Crypto-wallets revolution! Key factors driving behavioral intention to adopt the Coinbase Wallet using mixed PLS-SEM/ fsQCA methodology in the Spanish environment

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Eloy Gil-Cordero, Pablo Ledesma-Chaves and Rocío Arteaga Sánchez
Business Administration and Marketing Department, University of Seville, Sevilla, Spain, and
Ari Melo Mariano
Department of Production Engineering, Universidade de Brasília, Brasília, Brazil

Abstract

Purpose – The aim of this study is to examine the behavioral intention (BI) to adopt the Coinbase Wallet by Spanish users.

Design/methodology/approach – A survey was administered to individuals residing in Spain between March and April 2021. There were 301 questionnaires analyzed. This research applies a new predictive model based on technology acceptance model (TAM) 2, the unified theory of acceptance and use of technology (UTAUT) model, the theory of perceived risk and the commitment trust theory. A mixed partial least squares structural equation modeling (PLS-SEM)/fuzzy-set qualitative comparative analysis (fsQCA) methodology was employed for the modeling and data analysis.

Findings – The results showed that all the variables proposed have a direct and positive influence on the intention to use a Coinbase Wallet. The findings present clear directions for traders, investors and academics focused on improving their understanding of the characteristics of these markets.

Originality/value – First, this study addresses important concerns relating to the adoption of crypto-wallets during the global pandemic. Second, this research contributes to the existing literature by adding electronic word of mouth (e-WOM), trust, web quality and perceived risk as new drivers of the intention to use the Coinbase Wallet, providing unique and innovative insights. Finally, the study offers a solid methodological contribution by integrating linear (PLS) and nonlinear (fsQCA) techniques, showing that both methodologies provide a better understanding of the problem and a more detailed awareness of the patterns of antecedent factors.

Keywords Cryptocurrencies, Crypto-wallet, Coinbase, Intention to use, Adoption, fsQCA, PLS-SEM

Paper type Research paper

1. Introduction

The use of cryptocurrencies is a recent phenomenon that nowadays is attracting the attention of a large part of society (Alekseenko and Gidigbi, 2021; Davison *et al.*, 2022; Shin and Rice, 2022). Two of the main existing cryptocurrencies by capitalization are Ethereum and Bitcoin.

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The use of cryptocurrencies has grown steadily and its capitalization can be compared to the population of some small countries (Banco de España, 2022; Hileman and Rauchs, 2017). In contrast to those who see the system as simply a passing fad or insignificant (Hileman and Rauchs, 2017), others who are more optimistic claim that cryptocurrencies, such as Bitcoin, will alter payments, economies and even policies around the world (Narayanan *et al.*, 2016).

Cryptocurrencies are a medium of exchange that functions like any monetary asset (as they can be exchanged to acquire and transfer goods and services) but, unlike traditional money (Namazi, 2020), they do not require the intervention of governments, financial institutions or third parties (Geiregat, 2018). Cryptocurrencies rely on blockchain technology which enables the transmission of digital information through the use of cryptographic methods to guarantee unique and legitimate transactions (Farell, 2015; García-Corral *et al.*, 2022; Sanz-Bas *et al.*, 2021).

During 2021, Spain was the fifth largest financial asset in Europe, with approximately €60 billion, behind the United Kingdom, France, Germany and the Netherlands and ahead of Switzerland and Italy (Banco de España, 2022).

Payments with cryptocurrencies can be made between all those subjects who have software in their computer, smartphone or tablet; these are the so-called cryptocurrencies wallets (crypto-wallets) (Hossain, 2020). A crypto-wallet is a software that securely stores, sends and receives cryptocurrencies through public or private cryptographic keys (Hileman and Rauchs, 2017; Jørgensen and Beck, 2022; Saputra and Darma, 2022).

One of the major crypto-wallets, which also act as exchanges (buying, selling and exchanges between different cryptocurrencies), is Coinbase (Rezaeighaleh and Zou, 2019). Coinbase is a secure online platform for buying, selling, transferring and storing cryptocurrency (Albayati *et al.*, 2021). Coinbase Global Inc., was started in 2012 by Brian Armstrong, originally to enable people to easily store, send and receive digital assets like Bitcoin in a simple and secure way. Since then, the company has built a reliable and solid platform that allows users to easily access an extensive range of crypto products (Sandner *et al.*, 2022). The number of crypto-wallets created globally reached over 81 million wallet users in 2022. Statista (2022) points out that the use of multiple crypto apps around the world increased significantly in 2021.

In addition, the COVID-19 pandemic severely affected the global economy during 2020 (OECD, 2020) and many researchers have analyzed the impact of this crisis on financial markets' properties and relationships. Among these markets, due to their unique blockchain technology cryptocurrencies present different attributes from conventional assets that need to be investigated (Foroutan and Lahmiri, 2022; Vidal-Tomás, 2021). To the best of our knowledge, there are no previous studies which have focused on the technological acceptance of crypto-wallets during the COVID-19 pandemic. Thus, this study aims to reduce this research gap by proposing a model to determine the factors in adopting Coinbase Wallets among enthusiasts of information technology (IT) and crypto users' communities. Based on the technology acceptance model 2 (TAM 2), the unified theory of acceptance and use of technology (UTAUT) model, the theory of perceived risk and commitment trust and proceeding to a mixed PLS-SEM/fsQCA analysis, the aim of this article is to identify the factors affecting the intention to adopt the Coinbase Wallet by Spanish users. This objective is further complemented by the following secondary objectives. First, to know how the situation caused by the COVID-19 pandemic directly affects the intention to use this crypto-wallet and, second, to determine the importance of recommendations and trust of potential users in the intention to use the Coinbase Wallet.

The present study contributes and extends the literature on crypto-wallets in various ways. Firstly, since cryptocurrencies differ from traditional financial assets, this study addresses important concerns relating to the adoption of crypto-wallets during the global pandemic. Secondly, this study may be the first to adapt and develop a new predictive model

for user intentions in the context of crypto-wallets. Thirdly, this study contributes to the existing literature by adding electronic word of mouth (e-WOM), trust, web quality and perceived risk as new drivers of the intention to use the Coinbase Wallet, providing unique and innovative insights. Fourthly, the study offers a solid methodological contribution by integrating linear (i.e. regression analysis with PLS) and nonlinear techniques (fuzzy-set qualitative comparative analysis), showing that both methodologies provide a better understanding of the problem and a more detailed awareness of the patterns of antecedent factors. The use of a sole methodology might restrict the overall results when a complicated phenomenon arises. Finally, the study provides an enriching and updated literature review concerning crypto-wallets. From a corporate point of view, as digital cryptocurrencies become more popular with governments, businesses and individuals, the findings present clear directions for traders, investors and academics focused on improving their understanding of the characteristics of these markets.

This work has the following structure. After this introduction, the literature review is presented. In the third section the proposed model is justified by setting out the related hypotheses. The fourth section deals with the methodology identifying the measures used for each of the variables to be studied. In the next section, the analysis of data and results is carried out, and the hypotheses put forward in the third section are verified. The last section presents the discussion of the results obtained and ends with the most relevant conclusions of this work, also presenting its limitations and possible related future research.

2. Literature review

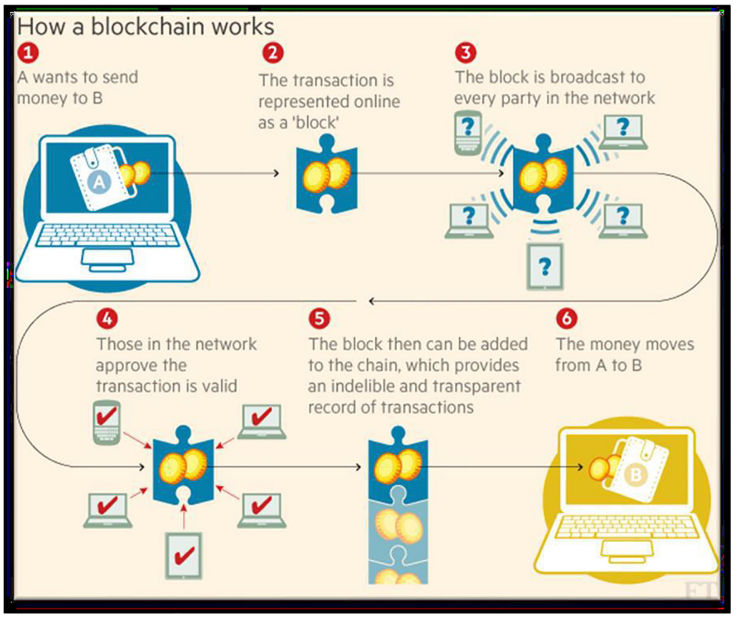
2.1 Crypto-wallets

In recent years, technology has acquired a leading role in many sectors, including the banking and financial services sector (Kumari and Devi, 2022). The combination of financial technology (FinTech) and blockchain is deliberately transforming digital banking services (Alaassar *et al.*, 2023; Kumari and Devi, 2022). The term FinTech refers to all those activities that imply the use of innovation and technological developments for the design, supply and provision of products and financial services. FinTech in banking services has mainly affected payments and the mode by which transactions are executed (Kumari and Devi, 2022; Thakor, 2020). FinTech aims for the banking sector to reshape profit-making conditions for industries and produce new revenue channels through online payments. The biggest disruptive potential of FinTech in payments services is with cryptocurrencies (Alaassar *et al.*, 2023; Kumari and Devi, 2022).

In this context, crypto-wallets are software applications used primarily to manage cryptocurrencies, and they gained prominence with the rise of cryptocurrencies (Jørgensen and Beck, 2022; Shin and Rice, 2022). A cryptocurrency wallet is an essential tool that has been used to interact with blockchain and cryptocurrencies. Blockchain is a technology based on a decentralized and public-operation chain of blocks. The technology creates a common database whose users can access and track all transactions they have performed (Suratkar *et al.*, 2020; Zakarneh *et al.*, 2022). Every time a network user performs a digital operation, associated data is generated and stored in one of the blocks. When the block contains information, it is connected to an existing blockchain (Hurtado, 2022) (See Figure 1). This technology's programming and open nature makes it possible to innovate the financial sector and administrative processes to improve efficiency and transparency.

According to the report published by MarketsandMarkets (2022) "the Blockchain Market size was valued $4.9 billion in 2021 and projected to reach $67.4 billion by 2026, at a Compound Annual Growth Rate (CAGR) of 68.4% during the forecast period".

Therefore, a cryptocurrency wallet is a system that provides a secure environment for accessing and conducting transactions on blockchains (Suratkar *et al.*, 2020). This means that to use cryptocurrencies it is essential to have one of these digital wallets.



Source(s): Wild *et al.* (2015)

Figure 1.
How blockchain works

Crypto-wallets can be classified into hot wallets or cold wallets (Taylor *et al.*, 2021). Hot wallets (online) are those that are online (software) and can be accessed whenever you have Internet access from any browser or application. Since the Internet is not totally secure, funds stored in a hot wallet may be at a slight risk of theft or loss due to software bugs. Cold wallets (offline) store digital currencies outside the network (hardware), therefore some physical support is needed to access them – this could be a computer, a USB or a QR code. A wallet is cold when it is safe offline and it is not exposed to the dangers that are on the Internet (Rámirez, 2022; Suratkar *et al.*, 2020).

The main hot wallets are desktop wallets, web wallets and mobile wallets (Biernacki and Plechawska-Wójcik, 2021; Rámirez, 2022). The main cold wallets are hardware wallets and paper wallets (Suratkar *et al.*, 2020; Zakarneh *et al.*, 2022). Some widely used multicurrency web wallets are shown in Table 1.

As we see in Table 1 Coinbase is one of the most important web wallets and it has emerged as one of the most popular cryptocurrency wallets in the world (Auer *et al.*, 2023). On April 2021 it debuted on Nasdaq, the New York stock exchange where the world's leading technology companies are listed, and its price skyrocketed immediately (Cinco Dias, 2021).

Crypto-wallets type	Most relevant wallets
Hardware Wallet	Ledger and KeepKey
Desktop wallet	Electrum, Bitcoin Core and Bither
Web wallet	Blockchain.info, Strongcoin and Coinbase
Mobile wallet	Mycelium, Blockfolio Bitcoin and Bitcoin Wallet

Source(s): Adapted from Coinmotion (2022)

Table 1.
Crypto-wallets classification

Coinbase has more than 4,900 employees and is present in more than 100 countries. It has over 103 million verified users, generates over $217 billion quarterly volume traded and it has $96 billion assets on its platform (Coinbase, 2022).

Cryptocurrency is an emerging economic phenomenon in the world of finance that has recently been attracting scholars' attention to identify research topics and future trends. Despite the importance of cryptocurrencies, global research on cryptocurrency is still very scarce, and it is in a nascent phase (Dabbous *et al.*, 2022).

Most studies about crypto-wallets have centered on technological characteristics. For example, Jørgensen and Beck (2022) focused on the universal wallet by describing the first elements of taxonomy for the application area and environment to manage these wallets. Furthermore, this taxonomy explains how universal wallets are a logical improvement on blockchain systems. Similarly, Suratkar *et al.* (2020) carried out a multicurrency wallets review, exploring features like supported currencies, anonymity, cost, platform support, key management, wallet recovery methods and fiat currencies supported. Zakarneh *et al.* (2022) concentrated on cryptocurrencies in terms of advantages and disadvantages. Other researchers, such as Rezaeighaleh and Zou (2019) evaluated the methodology using real-world examples and simulation exercises with various types of crypto-wallets. In the same context, Taylor *et al.* (2021) assessed the methodology using real cases and simulation exercises of different crypto-wallet types. Finally, Biernacki and Plechawska-Wójcik (2021) developed a comparative analysis of tools for managing a cryptocurrency portfolio in order to find out which of the tools is currently the best solution for users.

2.2 Theoretical foundation

The current study proposes a new predictive model to investigate user intentions toward using Coinbase Wallets based on TAM 2, the UTAUT model, the theory of perceived risk and the commitment trust theory. These theoretical models have been used to measure the behavioral intent in IT adoption and actual use of information systems by users (Nguyen and Huynh, 2018). The linking of these relevant four theories has been widely used in previous studies (Liu and Tu, 2021; Namahoot and Jantasri, 2023; Nguyen and Huynh, 2018). The details of these theories are set out below.

2.2.1 TAM 2 and the UTAUT model. Several models of technology acceptance have been developed over the last 40 years. Among the first to be proposed was the TAM proposed by Davis (1989), which studied how to predict the acceptance and use of technology in the work context. In 2000, TAM 2 was developed by Venkatesh and Davis (2000) on the basis of TAM and is composed of two crucial processes to the study of user acceptance, the Social Influence Processes (Subjective Norm, Voluntariness and Image) and the Cognitive Instrumental Processes (Job Relevance, Output Quality, Result Demonstrability and Perceived Usefulness). In these models, the field of study on technology acceptance and use was initially based on studies in the area of psychology, more specifically Fishbein and Ajzen (1975) theory of reasoned action (TRA) and Ajzen's (1985) theory of planned behavior (TPB). These models served as the basis for Venkatesh *et al.* (2003) to advance their initial unified theory of acceptance and use of technology (UTAUT) model of technology acceptance in a work environment.

UTAUT considers that four constructs are the main factors determining the intention to use IT. The four constructs are: expected performance, expected effort expectancy, social influence and facilitating conditions (Venkatesh *et al.*, 2003). All of them shape the most influential variables of the eight models or theories discussed above.

2.2.2 The commitment trust theory. In a highly risky environment such as the Internet, companies use trust variables as a basis for their services. The theory of commitment trust explains that trust is the intention or belief of a consumer in a product or service (Morgan and

Hunt, 1994). These authors point out that the trust of one of the parties in the other comes from the belief that the partner is reliable and upright. According to Gefen (2000), trust is a set of beliefs comprising competency, honesty and benevolences of service providers. Commitment trust theory indicates that there are five precursor variables (relationship termination costs, relationship benefits, shared values, communication and opportunistic behavior) and five outcome variables (acquiescence, propensity to leave, cooperation, functional conflict and uncertainty in decision-making) (Morgan and Hunt, 1994) and the relationship of commitment and trust are key mediators between these precursor variables and the outcome.

2.2.3 Perceived risk theory. The theory of perceived risk is focused on understanding consumer decision-making behavior (Park and Tussyadiah, 2017). Consumers prefer to avoid risk rather than increase utility when purchasing (Mitchell, 1999). Perceived risk has been a common extension of UTAUT and it is considered one of the important factors that affect the intention to adopt new technologies (Salem, 2019). Perceived risk is defined as consumers' perceptions of the "potential for loss in the pursuit of the desired outcome of using an e-service" (Featherman and Pavlou, 2003; Ter Ji-Xi *et al.*, 2021a). López-Zambrano *et al.* (2021) point out that in relationships where there is uncertainty it is necessary to include the variable perceived risk, since our decision to use a technology or not depends on the cost-benefit analysis (Gefen *et al.*, 2003; Pavlou, 2003).

The factors influencing the growing use of cryptocurrencies have been an increasingly intriguing topic for researchers; however, there is a dearth of global empirical studies on the drivers of its adoption. These studies are even more limited on drivers of crypto-wallet adoption (Saiedi *et al.*, 2021). In fact, research studies related to crypto-wallet adoption are inexistent in the context of Spain.

Some authors have analyzed factors determining consumers' behavioral intention (BI) to use cryptocurrencies (Almajali *et al.*, 2022; Schaupp *et al.*, 2022; Ter Ji-Xi *et al.*, 2021a). From a consumer behavior perspective in Spain, Arias-Oliva *et al.* (2021) analyzed the most important factors that ensure the success of the development of cryptocurrency. The results showed that risk was not a significant factor. However, willingness to manage cryptocurrency risk could be a prerequisite for adoption.

In addition, the most important factor for a given cryptocurrency's success has been the performance expectancy. As for the literature specifically on crypto-wallet adoption, we have only managed to find Albayati *et al.*'s (2021) study that examined the reasons behind the high adoption and low usage rate of cryptocurrency wallets. The model proposed mixed usability with a user experience questionnaire (UEQ) to understand user experience.

3. Research model and hypothesis

This research applies a new predictive model based on TAM 2 and the UTAUT model, the theory of perceived risk and the commitment trust theory. Our model includes the following variables e-WOM, web quality, perceived risk, trust and performance expectancy as possible new drivers of the intention to use the Coinbase crypto-wallet, providing unique and innovative insights.

3.1 Electronic word of mouth (e-WOM)

The Internet is a global computer network and the services it offers allow users to share their opinions and experiences about goods and services (Hennig-Thurau *et al.*, 2004) with complete strangers who are socially and geographically dispersed (Cheung and Lee, 2012). This is known as e-WOM. This refers to any positive or negative statement based on experience made by potential or current customers concerning a product, service, brand or

company available to a large number of people and institutions through the Internet (Chetioui *et al.*, 2020; Hennig-Thurau *et al.*, 2004; Putri and Hasib, 2022).

In this phenomenon, trust is a concept that plays an important role (Seo *et al.*, 2020) since, as a consequence of the nature of e-WOM, unknown participants develop a lot of unfiltered information, it being difficult to judge the credibility of the source (Di and Luwen, 2012). Despite this, users today perceive sources such as social networks as places where information is even more reliable than that coming from traditional channels (Mangold and Faulds, 2009). Herd behavior, derived from the trust that social networks provide to users, is increasingly common. Turning to empirical studies, these reveal that popular short-term behavior is also observed in financial markets (Hotar, 2020), among them, the buying and selling of cryptocurrencies.

Previous scientific literature has shown that e-WOM on cryptocurrencies has a positive impact on trust in the adoption of Bitcoin and other cryptocurrencies (Anser *et al.*, 2020; Asmi *et al.*, 2019; Gil-Cordero *et al.*, 2020; Rasika Hemantha, 2021). For example Asmi *et al.* (2019) explained a direct relationship between Blockchain e-WOM and blockchain use and Gil-Cordero *et al.* (2020) concluded in their work, that e-WOM can be considered as one of the constructs that exerts the greatest weight on trust in the purchase of cryptocurrencies. In this paper we therefore propose the following hypothesis to test this:

H1. E-Wom influences trust in Coinbase Wallets.

3.2 Web/app quality

Web/app quality can be defined as user's evaluations of the features of a website that meet their needs and reflect the excellence of the website (Aladwani and Palvia, 2002). Web/app professionals are concerned with web/app quality factors because they have an important impact on user acceptance (Ahn *et al.*, 2007). Many studies show the relationship between web/app quality and user acceptance. This is because web/app quality has a positive impact on beliefs about the perceived usability and ease of use of websites/apps (Ahn *et al.*, 2007; Ali *et al.*, 2022; Ighomereho *et al.*, 2022; Palos-Sanchez *et al.*, 2021). Moreover, Teng and Khong (2021) and Awad *et al.* (2022) state that the system's quality can affect not only the adoption of a system but also its continued use, being a trigger for other essential issues such as security and privacy.

All interactions require an element of trust, especially those in the uncertain e-commerce environment (Pavlou, 2003). In e-commerce, consumers need assurances that the other party is not abusing confidential information (Atif, 2002) as the risks in these online exchange relationships are based on anonymity, a lack of control and potential opportunism (Bhattacherjee, 2002). Trust, therefore, is considered as a catalyst in consumer-seller relationships, as it provides expectations of successful transactions (Pavlou, 2003) and helps to establish long-term relationships (Bhattacherjee, 2002).

The quality of the system also has a high impact on mobile wallets and their trust (Azizah *et al.*, 2018). In order to be able to ensure this necessary trust it is mandatory, after the development phase, to perform a quality test (Praitheeshan *et al.*, 2020) that measures the variables of access speed, response time, ease of use, flexibility and navigation (Azizah *et al.*, 2018).

H2. Web/app quality influences trust in Coinbase Wallets.

3.3 Perceived risk

Perceived risk is generally considered to be the person's perception of the uncertain and undesirable consequences of participating in an activity (Dowling and Staelin, 1994; Namahoot and Jantasri, 2023; Widyanto *et al.*, 2022). Previous work has described perceived

risk in e-commerce as the degree to which a user believes that using the web is dangerous or may have negative consequences (Glover and Benbasat, 2010; Sharma *et al.*, 2022; Ter Ji-Xi *et al.*, 2021b). Both conceptualizations refer to Bauer's (1960) definition of perceived risk, which states that this is the customer's anticipation that certain purchase actions could have consequences that cannot be anticipated with certainty, some of them being undesirable (Bauer, 1960). Because of this, when risk is present, trust occupies an important place when it comes to a buyer's willingness to enter into a transaction (Grazioli and Jarvenpaa, 2000).

From the perspective of cryptocurrencies, their use can have advantages over traditional payment methods, for example, lower costs, speed and anonymity, among others. However, their use may entail certain risks since this digital money is not directly covered by the laws imposed by governments on the usual means of payment (Almajali *et al.*, 2022; Arias-Oliva *et al.*, 2019; Segendorf, 2014). Therefore, the major innovation in its use is the ability to implement a decentralized payment network. This service is hampered by the apparent lack of collateral in its operations and the volatility of its valued functions (Gil-Cordero *et al.*, 2020; Mendoza-Tello *et al.*, 2019).

H3. Perceived risk influences trust in Coinbase Wallets.

3.4 Performance expectancy

Performance expectations are defined as the degree to which a person believes that the use of a particular technology is useful in improving his or her performance in a particular activity (Venkatesh *et al.*, 2003). There are some factors that help in forming performance expectations, such as perceived usefulness, external motivation, relative advantages and outcome expectations (Ghalandari, 2012).

Venkatesh *et al.* (2003) states that people will adopt blockchain technology if they believe it will lead to positive results. This is due to the lack of intrinsic value, as the value of cryptocurrency depends on the number of users using it. Consequently, cryptocurrency must be a high-value proposition and significant marketing efforts must be made to ensure that potential customers understand this value, as the more value-added they provide, the more likely it will be used (Arias-Oliva *et al.*, 2019). From the findings of Yeong *et al.* (2022) and Ghalandari (2012), it is perceived that there is a significant and positive effect of performance expectations on users' usage intention. Conversely, Miraz *et al.* (2022) examined the factors that influence cryptocurrency adoption in the digital market in Malaysia and the results showed that performance expectancy negatively impacts the digital market of that country.

Based on the above, we establish as the fourth hypothesis of the article:

H4. Performance expectations influence the intention to use Coinbase Wallets.

3.5 Trust

Moorman *et al.* (1993) define trust as the willingness to rely on an actor in whom the user has confidence (Moorman *et al.*, 1993). Thus Morgan and Hunt (1994) define it as the perception of security in the trustworthiness and integrity of the individual participating in the exchanges.

Cryptocurrencies have sometimes been used for theft and fraud, on occasions due to faulty systems of exchange companies, and this makes users think that it is not a safe location to deposit their money (DeVries, 2016). This has had direct consequence on consumers and has made some reluctant to use cryptocurrencies. As long as cryptocurrencies remain in a space that is not covered by law, they will have a limited user acceptance. Users need to trust that any transaction using cryptocurrencies is legal and restrictive of other risks (Almajali *et al.*, 2022; DeVries, 2016; Miraz *et al.*, 2022; Schaupp *et al.*, 2022).

Nevertheless, trust can be generated by the credibility of the technology based on cryptocurrency. Blockchain technology has become popular by providing decentralized,

independent and verifiable powers to ensure the integrity and consistency of ledgers and associated transactions (Anjum *et al.*, 2017; Schaupp *et al.*, 2022).

We can conclude that this system maintains credibility and motivates its use (Dierksmeier and Seele, 2018), thus posing the following hypothesis:

H5. Trust influences the intention to use Coinbase Wallets.

3.6 Proposed model

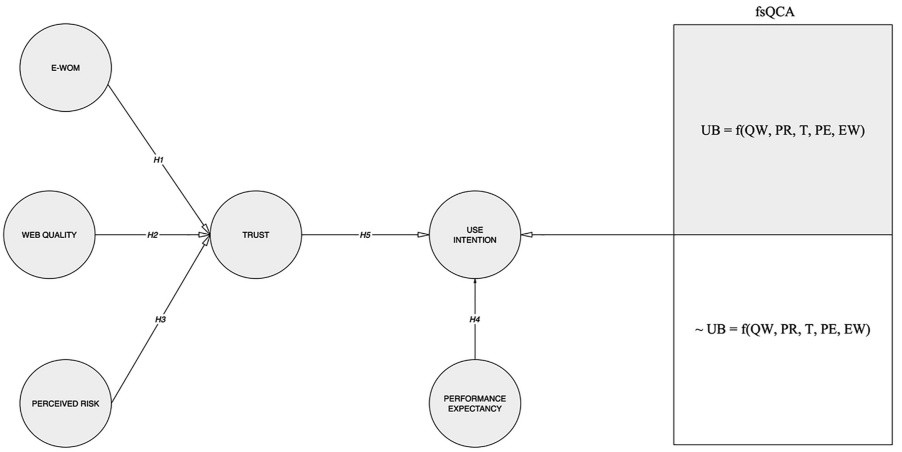
The model we have proposed for this research is shown in Figure 2.

4. Methodology

4.1 Sample and data collection

This paper analyzes the different factors that affect the adoption of Coinbase Wallets and how these factors are related to each other, through the use of a mixed methodology based on a model founded on TAM 2, the UTAUT model, the theory of perceived risk and the commitment trust theory and developed through PLS-SEM and a nonlinear development using fsQCA, aiming to understand how the crisis caused by the COVID-19 pandemic has affected the behavior of users of these financial products. The sample is made up of Spanish users knowledgeable about the Coinbase platform. The reason for choosing Spanish users is twofold. Firstly, among these technologies, the Spanish market is considered to have a high potential and development within FinTech applications (Valero *et al.*, 2020), and, secondly, Spain has a solid and developed banking sector, which has successfully overcome the recent financial crises as well as the consolidation process (Okolelova and Bikker, 2022), allowing a great starting point for the development of new businesses and banking systems.

A questionnaire was developed in order to check the previously defined hypotheses. The survey was based on 17 questions aimed at assessing the variables of our model (See Table 3): e-WOM, web quality, perceived risk, trust and performance expectancy. It uses a seven-point Likert scale ranging from 1 "strongly disagree" to 7 "strongly agree". The population selected



Note(s): UB (User Intention); QW (Web Quality); PR (Perceived Risk); T (Trust); PE (Performance Expectancy); EW (E-WOM)

Source(s): Authors own creation

Figure 2.
Proposed model

for this research were individuals residing in Spain with a minimum age of 18 years old. For the selection of the elements of the sample, a non-probabilistic convenience sampling is carried out. This type of sampling implies that not all the elements of the population have the same possibility of being selected, the reason for this being left to the researcher's discretion. It is widely used in social and business disciplines, since diversity in terms of the possible

Table 2.
Sample characteristics

	Feature	Frequency	Percent
Gender	Men	163	53.97
	Women	139	47.03
	Total	302	100
Age	<25	177	58.60
	From 25 to 34	54	17.88
	From 35 to 44	34	11.25
	From 45 to 54	22	7.28
	>54	15	4.90
	Total	302	100%

Source(s): Authors' own creation

Table 3.
Scales of measurement

Construct	Ítems	Authors
e-WOM (EW)	EW1. People who are important to me think I should use Coinbase EW2. People who have an influence on me think I should use Coinbase EW3. People whose opinions are of value to me would like me to use the Coinbase app	Arias-Oliva *et al.* (2019)
Web/app quality (QW)	QW1. The cryptocurrency website is of high quality QW2. The expected quality of the cryptocurrency web site is extremely high	Everard and Galletta (2005)
Perceived risk (PR)	PR1. I believe that the use of Coinbase for the exchange of cryptocurrencies puts my privacy at risk PR2. The mere use of cryptocurrencies exposes me to a general risk PR3. To use the Coinbase app for cryptocurrency transactions puts my financial activities at risk PR4. I think hackers can monitor my transaction history if I use Coinbase	Featherman and Pavlou (2003)
Performance expectancy (PE)	PE1. To use Coinbase to transact cryptocurrencies will increase the chances of achieving important goals for me PE2. To use Coinbase for cryptocurrency transactions will help me reach my goals faster PE3. To use Coinbase to transact cryptocurrencies will increase my standard of living	Arias-Oliva *et al.* (2019)
Trust (T)	T1. Coinbase is reliable T2. Coinbase providers give the impression that they keep promises and commitments T3. I believe Coinbase providers have my best interests in mind	Albayati *et al.* (2021)
Use intention (UB)	UB1. If I have access to Coinbase, I intend to use it UB2. I plan to use Coinbase in the next "n" months	Albayati *et al.* (2021)

Source(s): Authors' own creation

characteristics of the surveyed elements requires the establishment of research guidelines (Liao *et al.*, 2019). In our case, the choice of the non-random method was based on the need for the individuals in the sample to have prior knowledge about cryptocurrencies and crypto-wallets and specifically about Coinbase. Subsequently, once the sample was determined, the questionnaires were self-administered through a platform created for this purpose. In addition, this fact was subsequently verified by means of control questions in the questionnaire (Gil-Cordero *et al.*, 2023). The distribution of the questionnaire was between March and April 2021, being online and anonymous. A total of 650 questionnaires were sent out, of which 349 were answered, 48 of these were eliminated because they did not answer affirmatively to the three control questions (the first of the questions is based on whether they know cryptocurrencies, the second whether they know crypto-wallets how Coinbase or similar, the third of the questions is whether they have owned or have crypto-wallets how Coinbase or similar) or contained errors or lacked responses, leaving 301 valid questionnaires, giving a response rate of 46.3%. The sample size was determined with the G* Power program, which is a program for calculating statistical power, widely used in social sciences (Erdfelder *et al.*, 2009), resulting in an optimal sample from 107 samples, so this research meets the requirements described above. The evaluation survey questionnaire and methodology were examined, approved and endorsed by research ethics. The study meets the requirements of the National Statement on Ethical Conduct in Human Research (2007). The procedures used in this study adhere to the tenets of the declaration of Helsinki (the characteristics of the sample can be seen in Table 2 below). Quality control checks were also conducted beforehand in order to avoid measurement bias errors, such as common method bias (CMB) (Cabrera-Sánchez and Villarejo Ramos, 2018). The subsequent steps were followed for this test by Kock (2015) and Kock and Lynn (2012), which added a new latent variable (variable CMB) as a dependent variable. All the variance inflation factors (VIFs) that are obtained by the method must be < 3.3 in order to affirm that the sample is free of a measurement bias error.

Those under 44 years of age represent 87.73% of the sample (See Table 2). This result is to be expected since the use of means of payment through Coinbase Wallet is relatively recent and requires an average technological knowledge, so young people respond better to its use (Karim *et al.*, 2020), valuing aspects such as speed, acceptance, quality of service or time savings (Adharsh *et al.*, 2018).

4.2 Variables measurement

The variables are measured using a seven-point Likert scale, where 1 is strongly disagree and 7 is strongly agree. The variables used in this research are shown in Table 3. This shows the 17 items used and the literature from which they are taken.

4.3 Data analysis

The validity and reliability of the measurement model and the structural model are analyzed using the PLS statistical tool (Hulland, 1999). Specifically, this was the Smart-PLS 3 software package, developed by Ringle *et al.* (2005). Within the operations, a bootstrapping with 10,000 subsamples is performed for parameter estimation. We also use the fsQCA methodology to complement the results of the symmetrical method, analyzing the cases and better capturing the complexity of human behavior (Rihoux and Lobe, 2009).

5. Results

5.1 PLS-SEM

A reliability analysis of the constructs and their measurement scales was previously carried out in order to subsequently assess the model itself (Hair *et al.*, 2019). According to Roldan and

Cepeda (2017), a minimum factor loading of 0.7 on the latent variables is considered acceptable in the measurement model to ensure its validity and reliability (See Table 4). At this level, 50% of the variance of the indicator is explained by its factor (Ringle *et al.*, 2022).

To check the internal consistency of the test, the reliability of the constructs was analyzed using Cronbach's alpha indicator. This coefficient analyzes to what extent the measures obtained by the different items included are consistent with each other and representative of all the possible items which could measure each construct. It is suggested that this coefficient be higher than 0.7 in exploratory research such as this.

On the other hand, to ensure convergent validity, the average variance extracted (AVE) was analyzed (See Table 5). This measures that the variance of the construct can be explained through the chosen indicators (Fornell and Larcker, 1981). The AVE must be equal to or greater than 0.5, meaning that each construct or variable explains at least 50% of the variance of the indicators (Martínez Ávila and Fierro Moreno, 2018). This requirement is met by all the constructs.

The discriminant validity analysis indicates to what extent a given construct is different from other constructs. To do so, the Fornell–Larcker test considers that the square root of the AVE of each latent variable should be greater than the correlations which it has with the rest of the variables (Martínez Ávila and Fierro Moreno, 2018). The results of this criterion are in Table 6. The results allow us to ensure discriminant validity for the latent variables.

	Web/app quality	Trust	Performance expectancy	e-WOM	Use intention	Perceived risk
T1		0.863				
T2		0.880				
T3		0.808				
QW1	0.927					
QW2	0.917					
ER1			0.934			
ER2			0.938			
ER3			0.908			
EW1				0.956		
EW2				0.965		
EW3				0.961		
UI1					0.945	
UI2					0.946	
RP1						0.932
RP2						0.893
RP3						0.878
RP4						0.761

Table 4. Factor loadings

Source(s): Authors' own creation

	Cronbach alpha	Average variance extracted (AVE)
Web/app quality	0.824	0.850
Trust	0.811	0.724
Performance expectancy	0.918	0.859
e-WOM	0.958	0.923
Use intention	0.881	0.894
Perceived risk	0.889	0.754

Table 5. Composite reliability and convergent validity

Source(s): Authors' own creation

	App quality	Trust	Performance expectancy	e-WOM	Use intention	Perceived risk
App quality	0.922					
Trust	0.613	0.851				
Performance expectancy	0.445	0.589	0.927			
e-WOM	0.337	0.451	0.716	0.961		
Use intention	0.467	0.545	0.686	0.550	0.945	
Perceived risk	−0.455	−0.428	−0.226	−0.147	−0.316	0.868

Source(s): Authors' own creation

Table 6. Fornell–Larcker test

There is discriminant validity between the constructs, since the shared variance between pairs of constructs is smaller than the variance extracted for each individual construct as proposed by Fornell and Larcker (1981). Table 6 shows that the values on the diagonal are higher than the values below the diagonal. Similarly, we assessed discriminant validity with the Heterotrait-Monotrait (HTMT) ratio (Sarstedt *et al.*, 2017), and it has been found that in all the cases the levels are below the recommended 0.9, or even 0.85, as a more conservative criterion (Ringle *et al.*, 2022) (Table 7). Discriminant validity proves that constructs that should not have any factual relationship indeed do not have any relationship at all (Roldan and Cepeda, 2017). Considering that the reflective measurement model contains reliability and validity, we proceed to evaluate the structural model.

To evaluate the model, we analyzed the variance explained and the path coefficients of the endogenous variables (R^2). The R^2 of the second-order constructs -trust and use intention-can be seen in Table 8. This coefficient of determination reflects the goodness of fit of a model to the variable it seeks to explain; the closer this value is to 1, the greater the fit and, therefore, the more reliable it is. The model with the proposed constructs explains almost 50% of the dependent construct with its antecedents, which is a good level for a parsimonious model (Roldan and Cepeda, 2017). This fact is especially relevant in the case of UB, with only two antecedents (PE and T), revealing the importance of these two variables in the analyzed area.

	App quality	Trust	Performance expectancy	e-WOM	Use intention	Perceived risk
App quality						
Trust	0.727					
Performance expectancy	0.468	0.679				
e-WOM	0.316	0.514	0.763			
Use intention	0.533	0.636	0.762	0.599		
Perceived risk	0.654	0.484	0.245	0.153	0.352	

Source(s): Authors' own creation

Table 7. HTMT ratio

	R^2	R^2 adjusted
Trust	0.472	0.467
Use intention	0.501	0.498

Source(s): Authors' own creation

Table 8. Explained variance (R^2)

This indicates that the model explains all the variability of the data concerning its mean, but these values obtained are usual in studies that aim to predict human behavior. Path coefficients allow us to identify the direct and indirect contribution made by a set of independent variables to explain the variability of the dependent variables (Pérez *et al.*, 2013) (See Table 9). Currently, to globally evaluate the results the only criterion for a global model fit is the normalization root mean square residual (SRMR) coefficient. The values of this coefficient range from 0 to 1, with a value lower than 0.08 being indicative of an overall model fit (Hu and Bentler, 1999). In this work this fit is assured since a value of 0.055 is obtained.

The observation of the table of the structural model contrast allows us to appreciate some important elements (See Appendix 2). With respect to the hypothesis test itself, the five hypotheses tested are significant. Within these results and analyzing the antecedents of trust, E-Wom and above all web quality stand out. Web quality contributes 26.36% of the variance explained with a t-value of 9.511, showing a strong relationship with trust. E-Wom (*t*-value 7.426) explains 13.48% of trust, so that both constructs are capable of explaining 40% of the trust placed by users in the platform. As the last antecedent of trust, perceived risk (*t*-value 3.47) makes a more moderate contribution (explained variance 6.60%), indicating that users do not consider risk as the most determinant antecedent of trust, this also having an inverse relationship with trust. With respect to the antecedents of Use Intention, it is noteworthy that the model, although parsimonious, has great explanatory power for the final variable, since trust and performance expectancy explain 50% of the intention to use. Performance expectancy is the variable that, individually, shows more intensity in its relationship (*t*-value 11.660) and, by itself, represents 38.34% of the explanation of Use Intention. Trust (*t*-value 4.400) represents on the contrary 11.71%. Therefore, the result is more highly valued than trust by Coinbase users.

5.2 fsQCA

The present study used fsQCA to explore the interdependence of behavioral antecedents on the intention to use crypto-wallets. The identification of a single effect of each independent variable does not respond to the real complexity of human behavior (Rihoux *et al.*, 2021). To avoid this drawback, the development of asymmetric methods such as fsQCA can offer combinations between variables not contemplated in discrete models (Fernández-Esquinas

Table 9. Contrast of the structural model (path coefficients)

Hypotheses	β	*t*-value	*p*-value	Explained variance (%)	Confidence intervals 2.5%	97.5%	Supported
Trust $R^2 = 0.467$							
H1: e-WOM → Trust	0.299	7.426	0.000***	13.48	0.2189	0.3758	Yes
H2: Web quality → Trust	0.435	9.511	0.000***	26.36	0.3462	0.5260	Yes
H3: Perceived risk → Trust	−0.155	3.470	0.000***	6.60	−0.2424	−0.0665	Yes
Use Intention $R^2 = 0.498$							
H4: Performance expectancy → Use intention	0.559	11.660	0.000***	38.34	0.4625	0.6505	Yes
H5: Trust → Use intention	0.215	4.400	0.001***	11.71	0.1187	0.3117	Yes

Note(s): ***$p < 0.001$, **$p < 0.01$, *$p < 0.05$, ns: not significant (based on t (10.000), two-tailed test)
Source(s): Authors' own creation

et al., 2021). Our work, therefore, by including this multi-method analysis, recognizes equifinality, i.e. that different combinations of antecedents can bring us closer to the same solution (Rippa *et al.*, 2020).

The fsQCA approach uses set theory and Boolean algebra to examine the complex causalities of the outcome through comparisons between cases. Traditional statistical methods do not give much information about the interactive effects between three or more antecedents (Ragin, 2012). Instead, fsQCA is suitable for exploring possible configurations of factors affecting an outcome and revealing equivalent paths that produce the same outcome (Ragin, 2012). There are three assumptions of fsQCA: conjunction, equifinality and asymmetry. First, fsQCA focuses on a configuration of conditions leading to an outcome rather than on the net effect of a single factor (Rihoux and Ragin, 2008). Second, fsQCA assumes that multiple configurations of equally suitable factors can produce the same result (Woodside, 2014). Third, fsQCA takes into account both causal and conditional asymmetry. Conditional asymmetry suggests that related conditions leading to the target need not be related to another configuration of conditions leading to the same target, whereas causal asymmetry implies that configurations or conditions asymmetrically affect the presence or absence of the outcome (Ragin, 2012). This suggests that fsQCA may provide insight into the intended use of crypto-wallets.

The fsQCA methodology aims to find sets of conditions that imply the outcome (outcome-Use Intention), by using inferential logic. Therefore, we start by considering for this methodology all the factors introduced in the model, including the moderating element of uncertainty, in order to observe which are the possible combinations that can lead to the expected performance outcome (UB). Therefore, two models are considered. The models are expressed as a function where the dependent variable is obtained by a combination of the analyzed antecedents (Ragin, 2012). The methodology develops the functions for both the presence (UB) and the negation (~UB) of the target, in this case the BI (Pappas and Woodside, 2021). The presence or participation of an antecedent does not influence the final result. According to the above, the functions would be expressed as follows:

$$\text{Model I}: \text{UB} = f(\text{QW}, \text{PR}, \text{T}, \text{PE}, \text{EW}) \text{ and}$$

$$\text{Model II}: \sim \text{UB} = f(\text{QW}, \text{PR}, \text{T}, \text{PE}, \text{EW})$$

Rather than focusing exclusively on the net effects of each of the factors, we focus on explanations based on the different case studies (Ragin, 2006) to highlight the combined effects as different pathways that can lead to the same end result (Use Intention). There are likely to be multiple activity-based pathways leading to a specific consumer behavior and recognition of this equifinality is very important (Rippa *et al.*, 2020).

5.2.1 Contrarian case analysis. Research is usually carried out by analyzing whether a given variable has a positive or negative effect on another, based on the support of the hypotheses analyzed (Jiang *et al.*, 2019). However, certain cases in the sample reveal opposite relationships, so they should be analyzed to check the empirical consistency of the symmetrical analyses, and in case of their existence, the convenience of using non-symmetrical analyses. Asymmetric techniques can overcome the drawbacks associated with asymmetric data, generating a better understanding of the problem and a deeper theoretical development (Pappas and Woodside, 2021). Although the analysis of contrary cases is considered important for identifying asymmetric relationships between variables, many studies using nonlinear techniques do not provide this test (Pappas and Woodside, 2021). Positive contrary cases represent those sample elements that, having indicated a low concern for the characteristic analyzed, nevertheless have a high or very high intention of using it. Negative contrary cases indicate those cases in the sample in which, having indicated that they have a high concern for the characteristic analyzed, their intention to use it is low or very

low. Therefore, we indicate with the total number of cases those cases in the sample that express contrary or "illogical" behavior with respect to their intention to use, especially if we were to analyze it only from the perspective of a unidirectional symmetric methodology (Russo and Confente, 2019). Thus, the presence of a high percentage of these cases in the sample further justifies the use of complementary case-based methodologies, such as fsQCA. For our research, we provide in Table 10 the summary of the counterfactual analysis. The complete development can be found in Appendix 1.

5.2.2 Calibration. To initiate the calibration process in fsQCA the data must be converted from the original 7-point Likert scale into a data set suitable for calibration. The conversion process included the following: (1) calculating the mean of each construct, based on the responses of the analyzed companies and the corresponding factor loadings; (2) choosing the appropriate percentiles to calibrate the results according to the mean score of the respective constructs (Ragin *et al.*, 2008). This fact implies the appropriate choice of cut-off points, in order to correctly determine the levels of membership. The choice of cut-off points should be determined according to the needs of the study, as well as the special characteristics of the sample or the research (Ragin, 2012). However, this is a generic approach to social science research using this methodology, we have chosen the 10th, 50th and 90th percentiles, according to the main studies in the area (Beynon *et al.*, 2016; Dul, 2016; Kraus *et al.*, 2018; Kusa *et al.*, 2022), which recommend these cut-off points in similar works.

Following the indications of Pappas and Woodside (2021) Table 11 shows the descriptive statistics of the result. The descriptive statistics allow us to assess whether the mean of the constructs is outside an adequate range for the application of the determined cut-off points.

Next, we analyze in Table 12 the necessary conditions regarding the presence and denial of UB. According to Schneider (2018), the necessary conditions that the QCA analysis establishes should be analyzed through the view of empirical consistency, empirical relevance and conceptual significance. A casual condition is considered necessary if its consistency is above the threshold of 0.90 (Ragin, 2012). In our case, for the variable UB the necessary condition is T (consistency = 0.9042) and for the variable ~ this would be UB ~ EW (consistency = 0.9133).

	Positive contrarian cases (%)	Negative contrarian cases (%)	Total contrarian cases (%)
Web quality	7.45	10.88	18.33
Trust	6.31	7.46	13.77
Perceived risk	9.16	8.88	18.04
e-WOM	10.03	6.60	16.63
Performance expectancy	4.87	3.72	8.59

Table 10. Analysis of opposing cases

Source(s): Authors' own creation

		Mean	Standard deviation
QW	Web Quality	0.6051	0.1513
PR	Perceived Risk	0.3890	0.2834
T	Trust	0.7033	0.2078
PE	Performance expectancy	0.5477	0.2859
EW	e-WOM	0.4348	0.3118
UB	Use Intention	0.6123	0.3226

Table 11. Descriptive statistics

Source(s): Authors' own creation

Outcome variable: UB Presence of use behavior (UB) Conditions tested	Consistency	Coverage	Outcome variable: ~UB Negation of use behavior (~UB) Conditions tested	Consistency	Coverage
QW	0.7972	0.8067	QW	0.7584	0.4859
~QW	0.4919	0.7628	~QW	0.6983	0.6856
PR	0.4438	0.6986	PR	0.6617	0.6594
~PR	0.7836	0.7853	~PR	0.6975	0.4426
T	0.9042	0.7871	T	0.7836	0.4319
~T	0.3474	0.7172	~T	0.6138	0.8022
PE	0.8066	0.9016	PE	0.5547	0.3926
~PE	0.4566	0.6182	~PE	0.8610	0.7381
EW	0.6553	0.9227	EW	0.4531	0.4039
~EW	0.5766	0.6248	~EW	0.9133	0.6265

Source(s): Authors' own creation

Table 12.
Necessary conditions

The different combinations of results and conditions are then generated by means of a truth table (Tables 13 and 14). By interpreting them, we establish the conditions that determine the proposed result (use intention). The presence or not of the different antecedents will depend on the parameters of consistency and frequency that we have determined. In our research, the

Solutions **UB**	**1**	**2**	**3**	**4**	**5**
QW	●	●		●	
PR		○	○	•	
T			●		●
PE		○		●	●
EW	●		○		●
Consistency	0.9409	0.8022	0.7998	0.8981	0.9607
Raw coverage	0.5918	0.4050	0.4853	0.3951	0.6123
Unique coverage	0.0089	0.0042	0.0531	0.0225	0.0447
Overall solution consistency	0.8305				
Overall solution coverage	0.8341				

Note(s): Black (" ● ") and hollow circles (" ○ ") show the presence and absence of a condition, respectively. Moreover, large and small circles show core and peripheral conditions, respectively. Blank cells show a "do not care" situation

Source(s): Authors own creation

Table 13.
Table of truth, presence

Solutions ~UB	1	2	3	4	5	6
QW	○	●	●	●		●
PR		●	●			
T			○	○	○	○
PE	○	○			○	○
EW	○			●	○	
Consistency	0.8242	0.8491	0.8503	0.8025	0.8612	0.8489
Raw coverage	0.6556	0.5456	0.4818	0.3586	0.5730	0.5246
Unique coverage	0.0711	0.0346	0.0028	0.0050	0.0195	0.0000
Overall solution consistency	0.7745					
Overall solution coverage	0.7542					

Note(s): Black ("●") and hollow circles ("○") show the presence and absence of a condition, respectively. Moreover, large and small circles show core and peripheral conditions, respectively. Blank cells show a "do not care" situation

Source(s): Authors own creation

Table 14.
Table of truth, absence

frequency limits follow Greckhamer *et al.*'s recommendations (Greckhamer *et al.*, 2013), and the consistency limits are set according to Ragin's indications (Ragin, 2006). Finally, the number of combinations are logically minimized (Fiss, 2011).

Values for each solution exceed the minimum consistency limit of 0.75 (Rihoux and Ragin, 2008), as well as the overall solution. In the case of presence (UB), the five solutions represent 83.41% of the cases, above the recommended level of 80%. The methodology contemplates the presence of a condition and its opposite (negation). In the literature, the negation of a condition refers to the absence of the condition. Negation and absence have been used interchangeably in research (Pappas and Woodside, 2021). Absence, in our work, refers to a condition irrelevant to the proposed solution.

Although the analysis using fsQCA offers the presence (Table 13) and negation (Table 14) tables, we generally proceed with the analysis of the former, since it provides the most information regarding the dependent variable established (Pappas and Woodside, 2021). In our case, the table for the presence of UB contemplates five antecedent solutions, all converging toward the same result. As for the presence of constructs, the intention to use Coinbase Wallets is established without the need for the involvement of a large number of antecedents, which is indicative in view of possible subsequent banking strategies. QW is present in three solutions (1-2-4), while T, PE and EW are present in two solutions each, leaving PR as the least considered variable, being present only in solution 4. Following the criteria of Kusa *et al.* (2022), unique coverage is the indicator that shows the presence of the solutions in the different sample data. Solutions 3 (unique coverage

0.0531) and solution 5 (unique coverage 0.0447) have the highest level for this value. Both solutions have confidence as a common factor, indicating that it is an important construct for intention to use, acting either in isolation or in combination with PE and EW. This fact regarding the relative importance of the factors can be reflected in the negation table (Table 13), where the absence or negation of key factors such as T or PE therefore implies the negation of the solution.

6. Discussion

The results obtained in this work are in line with previous studies and allow us to achieve our objectives. In the following, we will present the different results in the light of similar studies. The positive relationship between web/app quality and trust is reflected in works such as Azizah *et al.* (2018), indicating the importance given by users in this aspect, not only in the elimination of mental barriers during the first purchase but also in subsequent repurchases and recommendations (Kim and Peterson, 2017). In this sense, Alothman and Al-Meshal (2022) find a direct relationship between FinTech adoption and web quality, although they consider precisely the existence of intermediate variables, including trust. In line with this, Wang *et al.* (2019) establish that trust is influenced by both technical and non-technical factors, such as website quality, which is in line with the results obtained. Something similar occurs with the relationship between e-WOM and trust, its importance in consumer trust having been demonstrated in previous studies on cryptocurrencies (Gil-Cordero *et al.*, 2020) and e-WOM's ability to also capture the user's attention on the web/app (Ahn and Yang, 2021). Some studies have analyzed e-WOM decomposed into different elements, such as the analysis of Khwaja *et al.* (2020), where the dimensions of quality, usefulness and argument are also significant for trust. However, although the results obtained here are relevant for crypto-wallets, they are not as important as for other FinTechs. It is possible that one of the reasons for this is that the vast majority of users are still unfamiliar with these financial products. In fact, these authors highlight the need to fill the gap in the literature regarding this dimension and its relationship with advanced digital marketing contexts, such as crypto-wallet banking. The importance of the e-WOM concerning trust in new online communities is consistent with Gharib *et al.* (2020), determining the importance of creating communication and recommendation channels about crypto-wallets in banking institutions.

The analyses carried out so far on perceived risk and its influence on confidence in Coinbase Wallet adoption are also in line with the results obtained in our research (Grazioli and Jarvenpaa, 2000). In fact, the perspectives on this issue indicate that an analysis of the components of perceived risk is necessary, given its important influence on trust (Al-Amri *et al.*, 2019). Within an analysis of FinTech products, Ali *et al.* (2021) agree on the inverse results obtained, also analyzing the financial, legal, security and operational risk components, concluding that the most important is the legal risk. This fact is relevant and is connected with the expectation of performance which, as an influential factor on adoption, can be conditioned if the risks, especially the legal risk regarding crypto-wallets, are not well exposed by the banking entities. Some studies have analyzed the variables perceived risk and trust independently, within the same model, also finding a significant relationship between both with respect to the dependent variable (Meyliana and Fernando, 2019).

The significance of trust in use intention is a more in-depth question. It is true that the direction of this relationship is consistent with other studies (Steinmetz *et al.*, 2021), but it is necessary to analyze the social environment of the sample to make appropriate generalizations. Trust is based on subjective values, which in our case can range from belief in a better economic system through crypto-wallets as well as an understanding of the computer system, so the determination of trust as a precursor to intention to use can be

established in several aspects (Gagarina *et al.*, 2019). In fact, this approach is shown in that some studies have not obtained a direct relationship between trust and intention to use FinTech, such as Singh *et al.* (2021), indicating that trust was only affected in the case of being mediated by factors such as usefulness or ease of use. This fact is relevant, as the circumstances of adoption may vary according to the particular financial product. Some authors distinguish several types of trust in the use of digital banking services, such as Dawood *et al.* (2021) when they speak of dispositional trust, technology trust and vendor trust, although they agree on the importance of the concept with adoption and its ability to reduce perceived risk. Roh *et al.* (2022) relate trust with confidence and security, also highlighting its mediating role and agree as well with the results of this analysis indicating its significance on adoption.

The expectation of Coinbase Wallet performance, as an element of financial system utilization, is a fundamental variable in determining the intention to use it. Our model finds this hypothesis to be highly significant, which is consistent with previous analyses (Arias-Oliva *et al.*, 2019). Bajunaied *et al.* (2023) determine in their study on FinTech that performance expectancy is the construct with the largest effect size on BI, verified that the performance expectancy plays a central role in forecasting users' inclination to engage with FinTech offerings. It is also important to highlight how performance expectancy influences perceived value and adoption intention in the financial and banking environment, as indicated by Yan *et al.* (2021) in a pandemic environment.

Additionally, we wanted to complement this analysis with a non-symmetric methodology that would allow us to better analyze human behavior with respect to crypto-wallets. Analyzing the proposed solutions, we observed that no solution is composed of more than three antecedents, i.e. from a behavioral point of view, a combination of three antecedents is sufficient to achieve the usage behavior. This fact responds to the difference between the significance of a construct and its combinatorial capacity, according to the methodology used. The solutions can be modified with the introduction of new variables, improving their explanatory and combinatorial power, but the cases analyzed according to the model presented determine the dependent construct in this way. We also observe a balance with respect to the importance of each of the antecedents, albeit with certain considerations. The antecedent with the highest level of presence is web quality, which appears in this state in three solutions (1-2-4). This fact is relevant because the consumer, faced with an unknown environment, has a reduced level of stress in the use of crypto-wallets if he/she is in an environment of trust and recommendation and has been proven in the use of other financial assets (Maraqa *et al.*, 2018). In fact, solution 1 indicates that the presence of a quality website and an appropriate recommendation leads us to achieve the objective. This simple solution reflects that consumer behavior in this environment can be seen as simple if they are offered clear options for managing their cryptocurrencies.

Following on from the above, perceived risk could be seen as a fundamental variable for the consumer's decision. Indeed, solutions 2 and 3 indicate the absence of perceived risk, which could be considered a more logical behavior in the face of a volatile asset such as cryptocurrency. However, solution 4 contemplates the presence of the perceived risk as an antecedent. The latter user accepts the presence of risk, but also considers an expectation of benefit necessary to arrive at utilization. Risk has appeared in previous studies on cryptocurrencies, obtaining results where its presence was a determining factor (Anser *et al.*, 2020), but also where it was not (Alaklabi and Kang, 2021). Contrary to risk, the antecedent that appears least in the solutions is trust. In solution 3, it appears as opposed to risk and without the need (negation) of e-WOM, which would indicate that the consumer who believes in the system bases his/her decision on this value, but in solution 5 it appears in the presence of performance expectancy and e-WOM. It could express a decision based on self-confidence or reinforced by other people's values.

7. Conclusion, implications and limitations

7.1 Conclusion

The intention to use Coinbase Wallet conditioned during the period of economic crisis caused by COVID -19 is determined mainly by performance expectancy, as well as by trust. Regarding the former, this may be a consequence of the fact that users are not willing to use the websites/apps linked to this digital money if they do not provide them with some kind of added value with respect to the traditional money used today. Users contemplate their decisions based on the expected benefits of digital portfolios, considering some aspects of trust. Such trust is mostly based on e-WOM and web quality, with perceived risk having a more residual effect. The study tries to understand the complex decision system of the crypto-wallet user, which is expressed in a balance between trust and expectation of benefits. According to the results, trust could be established as an internal value and profit expectation as an external value. The study also demonstrates the synergic capacity of the different antecedents to produce the expected result, highlighting above all the combinatory power of web quality, obtaining different solutions that can respond to different banking strategies for their implementation.

7.2 Implication

7.2.1 Theoretical implications. From the perspective of management implications and banking operations, it is important to distinguish between the services that banks provide in the cryptocurrency environment, as is the case of BBVA (BBVA, 2023). Banks offer deposit services or cryptocurrency portfolios (crypto-wallets), where users can manage their own portfolio of virtual currencies, with the bank acting as depository and custodian of the movements, but they also offer other financial asset services associated with cryptocurrencies, where they have complete management programs for this asset class. Although both elements are related, the results of this paper are mainly associated with the first service, crypto-wallets. Banking institutions have launched themselves into attracting deposits on these assets, where, through the results of this study, important contributions are offered for their promotion and development. Thus, from a managerial point of view, trust must be improved by banks in the promotion of crypto-wallets. First of all, the importance given to performance expectancy should be taken into account by banks, improving and reinforcing this construct, because if users consider that the use of these apps/webs for cryptocurrency depositing improves their performance, they will be more motivated to use these services. Strategies through the advertising of results or the comparison with other banking institutions can lead to success in the consumer's decision. Regarding the components of trust, e-WOM, perceived risk and web/app quality, the latter is the construct that has the most weight on trust. Due to the multitude of existing crypto-wallet websites/apps, some of which are of low quality or oriented towards cryptocurrency experts, users value positively that the apps/webs they use to make transactions and deposits have a quality that is adequate for the use they are going to make of them. Taking this into account, it is recommended that providers stress both the quality of the web design and its security, including on the website all the information that is relevant to consumers (contact information, service details, . . .) to generate a high degree of trust and encourage users to use their services again at a later date. In addition, from the user's point of view, it is recommended that the user be informed of the characteristics of the web/app with which they are going to operate prior to its use. The increase in regulation should also be taken into account by banks, clearly stating the legal limitations, as well as the cost of services and transactions, something that would also be related to performance expectancy.

This situation, from a management point of view, is related to perceived risk and its negative influence on trust, i.e. the higher the perceived risk, the lower the users' trust in the use of cryptocurrencies, although users know that trading cryptocurrencies on these

websites/apps entails an intrinsic risk. If they perceive that the service lacks guarantee or do not consider them sufficient, their confidence will decrease and they will tend not to use the website/app. Therefore, it is recommended that crypto-wallet banking providers try to reduce this lack of trust by updating their security measures and placing more emphasis on information about their services and privacy policies, as web security and privacy enhance the user experience and significantly affect the risk that users may perceive.

An important element with respect to management from the banking point of view involves the management of communication, virtual communities of experts and social networks with respect to information about crypto-wallets, since to a lesser extent, e-WOM also influences trust. Users may be influenced by the recommendations and opinions of their close groups, family or the virtual community, so attention should be paid to the recommendations that they make. This is especially important to attract users, since as they do not know the web/app and do not have enough experience or convictions about it and its use, they will be more conditioned by the feedback or advice provided by more experienced users. Therefore, banks and service providers should pay special attention to their social networks, communications and expert communities and monitor the recommendations issued regarding their products. The variability of solutions makes it possible to determine that the establishment of a customer forum where management experiences could be exchanged in a simple way would multiply the options for the use of crypto-wallet banking services, as each customer could tailor his decision according to his own decision-making system.

7.2.2 Managerial implications. Finally, from a managerial point of view, trust must be improved by banks in the promotion of crypto-portfolios and cryptocurrency management. First of all, the importance given to performance expectancy should be taken into account by banks, improving and reinforcing this construct, since if users feel that using these apps/webs for cryptocurrency exchanges improves their performance, they will be more motivated to use these services. Strategies through the advertising of results or the comparison with other banking institutions can lead to success in the consumer's decision. Regarding the components of trust, e-WOM, perceived risk and web/app quality, the latter is the construct that has the most weight on trust. Due to the multitude of existing websites/apps for the exchange of cryptocurrencies, some of them with a low quality or oriented to cryptocurrency experts, users value positively that the apps/webs which they use to make transactions have an adequate quality for the use that they are going to make of them. Taking this into account, it is recommended that providers stress both the quality of the web design and its security, including on the website all the information that is relevant to consumers (contact information, service details, . . .) to generate a high degree of trust and encourage users to use their services again at a later date. In addition, from the user's point of view, it is recommended that the user be informed of the characteristics of the web/app with which they are going to operate prior to its use. The increase in regulation should also be taken into account by banks, clearly stating the legal limitations, as well as the cost of services and transactions, something that would also be related to performance expectancy.

This situation, from a management point of view, is related to the perceived risk and its negative influence on trust, i.e. the more the perceived risk, the less trust users have in the use of crypto-wallets, although users know that trading cryptocurrencies on these websites/apps entails an intrinsic risk. If they perceive that the service lacks guarantees or do not consider them to be sufficient, their trust will decrease and they will tend not to use the web/app. Because of this, it is recommended that providers try to reduce this lack of trust by updating their security measures and emphasizing more information about their services and privacy policies, as web security and privacy enhance the user experience and significantly affect the risk that users may perceive.

An important element with respect to management from the banking point of view involves the management of communication, virtual communities of experts and social networks with respect to information about cryptocurrencies and crypto-wallets, since to a

lesser extent, e-WOM also influences trust. Users may be influenced by the recommendations and opinions of their close groups, family or the virtual community, so attention should be paid to the recommendations that they make. This is especially important to attract users, since as they do not know the web/app and do not have enough experience or convictions about it and its use, they will be more conditioned by the feedback or advice provided by more experienced users. Therefore, banks and service providers should pay special attention to their social networks, communications and expert communities and monitor the recommendations issued regarding their products. The variability of solutions allows us to determine that the establishment of a client forum where to exchange management experiences in a simple way would multiply the options of using crypto-wallet websites, since each client could adapt his/her decision according to his/her own decision system.

7.3 Limitations and direction for future research

In this study we have considered variables that, after analyzing the results, we have found to influence the use of crypto-wallets. It could be examined whether the same occurs with an international sample, since the one we have studied has been in Spain. Regarding the relevant variables that we have observed, others could be added that also influence our study object, such as perceived usefulness, effort, design or ease of use. The study was also conducted under social conditions determined by the COVID-19 pandemic. It would be advisable, once normality has returned, to analyze whether such a background is a determining factor in the use of crypto-wallets.

Future research should consider whether the trust-performance expectancy dichotomy will continue to be representative of the process of adoption and use of cryptocurrencies by knowledgeable users of the system, as well as whether that model is applicable to those users less knowledgeable about the system. In addition, the results of the research should help the banking communication process regarding new cryptocurrency-based financial products, which are currently in their infancy and beginning to grow significantly.

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Further reading

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Appendix 1

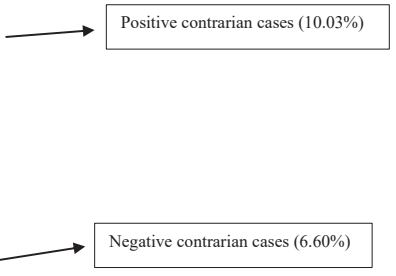
Web Quality	Use Intention (phi = 0.470, $p < 0.001$)				
	1	2	3	4	5
1	21	8	8	**0**	**4**
	6.02%	2.29%	2.29%	**0.00%**	**1.15%**
2	25	23	14	**9**	**13**
	7.16%	6.59%	4.01%	**2.58%**	**3.72%**
3	10	14	12	12	14
	2.87%	4.01%	3.44%	3.44%	4.01%
4	**5**	**17**	18	20	15
	1.43%	**4.87%**	5.16%	5.73%	4.30%
5	**5**	**11**	15	28	28
	1.43%	**3.15%**	4.30%	8.02%	8.02%

Perceived Risk	Use Intention (phi = 0.458, $p < 0.001$)				
	1	2	3	4	5
1	**5**	**6**	4	15	21
	1.43%	**1.72%**	1.15%	4.30%	6.02%
2	**5**	**16**	15	26	30
	1.43%	**4.58%**	4.30%	7.45%	8.60%
3	12	17	10	10	10
	3.44%	4.87%	2.87%	2.87%	2.87%
4	21	21	20	**6**	**5**
	6.02%	6.02%	5.73%	**1.72%**	**1.43%**
5	23	13	18	**12**	**8**
	6.59%	3.72%	5.16%	**3.44%**	**2.29%**

Trust	Use Intention (phi = 0.576. $p < 0.001$)				
	1	2	3	4	5
1	29	26	12	**5**	**4**
	8.31%	7.45%	3.44%	**1.43%**	**1.15%**
2	13	16	9	**4**	**9**
	3.72%	4.58%	2.58%	**1.15%**	**2.58%**
3	15	14	22	10	9
	4.30%	4.01%	6.30%	2.87%	2.58%
4	**5**	**7**	16	21	13
	1.43%	**2.01%**	4.58%	6.02%	3.72%
5	**4**	**10**	8	29	39
	1.15%	**2.87%**	2.29%	8.31%	11.17%

Performance Expectancy	Use Intention (phi = 0.792. $p < 0.001$)				
	1	2	3	4	5
1	36	12	7	**0**	**5**
	10.32%	3.44%	2.01%	**0.00%**	**1.43%**
2	17	21	13	**6**	**6**
	4.87%	6.02%	3.72%	**1.72%**	**1.72%**
3	10	30	16	7	12
	2.87%	8.60%	4.58%	2.01%	3.44%
4	**3**	**8**	28	23	15
	0.86%	**2.29%**	8.02%	6.59%	4.30%
5	**0**	**2**	3	33	36
	0.00%	**0.57%**	0.86%	9.46%	10.32%

E-wom	Use Intention (phi = 0.659, $p < 0.001$)				
	1	2	3	4	5
1	35	7	9	**0**	**7**
	10.03%	2.01%	2.58%	**0.00%**	**2.01%**
2	25	23	12	**11**	**17**
	7.16%	6.59%	3.44%	**3.15%**	**4.87%**
3	4	22	14	11	13
	1.15%	6.30%	4.01%	3.15%	3.72%
4	**1**	**17**	25	28	13
	0.29%	**4.87%**	7.16%	8.02%	3.72%
5	**1**	**4**	7	19	24
	0.29%	**1.15%**	2.01%	5.44%	6.88%

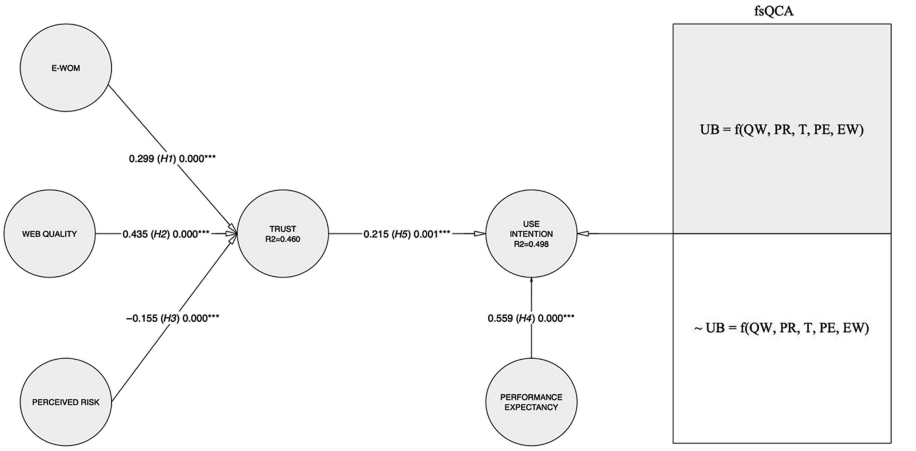


Source(s): Authors own creation

Figure A1. Case contraries analysis

The quintile analysis divided respondents' cases into the lowest (i.e. 1) to the highest (i.e. 5) quintiles for each measured construct and examined the relationships between two or more constructs (McClelland, 1998). The key point here is the occurrence of cases where consumers with a low to very low concern for an adoption factor (e.g. e-WOM) have a high to very high intention to use ($0 + 7 + 11 + 17 = 38$ cases or 35/349 or 10.03% of total cases), as well as cases where consumers with a high to very high concern for an adoption factor (e.g. trust) have a low to very low purchase intent ($5 + 7 + 4 + 10 = 26$ or 26/349 or 7.44% of total cases). Thus, in the case for example of web quality, approximately 19% of the total cases in the study show two relationships that run counter to the symmetric relationship that consumers with a high to very high concern for web quality have a high to very high intention to use. Also, in some of the sample cases, there is an opposite relationship for other adoption values in this study. Thus, the use of non-symmetric methodologies is justified by a deeper analysis of consumer behavior, as well as to improve the predictive ability of the analyses (Pappas and Woodside, 2021). In the case of perceived risk, the tables of opposite cases are on the opposite side, since it is a condition expressed in negative, i.e. that is, we consider that the higher the perceived risk, the lower the intention to use. In the case of the table, we show the cases where a low level of perceived risk implies a low level of use, and a high level of perceived risk implies a high level of intention to use.

Appendix 2



Note(s): *$p < 0.05$, **$p < 0.01$, ***$p < 0.001$, ns: not significant (based on $t(10{,}000)$, two-tailed test)

Source(s): Authors own creation

Figure A2.
Structural model

About the authors

Eloy Gil-Cordero is Associate Lecturer at the Faculty of Business Administration, specifically in the Department of Business Administration and Marketing at the University of Seville. He holds a Ph.D. in Strategic Management and International Business from the University of Seville (Spain). His research focuses on new marketing environments, consumer behavior, tourist behavior and digital marketing.

Pablo Ledesma-Chaves is Associate Lecturer at the Faculty of Business Administration, specifically in the Department of Business Administration and Marketing at the University of Seville. He holds a Ph.D. in marketing at the University of Seville (Spain). His research focuses on new marketing environments, the internationalization of companies, consumer behavior, tourist behavior, digital marketing and teaching innovations.

Rocío Arteaga Sánchez is Assistant Professor at the Faculty of Business Administration, specifically in the Department of Business Administration and Marketing at the University of Seville. She holds a Ph.D. in Business Administration at the University of Huelva (Spain). Her research interests lie in the areas of information systems in business, marketing, consumer behavior, tourism planning, tourist behavior and social media marketing. Rocío Arteaga Sánchez is the corresponding author and can be contacted at: rarteaga@us.es

Ari Melo Mariano is Professor/Researcher of Production Engineering at the University of Brasília-Brazil (UNB) and Professor of the Professional Master in Applied Computing at the Department of Computer Science. As a researcher, he works in the areas of data science, big data, data mining, bibliometrics, predictive modeling and through structural equations, consumer behavior and interculturality.