Determinants of Blockchain Adoption as Decentralized Business Model by Spanish Firms: – An Innovation Theory Perspective.

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Abstract

A large attention surrounding to identify the meaningful blockchain business model on financial services, while a little focus about non-financial organization and solutions in terms of how blockchain business model can affect the organization and bring more value. To address the complex structure of businesses that have public goods, it is important to develop sustainable blockchain-based business models. In addition, this study offers the first qualitative research that uses and integrated Technological, Environmental and Organizational (TOE) framework with Technology Acceptance Theory (TAM) to study the adoption of blockchain technology by Spanish firms. The key contribution of this study lies in providing a comprehensive understanding of the environmental, technological, and organizational factors that impact the intention to adopt Blockchain which eventually affect adoption. The results of the paper discuss how that competitive pressure, competence, top management support, and relative advantage have a positive impact on intention to adopt blockchain technology while complexity affects the intention to adopt the technology negatively. Contrary to many adoption studies, our findings show that intention to adopt negatively impacts adoption and outlines the effect of blockchain on business model elements on macroeconomic level.

Keywords: Decentralized, Blockchain technology, Business Model, TOE, TAM

1.1 Introduction

In recent years, blockchain has received colossal interest from the industry, several applications of distributed ledgers and blockchain has been identified in various sectors. While it has been observed that some companies are adopting Blockchain technology to produce innovative solutions and tackle the existing inefficiencies in the business processes, many firms are still not confident about its adoption. It is well-known that new technology will change many business processes and will impact many sectors however, the decision to adopt a technology remains with the management of the company.

Various studies have highlighted the potential use of blockchain in different industries. It can provide the strategic and operational advantage to different processes and functions of the organization including faster transactions, transparency, security and cost saving (Lansiti and Lakhani, 2017; Tapscott and Tapscott, 2016). As per various published reports (McKinsey, 2017; Accenture (Treat et al., 2017); and IBM (Bear et al., 2016)), globally, the blockchain adoption rate is increasing. Different research on blockchain adoption has been conducted previously in the form of case studies and mostly conceptual (Weking et al., 2020). There are published studies on the adoption of blockchain but most of these studies are qualitative and only lays down the theoretical and conceptual framework to better understand the adoption process (Clohessy & Acton, 2019; Lian et al., 2020; Woodside, Augustine, Fred, & Giberson, 2017). Little focus has been put on quantitative studies to find out the impact of different factors on the uptake of the technology and innovative processes by firms (Reyna et al., 2018). Apart from Bitcoin and other cryptocurrencies, few quantitative studies on the adoption of specific applications of Blockchain e.g. adoption of Blockchain in the supply chain (Kamble, Gunasekaran, & Arha, 2019), can be found in the literature. This paper aims to contribute to the limited quantitative empirical studies in this area.

Thus, in this research, the major focus was given on development of various antecedents that has huge role in the organizational innovativeness and adoption of decentralized blockchain business model. Technological, Environmental and Organizational (TOE) Framework integrated with Technology Acceptance Theory (TAM) has been used as underlying conceptual framework. Thus, extending the literature on the use of integrated adoption models and contributing to theoretical framework. To provide credibility and prevent biases in data collection process, the data was collected by a professional data collecting company called Netquest in May 2021 from 800 companies in Spain. Out of 800 observations, 213 respondents who had adequate knowledge of blockchain were selected to validate the conceptual model.

An outlook on the influential factors observed from the study will help managers grasp a better understanding of the perception towards the adoption of blockchain technology in the firms. To our knowledge, this will be the first quantitative study on the adoption of blockchain technology in the European context. As per the IDC report (April 2021), it is highlighted that the growth of blockchain adoption accounts for 46% especially in large businesses in Spain. The most important aspect in terms of this growth potential is that the Spanish government is highly positive towards blockchain. Therefore, the research seeks to unravel the potential of adoption of blockchain to reduce the theoretical gaps by testing the theorized framework including technology acceptance model (TAM) and technology-organization-environment (TOE). This study aims to provide a comprehensive understanding of the environmental, technological, and organizational factors that impact acceptance and adoption of blockchain by firm managers. Motivated by the blockchain potential for businesses, the lack of comprehensive studies from IS perspective and the innovations theories perspective, this current study proposes the following research questions:

- How do technological, organizational, and environmental factors influence blockchain adoption in an industry specific organization?
- How does the organizational innovativeness perspective of intention to adopt on the actual adoption of the blockchain technology?

The paper is organized as follows: Section 2 presents the literature review for the existing studies and describes the theoretical background of the integrated model in detail, explaining the technology adoption theories considered for the paper, Section 3 illustrates the technology adoption models and section 4 describes the hypothesis developed for studying the model, Section 5 provides the research methodology adopted for the empirical analysis, Section 6 discusses the results from the econometric model, demonstrates the findings, discussion and conclusion followed by implication in Section 7, and 8 respectively.

1.2 Literature Review

Most of the research that investigated the factors affecting Blockchain adoption is qualitative. These studies are essential for developing theory and gaining a better understanding of the phenomena, but they only capture conceptual difficulties in blockchain implementation and need to be tested to provide evidence for applicability. Helliar et al. (2020) studied the diffusion of permissionless and permissioned Blockchain using a case study methodology. The study provides insights into the causes and constraints to technological dissemination. On the other hand, papers like (Lian et al., 2020) carried semi structured interviews to find the factors that affect users' acceptance and usage intention toward blockchain-based smart lockers. Their results show that the market entry of new technology requires to be user-friendly and convenient for the users. But, the result of this paper is specific to a use case and cannot represent all the companies. Clohessy & Acton (2019) uses TOE framework to investigate the factors that impact the adoption of blockchain in Irish companies through analysis of secondary databases and the available online literature.

There are also a few quantitative studies that aim to find out the factors that impact the acceptance and adoption of blockchain technology. We have found ten articles that study the adoption of Blockchain in different sectors. Knauer & Mann (2020) uses the integration of TAM and Diffusion of innovation theory to identify the key factors that influence the German consumers in investing in Blockchain Technology. Queiroz et al. (2020); Alazab et al. (2021); Fosso Wamba, Queiroz, & Trinchera (2020); Kamble et al, (2019) employed different technology adoption theories to investigate the adoption of Blockchain in supply chain among companies in Brazil, Australia, India and the USA. Li (2020) used TAM with few constructs from TRA to identify the key determinants in the adoption of blockchain technology in Hong Kong. These studies have been conducted using samples from various countries1 and mostly for specific sectors as supply chain. Moreover, the conceptual framework and the factors of analysis are different in each one of the studies. Table 1 shows the use of integrated TOE-TAM framework in different qualitative studies. To complement these studies, this chapter uses an integrated TOE framework with TAM to investigate the environmental, technological, and organizational factors that impact the acceptance of Blockchain technology by Spanish firms.

Table 1: Review on new technology adoption studies in organization using TAM-TOE framework

Studies	Topic	Brief detail
Gangwar, Date and Ramaswamy (2014)	Understanding determinants of cloud computing adoption using an integrated TAM-TOE model	The study integrated TAM-TOE model to develop variables for cloud computing adoption at organizational level.
Fosso Wamba, Queiroz, and Trinchera (2020)	Dynamics between blockchain adoption determinants and supply chain performance: An empirical investigation	The paper examined the integrated TAM framework to analyse the blockchain adoption for supply chain management in India and US region.
Cho, Cheon, Jun, and Lee, 2021	Digital advertising policy acceptance by out-of-home advertising firms: a combination of TAM and TOE framework	The study employed the TAM-TOE framework to examine the acceptance of digital advertisement policy by Korean.
Awa, Ojiabo, and Emecheta, 2015	Integrating TAM, TPB and TOE frameworks and expanding their characteristic constructs for e-commerce adoption by SMEs	The paper conceptualized the integrated framework of TAM, TOE and TPB to understand the e-commerce adoption with SMEs.
Chatterjee, Rana, Dwivedi, and Baabdullah, 2021	Understanding AI adoption in manufacturing and production firms using an integrated TAM-TOE model	The study adopted the TOE framework to identify the influencing factors for adoption of industry 4.0 in digital manufacturing.
Raut, Priyadarshinee, and Jha, 2018	Understanding the mediation effect of cloud computing adoption in Indian organization: integrating TAM-TOE-Risk model	The paper conceptualized TAM-TOE framework to measure the business performance by taking Cloud computing adoption as a mediating variable in Indian industries

[1] India, Germany, Australia, Brazil, US, Bangladesh, Nigeria and Hong Kong

Li, 2020	Blockchain technology adoption: examining the fundamental drivers	The study analysed and identified the various adoption drivers for blockchain technology using TAM framework.

1.3 Technology Adoption Models

With growing advancements in technology, the companies have started updating their Information System (IS) to enhance their performance. One of the more established areas of IS study is technology adoption. Carr (1999) has defined technology adoption as “the stage in which a technology is selected for use by an individual or an organization.” The development of numerous theories and models has resulted from research in this subject, which has progressed throughout time by conceiving new aspects that can better explain the phenomena of technology adoption.

Many grounded and widely used adoption theories as Diffusion of Innovation Theory (DIT) (Roger, 1962), TAM (Davis, 1986), Theory of Reasoned Action (Ajzen, 1985), TOE (Tornatzky, Fleischer, & Chakrabarti, 1990), and Assimilation Theory (Armstrong & Sambamurthy, 1999) have found practical utility in studying the factors that impact the acceptance and adoption of innovation. This study considers two adoption models, the TAM model and the TOE framework, based on their relevance to technology adoption at firm level, as determined by the literature review. The following are the explanations behind these models:

1.3.1 Technology Acceptance Model (TAM)

Among the various theoretical models for understanding IT adoption and usage processes, TAM is the most frequently acknowledged. Davis developed TAM in 1985 based on prior theories of innovation adoption as (Ajzen, 1985) Theory of Reasoned Action in Davis´s TAM theory, there are two main constructs that influence the intention to use a new technology, namely perceived ease of use (PEU) and perceived usefulness (PU). According to Davis, perceived usefulness is "the degree to which a person believes that using a particular system would enhance his or her job performance" (Davis, 1986) and perceived ease of use is "the degree to which a person believes that using a particular system would be free of effort¨ (Davis, 1986). Through these factors, TAM seeks to explain the relationship between the intention to adopt a technology and its actual adoption and use. This theory has been validated by different scholars in various settings in the past decades and has been applied widely to identify the technological innovation adoption determinants and study the innovation acceptance.

1.3.2 **Technology-Organisational-Environmental (TOE) framework**

Tornatzky et al, (1990) proposed TOE framework to study the factors that impact adoption. This model is popularly referred to as ''Tornatzky and Fleischer'', which is developed from the Diffusion Innovation Theory. The TOE theory examines the adoption and use of IS at the firm-level taking into consideration the external and internal factors. TOE approach designs a generic set of factors to predict the likelihood of technology adoption. The TOE model captures the comprehensive theoretical perspective of IT adoption (Zhu, 2004). TOE offers an advantage over other adoption models in evaluating technology adoption since it includes technological, organizational, and environmental aspects (Clohessy & Acton, 2019; Gangwar et al., 2014). It is also unrestricted by industry or company size (Hossain &Quaddus, 2011; Zhu, 2004). As a result, it presents a comprehensive picture of the elements that influence a company's technology adoption.

1.3.3 Contextual model: Integration of TAM and TOE

In studying organizational-level adoption, TAM is a valid , robust, and precise model (Gangwar et al., 2015) because of its generic constructs that provide perspectives to analyse a user´s perception about a particular technology, and the adoption processes. But it is a simple and flexible model with few constructs that can be modified or expanded in various ways. Thus, several extensions have emerged in the literature integrating constructs from other theories to enrich the analysis. But, the external variables in the extended models of TAM are not clearly defined yet (Gangwar et al., 2015).

On the other hand, TOE framework is a generic model. By combining the TOE framework with models that have well-defined constructs, it can be strengthened. While TAM is extensively utilized to measure the impact of intention to use a technology on its actual use, TOE considers not only the technological aspects, but also organizational and environmental factors that influence technology acceptance and adoption at the corporate level. Academics have advocated integrating TAM and TOE to increase the predictive capacity of the resulting model and overcome some of their separate limitations in order to establish a holistic view and boost the level of understanding. Combining the benefits of TAM and TOE could capture both internal and external factors that impact the intention to use blockchain technology among Spanish firms.

There are some prior studies that have combined TAM and TOE framework to explore the adoption of new technologies at organizational level. Gangwar et al. (2015) used an integrated TAM and TOE to study the cloud adoption mechanism at manufacturing and finance sectors in India. Following these studies, we propose the conceptual framework illustrated in Figure 1.

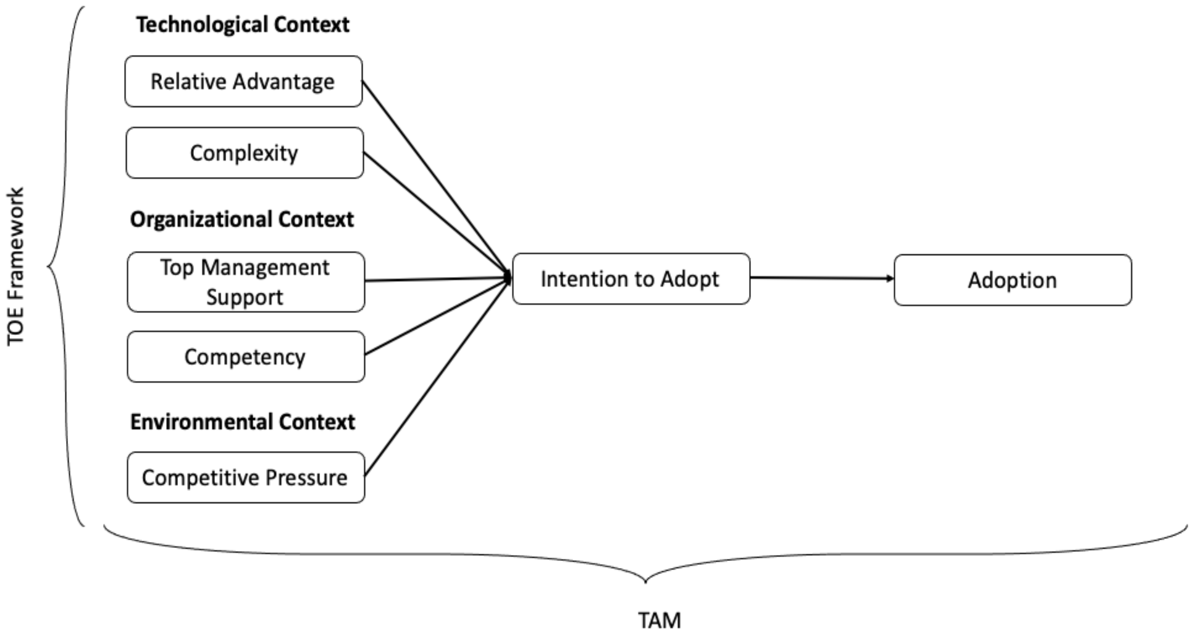

Figure 1 Integrated TAM-TOE conceptual framework

1.4 Hypothesis Development

Based on the literature, we have used some adoption variables that have widely been used in similar domains and have proven to have significant role on the acceptance of new technologies at organizational level.

1.4.1 Technological Context

Davis (1986) proposed two theoretical constructs for predicting and explaining the use of technology, Perceived Usefulness (PU) and Perceived Ease of Use (PEU). Moore & Benbasat (1991) argue that PEU and PU are analogous to relative advantage and complexity in diffusion of innovation theory. Many other studies have also used relative advantage and complexity instead of PU and PEU as technological constructs under TOE framework. Unlike (Gangwar et al., 2015), we believe that by including Relative Advantage and Complexity we don´t need to include another construct for PU and PEU as they capture the same effect.

Relative Advantage: Roger (1962) defines relative advantage as "*the degree to which an innovation is perceived as being better than the idea it supersedes*". According to (Iacovou, Benbasat, & Dexter, 1995) relative advantage entails comparing existing technologies to proposed technologies, as well as the perceived benefits that follow. The larger the perceived difference, the more likely it is that firm will have a positive perception about its adoption. Studies as (Li et al., 2010) showed that relative advantage of e-business over traditional methods was a significant predictor in e-business adoption by Chinese businesses. As seen in chapter 1, blockchain has many advantages. These advantages are believed to impact positively on the intention to adopt the technology, which eventually will impact adoption.

<u>**H1: Relative advantage will be positively related to the intention to adopt blockchain technology**</u>

Complexity: Technological complexity refers "*the degree to which an innovation is perceived as relatively difficult to understand and use*" (Roger, 1962). New technologies might also need new skill sets. The difficulty in acquiring these skill sets will impact the intention to adopt a technology negatively and stifle the adoption. Also, the complexity in understanding the benefits or use of a technology might impact the intention to use it negatively. The more complex a technology appears to be, the less likely it is to be accepted by a company. Gangwar et al. (2015) and (Cooper and Zmud 1990) found out that complexity plays a significant role in adoption of IS technologies. Some companies continue to struggle with understanding how the technology work and how they might benefit from it. Mostly, this complexity is associated to the technical or conceptual structure of the technology.

<u>**H2: Complexity will be negatively related to the intention to adopt blockchain technology.**</u>

1.4.2 Organizational Context

Top Management Support: An organization requires support from the management to pursue new ideas. The management plays an integral part in the allocation of resources, integration of services, restructuring and re-engineering of processes (Amini et al., 2014). Top Management is defined as "*the decision-makers who influence the adoption of innovation*" (Lai, Lin, & Tseng, 2014). Top management support refers to the degree to which they understand the importance of and are involved in Blockchain adoption (Wong et al., 2020). Many papers identified Top Management Support as a significant determinant in the adoption of Information Technologies (IT) (Cruz-Jesus, Pinheiro, & Oliveira, 2019; Khayer et al., 2020; Sabherwal, Jeyaraj, & Chowa, 2006). According to a study conducted by (Clohessy and Acton 2019) in Ireland, businesses that have adopted blockchain had high levels of managerial support. Furthermore, the study found that senior management support for blockchain evolved progressively among adopting organizations, impacted by relative advantage and the technology's ability to develop new business models. In other related studies, it has also been shown that top management support is crucial for adopting a new technology in a firm as it impacts the intention to adopt positively (Crosby et al. 2016; Gangwar et al., 2015).

H3: Top management support will be positively related to the intention to adopt blockchain technology.

1.4.3 Environmental Context

Competitive Pressure: Competitive pressure has been acknowledged as an effective driver for technology adoption since the early years of research in this topic. Iacovou, Benbasat, & Dexter (1995) define competitive pressure as the degree to which organizations in a specific industry or field compete with one another for resources such as consumers or market share. Empirical papers as (Ramdani, Kawalek, & Lorenzo, 2009) show that industry competition has a positive impact on information technology adoption. A firm achieves a competitive advantage and can compete better in the market, if it has a cost advantage, lower unit cost of the product, or it manages to differentiate the product by incorporating new features. The incorporation of blockchain technology in a specific industry would allow an increase in productivity and, consequently, cost savings. Likewise, the adoption of blockchain technology can facilitate the incorporation of new services and features to the product that were not possible before. In a competitive market, if some of companies in an industry start using Blockchain others might feel the pressure to adopt it as well. Thus, the fourth hypothesis is that competitive pressure will impact firms' decisions to use blockchain technology in a positive way.

H4: Competitive pressure will be positively related to the intention to adopt blockchain technology.

Competence: According to some studies, organizational knowledge and competence are important determinants of the firms perception of a technology and whether or not a technology is adopted (Lee & Shim, 2007). Mehrtens, Cragg, & Mills (2001) discovered that knowledge among non-IT professionals was a significant predictor of internet adoption among small and medium size companies. Ettlie (2011) in their article that studies the factors that impact the manufacturing companies to innovate found out that business owners who are more knowledgeable about technological innovation are more likely to implement an aggressive technology adoption policy. Thus, organization's competence and knowledge of blockchain can impact their intention to adopt it.

H5: Competence will be positively related to the intention to adopt blockchain technology.

Intention to Adopt: Intention to adopt is referred to the firm´s perception (positive or negative) in intending to adopt a technology. It is considered as a crucial factor in determining the use of a technology (Venkatesh, Thong, & Xu, 2012). The intention to accept the technology influence the firm to actually use it. Davis, Bagozzi, & Warshaw (1989) found that intention is significantly correlated with adoption. Kamble et al. (2019) in a survey of 181 supply chain practitioners in India found out that behavioral intention has positive impact on adoption. Based on this, the hypothesis is defined as follows:

H6: Intention to adopt will be positively related to adoption for blockchain technology.

1.5 Research Method

The paper uses confirmatory factor analysis using Structural Equation Model (SEM) to determine the extent to which the integrated TAM and TOE framework and the existing relationship between factors is supported by empirical data. An online survey is used to collect data for this quantitative study. By overcoming geographic distances, online surveys provide advantages such as wider coverage and saving time. The online survey was created to investigate the relationship between the study model's proposed constructs.

1.5.1 Participants

To collect data, a professional data gathering company called Netquest2 with ISO quality certificate and more than 10 years of experience in gathering online data for research was contracted to prevent errors associated to data extraction and to ensure high quality. The participation was kept voluntary with follow up messages from the company. The online portal of the company with the database of panelist they have was used to gather data. The participants were filtered based on sector and position. Only top and middle managers from 10 selected sectors from the list of CNAE3 could participate in the survey. Two more filter questions were utilized to improve the instrument's content validity. The first filter question measured the basic knowledge of participants about blockchain Technology and the second question measured their understanding of the usability of the technology. The original sample included 800 respondents. But only respondents that answered ¨Yes¨, meaning that they knew what blockchain is and had the knowledge about its applications were included in the study. This ensures the accuracy of the results.

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[2] https://www.netquest.com/es/encuestas-online-investigacion

[3] Clasificación Nacional de Actividades Económicas

The sample size of 213 meets the minimum of five observations per parameter (Bentler & Chou, 1987; Bollen, 1989; Kamble et al., 2019). A sample size of 85 observations is sufficient for the 17 parameters we use to evaluate our model. Sideridis et al. (2014) claim that 70 to 80 participants are sufficient to model relationships in SEM. Wolf et al. (2013), however, discovered that there is no such thing as a “one-size-fits-all” sample size need.

1.5.2 Instrument Development

To determine the true relationships between constructs, a proper instrument development is important. Internal consistency of measurement instruments must be assured on the one hand, and interrater reliability of instrument results must be acquired on the other. This study uses an integrated TAM and TOE framework to investigate the factors that influence blockchain adoption within Spanish firms. Based on the literature and previous studies, the items for TAM and TOE and the scales were selected. See Table 2 for description on the measurement items for each construct. Then, a questionnaire-based survey instrument was developed. The questionnaire comprises of two parts (i) general questions that consisted demographic information including gender, age, education, position of the respondents and company information including size and sector and (ii) factors affecting adoption of blockchain technology. The questions in the first phase of the survey were set up as multiple choice, allowing respondents to choose the answer that was most relevant to them. The 5- and 7-point Likert scales are the two most common forms of the Likert scale used in information systems research. The 5-point scale, on the other hand, outperforms the 7-point scale. Based on some prior research as (Babakus &Mangold, 1992; Devlin, Dong, &Brown, 2003 ; Bouranta, Chitiris, and Paravantis 2009) advocates the use of a 5-point Likert scale, arguing that it boosts response rate and quality while lowering respondents' "frustration level." It has also been argued that for European surveys, a five-point scale is more appropriate (Prentice, Witt, &

Hamer, 1998). According to (Dawes 2008) the interviewer can easily read out the whole list of scale descriptions when using a 5-point scale in contrast to longer formats of Likert scale. Hence, a 5-point Likert scale (strongly disagree, disagree, neutral, agree, strongly agree) was used for the second part of the question. Two multiple choice questions were added at end of the questionnaire to measure adoption. The survey was written first in English, then translated into Spanish and Catalan.

As it can be seen in Figure 2, the measuring items generated were adapted from prior research as part of an integrated model, they were pretested for the face validity and content validity with topic specialists to ensure that the scale and the questions were relevant to the notion of blockchain technology adoption.

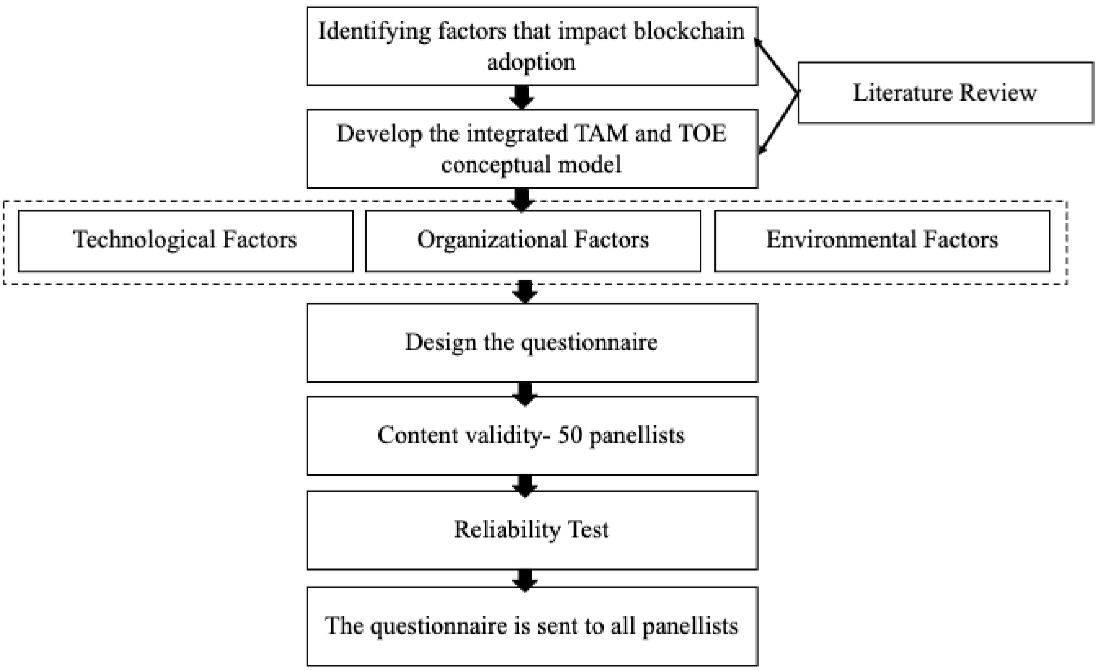

Figure 2 Flowchart of the instrument development and validation process

Duplicate and extensive queries were avoided, as were technical and specialized words. To evaluate instrument relevance and content clarity, feedback from leading academics and researchers working in the information system area was sought in order to avoid any problem or non-response that the respondents could have encountered while completing the survey. The questionnaire was forwarded to native speakers for proofreading, which included a review of grammatical and wording errors. According to (Gould, 1994) “the measurement tool must be understandable and perceived as relevant by the subjects to ensure their co-operation and motivation”. Then, the specialists were directed in selecting the appropriate constructs and measurement items for the study. The final version of the questionnaire consisted of 12 constructs and 40 measurement items. We have included only 7 constructs that are relevant to the theory and the structural model under study. Furthermore, only the measurement items with the highest factor loadings were included for the analysis. A description of the measurement items and the reference to the literature from where it is adapted in provided in Table 2. Some items' phrasing has been changed to fit the research.

Table 2 Description of measurement items for each construct

Construct	**M. Items**	**Item Description**	**Reference**
Relative Advantage	RA_1	Blockchain facilitates improved decision making.	Picoto, Bélanger, & Palma-Dos-Reis (2014); Venkatesh & Bala (2008); Knauer &Mann (2020)
	RA_2	Blockchain will enhance organization flexibility.	
	RA_3	The adoption of Blockchain technology will help to better serve our customers and improve our relationship with our suppliers.	
	RA_4	Blockchain will increase employee performance.	
Complexity	Cmplx_1	Blockchain is conceptually difficult to understand from a business perspective.	Fosso Wamba et al., (2020);
	Cmplx_2	Using Blockchain Technology is difficult.	
Top management Support	TMS_1	Our top management provides strong leadership and engages in the process when it comes to information systems.	Fernando et al., (2021) ; Oliveira, Thomas, & Espadanal (2014)
	TMS_2	Our top management understands the benefits of Blockchain technology.	
Competitive Pressure	CP	Competition will make it necessary for our organization to implement Blockchain.	Sutanonpaiboon & Pearson (2006)
	CP_2	To be a leader in my organization´s industry, we need to implement Blockchain.	
Competence	Cmp	Our employees have a sufficient level of Blockchain technology-related knowledge.	Fernando et al., (2021)

	Cmp_2	Our employees have a sufficient level of Blockchain technology-related knowledge.	
	Cmp_3	Our employees are familiar with Blockchain technology	
Intention to adopt	IA_1	It is a feasible/viable option to adopt Blockchain technology.	Fernando et al., (2021)
	IA_2	Our firm can foresee the business potential for the utilization of Blockchain technology.	
	Adp_1	Is your organization currently implementing, or planning to implement, Blockchain technology?	Venkatesh et al., (2012); Fernando et al., (2021); Picoto, et al., (2014)
	Adp_2	To what extent is your organization currently using Blockchain technology?	

1.5.3 Sample and Data Collection

To assess the reliability of the measuring items, a pilot testing was performed on the questionnaire, and it was distributed among 50 panelists. At the end of the survey, the participants were asked if they had any difficulties answering the questions. Some participants requested a guideline/definition of blockchain technology in their comments. Thus, we included a guideline to blockchain technology for those who answered ¨No¨ to the first knowledge question. Once, we collected the results of the first round, we preformed reliability test. All of the measurement items had a composite reliability of over 0.7 which is the acceptable threshold (Chiu & Wang, 2008; Lin & Lin, 2008). Then, the second round of the questionnaire was released on the 23rd of April 2021 and 2496 panelists were invited to fill in the questionnaire. The survey was closed when the required number of responses, 800 observations, were reached. Table 3 shows the demographic features of the sampled companies as well as the demographic characteristics of the respondents. As it can be seen, out of 213 observations taken into consideration for this study, 79% are men. Most respondents have bachelor’s degree or master studies and 46% are 41-50 years old and 81% are middle managers. The sector with the highest number of respondents is information and communication and 44% of respondents represent big companies with more than 1000 employees. The sample is representative as company managers from 17 autonomous communities in Spain participated in the survey. Though, most respondents are from Madrid (79) , Catalunya (43), and Andalucía (27) respectively.

Table 3 Sample Characteristics

Demographics		Number	Percentage
Gender	Male	168	79
	Female	45	21
Education	Upper Secondary Education	17	8
	Non-university technical / Occupational / Vocational	19	9
	Bachelor's degree	95	45
	Master's degree	71	33
	Doctorate	9	4
	Other	2	1
Age	20_30	10	5
	31_40	50	23
	41_50	97	46
	51_60	54	25
	61_+	2	1
Position	Senior Manager	41	19
	Middle Manager	172	81
	Junior Manager	0	0
Sector	Agriculture, forestry and fishing	8	4
	Manufacturing industry	10	5
	Supply of electricity, gas, steam and air conditioning	11	5
	Water supply, sanitation activities, waste management and decontamination	3	1
	Wholesale and Retail	18	8
	Transport and storage	9	4
	Information and communications	49	23
	Financial and insurance activities	26	12
	Real estate activities	3	1
	Professional, scientific and technical activities	26	12
	Public Administration and Defence	26	12
	Health and social services activities	9	4
	Artistic, recreational and entertainment activities	4	2
	Another sector	0	0
Size	1-50 employees	24	11
	51-100 employees	18	8
	101-500 employees	50	23
	501-1000 employees	27	13
	More than 1000 employees	94	44
	Andalucía	27	13

Region/ Autonomous Community	Aragón	7	3
	Principado de Asturias	5	2
	Illes Balears	2	1
	Canarias	1	0
	Cantabria	1	0
	Castilla y León	8	4
	Castilla-La Mancha	2	1
	Catalunya	43	20
	Comunitat Valenciana	13	6
	Extremadura	5	2
	Galicia	6	3
	Madrid	79	37
	Murcia	2	1
	Navarra	2	1
	País Vasco	9	4
	La Rioja	1	0

1.6 Results

Structural Equation Modelling using variance-based partial least squares (PLS-SEM) is used to acquire the results of the quantitative data analysis. The PLS-SEM technique uses a component-based approach and allows for simultaneous examination of measurement and structural models (Fornell & Bookstein, 1982). One of the key features of the PLS-SEM is its ability to estimate a model with a large number of latent variables and indicators even with a small sample size (Dijkstra & Henseler, 2015). Furthermore, unlike other first-generation regression approaches, the causal modelling of PLS attempts to maximize the explained variance of the dependent variables (Hair et al., 2021) and accommodates the exploratory nature of the research model (Liang et al., 2007). The measurement model depicts the link between indicators (items) and their concept, whereas the structural model is used to investigate the relationship between constructs (Hair et al., 2021).

Smart-PLS 3 software is used for modelling of the latent variables. accommodates the exploratory nature of the research model (Liang et al., 2007). The model was tested using a two-step procedure. The evaluation of the measurement model, reliability and validity, was performed in the first step, and the structural model was assessed in the second step.

1.6.1 Measurement Model

Both reliability and validity tests are preformed to assess the measurement model in terms of convergent and discriminant validity.

1.6.1.1 Indicator reliability and internal consistency reliability

The indicator reliability shows that relationship between the construct and the measurement items. Squaring the outer loadings of reflective constructs yields indicator reliability. The indicator loading must be greater than 0.708 to achieve acceptable indicator reliability (Hair et al., 2021). All the items with a factor loading of lower than this threshold has been dropped. One item for complexity, one item for competitive pressure, two items of TMS had lower than 0.708 item loadings and were eliminated and has not been reported in Table 4. 11 items for measuring relative advantage were included in the survey. We excluded all the items with factor loadings of lower than 0.8 and only included 4 items which had the highest factor loadings to have consistency in the number of items for measuring each construct and prevent the tendency of making the variable significant by including many items.

Internal consistency reliability assesses how well different test items probing the same construct produce similar results. There are different ways of measuring the internal consistency two widely used methods are measuring the internal consistency through cronbach alpha and composite reliability scores or rho_a. The cut off for composite reliability score according to (Hair et al., 2021) is between 0.7-0.95. Table 4 shows that the composite reliability (CR) of all constructs is higher than 0.7 indicating the reliability of the measure.

Table 4 Reliability and validity assessment results

Construct	Item/indicator	Loadings	CR	AVE
Adoption	Adp_1	0.942	0.931	0.872
	Adp_2	0.925		
Complexity	Cmplxty_1	0.856	0.839	0.723
	Cmplxty_3	0.845		
Competence	Cmptncy	0.866	0.906	0.762
	Cmptncy_2	0.859		
	Cmptncy_3	0.893		
Competitive Pressure	Comp_P	0.919	0.902	0.821
	Comp_P_2	0.893		
Intention to adopt	IA_1	0.848	0.861	0.756
	IA_2	0.890		
Relative Advantage	RA_11	0.847	0.901	0.695
	RA_7	0.834		
	RA_8	0.831		
	RA_9	0.823		
Top Management Support	TMS_2	0.839	0.872	0.774
	TMS_4	0.918		

1.6.1.2 Convergent validity and Discriminant Validity

Convergent validity demonstrates that items measuring the same construct are strongly correlated with the construct thus the variance between the items should be high. The average variance extracted (AVE) of higher than 0.5 shows an acceptable convergent validity of each construct. As it can been in Table 4 the AV scores for all the constructs are above 0.5 thus satisfying the convergent validity.

While convergent validity measures if the items that needs to be correlated are correlated, discriminant validity tests if the items that are not supposed to be correlated are unrelated. There are also different ways to test discriminatory validity. Fornell-lacker criterion and Heterotrait-Monotrait Ratio (HTMT) are the two widely accepted techniques for testing the discriminatory validity. The fornell-lacker criterion compares the square root of the AVE to the correlation of latent constructs. It should better explain its own indicator's variance than the variance of other latent constructs. As a result, the square root of AVE of each construct should be greater than the correlations with other latent constructs. Table 5 shows the discriminatory validity results. In diagonal of the table 4 (in bold) show the square root of each constructs AVE and the off-diagonal scores show the correlation between constructs. The results show that the AVEs of the constructs are higher than the correlation between constructs. It means that the constructs satisfy the discriminant validity criteria and can be used to test the structural model.

HTMT measures the similarity between the variables. Henseler, Ringle, & Sarstedt (2015) found out that HTMT can achieve higher specificity and sensitivity rates compared to Fornell-Lacker. A threshold of 0.85 reliably distinguishes between discriminant valid and non-discriminant valid pairs of latent variables. The second part of Table 5 shows the results of HTMT. As it can be seen all the constructs have an HTMT score of lower than 0.85 confirming similar results as in the Fornell-Lacker criterion and the validity of constructs.

Table 5 Discriminatory Validity test results

Fornell-Lacker Criterion							
	Adp	Cmp	CP	Cmplx	IA	RA	TMS
Adop	**0.934**						
Cmp	-0.493	**0.873**					
CP	-0.400	0.461	**0.906**				
Cmplx	0.142	-0.268	-0.172	**0.850**			
IA	-0.434	0.631	0.631	-0.280	**0.869**		
RA	-0.271	0.367	0.627	-0.130	0.574	**0.848**	
TMS	-0.429	0.700	0.478	-0.188	0.613	0.368	**0.880**
Heterotrait-Monotrait Ratio (HTMT)							
	Adp	Cmp	CP	Cmplx	IA	RA	TMS
Adop							
Cmp	0.573						
CP	0.494	0.562					
Cmplx	0.192	0.366	0.252				
IA	0.563	0.819	0.859	0.430			
RA	0.311	0.429	0.758	0.180	0.752		
TMS	0.526	0.876	0.613	0.266	0.855	0.454	

1.6.2 Assessment of the structural model

Prior to hypothesis testing, the collinearity issue must be addressed. One of the major potential issues in structural models, according to (Hair et al., 2021), is collinearity, which occurs when the value of the Variance Inflation Factor (VIF) exceeds 5. As a result, the VIF value must be 5 or less. As the model consists of only formative variables, inner model VIFs are measured (Table 6). The results show that all values are less than 5, indicating that there is no collinearity among the constructs.

Table 6 Inner VIF results for Collinearity

Intention to Adopt	VIF
Competence (Cmp)	2.111
Competitive Pressure (CP)	2.096
Top Management Support (TMS)	2.092
Relative Advantage (RA)	1.820
Complexity (Cmplx)	1.081
Intention to Adopt (IA)	1.000

Figure 3 depicts the research model in the form of a structural model. Bootstrapping, producing subsamples using randomly selected observations from the initial set of data, is used to generate subsample. The PLS path model is then estimated using the subsample. This method is continued until a significant number of random subsamples, generally 5,000, have been generated (Hair et al., 2021). The standard error values acquired by bootstrapping determine whether or not the coefficient is significant.

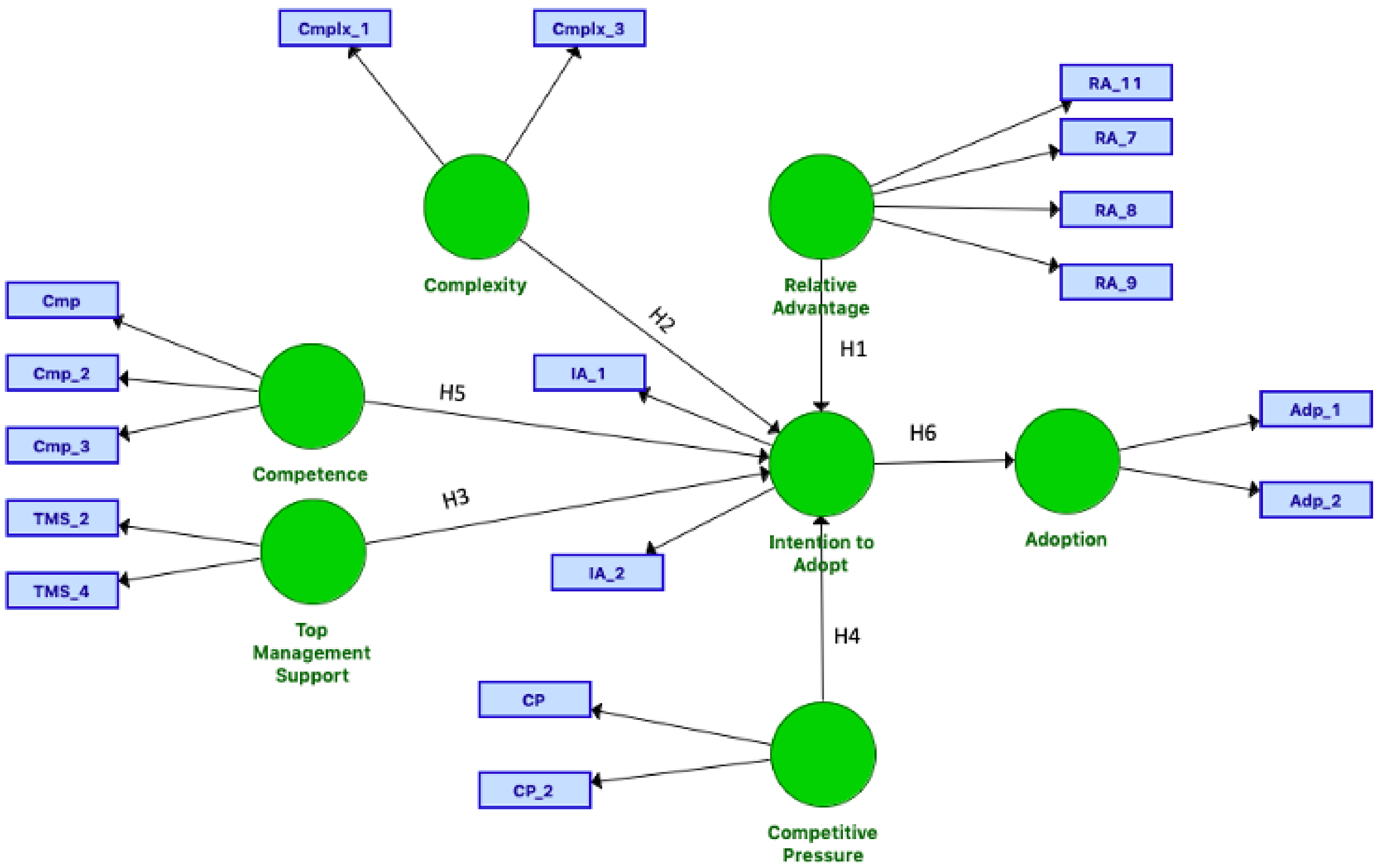

Figure 3 The research model in the form of SEM

Table 7 and Figure 4 show the results of the direct effects and hypothesis testing. As it can been seen, all variables are statistically significant at 95% confidence interval. It is found out the factor that has the highest impact on intention to adopt is relative advantage (β=0.310, P=0.000). One unit increase in relative advantage increases the intention to adopt by 0.310 unit. Top management support (β=0.201, P=0.00), competitive pressure (β=0.248, P=0.000), and competence (β=0.265, P=0.000) are also found to have positive impact on intention to adopt. Complexity, on the other hand, has been found to have a negative effect on intention to adopt, meaning that the more the technology is perceived as complex the less the intention to adopt it. Though the path coefficient of the complexity is significant (β= -0.097, P=0.024), its magnitude is small, which indicates that the negative impact of complexity on intention to adopt is relatively less important and less relevant. Our research results confirms that five out of six hypotheses are positively related to intention to adopt, wherein, the intention to adopt impact the adoption negatively.

Table 7 Results of direct effect and hypothesis test results

H	Path	Beta	T Values	P Values	Decision	f^2
H1	RA-> IA	0.310***	5.119	0.000	Supported	0.142
H2	Cmplx -> IA	-0.097**	2.263	0.024	Supported	0.023
H3	TMS -> IA	0.201***	2.763	0.006	Supported	0.052
H4	CP -> IA	0.248***	3.825	0.000	Supported	0.046
H5	Cmp -> IA	0.265***	4.446	0.000	Supported	0.089
H6	IA -> Adp	-0.433***	8.637	0.000	Rejected	0.230

*** significant at 99% confidence interval

** significant at 95% confidence interval

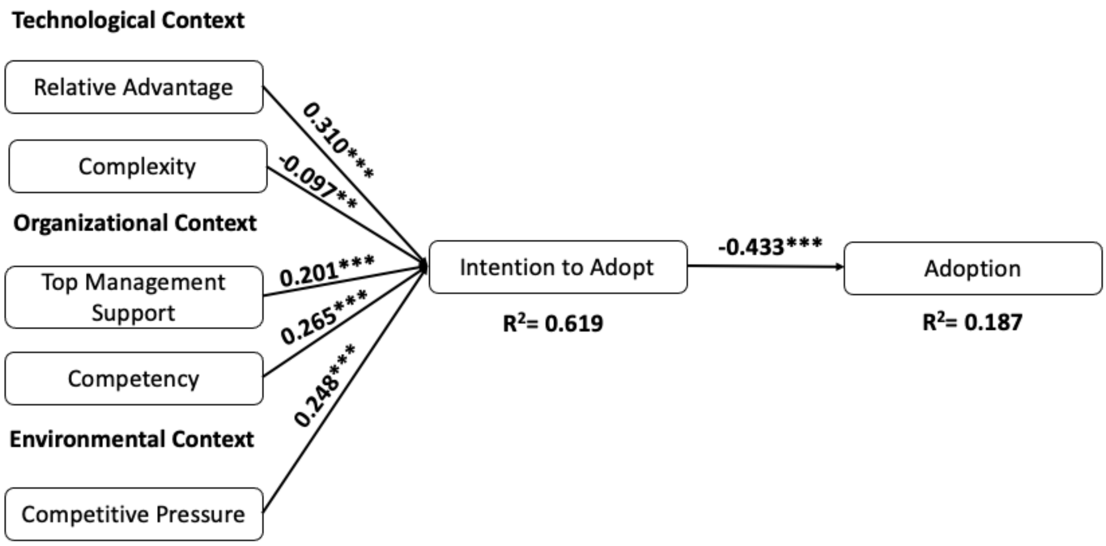

Figure 4 Measurement Model

R-squared (R2) or coefficient of determination is another important criterion for assessing the PLS-SEM. It is argued that the acceptability level of R2 depends on the research context. Hair et al. (2021) propose a minimum of 0.10 as the acceptable R2 level. For our model, while 62% variability of intention to adopt was explained by the independent variables and 19% of variance of adoption is explained by intention to adopt. Chin (1998) suggested that R2 values above 0.67 is considered high, any value (0.33 - 0.67) is moderate and value (0.19-0.33) is considered weak. Thus, the R2 value for intention to adopt is high, while adoption R2 value is weak (Table 8). This shows that our developed path model from the latent variables to intention to adopt has high levels of explanatory power and predictive relevance, while the path model from intention to adopt to adoption has low levels of explanatory power and predictive relevance.

Table 8 R-Squared of Endogenous Latent Variables

Construct	R^2	Results
Intention to Adopt	0.619	High/Substantial
Adoption	0.187	Weak

Following (Cohen, 1988)'s guidelines for assessing the effect size of the constructs, we have estimated the Cohen's $f2$ coefficient. Small, medium, and high impacts of an external latent variable on an endogenous latent variable are represented by values of 0.02, 0.15, and 0.35, respectively (Cohen 1988; Kock 2014). It can be seen in Table 7 that intention to adopt has the highest effect size ($f2$=0.230) followed by relative advantage ($f2$=0.142) with a medium effect size and other constructs, complexity ($f2$=0.023), top management support ($f2$=0.052), competitive pressure ($f2$=0.046), competence ($f2$=0.089), with small effect sizes.

1.6.3 Mediation Analysis

Preacher & Hayes (2008) explain that mediation happens when the effect of one variable on another variable is partly or entirely transmitted through a third variable which is called the mediator. Mediation analyses are employed to understand and confirm the indirect effect of the dependent variables on the independent variables through a mediator. To establish mediation, two criterion needs to be met according to (Preacher & Hayes, 2008), and (MacKinnon et al., 2002).

1. The relationship between independent variable and dependent variable via mediator must be significant.
2. The values of bootstrapped confidence interval should not pass through zero (zero is not included in the confidence interval).

Kenney (2021) explains that when there are multiple causal variables that each has an indirect effect on the dependent variable, one can treat the multiple independent variables as a formative construct4. Using this argument, we can say that intention to adopt is the formative variable that impacts/causes adoption and thus there is no need for mediation analysis for our model. Since, the hypothesis that intention to adopt impact adoption positively is rejected, we have performed mediation analysis to assess the mediating role of intention to adopt on the linkage between the variables of interest (top management support, competence, relative advantage, complexity, and competitive pressure) and adoption.

First, we test the significance of the indirect effects. For instance, as seen in Figure 5 the indirect effect of RA-> IA -> Adp is the product of path coefficient from relative advantage to intention to adopt (denominated as a) and from intention to adopt (denominated as b). The same applies for all other independent variables (complexity, competitive pressure, top management support, and competence).

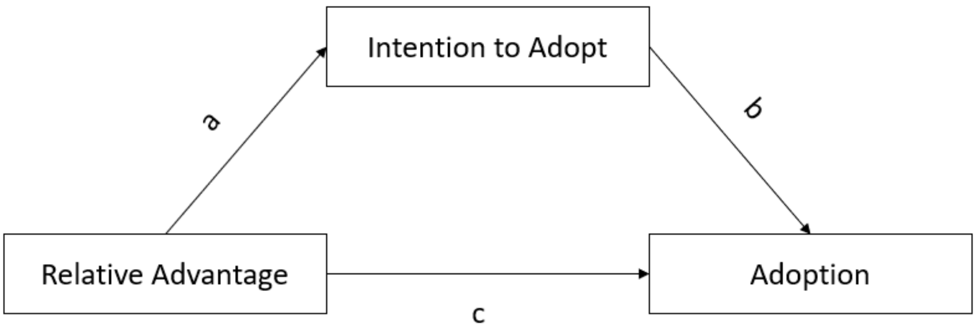

Figure 5 The indirect effect of relative advantage on adoption through intention to adopt as a mediator

For the first mediation effect to comply, the indirect effect should be statistically significant. The results (demonstrated in Table 9) show that the indirect relationships of all the constructs through intention to adopt, as a mediator, are statistically significant at

[4] There are two types of constructs in SEM, formative and reflective. If the indicator cause the construct it is formative, while if the indicator is caused by the construct it is called reflective. For more information please see (Kenney 2021).

95% confidence interval. For the second condition, the Standard Errors (SE) are calculated using bootstrapping method with 5000 samples. Then, the Lower Level (LL) 95% confidence interval and Upper Level (UL) 95% confidence interval of each indirect path is calculated. The results show that indirect path coefficients of all constructs are non-zero, thus compliant with the second condition for mediation as well. Thus, we can conclude that there is mediation.

Table 9 Specified indirect effects

Bootstrapping Confidence Interval						
Indirect Path	a*b	T Values	Standard Errors	P Values	95% LL	95% UL
RA-> IA-> Adp	-0.134	4.852	0.0280	0.000	-0.189	-0.079
CP -> IA -> Adp	-0.081	2.738	0.0290	0.006	-0.138	-0.024
Cmplx -> IA -> Adp	0.042	2.300	0.0180	0.021	0.007	0.077
TMS -> IA -> Adp	-0.087	2.627	0.0340	0.009	-0.154	-0.020
Cmp -> IA -> Adp	-0.115	3.633	0.0320	0.000	-0.179	-0.053

Zhao, Lynch, & Chen (2010) introduce three types of mediation, complementary, competitive, and indirect-only mediation. If the direct effect is not significant but the indirect effect is significant, indirect- only mediation is considered (which is also referred to full mediation (Baron and Kenny 1986)). When both indirect and direct effects are significant and points to the same direction, it is complementary mediation also called partial mediation (Baron & Kenny 1986). If direct effect and indirect effects point in different direction and both are significant, it is competitive mediation (also called competitive partial mediation).

To estimate the direct effect of independent variables on dependent variable, we run another bootstrapping model with 5000 samples eliminating the intention to adopt from the model. In the absence of intention to adopt, only competence and competitive pressure are significant, and the beta is negative meaning that the direct effect and the indirect effect point to the same direction (Table 10). Thus, there is complementary mediation for both competence and competitive pressure. The direct effect of complexity and top management support on adoption are non-significant and with same direction meaning that there is full mediation. The direct effect of relative advantage on adoption is insignificant but point to the opposite direction, indicating full mediation.

Table 10 The effect of independent varialble on adoption in absence of intetnion to adopt

Path	Beta	T Values	SE	P Values	Beta Indirect	Mediation effect	
RA-> Adp	0.024	0.359	0.068	0.719	-0.134***	F	
CP -> Adp	-0.222***	2.835	0.078	0.005	-0.081***	P	Complementary
Cmplx -> Adp	0.025	0.362	0.068	0.717	0.042**	F	
TMS -> Adp	-0.117	1.574	0.075	0.116	-0.087***	F	
Cmp -> Adp	-0.304***	3.637	0.085	0.000	-0.115***	P	Complementary

F= Full mediation, P=Partial mediation

In the case of latent variable relative advantage, complexity, and tope management support, full mediation indicates that only the indirect impact via mediator, intention to adopt, is present. In other words, intention to adopt totally transmits the impact of the latent variables relative advantage, complexity, and top management support. Competitive pressure and competence are partially mediated through intention to adopt, which means that intention to adopt is accounted for a fraction of the effect of competitive pressure and competence on adoption, whilst competitive pressure and competence are liable for a portion of adoption that is unrelated to intention to adopt. Thus, the identified mediator, intention to adopt, is consistent with hypothesized theoretical framework.

The complementary mediation indicates that the mediation possibly confounds or falsifies relationships between CP -> Adp and Cmp -> Adp and that the significance of the direct effect can be an indicator that there might be other (omitted) mediators (that match the sign of revealed direct effect) that need to be theorized (Zhao, Lynch, & Chen, 2010).

The results prove the predictive relevance by adopting the PLS-SEM analysis for hypothesis testing. The results highlight the model acceptability and the complementary medication effect also. Through the use of this methodology, all the hypotheses were found to be significant expect the relation between intention to adoption and actual adoption. The analysis of the theorized model shows the importance of complexity (Cmplx), and competitive pressure (Cmp) for the adoption of blockchain technology in the organization. the top management support plays a significant role in channelling the adoption of new technology within the organization and validates this with the past findings of various studies (Clohessy and Action, 2018; Clohessy et al., 2019).

1.7 Discussion

The findings of the study offer a refined innovation model validated using PLS-SEM for understanding the blockchain technology adoption in different industries. Contrary to our assumption, the intention to adopt impact the adoption negatively. Meaning that a unit increase in intention to adopt decrease the adoption by 0.433. The use of PLS-SEM for validating the conceptual model for the purpose of blockchain adoption by Spanish firms has helped in developing the model. The findings of the study confirms that five out of six hypotheses are positively related to intention to adopt, wherein, the intention to adopt impact the adoption negatively. This can be because intention is not the only determinant of adoption and there are other factors that impact adoption that are not included in our conceptual model. To justify this, we elaborate a bit further, some organization may find the innovative opportunities like better transparency, process efficiency or dynamically restructure the organization. But the organization might not have enough financial resources to buy it, or they may not be able to see the cost-benefit of blockchain technology implementation in the shorter term. In the case of blockchain adoption, the same analogy might apply.

Top management of the companies might support the technology and the organization might be aware of the relative advantages, but factors such as costs, uncertainty and risk might prevent the organizations from adoption. The other scenario can be that someone might be used to the car they have other cars with more attractive features and better functionalities might not convince the person to change the car. Companies that use conventional centralized databases might be aware of advantages of blockchain and perceive it as an innovative technology but might still have not been convinced enough to adopt it. One of the main reasons behind it can be the fact that blockchain is still in its early stages and need more time to be adopted by the companies. Previous published studies support these findings (Queiroz et al. (2020); Alazab et al. (2021); Fosso Wamba, Queiroz, & Trinchera (2020); Kamble et al, (2019)).

This study exemplifies, how top management support, competence of organization for innovation and competitive pressure, can translate into intention to adopt. In particular, our study described the various factors that support the intention to adopt but it also found that there is negative correlation between intention to adopt to adoption intention. While past studies suggested that organizations' willingness to adopt new technology largely depends upon the organizational flexibility and adaptability (Thong, 1995). We build our research largely to answer the address the dynamic capability of organizational in term of adoption of blockchain technology (Venkatesh and Bala, 2012). Thereby, out study presents the evidence how technological context, organizational context and environmental context can support to dynamically adopt the blockchain technology in business, where the decentralized blockchain-based model is perceived to be beneficial in future.

Our study contributes to the literature of IT innovation (Roger, 1962), our study unfolds the major findings that intention to adopt impact the adoption negatively. The study contributes to the limited pool of quantitative papers on the acceptance and adoption of blockchain technology and investigates the factors that impact the usage of the technology in the European context. The findings of this study have theoretical as well as practical implications.

1.7.1 Theoretical Implications

From a theoretical standpoint, it emphasizes the need for a more comprehensive theoretical framework that captures the influence of the elements that have not been included (e.g., costs, uncertainty both from the regulatory and technology development perspectives, etc.) in this model. Our study focuses on two technological factors (relative advantage and complexity), two organizational factors (top management support and competence), and one environmental factor (competitive pressure). We were unable to explore additional organizational, environmental, and technological factors that may impact intention to adopt and actual adoption since we confined the study to only these variables. Despite the paper's addition to the current limited qualitative research on blockchain technology acceptance, there is potential for future study on a wider framework, which might result in a more thorough analysis of blockchain adoption among firms in Europe. Moreover, the result of the mediation analysis shows that the mediation might confound the competitive pressure and competence effect on adoption. As a result, future study should account for the direct influence of competitive pressure and competence on adoption, as well as explore including other mediators, particularly those with a negative indirect effect on adoption (e.g., uncertainty).

1.7.2 Managerial Implications

From the practical and managerial standpoint of view, the results show that relative advantage and top management support are crucial for Blockchain adoption. Our findings are in line with those of (Clohessy &Acton, 2019; Orji et al., 2020) but contradicts the findings of (Wong, Leong, et al., 2020) which concluded that top management has no effect on intention to adopt Blockchain technology. It seems that though managers are aware of the benefits of the technology, they are not convinced to use it. Blockchain technology providers might need to wait some more time till the technology reaches maturity to find more clients for their services. This also can be an indicator of a market opportunity as the results also indicate that not many companies in Spain have adopted blockchain technology. It should be highlighted that out of 800 observations only 213 observations knew what a blockchain is and were aware of its applications. This shows low level of awareness and lack of information about the blockchain technology among Spanish firms. These findings may inspire IT providers, academia, government and blockchain community to develop improved ways for raising awareness about blockchain technology and its relevance to companies. Since top managers have the ability to take strategic decisions and allocate resources for adoption of new technologies which can also determine how competent the employees of the company are and the knowledge and skills they have related to a technology. We recommend top managers to educate themselves about the advantages, and disadvantages of using blockchain in their organization to be able to take better decisions.

1.7.3 Limitations and Future Research

As in any research, this study comes with its own limitations. To our knowledge, we are among the first studying blockchain systems adoption among companies in a quantitative research approach. After the data validation, the final responses obtained were less in number as compared to the actual target because the survey was conducted with a specified industry in Spain. Therefore, it is required that the findings of this study should be tested further with respect to different geographic area or country context. Further, we have collected the cross-sectional data for this analysis while the future studies can capture the longitudinal data. With respect to blockchain adoption, it is at a very nascent stage in Spain. Thereby, further studies are required in order to have high internal validity of data collection.

Regarding Blockchain adoption, the findings of the paper highlight the need for a more comprehensive theoretical framework that captures the influence of the elements that have not been included (e.g., costs, uncertainty both from the regulatory and technology development perspectives, standardization, etc.) in the model used by us. Despite the paper's addition to the current limited qualitative research on Blockchain technology acceptance, the findings are limited to a specific geographical location and there is potential for future study on a wider framework, which might result in a more thorough analysis of Blockchain adoption among firms in Europe. Also, specific use case of the companies that have already adopted the technology is highly encouraged. Such studies can provide more information about the advantages of the technology in different scenarios and associated costs.

Conclusion

As blockchain technology has risen in popularity, several companies have begun to look at how it might be used in several sectors. Every business has its own structure, strategy, and culture. Furthermore, the external environment has an impact on businesses. A company's approach to blockchain adoption is influenced by a mix of organizational, environmental, and technology related factors. Davis (1986), and Roger (1962) both agree that there is an intermediary step before adopting a technology which is the intention. The main goal of this study was to identify the technological, organizational, and environmental elements that influence firms’ willingness to embrace Blockchain technology. This intention/willingness is thought to play a role in whether a firm decides to employ the technology. The results of the paper show that top management support, competence, relative advantage, and competitive pressure has positive impact on intention to adopt blockchain technology while complexity affects the intention negatively. Against the expectation, it was found out that intention to use negatively affects adoption. This can be due to many reasons as omitted mediators, or other relevant factors.

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