析外部刺激（感知隐私、感知安全、政府支持）如何影响内部心理评估（感知信任、感知有用性与态度），并进一步作用于区块链使用意向。研究通过分层抽样在西班牙开展在线问卷调查，共获得544份有效样本。采用偏最小二乘结构方程模型 (PLS-SEM) 并结合预测分析 (PLSpredict) 对模型进行检验。

研究发现 – 结果表明，感知隐私对使用意向具有显著正向影响，而政府支持与感知安全主要通过影响用户心理过程发挥作用。此外，态度在模型中表现出强有力的中介作用。

创新性 – 本研究将更具灵活性的S-O-R模型应用于快速发展的技术采纳情境，并结合经典变量与新兴变量（如政府支持），重新审视并拓展了传统理论关系，同时揭示了政府支持在技术采纳中的重要作用机制。

关键词 区块链采纳，旅游，隐私与安全，政府支持，刺激—有机体—反应 (S-O-R) 模型

文章类型 研究型论文

1. Introduction

The emergence of blockchain technology has brought about a significant change in many economic sectors, offering new ways of guaranteeing transparency, security and trust in digital transactions. In the tourism sector, characterised by its dynamism, international interconnection and high dependence on trust between users and suppliers, this technology takes on particular relevance. Tourism faces challenges such as efficient management of payments, verification of the authenticity of services, protection of personal information and the need to generate more secure and personalised experiences for travellers (Mountije *et al.*, 2025; Rodríguez Bolívar *et al.*, 2025). In this context, blockchain technology is presented as a strategic instrument not only to optimise processes but also to transform the way tourists and organisations interact in an increasingly complex digital ecosystem (Folgieri *et al.*, 2025; González-Mendes *et al.*, 2024).

Following the proposal of PricewaterhouseCoopers (2020), five priority areas were identified in which blockchain can generate value in the tourism sector, which has become one of the main drivers of growth internationally, with projections of an average GDP increase of 5.8% between 2022 and 2032 (WTTC, 2022). On the one hand, the possibility of making secure, fast and intermediary-free payments makes blockchain an attractive alternative to traditional systems. In tourism, this is particularly relevant in international transactions, micro-payments and areas with low banking penetration. Moreover, the use of decentralised cryptocurrencies and wallets can promote financial inclusion (Albayati *et al.*, 2020). Previous studies have confirmed that perceived usefulness and security are key determinants of the adoption of these systems (Nuryyev *et al.*, 2020). Another area is

traceability and provenance, where blockchain enables the verification of the origin and authenticity of tourism products and services, such as sustainability certificates, local product routes and quality seals. This increases tourist trust, reduces information asymmetry and strengthens transparency (Velmovitsky *et al.*, 2021). Through immutable and auditable systems, users can access verifiable information in real time, which positively influences their perception of control and attitude towards usage. A third area is digital identity management, which allows tourists to validate their identity, credentials and documents without sharing sensitive information with multiple intermediaries. This not only improves the user experience but also reduces the risk of fraud (Zhou *et al.*, 2009). Recent studies have highlighted the fact that the perception of privacy and security is essential in building trust in such systems (Singh *et al.*, 2023; Yang *et al.*, 2025), especially in contexts with high exposure to personal data. The fourth area relates to smart contracts and dispute resolution. Smart contracts permit the automation of binding agreements between tourists, agencies and service providers, such as bookings, insurance and refunds (Prados-Castillo *et al.*, 2023). This automation not only reduces costs and errors but also increases the perceived usefulness and reliability of the system. The literature indicates that users positively value automatic dispute-resolution mechanisms, especially if they perceive that contracts are clear and enforceable (Chang *et al.*, 2022; De Filippi *et al.*, 2020). Finally, the fifth area relates to the implementation of customer engagement programmes, where blockchain technology enables the transformation of loyalty programmes through interoperable tokens, automated rewards and decentralised user control. Such programmes improve customer experience by removing redemption barriers and increasing transparency (Shi *et al.*, 2020). Variables such as a positive attitude towards technology and perceived usefulness are key to explaining the willingness to use such solutions (Khan *et al.*, 2025; Marikyan *et al.*, 2022).

However, while the benefits of blockchain technology have been widely described in the literature, most research has focused on the operational functions of the technology, while adoption by tourists remains largely unexplored (Nur Muharam *et al.*, 2024), not least because it is considered to be at a very early stage of development (Erol *et al.*, 2022). Thus, some aspects, such as privacy, which still raises concerns, have been little explored (Zhang *et al.*, 2025), as it is still unclear how well decentralised information and verification systems gauge the trust of tourists (Rui *et al.*, 2024). Furthermore, other questions remain unexplored: will efforts to develop and implement systems that are more secure and protect personal data and prevent unauthorised access improve tourist attitudes towards blockchain adoption, and are these elements actually perceived as useful by tourists, or do they perceive them as nothing new or valuable? In addition, there is the effect of regulation, which is often a key aspect of technology adoption in many sectors – would regulation of the technology help to improve trust in it, does the existence of a regulatory framework improve tourists' perception of the usefulness of the technology, and is regulation a relevant aspect of tourists' attitudes towards the adoption of blockchain technology? These questions have already begun to be answered in other sectors, leading to a greater degree of development and adoption of the technology; however, they remain unexplored in the tourism sector, despite recent research calling for them (Nur Muharam *et al.*, 2024).

Unlike previous research that applied technology adoption models from a predominantly confirmatory logic, this study does not seek to introduce new constructs, but rather a theoretical reconfiguration of the mechanisms of blockchain adoption in tourism. Specifically, we suggest that external stimuli do not act homogeneously on the psychological processes of the individual but rather follow differentiated routes of influence. While some stimuli, such as perceived privacy, can directly activate intention to use, others, such as perceived security and government support, operate as cognitive stimuli that shape internal evaluations such as attitude and

perceived usefulness. From this perspective, the stimulus–organism–response (S-O-R) model is used not as a generic descriptive framework, but as an analytical tool that allows us to determine and prioritise the psychological and behavioural mechanisms underlying the adoption of blockchain in a tourism context characterised by high levels of uncertainty, exposure of personal data and institutional dependence.

Based on this literature review and the gaps identified, this study sets the following research objectives. Firstly, it analyses how external stimuli, privacy, security and government support influence tourists' internal perceptions (trust, attitude and usefulness) in relation to blockchain adoption in the tourism sector. Secondly, to assess the effect of these internal processes on the intention to use the technology, this study broadens the understanding of consumer behaviour in digital environments linked to tourism. Thirdly, exploration of the differentiating role of each stimulus to determine which stimuli have the greatest impact on the formation of perceptions and adoption behaviour. Finally, the paper seeks to contribute to theoretical advancement by applying the S-O-R model in an underexplored context, while providing practical implications for technology providers, tourism businesses and policymakers wishing to boost trust, perceived usefulness and a favourable attitude towards blockchain in tourism.

2. Theoretical framework

2.1 The S-O-R model

The S-O-R theory, proposed by [Mehrabian and Russell \(1974\)](#), has been widely used in consumer behaviour research to explain how environmental stimuli generate behavioural responses through internal psychological processes. Specifically, the stimuli (S) refers to external factors perceived by the individual; the organism (O) represents the internal cognitive and affective processes that mediate that perception; and the response (R) is the resulting observable behaviour. Compared to other common theoretical frameworks in technology adoption, such as TAM, UTAUT and UTAUT2, among others, the S-O-R model is relevant for several reasons:

- it has great flexibility, allowing researchers to evaluate all kinds of tangible and intangible stimuli ([Kalaiairasan et al., 2024](#));
- it evaluates the dynamic interaction between the external environment and the internal state of individuals ([Pham et al., 2024a](#));
- it is especially useful in contexts where technological innovation transforms perceptions and behaviour ([Pham et al., 2024b](#)); and
- it permits evaluation of the mediating role of the organism between stimuli and responses.

Consequently, in the tourism sector, the S-O-R model is particularly suitable for analysing the adoption of emerging technologies such as blockchain. In fact, numerous studies have applied the S-O-R model to evaluate the impact of technologies such as ChatGPT and chatbots on the tourism industry (see, for example, [Kalaiairasan et al., 2024](#); [Pham et al., 2024a](#); [Pham et al., 2024b](#)). Thus, in our research, we considered traditional external factors (stimulus) such as perceived privacy and perceived security, and additionally incorporated a relevant aspect of technological innovation: government support. Considering internal processing (organism), we anticipated an impact on variables inherent to technology adoption, such as perceived usefulness, perceived trust and attitude. Finally, we assessed the consumer's ultimate goal in adopting the technology (response). Consequently, this approach combines traditional aspects of technology adoption with more current variables, such as government support, together with a flexible theoretical model better suited to contexts of

rapid technological innovation. Therefore, this approach allows us to understand how travellers transform perceived risks and benefits into technology adoption decisions, providing a solid framework to explain the integration of blockchain into the tourism experience (Nur Muharam *et al.*, 2024; Folgieri *et al.*, 2025).

In this study, the S-O-R model is not only used as an organisational structure but also as the underlying theoretical framework that allows classic constructs of technology adoption to be reinterpreted from an integrated psychological perspective. Unlike approaches such as TAM (Davis, 1989) and TRA (Fishbein and Ajzen, 1977), which conceptualise variables such as utility, attitude and confidence as direct determinants of behaviour, S-O-R allows these constructs to be understood as internal states of the individual (organism) that emerge in response to specific external stimuli (Mehrabian and Russell, 1974).

From this perspective, the adoption of blockchain in tourism is conceived as a sequential process in which tourists, exposed to contextual stimuli related to privacy, security and institutional support, develop cognitive and affective evaluations that mediate their final behavioural response. Thus, S-O-R offers a more appropriate theoretical lens to capture the psychological complexity inherent in emerging technologies, in which uncertainty, perceived risk and institutional legitimacy play central roles (Kalaiarasan *et al.*, 2024; Pham *et al.*, 2024a). This approach is particularly relevant to studying blockchain, a groundbreaking innovation whose adoption processes are strongly influenced by environmental and trust factors that transcend mere perceptions of utility and ease of use (Nur Muharam *et al.*, 2024).

2.2 Stimuli

In the S-O-R model, stimuli (S) constitutes the external factors, tangible and intangible, of the environment that are perceived by the individual and have the potential to trigger their internal evaluation process (Mehrabian and Russell, 1974). In the context of adopting emerging technologies, such as blockchain, the selection of stimuli should reflect the key concerns and facilitators that define the technological ecosystem. In line with previous research on blockchain adoption (Chang *et al.*, 2022; Yang *et al.*, 2025) and the nature of the tourism sector, where personal data transactions and uncertainty are high, this study identified three fundamental stimuli: perceived privacy, government support and perceived security.

These stimuli do not operate in a vacuum but represent critical signals that tourists process. Privacy and security address the core psychological barriers related to data protection in digital environments (Zhang *et al.*, 2019; Erol *et al.*, 2022), whereas government support signals legitimacy and institutional risk reduction (Choi and Luo, 2019; Dhingra and Gupta, 2025). The hypotheses on how each of these external stimuli influences the internal states of the organism and, potentially, behavioural responses are developed below.

2.2.1 Perceived privacy. Privacy refers to the user's belief that their information, especially sensitive information, will not be disseminated (Zhou *et al.*, 2009). Blockchain technology is characterised by traceability and the establishment of tamper-proof authorised access systems, as well as elements that guarantee data privacy (Shi *et al.*, 2020). Yang *et al.* (2025) found that the privacy systems of this technology are sufficient to improve users' attitudes towards the system, as well as to increase the perception of usefulness. Marikyan *et al.* (2022) found that blockchain systems that protect private data have the potential to improve trust. Finally, according to Zhang *et al.* (2019), technology providers' privacy efforts have a positive effect on users' usage intention. Based on these approaches, the following research hypotheses are proposed:

- H1. Perceived privacy positively influences perceived trust in blockchain technology in the tourism sector.
- H2. Perceived privacy positively influences the perceived usefulness of blockchain technology in tourism.
- H3. Perceived privacy positively influences attitudes towards blockchain technology.
- H4. Perceived privacy positively influences the intention to use blockchain technology in the tourism sector.

2.2.2 *Government support.* Government support is understood to be the existence of a legislative environment that protects consumers and users, and holds technology providers to their commitments (Choi and Luo, 2019). More specifically, government support takes the form of initiatives, incentives and policies aimed at supporting technological innovations (Tangsakul and Sureeyatanapas, 2024). Thus, recent research argues that government support in the context of blockchain technology has a positive impact on consumer trust (Orji et al., 2020) and contributes to consumer adoption of the technology (Dhingra and Gupta, 2025). However, there is no research that analyses the effect of government support on perceived usefulness and attitude towards blockchain technology. Therefore, we theorise that a developed regulatory framework that protects consumer interests will lead consumers to improve their attitude towards the technology, as well as finding it more useful. Based on these assumptions, the following research hypotheses are proposed:

- H5. Government support positively influences perceived trust in blockchain technology in the tourism sector.
- H6. Government support positively influences the perceived usefulness of blockchain technology in the tourism sector.
- H7. Government support positively influences attitudes towards blockchain technology.
- H8. Government support positively influences the intention to use blockchain technology in the tourism sector.

2.2.3 *Perceived security.* Information security involves ensuring that sensitive data is protected from unauthorised access, use, disclosure, disruption, modification or destruction (Al Omar et al., 2019). More specifically, the security of a technological system is determined by its ability to identify forgeries, disclosures and data breaches (Chang et al., 2022). One of the strengths of blockchain technology is the implementation of robust systems to ensure the security of user information (Shi et al., 2020), which is particularly relevant in contexts such as tourism, where confidential data is provided to tourism providers (Buhalis et al., 2019). Thus, recent research has shown that perceived security is a key aspect of trust in blockchain technology (Erol et al., 2022), it improves user attitudes (Yang et al., 2025), generates a higher perception of usefulness and positively influences usage intentions (Yang et al., 2025). Therefore, we propose the following research hypotheses:

- H9. Government support positively influences perceived trust in blockchain technology in the tourism sector.
- H10. Perceived security positively influences the perceived usefulness of blockchain technology in tourism.

H11. Perceived security positively influences attitudes towards blockchain technology.

H12. Perceived security positively influences the intention to use blockchain technology in the tourism sector.

2.3 Organism

Organism (O) in the S-O-R model encompasses internal psychological processes, both cognitive and affective, that mediate between the perception of external stimuli and the generation of a response (Kalaiarasan *et al.*, 2024). In this study, we conceptualise these processes through three central constructs in the literature on technology adoption, but reinterpreted here as mediating states: attitude towards technology, perceived trust and perceived usefulness.

The choice of these three constructs as the core of the “organism” allows for fruitful theoretical integration. Attitude captures the overall affective evaluation (Fishbein and Ajzen, 1977; Marikyan *et al.*, 2022), perceived trust reflects the expectation of reliability and honesty of the technological system (De Filippi *et al.*, 2020) and perceived usefulness represents the cognitive evaluation of its instrumental benefits (Davis, 1989; Nuryyev *et al.*, 2020). Together, they form an internal processing system through which tourists assimilate the stimuli of privacy, security and government support, transforming them into a behavioural predisposition. The hypotheses regarding the relationships between these states and their mediating roles are presented below.

2.3.1 Attitude. Attitude is defined as the positive or negative evaluation of an individual when performing a given behaviour (Ajzen, 1991) and is considered a crucial antecedent of intentions when carrying out particular behaviour (Fishbein and Ajzen, 1977). Attitude is a classic variable proposed in the theory of reasoned action (TRA) (Fishbein and Ajzen, 1977), which has been widely evaluated as an antecedent to the adoption of technology, including blockchain technology, in various sectors (e.g. Albayati *et al.*, 2020; Yang *et al.*, 2025). Likewise, consumer attitudes towards technology have emerged as an important mediating variable between perceived privacy (Shahzad *et al.*, 2024), perceived security (Al Mamun *et al.*, 2025) and intention to use. However, these effects have not been evaluated in the adoption of blockchain in the tourism sector, so we propose the following research hypotheses:

H13a. Attitude towards blockchain technology positively influences intention to use blockchain technology in the tourism sector.

H13b. Attitude towards blockchain technology mediates the relationship between perceived privacy and intention to use.

H13c. Attitude towards blockchain technology mediates the relationship between government support and intention to use.

H13d. Attitude towards blockchain technology mediates the relationship between perceived security and intention to use.

2.3.2 Perceived trust. In technology adoption, trust refers to the degree of reliability, security and effectiveness that users perceive in a particular technology (Mcknight *et al.*, 2011). In blockchain technology, trust is based on its architecture, operation and auditability (Naef *et al.*, 2024). Thus, trust is a particularly relevant dimension, particularly when it implies that data-sharing and access control are critical (Velmovitsky *et al.*, 2021). However, blockchain represents a major technological breakthrough in trustworthiness, with transparent commitments between agents within the same highly fortified network (Singh *et al.*, 2023).

Thus, recent research on blockchain argues that as trust in the technology improves, users will be more likely to adopt it (De Filippi *et al.*, 2020). Likewise, perceived trust not only contributes to the adoption of technology itself, but also helps to eliminate other risks, such as privacy and security risks, thus exerting a powerful mediating effect on the intention to use (Gómez-Hurtado *et al.*, 2025). To evaluate the direct and indirect effects of perceived trust, we propose the following research hypotheses:

- H14a. Perceived trust positively influences intention to use blockchain technology in the tourism sector.
- H14b. Perceived trust in blockchain technology mediates the relationship between perceived privacy and intention to use.
- H14c. Perceived trust in blockchain technology mediates the relationship between government support and intention to use.
- H14d. Perceived trust in blockchain technology mediates the relationship between perceived security and intention to use.

2.3.3 Perceived usefulness. Perceived usefulness is understood to be the user's perception of how the system will improve performance and is one of the classic variables in the TAM model proposed by Davis (1989). In the context of blockchain, Nuryyev *et al.* (2020) found that the utility of cryptocurrencies for making digital payments improved users' intention to use them. However, perceived usefulness plays a more significant role in technology adoption, as it has the potential to shape user experiences and behavioural predispositions, as proposed by Venkatesh and Davis (2000) in TAM2. Thus, for example, user attitudes towards technology can mitigate privacy risks (Ala'a and Ramayah, 2023) and security risks (Liu *et al.*, 2025). To evaluate these relationships in blockchain adoption within the tourism industry, we propose the following hypotheses:

Based on these approaches, the following research hypotheses are proposed:

- H15a. Perceived usefulness positively influences intention to use blockchain technology in the tourism sector.
- H15b. Perceived usefulness of blockchain technology mediates the relationship between perceived privacy and intention to use.
- H15c. Perceived usefulness of blockchain technology mediates the relationship between government support and intention to use.
- H15d. Perceived usefulness of blockchain technology mediates the relationship between perceived security and intention to use.

2.4 Response

The final phase of the S-O-R model, the response (R), represents the observable behavioural outcome or behavioural intention derived from the organism's internal processes (Mehrabian and Russell, 1974). In the context of adopting emerging technologies, measuring actual usage behaviour is often unfeasible in cross-sectional studies; therefore, usage intention is established as the most valid and widely accepted predictor of future adoption (Ajzen, 1991; Venkatesh and Davis, 2000). In line with previous research on blockchain adoption (Albayati *et al.*, 2020; Corne *et al.*, 2023), this study defined intention to use as a tourist's stated willingness to use blockchain-based services and platforms for tourism activities.

3. Methodology

3.1 Questionnaire

To construct the questionnaire, a review of the academic literature was conducted. Consequently, four items were used to measure government support (Albayati *et al.*, 2020), four items for perceived security (Patel and Patel, 2018) and four items for perceived privacy (Alshurideh *et al.*, 2021). Perceived trust was measured through four items (Corne *et al.*, 2023), as well as perceived usefulness (Corne *et al.*, 2023) and attitude (De Luna *et al.*, 2019). Finally, intention to use was measured with three items adopted from Corne *et al.* (2023).

Some adaptations were made to the original scales. Firstly, since the constructs were adopted from research that evaluated the adoption of different technologies, they were already adapted to Blockchain technology. Secondly, a back-translation procedure was applied, which is considered a recommended practice to ensure semantic and conceptual equivalence in cross-cultural studies (Brislin, 1970; Sousa and Rojjanasrirat, 2011). In this process, a bilingual researcher translated the items into Spanish and a second certified independent translator back-translated them into English, with discrepancies subsequently reviewed until a consensus was reached. After this, the new Spanish version was shared with four experts in consumer behaviour and technology adoption in different contexts, who certified that the new scale retained its meaning. Finally, a pre-test was conducted to check the clarity, reliability and relevance of the items by potential respondents. Specifically, the scale was presented to three groups of postgraduate and graduate students ($n=60$) in marketing and consumer behaviour. They were asked to complete the questionnaire and to provide their reasoning if there were any problems with the content or meaning of the items. Some minor problems were identified, so adjustments were made to retain the content and meaning of all items. Table 2 shows the measurement scales used (in English).

3.2 Data and sample

The geographical scope of the sample was limited to Spain, using a stratified sampling procedure to guarantee the representativeness of the different population profiles. To this end, relevant socio-demographic variables were considered as stratification criteria, such as gender, age, education level, income level and employment status, as well as experience in the use of blockchain technologies for different purposes. Data collection was carried out using online sampling through a specialised panel, which allowed access to a broad base of participants and ensured the diversity of the sample. The procedure applied with the expert panel was as follows:

- based on tests conducted with students during the content validity stage, it was estimated that watching the video and completing the questionnaire could be carried out in seven minutes (this was not communicated to the respondents);
- a response time bias of ± 90 s was established, so responses shorter than 5:30 min or longer than 8:30 min were not accepted, as they did not guarantee quality;
- the expert panel was asked to send completed questionnaires every two days, recording the response time; and
- responses that were not valid according to the established response time were reported to the expert panel and rejected.

In total, 43 completed questionnaires did not meet the response time requirement and were therefore rejected. This approach contributed to a heterogeneous and balanced set of responses suitable for reflecting the variety of perceptions in the target population. Table 1 shows the socio-demographic characteristics of the sample: female born between 1981 and

Table 1. Socio-demographic characteristics of the sample

Sociodemographic variables	N	%
<i>Gender</i>		
Male	259	47.61
Female	285	52.39
<i>Age</i>		
Baby boomers (1946–1964)	118	21.69
Generation X (1965–1980)	171	31.43
Millennials (1981–1996)	172	31.62
Generation Z (1997–2013)	83	15.26
<i>Education</i>		
No education	3	0.55
Secondary education	49	9.01
VET or Baccalaureate	205	37.68
University degree	191	35.11
Postgraduate (master’s degree or thesis)	96	17.65
<i>Income</i>		
No income	26	4.78
Less than €1,000	71	13.05
Between €1,001 and €2,000	220	40.44
Between €2,001 and €3,000	139	25.55
Between €3,001 and €4,000	62	11.40
More than €4,000	26	4.78
<i>Current situation</i>		
Student	29	5.33
Unemployed	65	11.95
Employed	344	63.24
Unemployed	32	5.88
Retired	74	13.60
<i>Have you used blockchain technologies to ...?</i>		
Digital payments	451	82.90
Digital wallets and exchanges	208	38.24
Decentralised platforms	120	22.06
NFTs and metaverse platforms	129	23.71
Web3 platforms	130	23.90
Smart contracts	119	21.88

Source(s): Authors’ own work

1996 (52.39%), having studied Vocational Training or Baccalaureate (37.68%), with an income level between €1,001 and €2,000 (40.44%), currently working (63.24%) and having used blockchain technology primarily to make digital payments (82.90%).

To ensure that all participants had a basic and uniform understanding of the application of blockchain in tourism, a neutral, explanatory introductory video lasting 1 min 41 s was included at the beginning of the questionnaire (Liébana-Cabanillas *et al.*, 2025a, 2025b). The video, developed specifically for this research by an independent scientific communication team, did not promote any commercial solution or refer to specific privacy, security or regulatory support attributes. Its content was limited to conceptually explaining (1) what blockchain technology is, (2) its generic application in the tourism sector to manage

reservations and verify authenticity and (3) its potential to create transparent records. The aim was to establish a common starting point for factual knowledge, minimising the variability derived from disparate interpretations of complex technological concepts (Erol *et al.*, 2022; Nur Muharam *et al.*, 2024).

However, we recognise that even though it was neutral, exposure to this informative content may have acted as a prior contextual stimulus that influenced the subsequent evaluation of the model constructs. This design decision, while justified on the grounds of ecological validity and comprehension, introduced a limitation in terms of pure isolation of the effects of the theoretical stimuli (privacy, security and government support), which were measured immediately afterwards. To partially control for the quality of attention, a verification question about understanding the video was included; respondents who indicated they did not understand it ($n = 39$) were excluded from the final analysis.

3.3 Data analysis

Two methodologies were used for data analysis and processing. On the one hand, structural equation modelling was applied; more specifically, the variance-based partial least squares SEM approach was used (Hair *et al.*, 2021). Thus, PLS-SEM is a casual-predictive approach that has, as its fundamental strength, the estimation of complex models (Hair *et al.*, 2021). Regarding CB-SEM, in our research, we applied PLS-SEM as it is more suitable for exploratory research and theory development, and is more effective in small samples (Hair *et al.*, 2017a). In this way, a two-level analysis was performed (Gefen *et al.*, 2000): on the one hand, at an internal level, to assess the relationships between latent variables and their constructs, and on the other hand, at a structural level, to analyse the relationships between the different constructs, thus evaluating the research hypotheses put forward.

3.4 Bias

A crucial aspect of research is methodological rigour, which can be compromised by biases resulting from respondents' positive self-assessments. To address this potential problem, measures were used to mitigate common method bias (Podsakoff *et al.*, 2012). These measures included:

- the use of clear, simple language;
- informing participants that there were no right or wrong answers;
- ensuring participant anonymity (Ibrahim *et al.*, 2023); and
- conducting pilot tests, which are useful to control bias (Podsakoff *et al.*, 2003).

Additionally, Sarstedt *et al.* (2016) empirically demonstrated that the PLS-SEM method does not exhibit bias problems when estimating data. However, bias-corrected confidence intervals are provided in the hypothesis test.

4. Results and discussion

4.1 Psychometric properties of the measurement scale

Firstly, the measurement model was evaluated. To this end, internal consistency was analysed, in which item loadings had to be statistically significant and yield values equal to or greater than 0.7 (Guenther *et al.*, 2023). Cronbach's alpha had to exceed the threshold of 0.7 (Martínez, 2014), composite reliability (Rho_A and Rho_C) had to be greater than 0.8 (Henseler *et al.*, 2016) and, finally, the average variance extracted (AVE) had to be greater than 0.5. Table 2 shows the results, and it can be observed that all values exceed the minimum thresholds.

Table 2. Psychometric properties of the measurement scales

Variables/Items	Loadings
<i>Attitude</i> (Cronbach's alpha = 0.962; Rho_A = 0.962; Rho_C = 0.962; AVE = 0.862)	
(ATT01) The use of a blockchain technology is a good idea	0.916
(ATT02) The use of a blockchain technology is convenient	0.924
(ATT03) The use of a blockchain technology is beneficial	0.936
(ATT04) The use of a blockchain technology is interesting	0.938
<i>Government support</i> (Cronbach's alpha = 0.958; Rho_A = 0.959; Rho_C = 0.958; AVE = 0.850)	
(GS01) Government supports of blockchain would provide an incentive to use blockchain technology	0.955
(GS02) Government regulations and monitoring would reduce the risks associated with using blockchain technology	0.901
(GS03) The government should support and/or be responsible for regulating the use of blockchain technology	0.940
(GS04) Regulations and government insurance should exist to protect the users of blockchain technology	0.891
<i>Intention to use</i> (Cronbach's alpha = 0.960; Rho_A = 0.961; Rho_C = 0.961; AVE = 0.890)	
(ITU01) I intend to use blockchain technology in general in the tourism accommodation sector, in the future	0.933
(ITU02) I predict that I will use blockchain technology in general in the tourism accommodation sector, in the future	0.950
(ITU03) I plan to use blockchain technology in general in the tourism accommodation sector in the future	0.948
<i>Perceived privacy</i> (Cronbach's alpha = 0.957; Rho_A = 0.958; Rho_C = 0.957; AVE = 0.849)	
(PP01) I believe the information (personal and behavioral) being collected about me is not being used for purposes other	0.896
(PP02) I do feel totally safe by providing personal privacy information through a blockchain technology	0.932
(PP03) I feel comfortable with the information being collected about me by the blockchain technology	0.911
(PP04) I believe the information (personal and behavioral) being collected about me is not being used for purposes other	0.944
<i>Perceived security</i> (Cronbach's alpha = 0.945; Rho_A = 0.951; Rho_C = 0.947; AVE = 0.818)	
(PS01) I believe that blockchain technology is able to conduct banking transactions securely	0.933
(PS02) I believe that blockchain technology guarantees that all transactions have taken place	0.934
(PS03) I believe that using blockchain technology is financially secure	0.945
(PS04) I am not worried about the security aspects of blockchain technology	0.796
<i>Perceived trust</i> (Cronbach's alpha = 0.961; Rho_A = 0.961; Rho_C = 0.961; AVE = 0.859)	
(PT01) Blockchain technology is very reliable	0.906
(PT02) Blockchain technology will not fail me	0.943
(PT03) Blockchain technology has the functionality I need for my future job	0.912
(PT04) Blockchain technology provides the help I will need	0.945
<i>Perceived usefulness</i> (Cronbach's alpha = 0.957; Rho_A = 0.958; Rho_C = 0.957; AVE = 0.848)	
(PU01) Using blockchain technology should improve my performance	0.889
(PU02) Using blockchain technology should improve my productivity	0.903
(PU03) Using blockchain technology should increase my efficiency	0.935
(PU04) I find blockchain technology useful	0.955

Source(s): Authors' own work

Discriminant validity was assessed using two tests. Firstly, the [Fornell and Larcker \(1981\)](#) test in which the composite variance of the constructs must be greater than 0.5. The second test was the heterotrait-monotrait test (HTMT), which was applied through the confidence interval procedure, whereby the value 1 must not be in the range of the confidence interval ([Henseler et al., 2015](#)). [Tables 3](#) and [4](#) show the results.

In the two tests applied, the values obtained were within the thresholds, which indicates that the measurement scales did not present discriminant validity problems.

Table 3. Fornell–Larcker test

Variables	ATT	GS	ITU	PP	PS	PT	PU
ATT	0.928						
GS	0.722	0.922					
ITU	0.836	0.625	0.944				
PP	0.852	0.661	0.876	0.921			
PS	0.919	0.707	0.844	0.926	0.904		
PT	0.812	0.783	0.711	0.779	0.831	0.927	
PU	0.869	0.732	0.808	0.834	0.862	0.849	0.921

Note(s): GS = Government support; PT = perceived trust; PU = perceived usefulness; ATT = attitude; PS = perceived security; PP = perceived privacy; ITU = intention to use

Source(s): Authors' own work

Table 4. Heterotrait-monotrait ratio test. Bias-corrected confidence intervals

Variables	Original sample	Sample mean	CI 2.5%	CI 97.5%	Bias
GS <-> ATT	0.722	0.722	0.661	0.777	-0.000
ITU <-> ATT	0.836	0.836	0.791	0.875	-0.000
ITU <-> GS	0.625	0.624	0.553	0.693	-0.001
PP <-> ATT	0.852	0.851	0.811	0.888	-0.000
PP <-> GS	0.661	0.660	0.591	0.725	-0.001
PP <-> ITU	0.876	0.876	0.837	0.912	0.000
PS <-> ATT	0.919	0.919	0.891	0.944	-0.000
PS <-> GS	0.705	0.705	0.641	0.763	-0.000
PS <-> ITU	0.848	0.848	0.802	0.888	0.000
PS <-> PP	0.931	0.931	0.899	0.959	-0.000
PT <-> ATT	0.812	0.812	0.764	0.854	-0.000
PT <-> GS	0.783	0.783	0.724	0.835	-0.000
PT <-> ITU	0.711	0.711	0.650	0.769	-0.000
PT <-> PP	0.779	0.778	0.725	0.825	-0.000
PT <-> PS	0.830	0.830	0.785	0.870	-0.000
PU <-> ATT	0.869	0.869	0.829	0.904	0.000
PU <-> GS	0.732	0.732	0.669	0.789	-0.000
PU <-> ITU	0.808	0.808	0.757	0.854	0.000
PU <-> PP	0.833	0.833	0.790	0.873	0.000
PU <-> PS	0.862	0.862	0.819	0.901	0.000
PU <-> PT	0.849	0.849	0.806	0.888	-0.001

Note(s): GS = Government support; PT = perceived trust; PU = perceived usefulness; ATT = attitude; PS = perceived security; PP = perceived privacy; ITU = intention to use; CI = confidence interval

Source(s): Authors' own work

Finally, multicollinearity was analysed. Beyond examining individual values, which in some cases show moderate values, we considered it relevant to complement the assessment with the mean VIF per construct, following the methodological recommendations available in the literature. Recent research recognises the mean variance inflation factor (MVIF/AVIF) as a suitable global indicator to assess the level of collinearity, as it synthesises information from all effects and relationships associated with the same block (Issah *et al.*, 2024; Jagrič *et al.*, 2025). Table 5 presents the results.

In our case, the MVIF obtained for each latent variable were clearly within the accepted limits (<5). This overall assessment reinforces the fact that the model’s general collinearity is low and does not compromise the numerical stability or the interpretation of the structural coefficients, in line with the criteria established in SEM and PLS-SEM (Hair *et al.*, 2017b; Kock and Lynn, 2012).

4.2 Evaluation of the model

Secondly, an analysis of the explanatory power and predictive power was carried out. To assess the explanatory power, R^2 was used, which assesses the explained variance of the endogenous constructs over the exogenous constructs. Hair *et al.* (2021) state that the results should be interpreted as follows: values of 0.25, 0.5 and 0.75 should be considered as weak, moderate and substantial explanatory power, respectively. In turn, to assess predictive accuracy, Q^2 was used, which, in this case, combines aspects of out-of-sample prediction and in-sample explanatory power (Shmueli *et al.*, 2016). Values of 0, 0.25 and 0.5 should be interpreted as small, medium and large predictive accuracy, respectively. In parallel, following the recommendations of Schmueli *et al.* (2016), the PLSpredict procedure was applied to estimate the in-sample model and evaluate its predictive performance on a non-sample data set (Hair *et al.*, 2021). Thus, firstly, the values of Q^2 predict must be assessed to be greater than 0 (Shmueli *et al.*, 2019), and then the PLS-SEM_RMSE values must be compared to the naïve benchmark (LM). Table 6 presents the results.

Table 5. Multicollinearity analysis

Variables	VIF
Attitude → intention to use	5.483
Government support → attitude	1.858
Government support → intention to use	2.496
Government support → perceived trust	1.858
Government support → perceived usefulness	1.858
Perceived privacy → attitude	4.615
Perceived privacy → intention to use	4.954
Perceived privacy → perceived trust	4.615
Perceived privacy → perceived usefulness	4.615
Perceived security → attitude	5.077
Perceived security → intention to use	7.347
Perceived security → perceived trust	5.077
Perceived security → perceived usefulness	5.077
Perceived trust → intention to use	4.077
Perceived usefulness → intention to use	4.640
MVIF	4.243

Source(s): Authors’ own work

Table 6. Explanatory power and predictive power

Variables/Items	R ²	Q ²	Q ² predict	PLS-SEM_RMSE	LM_RMSE	(PLS-SEM) – LM_RMSE
Attitude	0.856	0.793				
ATT01			0.697	1.054	1.030	0.024
ATT02			0.720	0.970	0.925	0.045
ATT03			0.702	1.011	1.007	0.003
ATT04			0.721	0.999	0.976	0.023
Intention to use	0.805	0.723				
ITU01			0.646	1.231	1.262	-0.031
ITU02			0.680	1.120	1.141	-0.021
ITU03			0.683	1.154	1.144	0.010
Perceived trust	0.767	0.715				
PT01			0.626	1.170	1.166	0.004
PT02			0.646	1.130	1.132	-0.002
PT03			0.623	1.132	1.150	-0.018
PT04			0.659	1.086	1.098	-0.012
Perceived usefulness	0.781	0.728				
PU01			0.607	1.255	1.239	0.016
PU02			0.602	1.206	1.210	0.006
PU03			0.677	1.106	1.101	0.005
PU04			0.689	1.093	1.078	0.015

Source(s): Authors' own work

All exogenous constructs showed substantial explanatory power ($R^2 \geq 0.75$) and large predictive relevance ($Q^2 \geq 0.5$). The PLSpredict analysis shows that most of the items produced more errors in the naïve LM benchmark compared to the PLS-SEM model, which confirms the predictive power.

4.3 Hypothesis testing and discussion

Thirdly, goodness-of-fit was assessed and hypothesis testing was performed. In terms of goodness of fit, SRMR yielded a value of 0.024. Williams *et al.* (2009) state that SRMR should be < 0.1 , so the model fit is very good. The results of the hypothesis test are presented in Table 7.

Before addressing the results of each hypothesis, it is important to distinguish conceptually between direct and indirect effects from the perspective of the S-O-R model. In this framework, direct effects between stimuli and intention to use reflect situations in which the stimulus activates the behavioural response without requiring explicit psychological mediation. In contrast, indirect effects highlight the existence of internal cognitive and affective processes that transform external stimuli into behavioural predisposition. This distinction is key to properly interpret the results and understand the nonlinear nature of the blockchain adoption process in tourism.

In relation to the variables considered as stimuli (S), the results revealed the existence of differentiated patterns of influence on the intention to use blockchain in the tourism sector, which reinforces the suitability of the S-O-R model for interpreting the adoption process from a nonlinear perspective.

Firstly, perceived privacy does not have a significant effect on the organisational variables considered (trust, perceived usefulness and attitude), but it does have a direct and significant effect on the intention to use. From a theoretical perspective, this result suggests that privacy does not operate as a progressive evaluative factor that must be cognitively processed, but

Table 7. Hypothesis test

Research hypothesis	β	SD	Statistics t (O/SD)	p-value	CI 2.5%	CI 97.5%	Decision
<i>Direct effects</i>							
H1. PP → PT	0.048	0.108	0.443	0.658	-0.165	0.255	Not supported
H2. PP → PU	0.238	0.134	1.781	0.075	-0.022	0.492	Not supported
H3. PP → ATT	-0.004	0.120	0.034	0.973	-0.272	0.202	Not supported
H4. PP → ITU	0.622	0.123	5.058	0.000	0.397	0.877	Supported
H5. GS → PT	0.391	0.050	7.852	0.000	0.293	0.487	Supported
H6. GS → PU	0.243	0.048	5.063	0.000	0.149	0.337	Supported
H7. GS → ATT	0.145	0.040	3.624	0.000	0.069	0.225	Supported
H8. GS → ITU	0.002	0.046	0.050	0.960	-0.082	0.100	Not supported
H9. PS → PT	0.510	0.121	4.213	0.000	0.277	0.746	Supported
H10. PS → PU	0.470	0.143	3.279	0.001	0.199	0.759	Supported
H11. PS → ATT	0.821	0.133	6.180	0.000	0.694	1.118	Supported
H12. PS → ITU	-0.099	0.161	0.616	0.538	-0.419	0.217	Not supported
H13a. ATT → ITU	0.327	0.102	3.201	0.001	0.126	0.533	Supported
H14a. PT → ITU	-0.120	0.060	2.007	0.045	-0.238	-0.002	Not supported
H15a. PU → ITU	0.191	0.095	2.012	0.044	0.011	0.377	Supported
<i>Indirect effects</i>							
H13b. PP → ATT → ITU	-0.001	0.043	0.031	0.975	-0.104	0.067	Not supported
H13c. GS → ATT → ITU	0.047	0.020	2.338	0.019	0.016	0.099	Supported
H13d. PS → ATT → ITU	0.269	0.102	2.622	0.009	0.109	0.512	Supported
H14b. PP → PT → ITU	-0.006	0.016	0.363	0.717	-0.048	0.019	Not supported
H14c. GS → PT → ITU	-0.047	0.025	1.871	0.061	-0.098	-0.001	Not supported
H14d. PS → PT → ITU	-0.061	0.034	1.785	0.074	-0.143	-0.006	Not supported
H15b. PP → PU → ITU	0.045	0.031	1.453	0.146	0.003	0.136	Not supported
H15c. GS → PU → ITU	0.046	0.026	1.787	0.074	0.005	0.106	Not supported
H15d. PS → PU → ITU	0.090	0.062	1.454	0.146	0.006	0.246	Not supported

Note(s): GS = Government support; PT = perceived trust; PU = perceived usefulness; ATT = attitude; PS = perceived security; PP = perceived privacy; ITU = intention to use; CI = confidence interval

Source(s): Authors' own work

rather as a minimum requirement or threshold for acceptance. In technological contexts characterised by high sensitivity to personal data management, such as digital tourism, users do not need to develop additional positive perceptions to consider adoption viable; it is sufficient for privacy to be perceived as guaranteed for the intention to use to be activated. This finding extends previous research emphasising the mediating role of trust and attitude (Marikyan *et al.*, 2022; Yang *et al.*, 2025) and reinforces the idea that certain critical stimuli can directly activate behavioural responses, in line with recent applications of the S-O-R model in emerging technologies (Pham *et al.*, 2024a).

In contrast, perceived safety and government support did not show a direct effect on intention to use, but they did have a significant influence through indirect effects mediated by attitude. This pattern shows that both stimuli require prior cognitive and affective processing to translate into behavioural predisposition. From the S-O-R model, these results indicate that the mere existence of technologically secure systems or protective regulatory frameworks does not automatically drive the adoption of blockchain, but rather that its impact depends on how tourists reinterpret these stimuli in terms of practical utility and affective valuation.

Specifically, the effect of government support on perceived usefulness and attitude is a relevant contribution, as it suggests that institutional legitimacy and regulatory protection act as cognitive structuring mechanisms, favouring more positive evaluations of the technology without necessarily generating an immediate behavioural impulse. This finding expands on previous studies focusing on the direct effects of regulation on technology adoption (Choi and Luo, 2019; Dhingra and Gupta, 2025) and reinforces a more nuanced view of the role of institutional factors in the context of emerging innovation.

Regarding organism variables (O), perceived usefulness and attitude showed a positive, significant relationship with intention to use, which is in line with the previous literature on technology adoption (Nuryyev *et al.*, 2020; Yang *et al.*, 2025). However, the results regarding perceived trust revealed that its direct effect on intention to use was not significant. Far from being interpreted as a weakness of the model, this finding suggests a reconfiguration of the role of trust in the context of blockchain technology in tourism. In particular, trust seems to function as a baseline condition or hygiene factor, necessary to avoid rejection of the technology, but not sufficient to actively drive its adoption. In other words, the absence of trust penalises the intention to use, while its presence does not necessarily act as a motivational driver, especially in technologies that incorporate structural mechanisms of verification, traceability and security (De Filippi *et al.*, 2020; Naef *et al.*, 2024).

Finally, mediation analyses confirmed that among the organism variables, only attitude exerts a robust mediating effect, facilitating the translation of stimuli related to perceived security and government support into intention to use. This result reinforces the central role of attitude as a key affective state within the S-O-R and highlights that the adoption of blockchain in tourism ultimately depends on how external stimuli are psychologically internalised by users.

5. Conclusions

The results of this study show that the adoption of blockchain in the tourism sector does not follow a linear or homogeneous process, but rather is articulated through differentiated psychological pathways through which external stimuli are transformed into intention to use. While some factors, such as perceived privacy, act as direct triggers for behaviour, others, such as perceived security and government support, need to be cognitively internalised through prior affective and utilitarian evaluations. This distinction allows us to move towards a more nuanced understanding of the adoption process, showing that not all stimuli influence in the same way or through the same psychological mechanisms. From this perspective, the S-O-R model proves particularly suitable for capturing the complexity of the phenomenon, providing a theoretically integrated reading that transcends merely descriptive or confirmatory approaches.

5.1 Theoretical contributions

This study makes several relevant theoretical contributions to the literature on technology adoption and blockchain in the tourism sector, particularly through the application of the S-O-R model as a central explanatory framework. Unlike previous research that used S-O-R primarily as an organisational structure, this research uses it as an analytical lens to reinterpret classic adoption constructs from psychological and processual logic, allowing us to move beyond linear and homogeneous approaches.

The main theoretical contribution lies in the reinterpretation of the process of blockchain adoption in tourism as a nonlinear, non-uniform phenomenon, even when using variables that are widely established in the literature. The results show that external stimuli do not

necessarily follow a homogeneous SOR sequence, but rather present differentiated patterns of influence, highlighting the existence of multiple psychological routes to usage intention.

Firstly, perceived privacy emerges as a direct behavioural trigger, capable of influencing the intention to use without requiring prior cognitive or affective mediation. This finding expands on previous literature, which has traditionally assumed the mediating role of trust and attitude, and suggests that in technological contexts that are highly sensitive to personal data management, privacy acts as a minimum threshold of acceptance rather than a progressive evaluative factor (Zhang *et al.*, 2019; Zhang *et al.*, 2025). From the perspective of the S-O-R model, this result shows that certain stimuli can directly activate behavioural responses when they are associated with critical perceived risks.

Secondly, perceived security and government support are configured as structural stimuli, whose impact on adoption is not direct, but is channelled exclusively through internal processes within the organisation, specifically through attitude and perceived usefulness. This distinction refines our understanding of the role of technological and institutional factors, showing that their influence depends on how individuals cognitively process these stimuli rather than on their mere presence. In this sense, the study contributes to the literature by demonstrating that government support does not act as an immediate behavioural driver, but rather as a mechanism of cognitive legitimisation that favours more positive evaluations of the technology.

Thirdly, the results allow for a critical review of the traditional role of trust in technology adoption models. Although the literature has consistently highlighted trust as a key predictor of usage intention, the findings of this study suggest that in the context of blockchain in tourism, trust functions more as a baseline condition or hygiene factor than as a direct motivational driver. In other words, the absence of trust penalises adoption, but its presence is not sufficient to drive it. This result points to a possible stage of technological maturity in which users assume certain levels of reliability as a minimum requirement, which contributes to nuancing classic adoption models and opens up new lines of research on the contingent and contextual role of trust in emerging technologies.

Taken together, these contributions allow us to move towards a more accurate understanding of blockchain adoption in tourism, demonstrating that theoretical originality does not necessarily lie in the incorporation of new constructs. Rather, it lies in the reconfiguration of the explanatory mechanisms through which external stimuli are transformed into behavioural responses within an integrative theoretical framework such as S-O-R.

5.2 Management contributions

The results of the study offer clear practical guidance for tourism managers, especially based on the distinction between stimuli that directly influence intention to use and those that act through internal psychological processes. Based on the findings on perceived privacy and intention to use, we recommend that managers explicitly communicate how the technology guarantees data protection and make efforts to minimise any perception of exposure of personal information. Privacy should be used as another technical element to be integrated as a strategic attribute, communicating it in a simple way to tourism users.

Based on findings regarding perceived security and government support in the psychological evaluation by technology users, we propose that tourism operators and governments communicate not only the security features of blockchain technology, but also its alignment with official regulatory frameworks, public certifications and other institutional guidelines. Additionally, the effect of government support highlights its ability to reinforce favourable attitudes towards the adoption of the technology through regulatory initiatives, sectoral standards and public certifications, even when this support does not have a direct influence on the user to

use the technology. In this regard, managers can take advantage of this governmental dimension to propose actions such as (1) promoting adherence to official blockchain technology standards for the tourism sector; (2) participating in pilot programmes promoted by public administrations and (3) incorporating regulatory compliance seals that are visible to tourists.

Finally, based on the findings on the role of attitude and perceived usefulness, managers should prioritise user experiences that demonstrate tangible benefits for tourists, such as faster check-in processes, agile authentication, fraud reduction and loyalty/reward programmes based on traceability.

5.3 Limitations and future lines of research

Although this research makes interesting contributions, it is important to recognise its limitations to guide future studies on the adoption of blockchain technology by tourists.

Firstly, this is a novel piece of research whose findings are mainly contrasted with studies from other sectors, giving it a fundamentally exploratory nature. The proposed theoretical relationships must continue to be evaluated to corroborate these results.

Secondly, the methodological decision to use an introductory explanatory video on blockchain, although intended to standardise the participants' level of knowledge, represents a limitation to the internal validity of the study. The video may have acted as an untheorised experimental stimulus that influenced subsequent assessments of privacy, security and perceived usefulness, potentially confounding the causal relationships proposed in the S-O-R model (Erol *et al.*, 2022; Nur Muharam *et al.*, 2024). Future research could overcome this limitation through alternative designs, such as the use of control groups or measurement of perceptions before and after the informational stimulus.

Thirdly, although the sample was highly diverse, this could mask certain specific findings. A large body of research argues that technology adoption is strongly related to certain age groups and previous technological experiences. Consequently, we propose that future studies conduct comparative analyses by age segment and consider the experience of potential users with similar technologies, which could help to better specify potential niches.

Another limitation is that this study did not consider variables that have traditionally been considered key to technology adoption, such as perceived risk, performance expectations and social influence; therefore, the effect of these factors should also be evaluated to complete knowledge about tourist perceptions.

Finally, we recognise that only the perceptions of tourists were evaluated; therefore, only part of the reality has been described. Therefore, we encourage researchers to evaluate the barriers and facilitators of blockchain technology from the perspective of tourism managers in the future.

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