London South Bank University

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Analysis of the factors determining the intention to adopt cryptocurrencies among consumers in the UK

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Student: Sarbjot Singh Mattar Sunny Dial

Student number: 4002692

Project Supervisor: Dr. Colin Knapp

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Executive Summary

Cryptocurrencies are a relatively recent phenomenon, which began in 2009 when Satoshi Nakamoto launched Bitcoin, and they represent a decentralized form of virtual currencies.

Their use is allowed through blockchain technology and is based on the principles of cryptography to process transactions and peer to peer verification to validate them.

Adoption of cryptocurrencies is constantly growing among businesses and consumers, and in this context this research aims to investigate the factors that influence the intention of British consumers to adopt cryptocurrencies.

The research is carried out through an online survey tool according to a research framework based on the Technology Acceptance Model (TAM) and the Theory of Planned Behaviour (TPB), and contribute to the body of knowledge in the context of the adoption of cryptocurrencies by exploring how the perceived ease of use, perceived usefulness, subjective norm and perceived risk influence the intention of consumers in the UK to adopt cryptocurrencies.

The results drawn upon an analysis of a sample of 30 responses reveal indicatively that the subjective norm and perceived usefulness are the main factors that directly influence the intention to adopt cryptocurrencies, while the perceived ease of use exerts only an indirect effect on the intention, mainly influencing perceived usefulness.

The findings suggest that for a wider adoption of cryptocurrencies, businesses should aim to increase public awareness of the advantages offered by their use, and greater effort should be directed toward simplifying the use of the technology and increasing its security.

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1. Introduction

1.1. Cryptocurrencies context

Cryptocurrencies are a relatively recent phenomenon, the first cryptocurrency represented by Bitcoin was in fact launched in 2009 by Satoshi Nakamoto, and they represent virtual currencies of which there are no cash versions as in traditional currencies.

Their use is enabled through blockchain technology and transactions are executed based on cryptographic principles.

The main difference compared to traditional currencies lies in the fact that in most cases cryptocurrencies are completely decentralized, there is no central body that issue them, and they are based on a peers to peers verification process.

In recent years there has been a growing interest in blockchain technology which has led to the development of a huge number of different cryptocurrencies, to the point that today there are more than 10,000 developed for different purposes, and this phenomenon has been followed by a strong rise in popularity with a global consumer base of around 221 million in 2021, with thousands of companies opening up to this technology and a massive increase in market capitalization, which peaked at over $3 trillion in 2021. (GP Bullhound et al., 2022; Pittis, 2022; Statista, 2021a, 2021b, 2022a)

All these different coins were created with the idea of using blockchain technology to overcome the limits with respect to Bitcoin or to add custom features, for example Litecoin which was created with the aim of reducing transaction fees and accelerating transaction times with respect to Bitcoin, or Ethereum which was born with the idea of being able to use the blockchain to execute contracts called "smart contracts" consisting of self-executing code written in Solidity or Vyper languages. (Zipmex, 2020; Blessing, 2021)

The use of cryptocurrencies represents an important innovation in the financial sector and in particular has significant advantages for businesses, such as reduction of transaction costs thanks to the absence of intermediaries, greater customer

privacy, greater protection of customer data, facilitation of international transactions and preventions of chargeback fraud.(Jackson, 2021; Deloitte,2021)

Trends toward adoption can also be observed in the United Kingdom which by 2021 has about 10.6 million users, and is the third country in the world for the number of Bitcoin ATMs. (Statista, 2021c; Coin ATM Radar, 2021)

However although there is a growing trends towards the adoption of cryptocurrencies, it seems that their adoption is not yet widespread for a number of concerns related with security risks such as scams or thefts, lack of legislation, volatility, scalability etc. (Haran,2017; Penser,2020)

From the point of view of security, the problem is linked both to the fact that transactions and accounts are managed through a pair of private and public keys, which can be lost or stolen during cyber-attacks, and also to the fact that the blockchain is a technology based on a consensus mechanism which makes the operation vulnerable to organized attacks such as the 51% attack that could take place in a scenario where a party is able to control 51% of the network.(Krishna, 2021)

From a scalability point of view, the problem is related to the number of transactions that can be performed per second.

For Bitcoin for example since all transactions are saved in a block every 10 minutes, and the maximum block size is set at 1 MB, the limit of transactions that can be carried out per second is 7, which is very low compared to the 1667 transactions per second manageable by VISA for example, or the 193 transactions per second manageable by PayPal.(Mechkaroska et al., 2018)

Cryptocurrencies are assets characterized by considerable volatility, with prices that can fluctuate by even 40% in a few days, and this factor makes cryptocurrencies unsuitable to be considered as an investment for the long term, and more appropriate for short-term speculation.(Och,2021; Investopedia, 2022)

Understanding the factors that determine consumers' willingness to adopt cryptocurrencies is fundamental for businesses to be able to make the most of the advantages offered by this technology.

1.2. Research aims and objectives

1.2.1. Research questions

This research aims to analyse the factors that determine the intention of British consumers to adopt cryptocurrencies, contributing to the body of knowledge on the cryptocurrency adoption, contextualizing it to the United Kingdom.

The main questions that research aims to answer are:

- What are the most influential factors in determining the intention of British consumers to adopt cryptocurrencies?
- What are the measures businesses can take to take advantage of the opportunities presented by cryptocurrencies?

1.2.2. Research Objectives

The objectives of the research are to present a general overview of the barriers and challenges that consumers and businesses encounter in the adoption of cryptocurrencies with a particular focus on customers side. For this it will be necessary to shed light on how cryptocurrencies work in relation to the underlying blockchain technology, on what are the main uses and what are the problems affecting the cryptocurrency environment, together with the future opportunities presented by this technology.

The theoretical framework used for the research will be based on the Technology Acceptance Model (TAM), considering not only the factors of perceived ease of use and perceived usefulness, but also the constructs of subjective norms from the Theory of Planned Behaviour (TPB) and the perceived risk for analysing the intention to adopt cryptocurrencies by British consumers.(Bauer, 1960; Davis, 1989; Ajzen, 1991)

In particular, the research objectives are to assess:

- The impact of perceived ease of use on the intention to adopt cryptocurrencies.

- The impact of perceived ease on the perceived usefulness of cryptocurrencies.
- The impact of perceived usefulness on the intention to adopt cryptocurrencies.
- The impact of the subjective norm on the intention to adopt cryptocurrencies.
- The impact of the subjective norm on perceived risk of cryptocurrencies adoption.
- The impact of the perceived risk on the intention to adopt cryptocurrencies.

1.3. How cryptocurrencies works

Each cryptocurrency has its own blockchain, which is basically a digital ledger distributed and synchronized across the entire network that wants to use the particular cryptocurrency, and users make transactions through *crypto wallets*, which are pieces of software that generate a unique pair of *public key* and *private key* to perform transactions and keep savings. (Segendorf, 2014)

The public keys of a wallet are in fact public, shareable and visible from the whole network, and can be compared to the generic account number of a bank account. Private keys, on the other hand, are secret and known only to the wallet owner and can be compared to the pin to access the account.

In a typical scenario that involves the transaction of a certain amount of cryptocurrency from user A to user B (fig.2.0), it happens that B first communicates the public key of his wallet to A, once received this, A writes a payment for B deciding the amount of the transaction and the fee it is willing to pay for having the transaction executed, and signs it with a *digital signature* generated using the transaction text along with his own wallet's private key, and the transaction is propagated to the network.

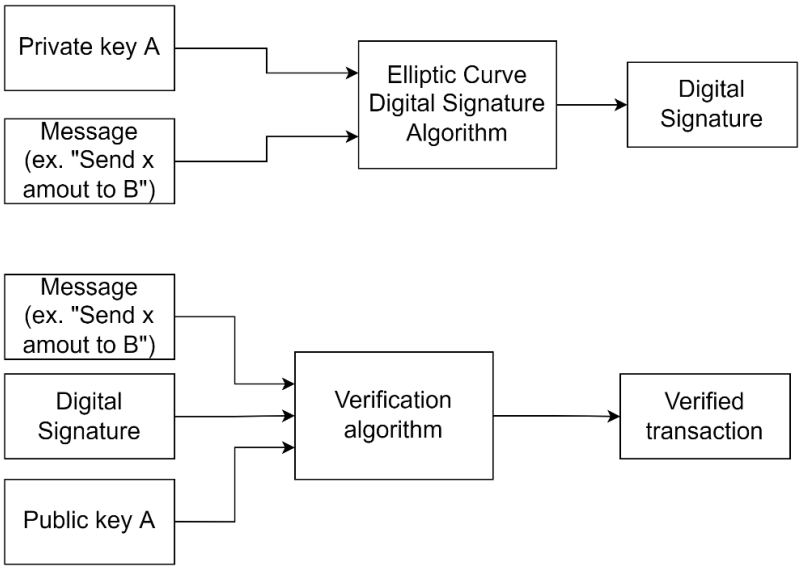

Figure 1.Transactions signature and verification.

The process is based on *asymmetric cryptography*, and allows the network to be able to verify the ownership of the sender account on the basis of three components which are its public key, the transaction message and the digital signature, that is, through A's digital signature, its public key and the transaction message, it is possible to verify A's ownership of the transaction without the need of knowing the private key of A as represented in figure 1. (Segendorf, 2014)

After the transaction is proved to be valid it is entered in a *mempool* with all the other valid transactions, and every ten minutes these are collected in blocks of transactions by the *miners*, who base their choice on the amount of fee that is associated with the transaction, i.e., transactions that pay a higher fee to the miner will have the preference. (Binance Academy, 2022)

The ultimate goal is to add the block of valid transactions waiting in the mempool to the blockchain shared by the entire network so that transactions are permanently and irreversibly recorded.

Note that at this point a same transaction can be chosen by multiple miners and added to their block, for this reason if all miners indistinctly could add their block to the blockchain, there would be many duplicate transactions and the system would no longer be reliable. For this reason, a mechanism is needed that allows to add

only one block of valid transactions at a time, having the consensus of the majority of the network.

This is achieved through the *proof of work* or *proof of stake* mechanism. In the proof of work mechanism, miners compete with each other in solving a complex problem represented by an hash function, which, once solved however, can be easily verified by the entire network. (Segendorf, 2014)

This usually requires high computational resources, and the miner who first manages to solve the problem broadcasts the solution to the network for verification and if the majority of the network agrees on the solution, the miner has the right to add the block into the blockchain.

In the proof of stake, on the other hand, the miner who has the right to add the block is chosen in a pseudo-random manner, based on the amount of the cryptocurrency that he holds, and the amount of cryptocurrency that he is willing to put at stake as an assurance of the validity and truthfulness of the block of transaction he wants to add, in case the block is fraudulent in fact the miner loses the amount he put at stake and is penalized for subsequent activities. (Coinbase, 2020)

The incentive for miners is represented by the fact that adding a block to the blockchain involves earning not only the transaction fees, but also a *block reward* represented by a certain amount of the cryptocurrency: along with the transactions that are present in the block, the miner who is going to add the block to the blockchain, is given the right to add a transaction of a certain amount of the cryptocurrency, which is fixed according to the rules of the blockchain, addressed to his wallet, and this represent the reward for adding the block. (Segendorf, 2014)

Block rewards are the only mechanism by which new cryptocurrency is created, and their amount is calculated on the basis of the volume of cryptocurrency in circulation and is decreased over time as the volume increases, at fixed intervals.

In the case of Bitcoin, for example, the initial value of the block reward for the miners was 50 Bitcoins for every new block added, while today it is 6,25 Bitcoins, as

the reward is halved for every 210,000 new mined blocks, which correspond to an interval of four years. (George, 2022a)

According to this mechanism therefore the last bitcoin block will be mined by 2140 as the entire cap for the cryptocurrency is set to 21 million. (George, 2022b)

Figure 2.0 summaries the entire process of the transaction.

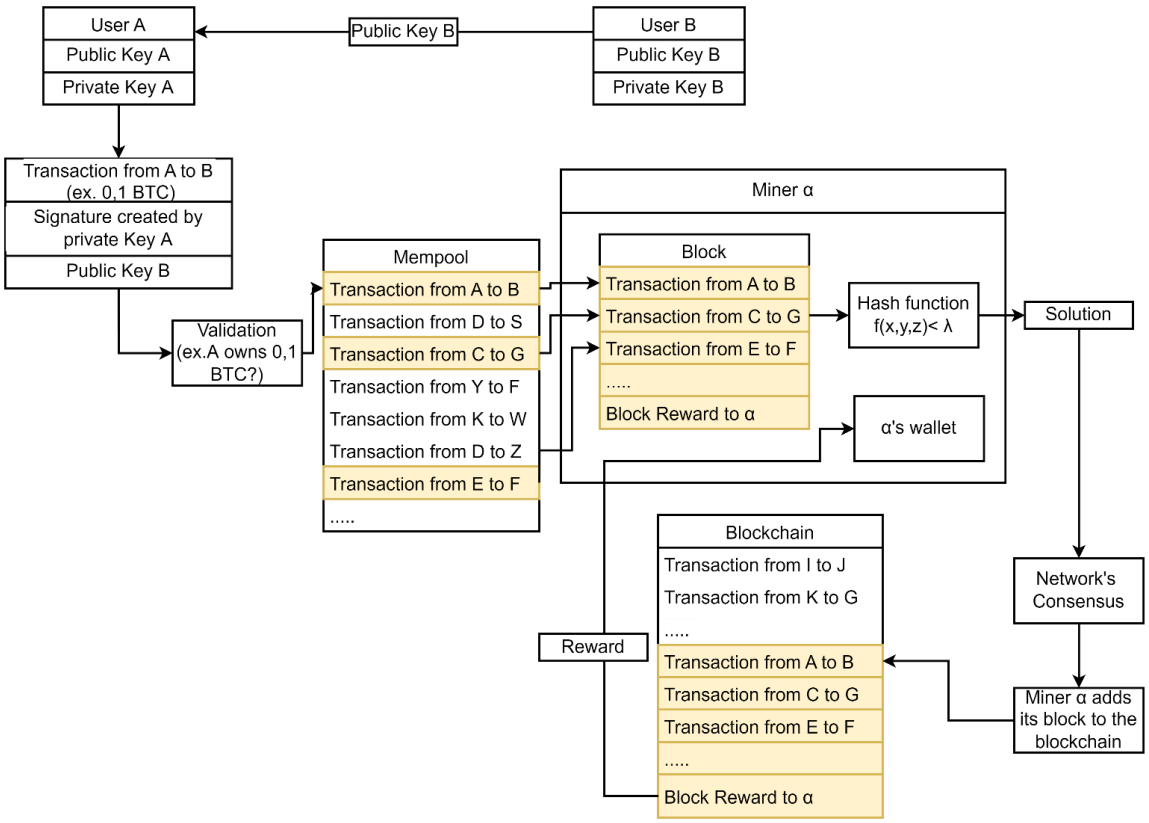

Figure 2. Transaction process according to proof of work mechanism.

2. Literature review

2.1. Technology acceptance model

The technology acceptance model was developed by Davis in 1989 initially in the context and use of an information and technology system among individuals. (Chuttur, 2009)

The objective of the model is to understand the dynamics that determine the acceptance and use of a new technology by consumers, and the technology in this context can be represented not only by a physical element, such as a PC or a tablet for example, but also by an application or innovative software. (Chuttur, 2009)

According to the model, the attitude towards the new technology depends mainly on two factors which are perceived usefulness and perceived ease of use.

The perceived ease of use indicates the perception of how much the use of the new technology will be without difficulty, while perceived usefulness indicates instead the individual perception of how much the technology will increase the performance of the work, or in other words the extent to which the use of new technology will be useful. (Lee et al., 2017)

The set of perceived usefulness and perceived ease of use determine the attitude towards the new technology which indicates how desirable the use of the new technology is by the user, and the step following the attitude is represented by the behavioral intention to use which indicates the actual probability that the user will be using the new technology.

According to the TAM, the greater the perceived ease of use of a technology, the greater the perceived usefulness, and a user who has a positive attitude towards the technology determined by both positive perceived ease of use and positive perceived usefulness will be more inclined to adopt the new technology.

2.2. Theory of planned behaviour

The theory of planned behavior is an extension of the theory of reasoned action, and it attests that a certain behavior can be explained on the basis of three factors which are attitudes, subjective norms and perceived behavioral controls.

The attitude towards a behavior determines the likelihood that such behavior will be implemented and indicates what a person thinks about a certain behavior, for example if a person thinks that a certain behavior will have a positive effect in his life he will be induced to implement it with a higher probability.(Ajzen, 1991)

Subjective norms, on the other hand, concern the opinion of the people who are in the social circle of a person and with whom the latter usually interacts. In particular it concerns with the opinion about the behavior under question from people who are close to the respondent and tries to answer the question of what others think of a certain behavior. (Ajzen, 1991)

Perceived behavioral controls, on the other hand, concern the perception of having the means and abilities to perform a certain behavior, i.e. how simple or difficult it will be to perform a certain behavior and considers not only internal factors such as one's own abilities or motivation, but also factors which are external, such as the availability of resources and support.(Brookes, 2021)

These three factors together contribute to determine the intention toward adopting a certain behavior or the desire to carry out a certain behavior, and finally the intention together with the perceived behavioral control directly impacts the actual implementation of the behavior. (Ajzen, 1991)

2.3. Consumers intention to adopt Cryptocurrencies

Over the years, many studies have been conducted in the field of consumer acceptance of cryptocurrencies, and these, despite having considered different social, demographic and geographical contexts from time to time, have always focused more on Bitcoin which is the main cryptocurrency for market capitalization.

Baur et al. (2015) in their research analysed the perceived usefulness along with other constructs of a group of people formed by consumers, merchants and employees of Bitcoins exchanges, and from their analysis anonymity and security in payments represented the most important factors for consumers, while lower transaction fees was perceived as a big benefit by both consumers and merchants.
Gunawan and Novendra (2017) conducted their research in Indonesia in the context of consumer acceptance of Bitcoin technology. The model they used was that of the Unified Theory of Acceptance and Use of Technology, consisting of four constructs which are performance expectancy, effort expectancy, social influence, and facilitating conditions, with age and sex considered as mediating factors. Their study involved 49 respondents and the research concluded that the performance expectancy, which can be interpreted as Perceived usefulness, together with the facilitating conditions are the most influential factors having a positive and statistically significant impact on the intention to adopt Bitcoin technology in the Indonesian context.
The same framework (UTAUT) was used by Gillies et al. (2020), who conducted their research in Malaysia. Other than considering the constructs of effort expectancy, facilitating conditions, performance expectancy and social influence, their model incorporated factors such as age, gender, education level, income and ethnicity as mediating factors in the intention to use Bitcoin.
From the results they obtained, it appears that facilitating conditions, performance expectancy and social influence are positively and significantly linked to the intention to adopt Bitcoins with the performance expectancy representing the most influential factor, as opposite to effort expectancy which does not have a significant impact on the final intention. (Gillies et al.,2020)
Their analysis also led to the conclusion that the intention to adopt cryptocurrencies is not statistically linked to demographic factors. (Gillies et al.,2020)
Sohaib, et al. (2019) in their study conducted in Australia used a model that integrates the Technology Acceptance Model (TAM) with constructs taken from the Technology Readiness Index (TRI), represented by innovativeness, optimism,

discomfort and insecurity. The results they obtained, not only confirmed a positive and statistically significant relationship between perceived ease of use, perceived usefulness and the intention to use cryptocurrencies, but highlighted that optimism towards this technology plays a fundamental role in the intention of use.

Alqaryouti et al. (2020) found in their research, which targeted a group of 25 specialized individuals who use cryptocurrencies, that contrary to what is predicted according to the TAM model the perceived ease of use in the case of cryptocurrencies is not significantly linked to the perceived benefit, and moreover the perceived benefit does not influence the usage behaviour. The only significant factor in determining the final intention to use cryptocurrencies in their research is represented by the perceived ease of use.

Another study carried out by Shahzad et al. (2018) in the Chinese context integrated factors such as perceived trustworthiness and awareness along with the perceived ease of use and perceived usefulness from the TAM, and the results indicated that all of these factors are positively and significantly related to the intention to use of Bitcoin among the people of the Mainland China and that people are eager to adopt Bitcoin as a mode of exchange only in case they are well aware of the functionality of this technology.

A similar study in the Chinese context was carried out by Nadeem et al. (2021) again based on the TAM framework, but which considered additional factors such as transaction processing and security and control factors. In this case they obtained that there is no significant relationship between security and control and perceived usefulness while transaction processing, perceived usefulness and perceived ease of use are statistically significant and positively associated with the intention to adopt Bitcoin.

Similar results were obtained by Arias-Oliva et al. (2019) who carried out their research in the Spanish context, according to a Unified Theory of Acceptance and Use of Technology model (UTAUT). In their research, while Performance expectancy, Effort expectancy together with facilitating conditions appear to be positively and significantly associated with the intention to use cryptocurrencies,

Perceived risks, social influence and financial literacy appear to have a negative but not significant effects on the intention to adopt cryptocurrencies.

Wood et al. (2017) investigated the idea of adopting bitcoins through a survey addressed to the global population, integrating the theoretical frameworks of the Innovation Diffusion Theory and Technology Acceptance Model. Their study indicated that factors such as perceived ease of use, compatibility, relative advantages over other currencies and visibility of the technology are positively and significantly linked to the intention to use cryptocurrencies.

Walton and Johnston (2018) instead carried out their research in the South African context and their results indicated that perceived benefit, perceived behavioral control, subjective norm and attitude towards Bitcoin have a direct significant effect on the intention to use Bitcoin, with the perceived Trust Risk factor capable of influencing both the Subjective Norm and the Intention to use Bitcoin, while the Perceived Security risk being irrelevant.

As regards the Saudi Arabian context, Alaklabi and Kang (2021) used a model based on the Theory of Reasoned Action (TRA), together with four other constructions which are perceived risk, subdivided as privacy risk, security risk and financial risk, perceived usefulness, perception of enjoyment and personal innovation, to investigate the intention by Saudi Arabian citizens to adopt cryptocurrencies. In their results, the subjective norm, perceived usefulness, predictable enjoyment have a significant effect on the intention to adopt cryptocurrencies while the perceived risk is not statistically significant.

Abramova and Böhme (2016) in their study on the adoption of Bitcoin by the general public to make online payments, found that the Perceived ease of use is the factor that has the least influence on the intention to use cryptocurrencies, while its mean value on the basis of the items used to measure it is slightly greater than the neutral position, an indication according to the authors that consumers think that use of Bitcoin requires a lot of learning effort especially in the early stages. The perceived risk in this study, however, is negatively and significantly linked to the

intention to adopt cryptocurrencies, with financial and legal risks representing the most influential.

In the same context of the using cryptocurrencies for electronic payments, Mendoza-Tello et al. (2018), conducted their research in Spain, in the city of Alicante, with the aim of investigating the role played by social media in favouring trusts and the intention to use cryptocurrencies for making electronic payments. The model they used exploits constructs from Social Support Theory, Social Commerce, and the TAM.

Their results indicated that social support has no direct influence on the perceived risk or the intention to use cryptocurrencies but only on the perceived trust, and that the perceived risk has no direct influence on the intention to adopt cryptocurrencies or on the perceived usefulness. The only statistically significant factors that determine the intention to adopt cryptocurrencies are represented by the perceived trust which is statistically influenced by the social support and the social commerce usage, and the perceived usefulness which is mainly influenced by the perceived trust, indicating that overall the social factors influence only indirectly the intention to use cryptocurrencies.

Anser et al. (2020), instead used the extended Theory of Planned Behavior (TPB) to investigate the relationship that exists between the use of social media and the individual intention and behaviour toward adopting cryptocurrencies in the Chinese context. Their results indicate unlike Mendoz-Tello et Al. (2018) that social media usage is directly, positively and significantly associated with users' intentions toward adopting Bitcoin, and social media usage is able to significantly influence attitudes and subjective norms, which in turn significantly influence the final intention to adopt Bitcoin. It also appears that the perceived risk in this case has a mediating effect between the intention to use Bitcoins and their actual use: this finding is important as it indicates that although an individual may have a strong intention to adopt Bitcoins, in case of a high perceived risk he may actually not adopt them.

Schaupp and Festa (2018), instead investigated the individual intention to adopt cryptocurrencies using a model that reflects the Theory of Planned Behavior (TPB). Their research addressed a group of undergraduate business students in the United States and their findings confirmed that those with higher subjective norms, more favourable attitudes toward cryptocurrency and higher perceived behavioural control are more likely to adopt the use of cryptocurrency, and these factors are positively and statistically significantly related to the intention.

Alzahrani and Daim (2019) instead proposed a hierarchical decision model based on the recent literature review and expert's input to investigate the user's intention to use cryptocurrencies, considering four perspectives which are: social, economic, technical and personal. The results indicate that the main factors influencing consumers' choice to adopt cryptocurrencies are represented by investment opportunity, subjective norms, recognition by businesses, privacy and global attention.

Nseke (2018) utilized UTAUT2 Model with the addition of key constructs such as hedonistic motivation, habit and price cost for analysing the intention to adopt cryptocurrency by African people. These key factors were considered in the case of African countries to understand if cryptocurrencies are essential for economic growth in these areas. The results mainly indicate that Social influence is one of the most important factor in determining the intention to adopt cryptocurrencies, as most Africans believe that their use by their friends and family members will lead to an improvement of the standard of living. It also appears that performance and effort expectancy are favourable to the intention to adopt cryptocurrencies while the influence of hedonic motivations and price have a negative effect on their acceptance.

2.4. Summary and key points

From the literature it is clear that classical models and theories such as the technology acceptance model (TAM), the theory of planned behaviour (TPB) are able to explain in most cases the intention to adopt cryptocurrencies in various

socio-economic contexts in which the researchers have carried out their research, with the introduction from time to time of further constructs that seek to shed light on specific aspects related to the adoption.
However, most of the literature deals specifically with Bitcoins, a phenomenon that could be linked to the fact that for many years this coin represented the main cryptocurrency in terms of market capitalization. The world of cryptocurrencies, however, has undergone significant changes in recent years, and Bitcoin despite being the most adopted cryptocurrency, has now a market cap of 47% in the overall crypto market as of April 2022, which indicates how much of the market and the adoption patterns are not simply explainable by considering Bitcoins only.(Statista, 2022b)
In the present research, for this reason, the analysis is not limited to Bitcoin alone but to cryptocurrencies in general, and for the choice of the constructs on which to build the model, those most discussed one in the literature have been considered and which are supposed to represent a core model in the attempt to explain the intention to adopt cryptocurrencies.

2.5. Hypothesis development

In accordance with the theory behind the technology acceptance model (TAM) and the results obtained by Gunawan and Novendra (2017), Sohaib et al. (2019), Alqaryouti et al. (2020), Shahzad et al. (2018), Nadeem et al. (2021), Arias-Oliva et al. (2019), Wood et al. (2017) in the context of the adoption of cryptocurrencies, the following hypotheses are assumed:

H1: Perceived ease of use has a positive effect on the intention to adopt cryptocurrencies.

H2: Perceived ease of use has a positive effect on the perceived usefulness of cryptocurrencies.

Again in accordance with the TAM and the results obtained by Sohaib et al. (2019), Shahzad et al. (2018), Nadeem et al. (2021), Arias-Oliva et al. (2019), Walton and

Johnston (2018), Alaklabi and Kang (2021), Mendoza-Tello et al. (2018), it is assumed that:

> H3: Perceived usefulness has a positive effect on the adoption of cryptocurrencies.

Despite the results obtained by Arias-Oliva et al. (2019), Mendoza-Tello et al. (2018), Last Mazambani and Mutambara (2019) which indicate that there is no significant link between the subjective norm and the intention to adopt cryptocurrencies, based on the results of the researches by Walton and Johnston (2018), Anser et al. (2020), Schaupp and Festa (2018), Alzahrani and Daim (2019), Nseke (2018), Alaklabi and Kang (2021), the following hypothesis is considered:

> H4: The subjective norm has a positive effect on the adoption of cryptocurrencies.

Considering now the influence of the opinions of people which are important to the individual and which belongs to his social circle, it is quite logical to think that the subjective norm is related to perceived risk, for this reason similarly to Walton and Johnston (2018) and contrary to the results of Mendoza-Tello et al. (2018) which found no significant relationship between the social support and perceived risk, it is assumed that a positive social influence results in a lower perceived risk, and for this reason the following hypothesis is considered:

> H5: The subjective norm has a negative effect on the perceived risk of adoption of cryptocurrencies.

As previously seen as regards the effect of perceived risk on the intention to use cryptocurrencies, the results in the literature are conflicting.

The results obtained by Abramova and Böhme (2016), Anser et al. (2020) in fact indicate that the perceived risk is significantly linked to the intention to adopt cryptocurrencies while the studies by Mendoza-Tello et al. (2018), Nadeem et al. (2021), Arias-Oliva et al. (2019), Walton and Johnston (2018) relating to security risk and Alaklabi and Kang (2021) indicate that perceived risk, despite having a high mean value, has no significant effect on the intention to adopt cryptocurrencies, as users are generally aware of these risks, and expect to be at risk.
However Based on the high mean value of perceived risk from previous studies and considering the actual risks associated with the adoption of the cryptocurrencies, such as financial risk related to high volatility, risk of fraud and theft with lack of consumer protection laws the following hypothesis is considered in this research:

> H6: Perceived risk has a negative impact on the intention to adopt cryptocurrencies.

To summarize, on the basis of the discussion presented, the research will use the research model presented in figure 3 to test the hypotheses reported in table 1.

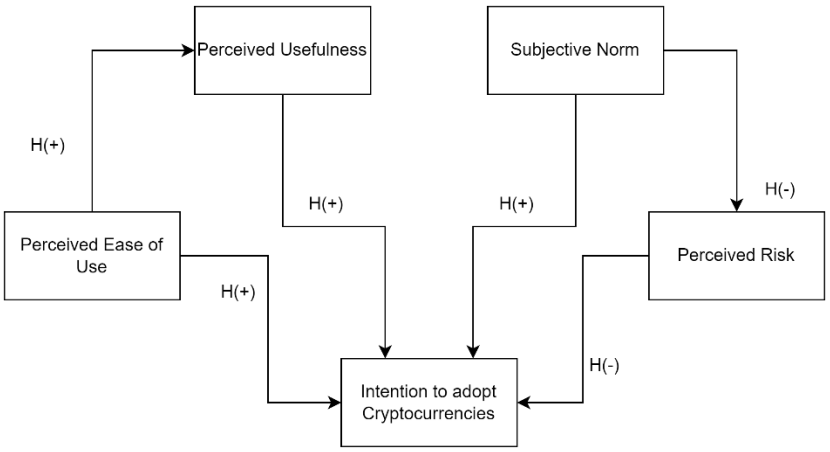

Figure 3. Research model.

HYPOTHESES	
H1	Perceived ease of use has a positive impact on the intention to adopt cryptocurrencies.
H2	Perceived ease of use has a positive impact on the perceived usefulness of cryptocurrencies.
H3	Perceived usefulness has a positive impact on the intention to adopt cryptocurrencies.
H4	The subjective norm has a positive impact on the intention to adopt cryptocurrencies.
H5	The subjective norm has a negative impact on the perceived risk for the adoption of cryptocurrencies.
H6	Perceived risk has a negative impact on the intention to adopt cryptocurrencies.

Table 1. Research Hypothesis

3. Research methods

3.1. Research Philosophy

Positivism is the research philosophy followed in this research, as the study focuses on the discovery of facts that are observable and measurable, through the application of quantitative and statistical analysis on the collected data. (Alharahsheh and Pius, 2020)

In this case, the researcher is independent from the studied context and the data collection process, as there is no direct interaction with the participants. (Saunders et al., 2019; Research-Methodology, 2022)

3.2. Research Approach

The research approach used in this study is of a deductive type as it starts from a clear theoretical position, with hypotheses developed taking into consideration both theoretical models such as the Technology acceptance model and the Theory of Planned Behavior, and the results obtained in the context of the adoption of cryptocurrencies by consumers in previous research. (Saunders et al., 2019)

In particular, the study tends to search for causal effects that determine the adoption of cryptocurrencies by consumers and focuses on testing how the factors of perceived usefulness, perceived ease of use, perceived risk and subjective norm, are related with the intention to adopt the cryptocurrencies.

3.3. Population and study sample

Statistics updated to 2020 shows that the adoption of cryptocurrencies in the UK is a phenomenon that interests population of all ages, with the majority of users between the ages of 18 and 44, and a low level of adoption in the population over 60 years. (Statista, 2021d)

For this reason, the target population of the research is represented by people living in the UK of both genders, regardless of age.

Unlike Arias-Oliva et al. (2019) who aimed their study mainly at an educated audience, in light of the results obtained from the research of Alaklabi and Kang (2021) who showed interest in cryptocurrencies even by people with no technical background, this study aimed at people of all levels of education, who have at least a minimum previous knowledge about cryptocurrencies even if they have never actually used them, and the data has been collected through random sampling by sharing the survey link online.

3.4. Research Methodology

To conduct the study, primary data collected through an online cross-sectional survey is used.

A structured questionnaire is created using closed-ended questions and a five-point Likert scale ranging from "strongly disagree" to "strongly agree" to measure each construct as reported in appendix 1. Items adapted from previous studies such as those by Last Mazambani and Mutambara (2019), Shahzad et al. (2018), Liu et al. (2014) and Venkatesh et al. (2012) are used to measure the intention to use of use cryptocurrencies, and these are for example: "I intend to buy or use cryptocurrencies", "in the future I will buy or use cryptocurrencies" or "I intend to use cryptocurrencies on a regular bases". Items adapted from Walton and Johnston (2018), Wood et al. (2017) and Venkatesh et al. (2012) are used to measure perceived ease of use, with questions like: "I think that it is generally easy to understand how to use cryptocurrencies", "For me I think it is easy to understand how to use cryptocurrencies" or " I think it is easy to make payments using cryptocurrencies". To measure the perceived usefulness, the items are adapted from the studies by Arias-Oliva et al. (2019), Walton and Johnston (2018), Wood et al. (2017) while to measure the perceived risk and subjective norm the further works by Mendoza-Tello et al. (2018), Schaupp and Festa (2018), Abramova and

Böhme (2016) are considered with questions like "Using cryptocurrencies is risky", "compared to other forms of investment, cryptocurrencies are riskier" for measuring perceived risk, and questions like "People important to me would support my use of cryptocurrencies", "People whose opinions matter to me would be in favour of me using cryptocurrencies" for measuring the subjective norm.

3.5. Data Analysis Methods

The data analysis will involves in the first instance the elimination of incomplete questionnaires and the transformation of the values ranging from "strongly disagree" to "strongly agree" into numeric values ranging from 1 to 5.

Once this transformation has been carried out, the next step will be to analyze and eliminate the answers that are improperly completed and to do this the method that will be adopted is that of the long-string analysis which assesses the validity of a response based on the number of identical responses given sequentially by a participant.

Questionnaires that contain identical answers for a length greater than half of the questionnaire can be discarded as they are an indication of carelessness in the filling of the questionnaire. (Brühlmann et al., 2020)

Another criterion that will be used is the one indicated by Collier (2020), which involves the analysis of the standard deviation of the answers provided by each respondent, and the elimination of the questionnaires that have a standard deviation value in their answers lower than 0.25, which indicates little to no variance in the answers provided thus no relevant information for the research purposes.

To assess the power of discrimination of single items, the corrected item-total correlation known also as item-rest correlation will be analyzed for each item. (Zijlmans et al., 2017)

This metric represents the correlation between a given item and the total score of the questionnaire calculated without considering the item. For example, in the case

of determining the value of the corrected item-total correlation for the first question of the questionnaire, represented by EOU1 which is used to measure the perceived ease of use, the first step is to calculate for each respondent the sum of the values of all the answers except EOU1, and then calculate the value of the Pearson's correlation between the array containing the values of the answers given to question EOU1 by each respondent and the one containing the sum of all the answers provided to the questions EOU1 excluded.

High absolute values of corrected item-total correlation are considered ideal as they indicate that the single item of the questionnaire is consistent with the overall set of other items and effectively contributes to the overall score. (Zijlmans et al., 2017)

After this first analysis the reliability and validity measures will be carried out, and as the values of the factor loadings will be required for this, SPSS AMOS software will be used to build the measurement model.

The indicators reliability will be assessed by analyzing the values of the factor loadings between the items and latent variables. Values higher than 0.7 for factor loading are considered ideal as indicated by Vinzi et Al. (2010), and values higher than 0.6 are considered acceptable as proposed by Fornell and Larcker (1981).

At this point, the construct reliability, the construct validity, the convergent validity and discriminant validity of the model will be assessed.

The construct reliability assessment aims to evaluate how consistent are the variables used to measure a given factor or latent variable in actually measuring the given factor, or in different terms how much under the same conditions the indicators produce the same results, and this requires that the items assigned to the measurement of the same factor reveal a strong mutual association. (Vinzi et al., 2010)

To assess the construct reliability the values of composite reliability and Cronbach's alpha are generally used.

The value of Cronbach's alpha is given by:

$$\text{Cronbach's alpha} = \left(\frac{N}{N-1}\right) * \left(1 - \frac{\sum_{i=1}^{N} \sigma_i^2}{\sigma_t^2}\right)$$

In which N is the number of indicators assigned to the factor, σ_i^2 indicates the variance of the i-th item and σ_t^2 indicates the variance of the sum of the scores of the items assigned to the factor. (Vinzi et al., 2010)

As indicated by Götz et al. (2010) although Cronbach's alpha values greater than 0.6 are considered acceptable, there are issues related to the fact that the value of Cronbach's alpha is critically influenced by correlations among indicators and scale length, and also the sample size has a significant effect on the precision of the alpha calculation, for this reason an alternative index given by composite reliability will be used.

Composite reliability is expressed as:

$$CR = \frac{(\sum \lambda_i)^2}{(\sum \lambda_i)^2 + \sum \varepsilon_i}$$

Where the λ_i values indicate the standardized factor loadings of the items on the analyzed construct and the ε_i indicate the values of the error variance of the i-th item. (Vinzi et al., 2010)

The variance is calculated as:

$$\varepsilon_i = 1 - {\lambda_i}^2$$

Again as indicated by Götz et al. (2010) values greater than 0.6 are generally considered acceptable, while, values above 0.95 could be considered problematic as may indicate redundant items in the construct.(Hair et. Al., 2010)

The construct validity measures the degree to which the items used to measure a construct are accurately measuring the construct in question, and this is verified through convergent validity and discriminant validity.

Convergent validity indicates the degree to which multiple indicators that measure the same construct are linked to each other, in fact these, measuring the same construct, should share a high portion of variance. (Hair et. Al., 2010)

An important notion in this context is represented by the extracted variance which indicates how much variation in an item is explained by the associated latent variable, and the convergent validity is assessed through the Average Variance Extracted which represents the average value of the variance extracted by the items associated to a factor. (Hair et al., 2010)

The Average Variance Extracted is calculated as the sum of the square of the factor loadings λ of the items with their construct, divided by the number of items that measure the construct as follows:

$$AVE = \frac{\sum_{i=1}^{n} \lambda_i{}^2}{n}$$

Discriminant validity instead measures the extent to which a construct is different from other constructs, and captures information that the other constructs do not capture. (Hair et al., 2010)

Discriminant validity can be assessed using the Fornell & Larcker (1981) criterion according to which the discriminant validity of a construct is verified if the value of its AVE is greater than the squared value of its correlations with the other constructs.

Once the validity and reliability of the measurement model has been assessed, to have an overview of the results obtained in the sample, the average of the item values for each construct will be considered, in order to have a unit value for each considered construct.

To analyze the relationships more accurately the pairwise analysis of the constructs will be considered, in order to determine the significance level of the correlation coefficients between them.

To do this, t test is used and t statistic value will be used for each correlation value, given by:

$$t = \frac{r\sqrt{n-2}}{\sqrt{1-r^2}}$$

Where *r* represents the correlation coefficient, and *n* the number of samples.
Once the value of t is known the significance of the relationship will be tested by fixing the level of significance α at 0.05, and the correlation will be considered statistically significant if the p value resulting from the t-distribution with n-2 degrees of freedom will be smaller than α.
If the correlation values obtained will be significant, despite the small sample size and for demonstration purposes, a structural equation model will be built on SPSS AMOS to test the hypothesis and analyze the causal effects between the constructs and the intention to adopt cryptocurrencies.

3.6. Ethical Considerations

In the present research data was collected from volunteers over the age of 18 of both genders.
Participants were provided with an information sheet that explained the context in which the research is developed, the objectives of the research, the anonymity of the answers and the voluntariness of the participation.
The complete anonymity of the participants was guaranteed as no personal information was requested except for the age and gender of the participant, and similarly no sensitive information concerning health, political views or religion was collected as it was not relevant to the research objectives.
The survey was implemented on the Online surveys (formerly BOS) platform, the protection of the participants' data was guaranteed as the platform is GDPR compliant, and all data collected was used be used for academic purposes only. (Onlinesurveys.ac.uk, 2021)

3.7. Limitations

The limitations of the presented methodology are mainly due to the fact that the generalizability of the results obtained depends on the size of the sample collected. Roscoe (1975) has indicated that a sample size between 30 and 500 is suitable for most behavioral studies, and bases its logic on the Central Limit Theorem. (Mumtaz et al., 2020)

However, it should be noted that according to other researchers such as Kline (2005) for analyzing structural equations models a sample of 100 is considered small, between 100 and 200 is considered medium and over 200 is considered large, and in general the optimal sample size depends on the complexity of the model. (Mumtaz et al., 2020)

4. Analysis and interpretation of research results

4.1. Data Analysis results

After converting the scale to numeric value and conducting the long-string analysis and standard deviation analysis, one response was discarded resulting in a total sample of 30 responses, reported in table 2.

Age	Gender	EOU1	EOU2	EOU3	EOU4	EOU5	PB1	PB2	PB3	PB4	R1	R2	R3	R4	SN1	SN2	SN3	IOU1	IOU2	IOU3	**STDEV**	**Long-string**
25-39	Female	4	3	4	3	4	4	3	4	3	4	3	2	5	4	4	4	4	4	3	**0.67**	**5**
40-60	Male	4	2	2	3	3	1	1	1	1	5	5	5	5	1	1	1	1	1	1	**1.62**	**4**
40-60	Female	2	2	2	1	2	2	2	2	2	4	3	4	4	4	4	4	3	4	3	**0.99**	**5**
25-39	Female	1	1	1	5	1	4	3	5	3	5	5	5	5	5	5	5	2	3	2	**1.63**	**7**
25-39	Male	2	2	2	3	2	1	2	2	2	4	4	4	4	2	2	2	1	2	2	**0.93**	**4**
25-39	Male	2	4	2	5	4	5	2	5	2	4	4	2	4	5	3	3	5	5	5	**1.21**	**2**
40-60	Male	2	3	4	4	2	2	2	5	4	4	2	1	5	5	5	5	5	5	3	**1.35**	**6**
25-39	Male	2	3	3	4	3	2	2	2	2	3	4	4	4	3	3	3	2	2	2	**0.77**	**4**
25-39	Female	3	3	3	4	3	3	3	3	3	4	4	4	3	3	3	3	2	2	2	**0.6**	**5**
25-39	Male	4	2	4	4	2	5	3	5	1	4	5	5	4	3	3	4	4	4	2	**1.14**	**3**
25-39	Male	2	4	2	4	3	3	3	3	3	4	5	3	3	3	3	3	3	3	3	**0.67**	**5**
25-39	Male	2	4	2	2	2	2	1	3	3	5	4	5	5	4	3	4	5	5	4	**1.27**	**4**
18-24	Male	2	3	3	2	3	3	3	5	5	2	4	4	5	5	5	5	5	5	5	**1.17**	**3**
18-24	Male	2	3	2	3	1	2	2	2	2	3	3	5	4	3	3	3	3	3	2	**0.86**	**5**
25-39	Male	4	3	3	3	2	3	3	5	4	3	2	1	2	4	4	3	5	5	4	**1.08**	**3**
25-39	Male	2	4	2	5	1	1	1	1	1	5	5	5	5	1	1	1	1	1	1	**1.75**	**5**
25-39	Male	2	4	4	5	5	5	4	5	5	4	5	2	4	2	4	4	5	5	3	**1.05**	**3**
40-60	Male	2	2	2	3	2	2	1	1	1	4	4	5	3	3	3	3	4	3	2	**1.09**	**4**
40-60	Male	2	3	3	3	2	3	3	4	2	5	5	5	5	1	3	3	3	4	3	**1.12**	**4**
25-39	Male	2	2	2	4	2	2	2	2	2	4	4	4	4	3	3	3	3	3	3	**0.81**	**5**
40-60	Male	5	5	5	1	5	5	5	5	5	1	2	2	4	5	5	5	5	5	5	**1.44**	**5**
40-60	Male	2	2	2	4	1	3	2	3	2	3	3	4	3	3	3	3	3	3	2	**0.73**	**6**
40-60	Male	2	4	2	4	2	3	3	4	3	4	4	5	5	4	3	3	4	5	4	**0.94**	**2**
25-39	Male	2	4	2	3	4	2	2	4	4	4	4	4	4	5	4	4	3	3	3	**0.88**	**6**
25-39	Male	3	4	2	4	2	3	3	3	3	4	3	4	3	2	2	2	3	3	2	**0.72**	**4**
25-39	Male	5	5	5	5	5	5	5	5	5	4	4	4	4	4	4	4	4	5	4	**0.5**	**9**
40-60	Other	1	1	1	1	1	1	1	1	1	4	4	4	4	4	1	1	1	1	1	**1.32**	**9**
25-39	Female	1	1	1	5	2	2	2	3	3	4	4	4	3	3	3	3	2	3	2	**1.08**	**4**
60+	Male	3	5	4	3	4	3	3	3	3	3	4	3	4	4	3	3	2	2	1	**0.87**	**5**
40-60	Male	1	4	1	3	3	3	3	3	1	3	5	3	3	3	3	3	2	2	2	**0.98**	**5**

Table 2. Long-string Analysis

The corrected item-total correlation values obtained for each item are indicated in the following table 3.

	EOU1	EOU2	EOU3	EOU4	EOU5	PB1	PB2	PB3	PB4	R1	R2	R3	R4	SN1	SN2	SN3	IOU1	IOU2	IOU3
Corrected item-total correlation	**0.39**	**0.47**	**0.64**	**0.07**	**0.59**	**0.8**	**0.72**	**0.86**	**0.7**	**-0.32**	**-0.2**	**-0.5**	**0.14**	**0.42**	**0.72**	**0.74**	**0.73**	**0.8**	**0.72**

Table 3. Corrected item-total correlation values.

From table 3 it appears that the values of the corrected item-total correlation for all items except EOU4 and R4 are higher than the acceptable threshold value of 0.2 as suggested by Zijlmans et al. (2017).

For the analysis of reliability and validity, SPSS AMOS software is used to build the measurement model, and figure 4 shows the results obtained for the correlation values and factor loadings once the model has been fitted. The values of the factor loading are indicated on the single headed arrows pointing from the latent variables to the items, while the values of correlation are reported on the double headed arrows connecting the latent variables.

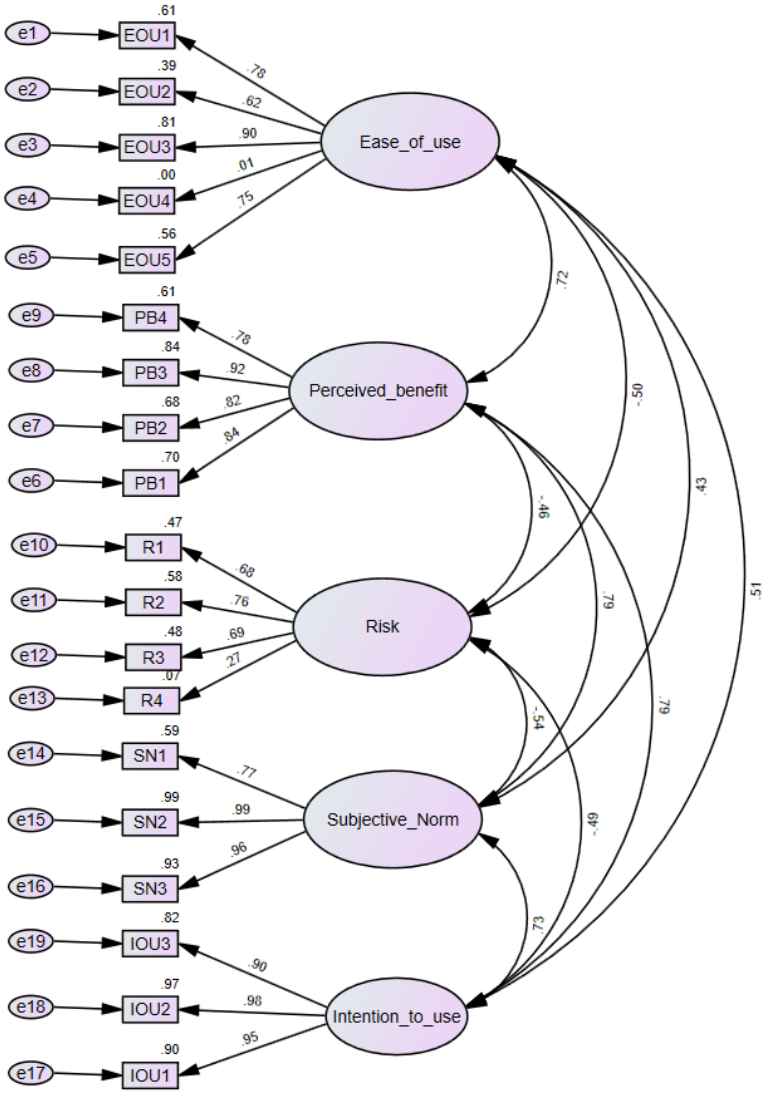

Figure 4. Measurement model.

With regard to the results of figure 4, it should be noted that although the chi-square fit statistics divided by the degree of freedom (CMIN / DF) is acceptable as it is lower than the rejection value of 5 according to the literature, the other indices of the model fit are lower than the acceptable values, indicating poor fit.
This problem is probably due to the sample size used which consists of only 30 responses, however as the sample size increases the values of the fit indices tend towards acceptable values as indicated by Taasoobshirazi and Wang (2016), so the results obtained in the further analysis should be taken with a grain of salt considering the small sample size used.
As shown in figure 4 for the measurement model built, all items except EOU4 (λ=0.1) and R4 (λ=0.27) have their factor loading values that are higher than 0.6, for this reason considering the fact that EOU4 and R4 in addition to having low factor loading values, have corrected item-total correlation values smaller than 0.2, it is decided to drop these items as suggested by Hulland (1999).
The final measurement model is therefore reported in figure 5.

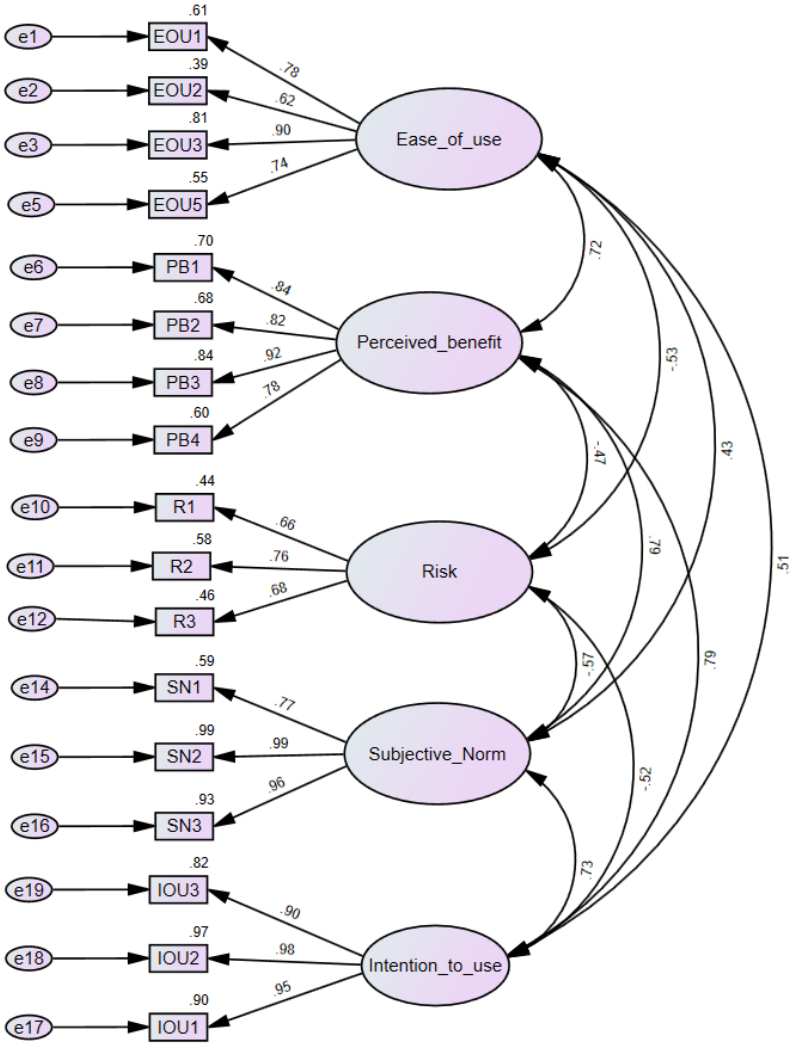

Figure 5.Final measurement model

At this point, the validity and reliability of the model are assessed.

The following table 4 reports the calculated values of the Cronbach's alpha for the constructs under study.

ID	EOU1	EOU2	EOU3	EOU5	PB1	PB2	PB3	PB4	R1	R2	R3	SN1	SN2	SN3	IOU1	IOU2	IOU3	SUM EOU	SUM PB	SUM R	SUM SN	SUM IOU
1	4	3	4	4	4	3	4	3	4	3	2	4	4	4	4	4	3	15	14	9	12	11
2	4	2	2	3	1	1	1	1	5	5	5	1	1	1	1	1	1	11	4	15	3	3
3	2	2	2	2	2	2	2	2	4	3	4	4	4	4	3	4	3	8	8	11	12	10
4	1	1	1	1	4	3	5	3	5	5	5	5	5	5	2	3	2	4	15	15	15	7
5	2	2	2	2	1	2	2	2	4	4	4	2	2	2	1	2	2	8	7	12	6	5
6	2	4	2	4	5	2	5	2	4	4	2	5	3	3	5	5	5	12	14	10	11	15
7	2	3	4	2	2	2	5	4	4	2	1	5	5	5	5	5	3	11	13	7	15	13
8	2	3	3	3	2	2	2	2	3	4	4	3	3	3	2	2	2	11	8	11	9	6
9	3	3	3	3	3	3	3	3	4	4	4	3	3	3	2	2	2	12	12	12	9	6
10	4	2	4	2	5	3	5	1	4	5	5	3	3	4	4	4	2	12	14	14	10	10
11	2	4	2	3	3	3	3	3	4	5	3	3	3	3	3	3	3	11	12	12	9	9
12	2	4	2	2	2	1	3	3	5	4	5	4	3	4	5	5	4	10	9	14	11	14
13	2	3	3	3	3	3	5	5	2	4	4	5	5	5	5	5	5	11	16	10	15	15
14	2	3	2	1	2	2	2	2	3	3	5	3	3	3	3	3	2	8	8	11	9	8
15	4	3	3	2	3	3	5	4	3	2	1	4	4	3	5	5	4	12	15	6	11	14
16	2	4	2	1	1	1	1	1	5	5	5	1	1	1	1	1	1	9	4	15	3	3
17	2	4	4	5	5	4	5	5	4	5	2	2	4	4	5	5	3	15	19	11	10	13
18	2	2	2	2	2	1	1	1	4	4	5	3	3	3	4	3	2	8	5	13	9	9
19	2	3	3	2	3	3	4	2	5	5	5	1	3	3	3	4	3	10	12	15	7	10
20	2	2	2	2	2	2	2	2	4	4	4	3	3	3	3	3	3	8	8	12	9	9
21	5	5	5	5	5	5	5	5	1	2	2	5	5	5	5	5	5	20	20	5	15	15
22	2	2	2	1	3	2	3	2	3	3	4	3	3	3	3	3	2	7	10	10	9	8
23	2	4	2	2	3	3	4	3	4	4	5	4	3	3	4	5	4	10	13	13	10	13
24	2	4	2	4	2	2	4	4	4	4	4	5	4	4	3	3	3	12	12	12	13	9
25	3	4	2	2	3	3	3	3	4	3	4	2	2	2	3	3	2	11	12	11	6	8
26	5	5	5	5	5	5	5	5	4	4	4	4	4	4	4	5	4	20	20	12	12	13
27	1	1	1	1	1	1	1	1	4	4	4	4	1	1	1	1	1	4	4	12	6	3
28	1	1	1	2	2	2	3	3	4	4	4	3	3	3	2	3	2	5	10	12	9	7
29	3	5	4	4	3	3	3	3	3	4	3	4	3	3	2	2	1	16	12	10	10	5
30	1	4	1	3	3	3	3	1	3	5	3	3	3	3	2	2	2	9	10	11	9	6
σ_i^2	1.22	1.38	1.289	1.49	1.592	1.086	2.01	1.666	0.79	0.85	1.513	1.482	1.2	1.22	1.868	1.83	1.39	14.71	19.4	6.116	9.89	13.98
$\sum_{i=1}^{N} \sigma_i^2$	5.374				6.354				3.151			3.902			5.084							
σ_t^2	14.713				19.402				6.116			9.89			13.978							
CR α	**0.846**				**0.897**				**0.727**			**0.908**			**0.954**							

Table 4. Cronbach's alpha

Results from table 4 indicates that the Cronbach's alpha values for each construct are higher than 0.6.

The following table 5 shows the values of composite reliability calculated for each construct.

Standardized Regression Weights			Estimate	ε = 1 - λ^2	Σε	Σλ	(Σλ)^2	CR
EOU1	<---	Ease_of_use	0.782	0.388	1.634	3.05	9.303	**0.85**
EOU2	<---	Ease_of_use	0.623	0.612				
EOU3	<---	Ease_of_use	0.902	0.186				
EOU5	<---	Ease_of_use	0.743	0.448				
PB1	<---	Perceived_benefit	0.837	0.299	1.182	3.351	11.229	**0.905**
PB2	<---	Perceived_benefit	0.822	0.324				
PB3	<---	Perceived_benefit	0.915	0.163				
PB4	<---	Perceived_benefit	0.777	0.396				
R1	<---	Risk	0.662	0.562	1.513	2.108	4.444	**0.746**
R2	<---	Risk	0.764	0.416				
R3	<---	Risk	0.682	0.535				
SN1	<---	Subjective_Norm	0.769	0.409	0.492	2.727	7.437	**0.938**
SN2	<---	Subjective_Norm	0.993	0.014				
SN3	<---	Subjective_Norm	0.965	0.069				
IOU1	<---	Intention_to_use	0.948	0.101	0.314	2.837	8.049	**0.962**
IOU2	<---	Intention_to_use	0.984	0.032				
IOU3	<---	Intention_to_use	0.905	0.181				

Table 5. Composite reliability.

Results shows that all constructs have values greater than the threshold value of 0.7, however, as previously stated values greater than 0.95 could be seen as problematic as may indicate redundant items in the construct.(Hair et. Al., 2010) For assessing the convergent validity the value of the average variance extracted are calculated and results are presented in table 6.

Standardized Regression Weights			**λ**	**λ^2**	**Σλ^2**	**AVE**
EOU1	<---	Ease_of_use	0.782	0.612	2.366	**0.59**
EOU2	<---	Ease_of_use	0.623	0.388129		
EOU3	<---	Ease_of_use	0.902	0.813604		
EOU5	<---	Ease_of_use	0.743	0.552049		
PB1	<---	Perceived_benefit	0.837	0.700569	2.817	**0.7**
PB2	<---	Perceived_benefit	0.822	0.675684		
PB3	<---	Perceived_benefit	0.915	0.837225		
PB4	<---	Perceived_benefit	0.777	0.603729		
R1	<---	Risk	0.662	0.438244	1.487	**0.5**
R2	<---	Risk	0.764	0.583696		
R3	<---	Risk	0.682	0.465124		
SN1	<---	Subjective_Norm	0.769	0.591361	2.509	**0.84**
SN2	<---	Subjective_Norm	0.993	0.986049		
SN3	<---	Subjective_Norm	0.965	0.931225		
IOU1	<---	Intention_to_use	0.948	0.898704	2.686	**0.9**
IOU2	<---	Intention_to_use	0.984	0.968256		
IOU3	<---	Intention_to_use	0.905	0.819025		

Table 6. Average Variance Extracted.

From table 6, the convergent validity for the constructs is verified as the values of AVE are all equal to or greater than the threshold value of 0.5. (Hair et al., 2010) Discriminant validity is assessed using the Fornell & Larcker (1981) criterion, the values of the correlation coefficients provided by AMOS are shown in table 7, while table 8 reports the result of the application of Fornell & Larcker criterion.

Correlations			r	r^2
Ease_of_use	<-->	Perceived_benefit	0.722	0.52
Ease_of_use	<-->	Risk	-0.526	0.28
Ease_of_use	<-->	Subjective_Norm	0.429	0.18
Intention_to_use	<-->	Ease_of_use	0.512	0.26
Perceived_benefit	<-->	Risk	-0.472	0.22
Perceived_benefit	<-->	Subjective_Norm	0.787	0.62
Intention_to_use	<-->	Perceived_benefit	0.786	0.62
Risk	<-->	Subjective_Norm	-0.568	0.32
Intention_to_use	<-->	Risk	-0.52	0.27
Intention_to_use	<-->	Subjective_Norm	0.732	0.54

Table 7. Correlation coefficients from Amos.

	EASE OF USE	PERCEIVED BENEFIT	RISK	SUBJECTIVE NORM	INTENTION TO USE
EASE OF USE	**0.59**				
PERCEIVED BENEFIT	0.52	**0.7**			
RISK	0.28	0.22	**0.5**		
SUBJECTIVE NORM	0.18	0.62	0.32	**0.84**	
INTENTION TO USE	0.26	0.62	0.27	0.54	**0.9**

Table 8. Discriminant validity.

From table 8 it results that the discriminant validity is verified.

To have an overall view of the results obtained in the sample, we now proceed to calculate the average of the item values for each construct, in order to have a unit value for each analyzed construct.

Table 9 reports the results obtained in terms of mean value and standard deviation for each construct.

Construct	**Mean**	**Stdev**
Perceived ease of use	2.67	0.95
Perceived usefulness	2.83	1.10
Perceived risk	3.81	0.82
Subjective Norm	3.26	1.04
Intention toward adoption	3.07	1.24

Table 9. Means and standard deviations of constructs

A first general analysis of the average values indicated in table 9, reveal that with respect to a neutral position represented in this case by a value equal to 3, the trend towards the adoption of cryptocurrencies is slightly positive even if the values for this construction compared to the others are more scattered as indicated by the standard deviation.

Perceived ease and perceived usefulness are lower than the value of 3 which indicates how the use of cryptocurrencies tends to be perceived as complex and not providing substantial benefit.

Values higher than the neutral position for the subjective norm and perceived risk would indicate that although there is a perceived risk towards the adoption of cryptocurrencies, the influence exercised by the social context of the respondents towards their adoption is positive.

To analyze the relationships more accurately the pair wise analysis of the constructs is now considered, in order to determine the significance level of the correlation coefficients between the constructs.

4.1.1. Perceived ease of use and Intention to adopt cryptocurrencies

Figure 6 show the values of perceived ease vs the Intention to adopt cryptocurrencies.

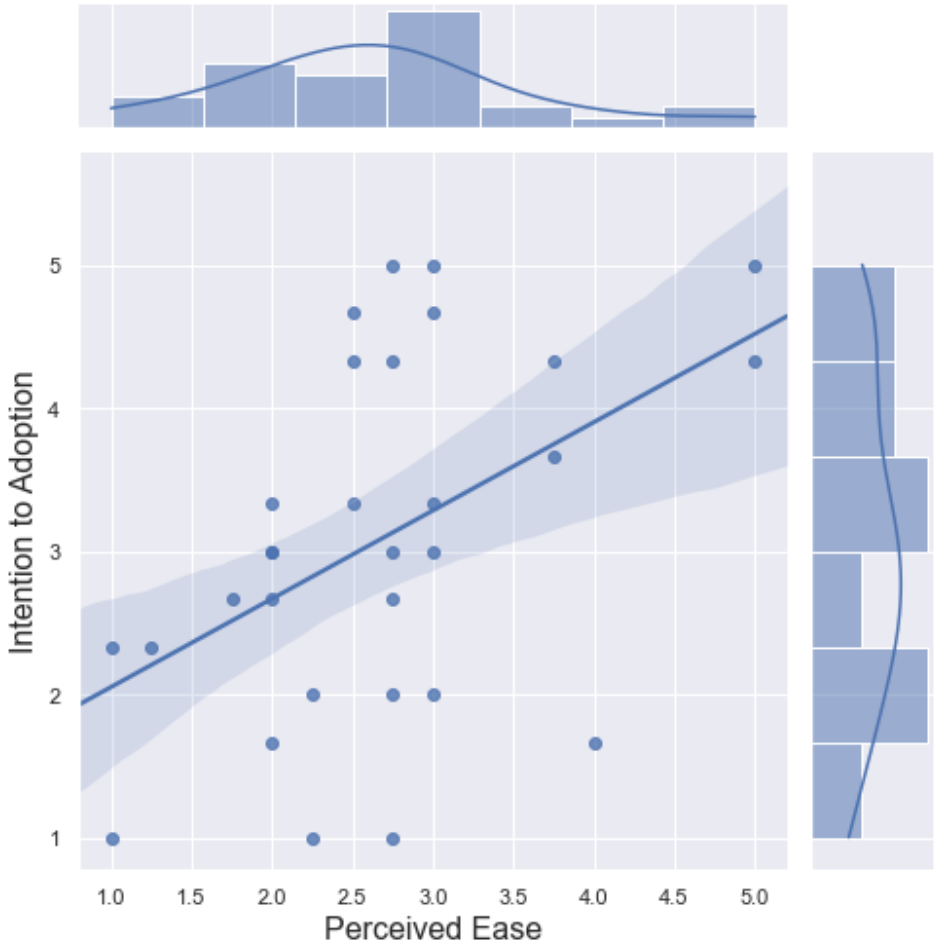

Figure 6. Perceived ease of use and intention to adopt cryptocurrencies.

As figure 6 shows the relationship between the constructs is positive, the value of the correlation coefficient in this case is equal to 0.474, while the value of t considering 28 degree of freedom is equal to 2.85, which corresponds to a value of p equal to 0.008.

Since p is less than the significance level of 0.05 the relation is considered as statistically significant.

4.1.2. Perceived ease of use and perceived usefulness

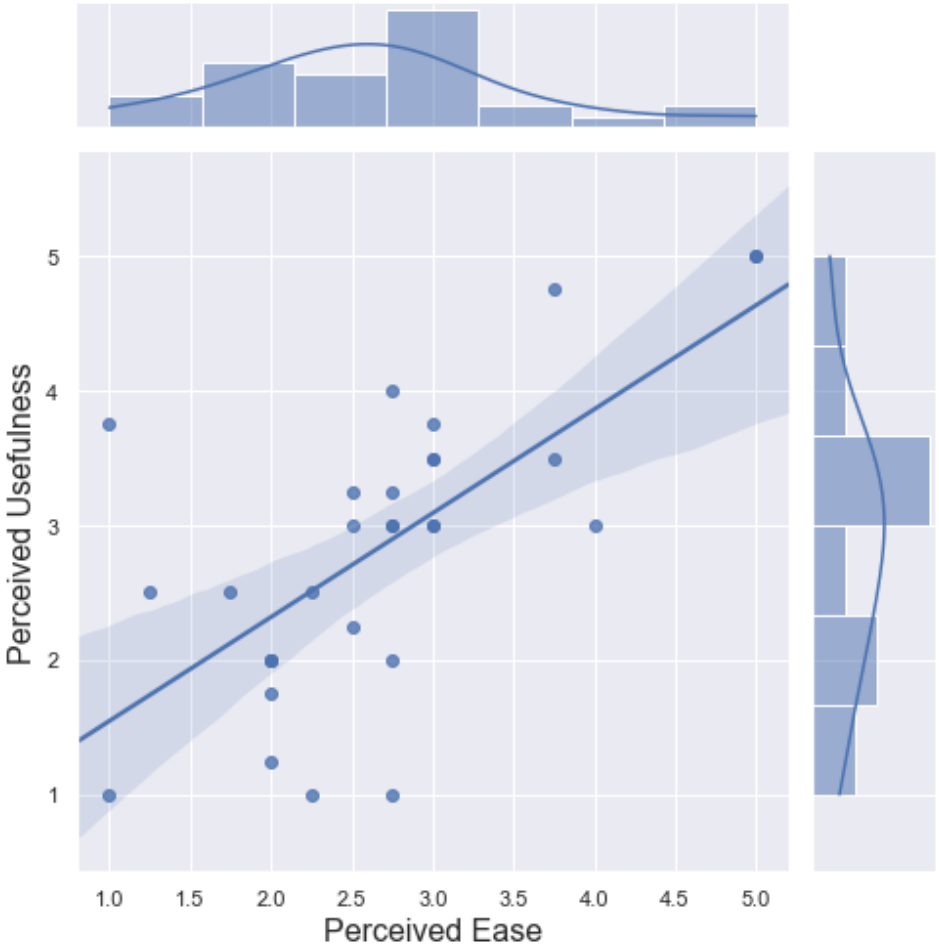

Figure 7. Perceived ease of use and perceived usefulness.

Considering now the perceived ease of use and perceived usefulness in the intention of adopting cryptocurrencies, we can see from figure 7 a positive relationship, the value of the correlation coefficient in this case is equal to 0.67, value of t equal to 4.77 which corresponds to a value of p smaller than 0.05. In this case, therefore, the results indicate that the relationship between the two constructs is statistically significant.

4.1.3. Perceived usefulness and intention to adopt cryptocurrencies

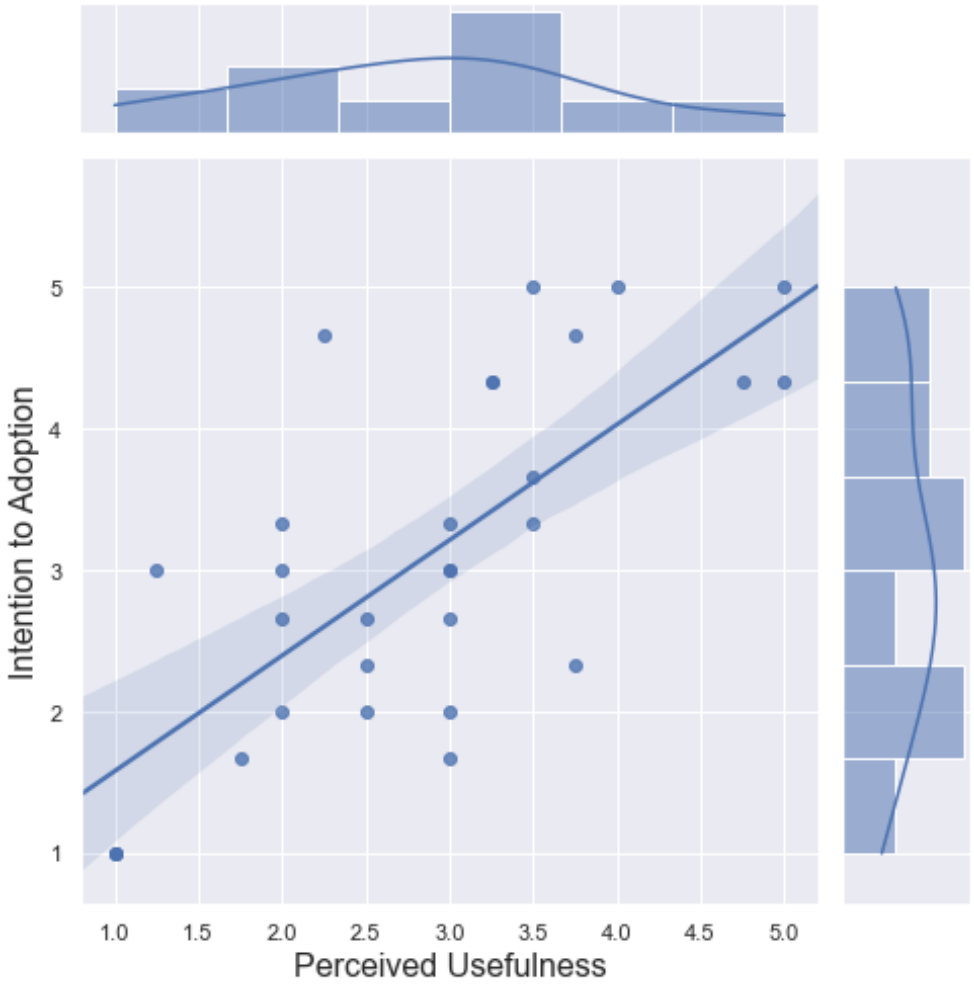

Figure 8. Perceived usefulness and intention to adopt cryptocurrencies.

From figure 8 it results that the relationship between perceived usefulness and intention to adopt cryptocurrencies is positive, the value of the correlation coefficient in this case is equal to 0.72, while the value of t is equal to 5.48, which corresponds to a value of p smaller than 0.05.

The relationship between perceived usefulness and intention to adopt cryptocurrencies is therefore statistically significant.

4.1.4. Subjective Norm and intention to use cryptocurrencies

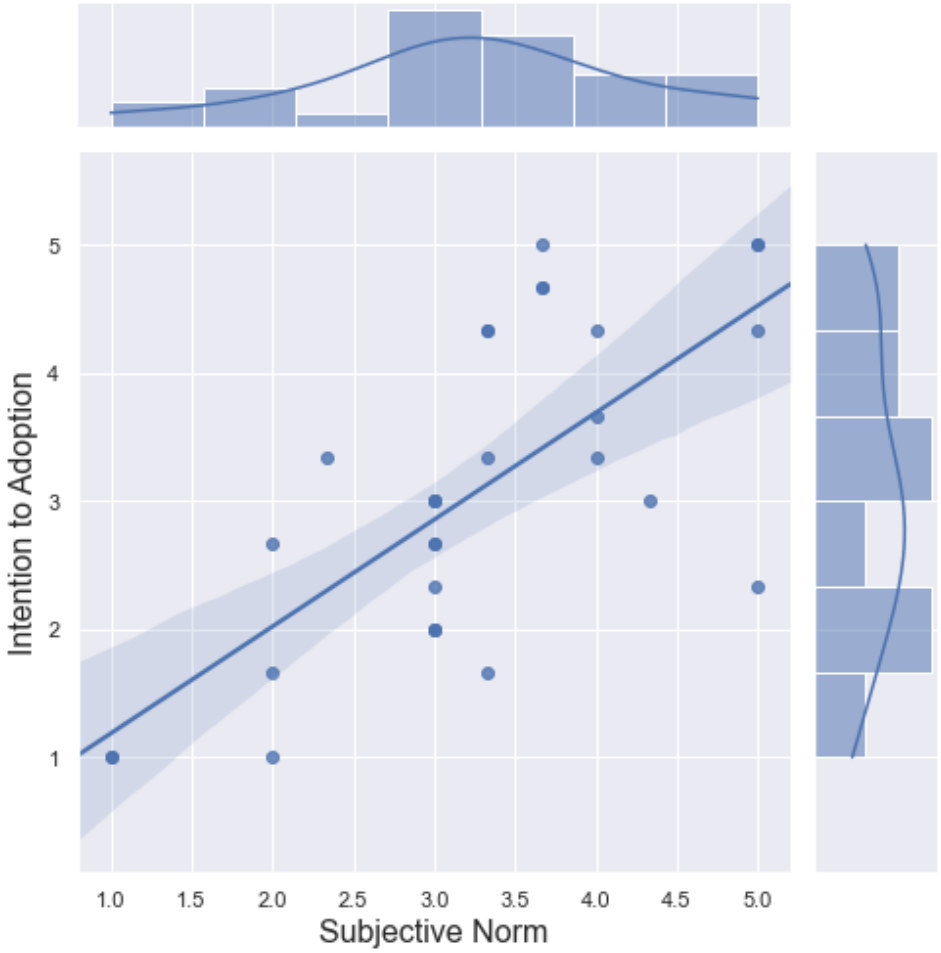

Figure 9. Subjective norm and intention to adopt cryptocurrencies.

From figure 9 the relationship between subjective norm and intention to use cryptocurrencies is positive, the value of the correlation coefficient in this case is equal to 0.7, while the value of t e is equal to 5.18, and p value is less than 0.05. Since the value of p is smaller than the significance level of 0.05, the relation is considered as statistically significant.

4.1.5. Subjective norm and perceived risk

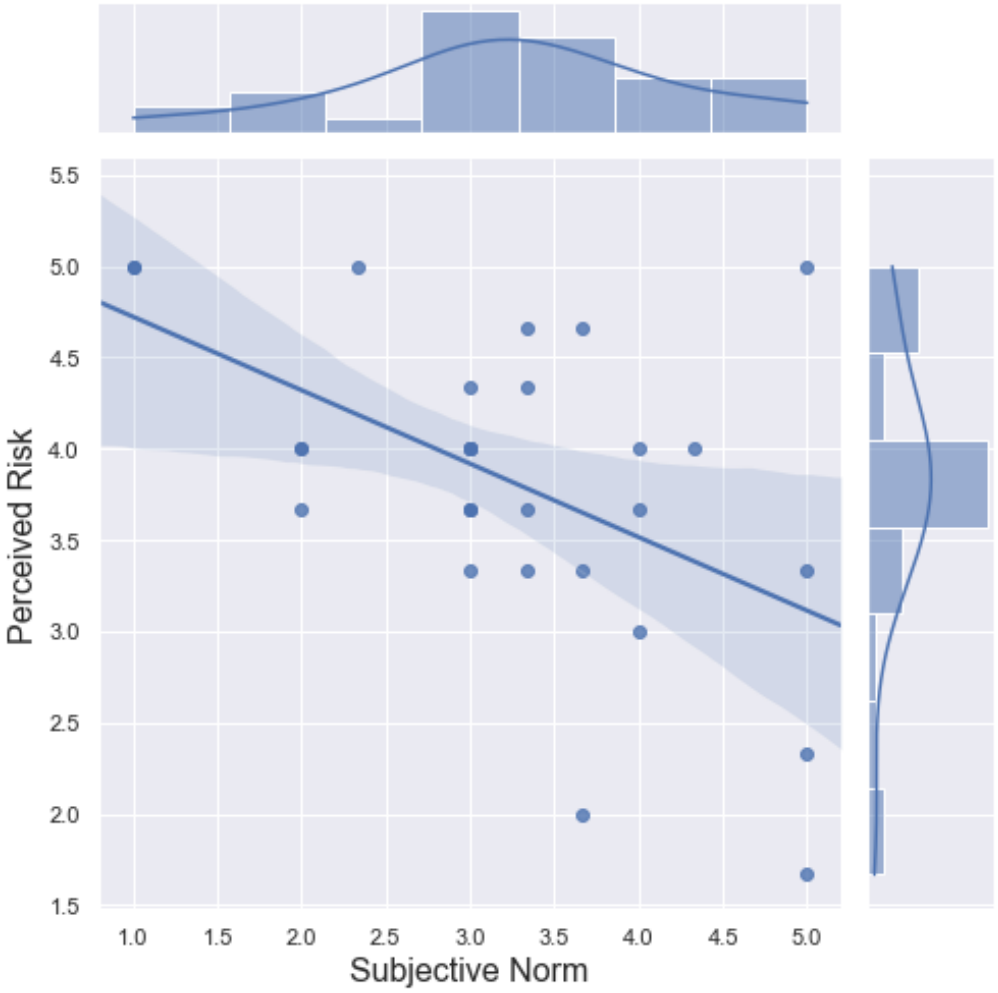

Figure 10. Subjective norm and perceived risk.

From figure 10 the relationship between subjective norm and perceived risk is negative, the value of the correlation coefficient in this case is equal to -0.51, which corresponds to a value of the t-statistic equal to 3.13 and a value of p equal to 0.004.

In this case too, since the value of p is less than the significance level of 0.05, the relationship is considered as statistically significant.

4.1.6. Perceived risk and intention to adopt cryptocurrencies

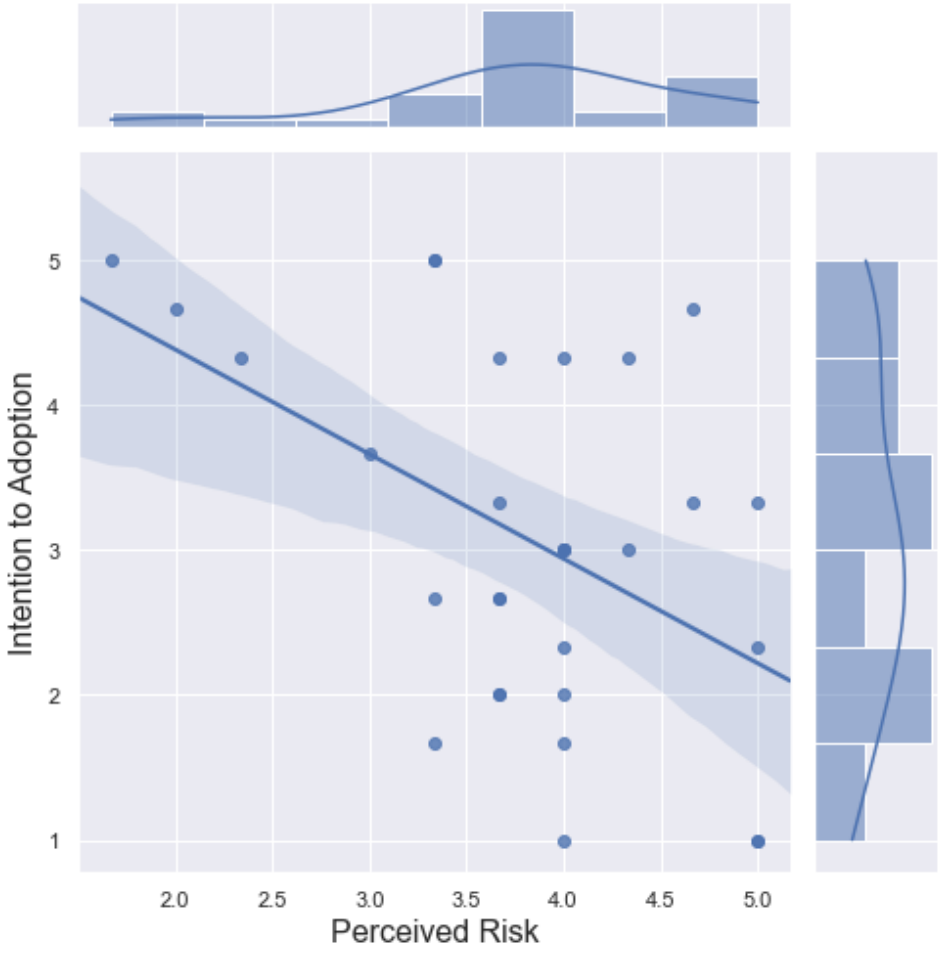

Figure 11. Perceived risk and intention to adopt cryptocurrencies.

From figure 11 the relationship between perceived risk and intention to adopt cryptocurrencies is negative, with the correlation coefficient value equal to -0.47, t value equal to 2.81, which corresponds to a p value equal to 0.008.
Since p is less than the significance level of 0.05 the relation is considered as statistically significant.

4.2. Structural model and Hypothesis testing

Since the regression values obtained in the previous analysis are significant, we can now proceed to fit the structural equation model in figure 12 built using SPSS AMOS, to test the hypothesis and analyze the causal effects between the constructs and the intention to adopt cryptocurrencies.

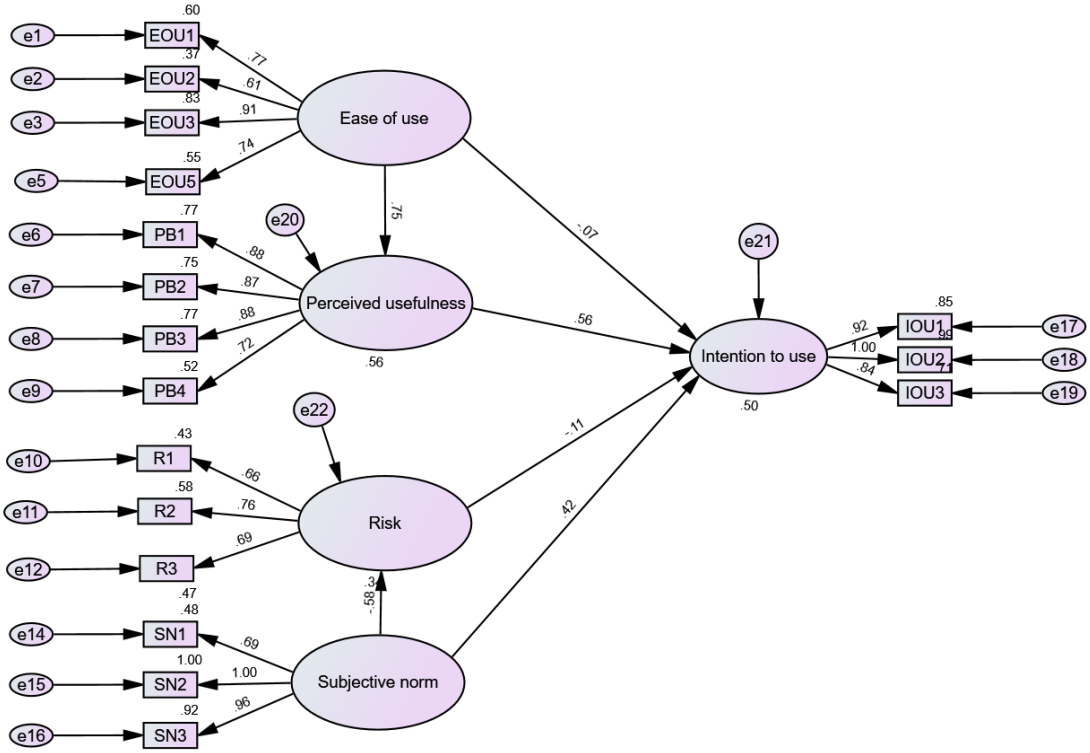

Fig 12. Structural Model

Table 10 reports the results obtained following the fitting of the model shown in figure 12.

Standardized Regression Weights:			Estimate	P
Perceived usefulness	<---	Ease of use	0.745	***
Risk	<---	Subjective norm	-0.582	0.022
Intention to use	<---	Ease of use	-0.073	0.762
Intention to use	<---	Perceived usefulness	0.561	0.025
Intention to use	<---	Risk	-0.115	0.578
Intention to use	<---	Subjective norm	0.417	0.038

Table 10. Standardize regression weights.

The results obtained indicate that in conformity with the TAM model the perceived ease of use has a positive and statistically significant effect ($\beta = 0.745$, $p < 0.001$) on the perceived usefulness which would confirm the H2 hypothesis, while it does not seem to be related to the intention to adopt cryptocurrencies given the very small value of the regression coefficient($\beta = -0.073$, $p = 0.762$) which is why the hypothesis H1 is rejected.

The perceived usefulness seems to has a positive and significant effect on the intention to adopt cryptocurrencies ($\beta = 0.561$, $p = 0.025$) which is why the H3 hypothesis is accepted.

The subjective norm has a negative and statistically significant effect on the perceived risk ($\beta = -0.582$, $p = 0.022$) and on the intention to adopt cryptocurrencies ($\beta = 0.417$, $p = 0.038$) which confirms the hypothesis H4 and H5, while the perceived risk despite having a negative influence on the intention to adopt cryptocurrencies is not statistically significant ($\beta = -0.115$, $p = 0.578$), which is why H6 is rejected.

The results are summarized in table 11.

Hypothesis test results		
H1	Perceived ease of use has a positive effect on the intention to adopt cryptocurrencies.	Rejected
H2	Perceived ease of use has a positive effect on the perceived usefulness of cryptocurrencies.	Accepted
H3	Perceived usefulness has a positive effect on the intention to adopt cryptocurrencies.	Accepted
H4	The subjective norm has a positive effect on the intention to adopt cryptocurrencies.	Accepted
H5	The subjective norm has a negative effect on the perceived risk for the adoption of cryptocurrencies.	Accepted
H6	Perceived risk has a negative impact on the intention to adopt cryptocurrencies.	Rejected

Table 11. Hypothesis test results.

4.3. Summary and interpretation of the results

The data analysis presented in the previous paragraphs made it possible first of all to evaluate the soundness of the measurement model. This phase represents the first step to verify that the items used to measure the constructs are valid and effective in measuring the constructs assigned to them. The analysis of the factor loadings and the values of the corrected item total correlations allowed to identify the items EOU4 and R4, which respectively represent the fourth question of the perceived ease of use and the fourth question of the perceived risk, as items that do not contribute in measuring the constructs assigned to them, reason why they were dropped from the analysis. Since the elements used in the questionnaire were adapted from the literature as expected the results of the composite reliability, Cronbach's Alpha, Average Variance Extracted and the application of the Fornell and Larcker criterion confirmed the validity and reliability of the measurement model.

The bivariate analysis of the correlation coefficients indicated a positive and statistically significant relationship of perceived ease of use, perceived usefulness and subjective norm with the intention to adopt cryptocurrencies, indicating that the intention to adopt cryptocurrency increases as that their adoption is perceived more useful, less complex, and the social influence on their adoption is positive. Negative is the bivariate relationship between subjective norm and perceived risk which indicates how the risk perceived by the individual is associated with the influence that his social circle exerts on him, in particular the greater the social support the lower the perceived risk and vice versa as social support decreases, perceived risk increases.

Regarding the relationship between perceived risk and the intention to adopt cryptocurrencies, the relationship is negative, which indicates that as perceived risk increases, the intention to adopt cryptocurrencies decreases.

The analysis using the structural model was performed with the aim of analyzing the causal effects between the different constructs according to the proposed research model.

The results with respect to the bivariate analysis of the single constructs in this case are different because in the structural model all the constructs together try to explain the variance, while in the bivariate analysis considering pairs of constructs there are no external effects.

The results indicate that the intention to adopt cryptocurrencies for the sample considered is mainly related to the subjective norm and perceived usefulness, while the perceived risk and ease of use are not very influential on the intention to adopt cryptocurrencies.

In agreement with the technology acceptance model and bivariate analysis carried out previously, the structural model confirm that perceived ease of use has a positive and significant influence on perceived benefit, and subjective norm has a negative influence on perceived risk indicating that increasing social support decreases the perceived risk.

As regards the structural model, however, it must be specified that the values of the fit indices of the model are lower than the acceptable threshold values as indicated in the literature, reason why the model as defined is not generalizable and the values of the significance levels cannot be considered stable.

5. Conclusions and recommendations

This research investigated the factors that determine the intention to adopt cryptocurrencies by consumers in the UK.

On the basis of the existing literature on the adoption of cryptocurrencies by consumers, a model that incorporates the constructs of the perceived ease of use and perceived usefulness of the Technology Acceptance Model with the constructs of the subjective norm and the perceived risk was used in this study.

The aim of the research was to investigate the explanatory power of the selected constructs on the intention to adopt cryptocurrencies by consumers in the UK and in particular (a) the impact of perceived ease of use on the intention to adopt cryptocurrencies and on their perceived usefulness, (b) the impact of perceived usefulness on the intention to adopt cryptocurrencies, (c) the impact of the subjective norm on the intention to adopt cryptocurrencies and on perceived risk, and finally (d) the impact of the perceived risk on the intention to adopt cryptocurrencies.

For the research, an online questionnaire was developed containing 19 questions readapted from the literature with the aim of measuring the different constructs, and a sample size of 30 responses was collected.

In reference to the research objectives of determining the most influential factors in determining the intention of British consumers to adopt cryptocurrencies, the findings indicate that the perceived usefulness and subjective norms have a direct impact on the intention toward adoption, and perceived usefulness increases strongly when the perceived ease of use increases in accordance with the theoretical model of the Technology acceptance model and in accordance with the results obtained by Sohaib et al. (2019), Shahzad et al. (2018), Nadeem et al. (2021), Abramova and Böhme (2016).

The perceived usefulness influence positively the intention to adopt cryptocurrencies, and this results is in accordance with both the theoretical model and the results obtained by Sohaib et al. (2019), Shahzad et al. (2018), Arias-Oliva et al. (2019), Walton and Johnston (2018), Mendoza-Tello et al. (2018).

The perceived ease of use in the present research is not directly explanatory of the intention of adopt cryptocurrencies as results from the structural model, and the results in this case are similar to what was found by Gunawan and Novendra (2017), Arias-Oliva et al. (2019), Gillies et al. (2020).

The influence exerted by the individual's social circle measured by the subjective norm is a factor capable of influencing both the intention to adopt cryptocurrencies, and the level of perceived risk in their usage: when people close to the individual have a good opinion of cryptocurrencies its intention to adopt cryptocurrencies increases and the perceived risk is lower.

This result is similar to the previous findings of Walton and Johnston (2018), Schaupp and Festa (2018), Anser et al. (2020), Alzahrani and Daim (2019), and makes it clear how strongly the phenomenon of cryptocurrencies is actually linked to the social factor.

Finally, perceived risk as also obtained by Mendoza-Tello et al. (2018), Nadeem et al. (2021), Arias-Oliva et al. (2019), Walton and Johnston (2018), Alaklabi and Kang (2021) despite being negatively associated with the intention to adopt cryptocurrencies does not significantly influence it, and the high average value for this construction indicates that in general the risk associated with their use is considered high.

The findings have practical implications for companies wishing to integrate blockchain technology or adopt cryptocurrencies, and some measures that companies can take follow from the findings obtained in this research.

Firstly, although the ease of use is not directly linked to the intention to adopt cryptocurrencies, it influences the perceived usefulness which in turn is decisive in determining the intention towards adoption, and for this reason for a successful integration into the business practice, It is recommended to increase the effort towards simplifying the way users can interact with this technology.

Secondly, The high perceived risk indicates the need to increase the security linked to the use of cryptocurrencies, as previously indicated the risks are not only related to the high volatility of the market, threats of cyberattacks and theft of

cryptocurrencies to which not even big exchanges are immune, but also to the definitive loss of assets in the event of loss of the private keys of the wallets, which is why the introduction of new mechanisms allowing greater control and protection over these assets could prove to be a decisive factor in the wide adoption and successful business integration.

Finally, The importance of the subjective norm in determining individual intention towards the adoption of cryptocurrencies suggests that businesses that want to be successful in the field of blockchain and cryptocurrencies need to focus more on increasing public awareness of these technologies and the advantages that they are able to draw from their adoption.

5.1. Limitations and future directions

One of the main limitations of the present research was related to the limited time available to collect the data and carry out the research.

The results obtained, although partially confirm the findings of previous studies in this field, are strongly influenced by the sample size of 30 responses.

As for the hypothesis tests, the results are to be considered as indicative as the values of the model fit coefficients do not satisfy the requirements as they are lower than the most widely used thresholds values, which means that the statistical significance values are unstable.

A further limitation is represented by the questionnaire design which as emerged from the analysis of the items, which highlighted that the fourth question of the perceived ease of use and perceived risk were not related to their latent variable, and this problem may be due to having formulated these questions in an unclear way or it could be just linked to the sample considered.

Future research should therefore consider a much larger sample size and improve the questionnaire by revising the problematic items and adding additional indicators to measure latent constructs to have more robust results.

As the cryptocurrency phenomenon is constantly evolving, considering in particular the recent developments in the UK which indicate an increased effort by the government in regulating cryptocurrencies use, future studies could expand the research model used in the present research including further constructs that take into account the legislative aspects in more detail and extend the surveys also to businesses that already use or intend to use cryptocurrencies.(HM Treasury, 2022)

6. References

- Alaklabi, S. and Kang, K., 2021. Perceptions towards Cryptocurrency Adoption: A case of Saudi Arabian Citizens. *IBIMA Business Review*, *2021*, pp.110411-110411.

- Abramova, S., Böhme R., 2016. *Perceived Benefit and Risk as Multidimensional Determinants of Bitcoin Use: A Quantitative Exploratory Study*. [online] undefined. Available at: https://www.semanticscholar.org/paper/Perceived-Benefit-and-Risk-as-Multidimensional-of-A-Abramova-B%C3%B6hme/f15ddad79b91c084b64dc920344e23fdbbe9e0ce [Accessed 17 December 2021].

- Arias-Oliva, M., Jorge Pelegrín Borondo and Gustavo Matias Clavero, 2019. *Variables Influencing Cryptocurrency Use: A Technology Acceptance Model in Spain*. [online] ResearchGate. Available at:https://www.researchgate.net/publication/331848541_Variables_Influencing_Cryptocurrency_Use_A_Technology_Acceptance_Model_in_Spain/link/5c905cd292851c1df94a69fe/download [Accessed 7 January 2022].

- Anser, M.K., Zaigham, G.H.K., Imran Rasheed, M., Pitafi, A.H., Iqbal, J. and Luqman, A., 2020. Social media usage and individuals' intentions toward adopting Bitcoin: The role of the theory of planned behavior and perceived risk. *International Journal of Communication Systems*, [online] p.e4590. Available at: https://onlinelibrary.wiley.com/doi/abs/10.1002/dac.4590

- Alzahrani, S. and Tugrul Daim, 2019. *Evaluation of the Cryptocurrency Adoption Decision Using Hierarchical Decision Modeling (HDM)*. [online] PDXScholar. Available at: https://pdxscholar.library.pdx.edu/etm_fac/217/

- Alharahsheh, H. and Pius, A., 2020. A Review of key paradigms: positivism VS interpretivism. *Global Academic Journal of Humanities and Social Sciences*, [online] 2(3), pp.39–43. Available at: https://www.gajrc.com/media/articles/GAJHSS_23_39-43_VMGJbOK.pdf.

- Alqaryouti, O., Siyam, N., Alkashri, Z. and Shaalan, K. (2020). Cryptocurrency Usage Impact on Perceived Benefits and Users' Behaviour. *Information Systems*, [online] pp.123–136. Available at: https://www.researchgate.net/publication/340738436_Cryptocurrency_Usage_Impact_on_Perceived_Benefits_and_Users'_Behaviour [Accessed 21 Mar. 2022].

- Ajzen, I., 1991. The theory of planned behavior. *Organizational Behavior and Human Decision Processes*. [online] 50(2), pp.179–211. Available at: https://www.sciencedirect.com/science/article/abs/pii/074959789190020

- Blessing, A.,2021. *Learn Solidity 01: Writing your first Smart Contract*. [online] Medium. Available at: https://medium.com/coinmonks/learn-solidity-01-writing-your-first-smart-contract-528cad29ba99 [Accessed 10 Mar. 2022].

- Baur, A.W., Bühler, J., Bick, M. and Bonorden, C.S. 2015. Cryptocurrencies as a Disruption? Empirical Findings on User Adoption and Future Potential of Bitcoin and Co. *Open and Big Data Management and Innovation*, [online] pp.63–80. Available at: https://link.springer.com/chapter/10.1007/978-3-319-25013-7_6.

- Bauer, R.A.,1960. *Consumer Behavior as Risk Taking*. In: Hancock, R.S., Ed., Dynamic Marketing for a Changing World, Proceedings of the 43rd. Conference of the American Marketing Association, 389-398.

- Brookes, E. 2021. *The Theory of Planned Behavior* [online] Available at: https://www.simplypsychology.org/theory-of-planned-behavior.html [Accessed 28 Mar. 2022].

- Binance Academy, 2022. *Mempool*. [online] Binance Academy. Available at: https://academy.binance.com/en/glossary/mempool [Accessed 4 May 2022].

- Brühlmann, F., Petralito, S., Aeschbach, L.F. and Opwis, K. 2020. The quality of data collected online: An investigation of careless responding in a crowdsourced sample. *Methods in Psychology*, [online] 2, p.100022. Available at: https://www.sciencedirect.com/science/article/pii/S2590260120300096 [Accessed 25 Apr. 2022].

- Collier, J. E., 2020. *Applied structural equation modeling using AMOS: Basic to advanced techniques*. Routledge.

- Chuttur, M., 2009. *Overview of the Technology Acceptance Model: Origins, Developments and Future Directions*. [online] ResearchGate. Available at: https://www.researchgate.net/publication/277766395_Overview_of_the_Technology_Acceptance_Model_Origins_Developments_and_Future_Directions [Accessed 28 Mar. 2022].

- Coin ATM Radar, 2021. *Number of Bitcoin ATMs in United Kingdom as of February 2021, by city. Statista.* Statista Inc.. https://www-statista.com.lsbu.idm.oclc.org/statistics/1208624/bitcoin-atms-city-uk/ [Accessed: Febbruary 27, 2022.]

- Coinbase, 2022. *What is 'proof of work' or 'proof of stake'?* [online] Available at: https://www.coinbase.com/learn/crypto-basics/what-is-proof-of-work-or-proof-of-stake [Accessed 4 May 2022].

- Davis, F.D., 1989. Perceived Usefulness, Perceived Ease of Use, and User Acceptance of Information Technology. *MIS Quarterly*, [online] 13(3), pp.319–340. Available at: https://www.jstor.org/stable/249008

- Deloitte, 2021. *The Business Benefit of Using Cryptocurrency*. [online] Available at: https://www2.deloitte.com/us/en/pages/audit/articles/corporates-using-crypto.html [Accessed 21 March 2021].

- Ethereum.org, 2022. *Home | ethereum.org*. [online] Available at: https://ethereum.org/en/ [Accessed 10 Mar. 2022].

- Fornell, C. and Larcker, D.F., 1981. Evaluating structural equation models with unobservable variables and measurement error. *Journal of marketing research*, *18*(1), pp.39-50.

- George, B. 2022a. *What Is a Block Reward?* [online] coindesk. Available at: https://www.coindesk.com/learn/what-is-a-block-reward . [Accessed 4 May 2022].

- George, B. 2022b. *What Happens When All Bitcoin Are Mined?* [online] coindesk. Available at: https://www.coindesk.com/learn/what-happens-when-all-bitcoin-are-mined/ [Accessed 4 May 2022].

- Gunawan, F.E. and Novendra, R. (2017). An Analysis of Bitcoin Acceptance in Indonesia. *ComTech: Computer, Mathematics and Engineering Applications*, [online] 8(4), p.241. Available at: https://journal.binus.ac.id/index.php/comtech/article/view/3885 [Accessed 20 Mar. 2022].

- Gillies, F.I., Lye, C.-T. and Tay, L.-Y. (2020). DETERMINANTS OF BEHAVIORAL INTENTION TO USE BITCOIN IN MALAYSIA. *Journal of Information System and Technology Management*, [online] 5(19), pp.25–38. Available at: http://www.jistm.com/PDF/JISTM-2020-19-12-03.pdf.

- Götz, O., Liehr-Gobbers, K. and Krafft, M., 2010. Evaluation of structural equation models using the partial least squares (PLS) approach. *Handbook of partial least squares* (pp. 691-711). Springer, Berlin, Heidelberg.

- GP Bullhound, The Motley Fool, Investing.com. 2022. *Number of cryptocurrencies worldwide from 2013 to February 2022*. *Statista*. Statista Inc.. Accessed: March 13, 2022. https://www-statista-com.lsbu.idm.oclc.org/statistics/863917/number-crypto-coins-tokens/

- Hair, J.F., Black, W.C., Babin, B.J. and Anderson, R.E. (2010) *Multivariate Data Analysis. 7th Edition*. Pearson, New York.

- HM Treasury (2022). *Government sets out plan to make UK a global cryptoasset technology hub*. [online] GOV.UK. Available at:

https://www.gov.uk/government/news/government-sets-out-plan-to-make-uk-a-global-cryptoasset-technology-hub [Accessed 25 Apr. 2022].

- Hulland, J., 1999. Use of partial least squares (PLS) in strategic management research: A review of four recent studies. *Strategic management journal*, *20*(2), pp.195-204.

- Haran, N., 2017. *What's keeping cryptocurrencies from mass adoption?* [online] TechCrunch. Available at: https://techcrunch.com/2017/04/20/whats-keeping-cryptocurrencies-from-mass-adoption/

- Investopedia, 2022. *Volatility From the Investor's Point of View*. [online] Available at: https://www.investopedia.com/ask/answers/010915/volatility-good-thing-or-bad-thing-investors-point-view-and-why.asp [Accessed 10 Mar. 2022].

- Jackson, T., 2021. *What Are the Business Benefits of Cryptocurrency*. [online] The European Business Review. Available at: https://www.europeanbusinessreview.com/whatare-the-business-benefits-of-cryptocurrency/ [Accessed 14 March 2022].

- Krishna, A., 2021. *Blockchain Security Issues - A Complete Guide*. [online] Astra Security Blog. Available at: https://www.getastra.com/blog/knowledge-base/blockchain-security-issues/ [Accessed 10 Mar. 2022].

- Kline, R.B., 2015. *Principles and practice of structural equation modeling*. Guilford publications.

- Lee, Y., Kozar, K. and Kai (2017). *The Technology Acceptance Model: Past, Present, and Future*. [online] undefined. Available at: https://www.semanticscholar.org/paper/The-Technology-Acceptance-Model%3A-Past%2C-Present%2C-and-Lee-Kozar/b7004a7f0cbfc37ab2c1a4d130a7cf94fbd53f9f [Accessed 28 Mar. 2022].

- Liu, Y., Li, H., Kostakos, V., Goncalves, J., Hosio, S. and Hu, F., 2014. An empirical investigation of mobile government adoption in rural China: A case study in Zhejiang province. *Government Information Quarterly,* 31(3), pp.432–442.

- Last Mazambani, Mutambara, E., 2019. *Predicting FinTech innovation adoption in South Africa: the case of cryptocurrency*. [online] ResearchGate. Available at: https://www.researchgate.net/publication/336777356_Predicting_FinTech_innovation_adop tion_in_South_Africa_the_case_of_cryptocurrency [Accessed 8 November 2021].

- Mechkaroska, D., Dimitrova, V. and Aleksandra Popovska-Mitrovikj, 2018. *Analysis of the Possibilities for Improvement of BlockChain Technology*. [online] ResearchGate. Available at: https://www.researchgate.net/publication/330585021_Analysis_of_the_Possibilities_for_Improvement_of_BlockChain_Technology [Accessed 10 Mar. 2022].

- Mendoza-Tello, J.C., Mora, H., Pujol-Lopez, F.A. and Lytras, M.D., 2018. Social Commerce as a Driver to Enhance Trust and Intention to Use Cryptocurrencies for Electronic Payments. *IEEE Access*, [online] 6, pp.50737–50751. Available at: https://ieeexplore.ieee.org/document/8457201

- Mumtaz, A., Memon, Ting, H., Cheah, J.-H., Thurasamy, R., Chuah, F., Cham, T., Rahman, A. and Kajang, M. (2020). Journal of Applied Structural Equation Modeling SAMPLE SIZE FOR SURVEY RESEARCH: REVIEW AND RECOMMENDATIONS. *Journal of Applied Structural Equation Modeling*, [online] 4(2), pp.i–xx. Available at: https://jasemjournal.com/wp-content/uploads/2020/08/Memon-et-al_JASEM_-Editorial_V4_Iss2_June2020.pdf.

- Nadeem, M.A., Liu, Z., Pitafi, A.H., Younis, A. and Xu, Y., 2021. Investigating the Adoption Factors of Cryptocurrencies—A Case of Bitcoin: Empirical Evidence From China. *SAGE Open*. [online] 11(1), p.215824402199870. Available at: https://journals.sagepub.com/doi/full/10.1177/2158244021998704 [Accessed 16 January 2022]

- Nseke, P. (2018). How Crypto-Currency Can Decrypt the Global Digital Divide: Bitcoins a Means for African Emergence. INTERNATIONAL JOURNAL OF INNOVATION AND ECONOMIC DEVELOPMENT, 3(6), pp.61–70.

- Och, N., 2021. *Crypto Market Volatility Guide - Coinmonks - Medium*. [online] Medium. Available at: https://medium.com/coinmonks/crypto-market-volatility-guide-c61e7d18a4e3 [Accessed 10 Mar. 2022].

- Onlinesurveys.ac.uk, 2021. *Online surveys*. [online] Available at: https://www.onlinesurveys.ac.uk/

- Pittis, D., 2022. *With so many cryptocurrencies, why do any of them have value?* [online] CBC. Available at:

https://www.cbc.ca/news/business/cryptocurrency-value-column-don-pittis-1.6303785 [Accessed 25 Apr. 2022].

- Penser, 2020. *Let's Talk About the Challenges with Widespread Crypto Adoption - Penser*. [online] Available at: https://www.penser.co.uk/article/lets-talk-about-the-challenges-with-widespread-crypto-adoption/ [Accessed 10 Mar. 2022].

- Research-Methodology, 2022. *Positivism - Research Methodology*. [online] Research-Methodology. Available at: https://research-methodology.net/research-philosophy/positivism

- Roscoe, J. T. (1975). Fundamental research statistics for the behavioral sciences (Second ed.). New York: Holt Rinehart and Winston.

- Saunders, M., Lewis,P., Thornhill, P. 2019. *Research Methods for Business Students Ebook*, Pearson Education, Limited.*ProQuest Ebook Central*. Available at: https://ebookcentral.proquest.com/lib/lsbuuk/detail.action?docID=577474

- Statista. (2021a). *Number of identity-verified cryptoasset users from 2016 to June 2021 (in millions)*. *Statista*. Statista Inc.. Accessed: March 10, 2022. https://www-statista-com.lsbu.idm.oclc.org/statistics/1202503/global-cryptocurrency-user-base/

- Statista. (2021b). *Number of businesses that either have a cryptocurrency ATM or offer crypto as an in-store payment method as of March 9, 2021, by country*. *Statista*. Statista Inc.. Accessed: March 10, 2022. https://www-statista-com.lsbu.idm.oclc.org/statistics/1222684/firms-with-crypto-payment-solution-country/

- Statista, 2021c. *Age groups who own a cryptocurrency in the United Kingdom in 2020*. Statista. Statista Inc.. Accessed: March 27, 2022. https://www-statista.com.lsbu.idm.oclc.org/statistics/1223344/cryptocurrency-penetration-age-uk

- Statista, 2021d. *Age groups who own a cryptocurrency in the United Kingdom in 2020*. *Statista*. Statista Inc.. Accessed: January 27, 2022. https://www-statista-com.lsbu.idm.oclc.org/statistics/1223344/cryptocurrency-penetration-age-uk/

- Statista. 2022a. *Overall cryptocurrency market capitalization per week from July 2010 to March 2022 (in billion U.S. dollars)*. *Statista*. Statista Inc.. Accessed: March 10, 2022. https://www-statista-com.lsbu.idm.oclc.org/statistics/730876/cryptocurrency-maket-value/

- Statista. 2022b. *Bitcoin dominance 2013-2022 | Statista*. [online] Available at: https://www.statista.com/statistics/1269669/bitcoin-dominance-historical-development/ [Accessed 25 Apr. 2022].

- Sohaib, O., Hussain, W., Asif, M., Ahmad, M. and Mazzara, M. (2020). A PLS-SEM Neural Network Approach for Understanding Cryptocurrency Adoption. *IEEE Access*, [online] 8, pp.13138–13150. Available at: https://ieeexplore.ieee.org/abstract/document/8933370 [Accessed 21 Mar. 2022].

- Shahzad, F., Xiu, G., Wang, J. and Shahbaz, M., 2018. An empirical investigation on the adoption of cryptocurrencies among the people of

mainland China*. Technology in Society*, [online] 55, pp.33–40. Available at: https://www.sciencedirect.com/science/article/pii/S0160791X18300204 [Accessed 16 November 2021]

- Schaupp, L. C. and Festa, M., 2018. *Cryptocurrency adoption and the road to regulation*. [online] ResearchGate. Available at: https://dl.acm.org/doi/pdf/10.1145/3209281.3209336?casa_token=RrMwJNS7V5MAAAAA:JpuYR69954Tvb7yo9RkmJ9T_sEJKQ9Q8hlRYzO6azd-GfuDGRkoJx4D9BuKrS4XOz6HN9489SEYn

- Segendorf, B. (2014). What is Bitcoin? *Sveriges Riksbank Economic Review*, 2, 71–87.

- Taasoobshirazi, G. and Wang, S., 2016. The performance of the SRMR, RMSEA, CFI, and TLI: An examination of sample size, path size, and degrees of freedom. *Journal of Applied Quantitative Methods*, *11*(3), pp.31-39.

- Venkatesh, V, Thong, J. Y. L., Xu, X., 2012. *Consumer acceptance and use of information technology: Extending the unified theory of acceptance and use of technology* MIS Quart., vol. 36, no. 1, pp. 157–178.

- Vinzi, V.E., Chin, W.W., Henseler, J. and Wang, H., 2010. *Handbook of partial least squares* (Vol. 201, No. 0). Berlin: Springer.

- Wood, J., Jang, H., Lenskiy, A. and Feroz Khan, G., 2017. The Diffusion and Adoption of Bitcoin: A Practical Survey for Business. *International Business Management, 11: 1278-1288.*

- Walton, A.J. and Johnston, K., 2018. *Exploring Perceptions of Bitcoin Adoption: The South African Virtual Community Perspective*. [online]

ResearchGate. Available at: https://www.researchgate.net/publication/345643483_Exploring_Perceptions_of_Bitcoin_Adoption_The_South_African_Virtual_Community_Perspective [Accessed 16 December 2021].

- Zipmex. (2022). *Why Are There So Many Cryptocurrencies? - Zipmex*. [online] Available at: https://zipmex.com/learn/why-are-there-so-many-cryptocurrencies/ [Accessed 10 Mar. 2022].

- Zijlmans, E.A.O., Tijmstra, J., van der Ark, L.A. and Sijtsma, K., 2017. Item-Score Reliability in Empirical-Data Sets and Its Relationship With Other Item Indices. *Educational and Psychological Measurement*, 78(6), pp.998–1020. doi:10.1177/0013164417728358.

7. Appendices

7.1. Appendix 1. Questionnaire copy

I confirm that I am over 18 years of age. ☐Yes ☐No

Your age group.

☐18-24

☐25-39

☐40-60

☐60+ Y

Gender

☐Male ☐Female ☐ Other

Background knowledge

Have you ever heard of Cryptocurrencies like Bitcoin or others?

☐Yes ☐No

Do you know what they are?

☐Yes ☐No

Ease of use					
How easy do you think it is to understand and use Cryptocurrencies?	Strongly disagree	Disagree	Neither agree nor disagree	Agree	Strongly agree
I think that it is generally easy to understand how to use Cryptocurrencies.	○	○	○	○	○
For me I think it is easy to understand how to use Cryptocurrencies.	○	○	○	○	○
It will be easy for me to become an expert in the use of Cryptocurrencies.	○	○	○	○	○

Using Cryptocurrencies require a lot of mental effort.	○	○	○	○	○
I think it is easy to make payments using Cryptocurrencies.	○	○	○	○	○
Perceived usefulness					
What benefits could derive from the use of Cryptocurrencies?					
Using Cryptocurrencies will increase my standard of living.	○	○	○	○	○
Using Cryptocurrencies makes my life easier.	○	○	○	○	○
I think that owning Cryptocurrencies is advantageous.	○	○	○	○	○
I think that transactions with Cryptocurrencies are more advantageous.	○	○	○	○	○
Perceived risk					
What are the risks associated with the use of Cryptocurrencies?					
Using Cryptocurrencies is risky	○	○	○	○	○
Compared to other forms of investment, Cryptocurrencies are riskier.	○	○	○	○	○
I worry about losing the value of my money if i invest in Cryptocurrencies	○	○	○	○	○
I am worried about possible government interventions to limit Cryptocurrencies usage	○	○	○	○	○

Subjective Norm					
Do you think people would approve or disapprove your usage of Cryptocurrencies?					
People important to me would support my use of Cryptocurrencies	○	○	○	○	○
People whose opinions matter to me would be in favour of me using Cryptocurrencies	○	○	○	○	○
People who influence my behaviours would be in favour of me using Cryptocurrencies	○	○	○	○	○
Intention to use Cryptocurrencies					
I intend to buy or use Cryptocurrencies	○	○	○	○	○
In the future I will buy or use Cryptocurrencies	○	○	○	○	○
I intend to use Cryptocurrencies on a regular bases	○	○	○	○	○