

## PROPOSING A MODEL FOR UNDERSTANDING BLOCKCHAIN TECHNOLOGY ADOPTION IN ORGANIZATIONS

### FİRMALARDA BLOCKCHAIN TEKNOLOJİSİNİN KABULÜNÜ ANLAMAK İÇİN BİR MODEL ÖNERİSİ\*

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#### Abstract

Blockchain technology was first introduced in 2008, and since then it has been a subject of interest for both academicians and practitioners. Blockchain has many applications in business areas, such as: cryptocurrency, health information systems, electronic notary, supply chain management, human resources management, music industry, real estate management and much more. Despite the growing interest in blockchain technology, the literature regarding it is relatively new and limited. In the context of technology adoption studies, especially in blockchain field, there are limited number of studies that investigate innovation adoption at the organizational level. This paper proposes a model that integrates diffusion of innovation theory, technology-organization-environment framework, and institutional theory for future blockchain adoption studies at the organizational level.

**Keywords:** Technology adoption, Diffusion of Innovation Theory (DOI), Institutional theory, Technology-Organization-Environment Model (TOE), Blockchain.

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## Öz

İlk olarak 2008 yılında ortaya çıkan Blockchain teknolojisi o tarihten itibaren gerek akademisyenlerin gerekse profesyonellerin ilgi odağı haline gelmiştir. Blockchain teknolojisinin, kripto para, sağlık bilgi sistemleri, tedarik zinciri yönetimi, insan kaynakları yönetimi, elektronik noter, müzik endüstrisi, gayrimenkul yönetimi gibi birçok alanda uygulanması mümkündür. Kullanım alanı bu kadar geniş olmasına rağmen Blockchain teknolojisi ile ilgili literatür henüz yeni ve kısıtlıdır. Teknoloji geliştirme çalışmalarında özellikle de Blockchain teknolojisi alanında yeniliğin kabulünü kurumsal düzeyde araştıran çok az sayıda çalışma bulunmaktadır. Bu çalışma yenilik yayılım teorisi, teknoloji-organizasyon-çevre çerçevesi ve kurumsal teori entegrasyonundan yola çıkarak kurumsal düzeyde blockchain teknolojisinin geliştirilmesi ile ilgili bir model önermektedir.

**Anahtar Kelimeler:** Teknoloji kabülü, Yenilik yayılım teorisi, Kurumsal Teori, Teknoloji – organizasyon – çevre modeli, Blokzincir.

## 1. Introduction

This study will be based on Diffusion of Innovation Theory (DOI), Institutional Theory and Technology – Organization-Environment model (TOE). In terms of Institutional Theory, the focus will be on powers of institutionalization as they will be used to explain the factors and pressures of institutional environment that might lead decision makers to adopt new technology. However, in existing literature the TOE model has been used to explain the group of technological, organizational, and environmental factors behind adopting new technology. Institutional theory bridges the gap in TOE model by explaining how organizational decisions are based on social and cultural factors (Oliveira & Fraga, 2011). Also, DOI is discussed to understand its dimensions, then later it will be employed to explain the technological part of the TOE model.

On the other side, the existing literature studied adoption factors of new technologies extensively both on individual level and organizational level and a set of frameworks were suggested, tested, and used to understand them (Janssen et al, 2020; Kusuma et al, 2020; Saurabh & Dey, 2021). However, a smaller number of studies were dedicated to study adoption factors at the organizational level when compared to the number of studies that examined individual level. Based on that, this study is planned to propose a model that can be used to explain technology adoption factors at the organizational level, and blockchain technology is the interest in this research.

This paper is organized as follows: the second section is a literature review of blockchain technology, technology adoption models, and institutional theory. Technology adoption models' part is organized into two parts to discuss diffusion of innovation theory, and technology-organization-environment framework separately. After that, the third section of the paper is dedicated to proposing a conceptual model and propositions. Finally, the fourth section is dedicated for discussion and final notes for future research.

## 2. Literature Review

### 2.1. Blockchain Technology

Blockchain is a new technology that was introduced in 2008 (Benisi, Aminian & Javadi, 2020). Business environment and industry 4.0 developments are aiming for bringing a decentralized environment for minimizing and eliminating trust related concerns in the environment. Blockchain technology is a critical part of industry 4.0 revolution that promotes decentralization principle. Blockchain is a digital record of transactions that utilizes distributed ledger technology, these records are stored across network nodes in a decentralized manner. This ledger is stored and arranged in the shape of interrelated blocks and because of this it was named blockchain. Each transaction is stored on a different block, these blocks are unchangeable and cannot be deleted in the future. By this way data stored on a blockchain is immutable and secured (Appelbaum & Smith, 2018).

Blockchain promotes the concept of collaboration between community members, because storing data to the chain is not achieved unless the change is approved by community members by consciences mechanisms. Because of its features blockchain offers innovative organizations to improve collaboration across them (Viriyasitavat & Hoonsopon, 2019).

Moreover, blockchain enables transactional transparency among different business function units and it will offer enterprise applications to be actively used. Beside that blockchain offers a vast variety of opportunities to businesses; it speeds up the process of automation, it changes the way business operates, and it makes it possible for businesses to conduct operations without the need for third party organizations (Konstantinidis, et al, 2018; White, 2017). By adopting blockchain's different applications, firms of all types and sizes can communicate, collaborate, and exchange data securely with other firms, without the need to employ an intermediary between them (Lohmer& Lasch, 2020).

Even though one of the most famous applications of blockchain technology is cryptocurrency, blockchain has many different applications in the business area and it is used in applications in insurance, healthcare, music industry, real estate, customer relationship management, managing internet of things, supply chain management, and e-government applications (Tasatanattakool & Techapanupreeda, 2018; Abou Jaoude& Saade, 2019). Blockchain is going to lead to an evolution in the way business runs.

Academic literature related to blockchain technology is emerging and relatively new and most of the studies are focused on the technical aspects of blockchain regardless of its adoption complexity in organizations. For that reason, it is attractive and valuable to study this technology, its business applications, and organizational adoption.

Different methods, different theories and perspectives were applied aiming to study and understand blockchain technology academically (Janssen, Weerakkody, Ismagilova, Sivarajah & Irani, 2020; Lohmer& Lasch, 2020; Vergouwen, Koens & Poll, 2020). But blockchain technology is relatively new and due to that there are limited knowledge and academic research related to it; so there is a need for

developing a comprehensive research model related to blockchain technology adoption in organizations (Malik, Chadhar, Chetty & Vatanasakdakul, 2020). The next section will discuss used frameworks and theories to study blockchain as a new technology at the organizational level.

## 2.2. Technology Adoption Models

Technology adoption is defined as a decision for opting for the complete utilization of an innovation as the most suitable path, while refusal involves choosing not to embrace an available innovation (Rogers, 1983). In addition, according to Carr's definition (1999), technology adoption is defined as the phase where an individual or an organization chooses a technology for utilization. More than that, Skare and Soriano (2021) Technology adoption refers to the initial use of new technology by a person or organization, where this can involve novel innovations in products, services, or managerial approaches within a given context.

Technology adoption involves effectively incorporating new technology into a business, extending beyond basic utilization. When a new technology is adopted, it is used to its maximum capacity, resulting in the realization of the advantages and benefits offered by the new system (Gong & Janssen, 2021).

Rogers (2010) draws a distinction between five types of technology adopters. The very first group to adopt new technology are called *innovators*, they usually represent 2.5% of the community. Despite the fact that this group is small, they are most crucial to the spread of the new technology, due to their willingness to fully test the new technology, they are risk-takers in nature and have adequate financial resource to acquire and try technologies. The second group of adopters is called *early adopters*, this group represents 13.5% of the adopters. Adopters in this group are usually risk-averse, they wait for preliminary reviews and feedback about the technology. The third group of adopters is called *early majority*, they represent 34% of the adopters. They adopt technology after careful study and research of it. They usually take the decision after they are convinced and sure about the advantages of the new technology (Rogers, 2010, Lai, 2017).

Moreover, the fourth group of adopters is called *late majority*, they represent 34% of the adopters. They differ from early majority in terms of time and risk taken. They are more risk-averse, more resistant to change, and they require more reviews about the technology and more evidence of its advantages and benefits to their business, and surely, more time than early adopters to decide on adopting new technologies. The fifth and last group of adopters is called *laggards*. They are the last group to adopt new technologies. They represent 16% of the adopters. They are more traditionalists and resisters to change. They usually wait until new technologies are used and utilized by all others in their community before they decide to adopt and use it (Rogers, 2010, Lai, 2017). Rogers's classification of technology adopters offers new insights regarding technology adoption and helps in the development of a good model for studying factors affecting technology adoption.

Another significant aspect of technology adoption that is noticed in literature that there are different theories and models for inspecting and studying technology adoption. After examining the

current research on information technology adoption, it has been noticed that the models employed to study this phenomenon can be classified into two distinct groups. The first group encompasses models designed to examine adoption of technology at the individual level, examples: theory of reasoned action (TRA)(Fishbein, & Ajzen, 1980), the theory of planned behavior (TPB) (Ajzen, 1985; Ajzen, 1991), the technology acceptance model (TAM) (Davis, 1986; Davis, 1989; Davis, Bagozzi & Warshaw, 1989), and Unified Theory of Acceptance and Use of Technology (UTAUT) (Venkatesh et al., 2003). While the second group pertains to models used to investigate adoption of technology at the organizational level, such as: technology environment organization framework (TOE) (Tornatzky& Fleischer, 1990), diffusion of innovations (DOI) (Rogers, 1983).

Since this paper is regarding adoption of technology at the organizational level; our primary focus lies solely on theories and models relating to the organizational level. Consequently, we place significant emphasis on adoption theories and models that specifically pertain to organizations. These theories are: first the DOI theory that will be discussed in the following section, and second the Technology-Organization-Environment (TOE) framework.

### **2.2.1. DOI Theory**

Diffusion of Innovation theory describes the spread of new innovation, product, idea, application or technology and it was introduced by Rogers (1983). The theory of Diffusion of Innovation was interrupted as the process by which an innovation is communicated through specific channels over time among the members of a social society (Rogers, 2010). The main idea of DOI theory is that it captures the factors that affect new technology or innovation adoption related to the innovation's characteristics, the adopters' characteristics, and the decision-making process (Sahin, 2006). DOI theory introduced the idea of studying adopters' characteristics in the context of technology adoption. Each category of adopters has its own characteristics that help in identifying and targeting them in the process of adopting and applying new technologies in organizations (Rogers, 1983).

Furthermore, under the umbrella of DOI theory, Rogers emphasized that there are five factors that result in the diffusion of adoption of new innovations. These factors are relative advantage, complexity, trialability, compatibility, and observability (Sahin, 2006). Relative advantage is the extent to which an innovation is perceived superior to the existent or previous innovation it replaces. Complexity refers to how difficult an innovation is perceived to be, making it challenging to comprehend and utilize. Compatibility is viewed as the ability of the new innovation to be suitable for the organization's current values, past experiences, and the needs of the adopters of it. Trialability denotes the opportunity to test and modify an innovation. Finally, Observability is defined as the extent to which the new innovation or its results can be noticed by potential adopters (Rogers, 2003; Sahin, 2006).

On the other stream, DOI discussed technology adoption from decision making process perspective. Rogers (2003) articulated that decision-making starts by information seeking and

information processing in the purpose of reducing uncertainty related to innovation and its advantages and disadvantages. In this context, Rogers concluded five stages of decision-making process, which are knowledge, persuasion, decision, implementation, and confirmation (Rogers, 2003). During the Knowledge stage, potential adopters know about the innovation and start to search for more information about the nature of the innovation, how it works and why it is used. Although an individual may have the awareness of the innovation, its usage, and its advantages, still do not adopt the innovation. That is because individual's attitudes toward the innovation effects and result in either accepting or refusing the innovation (Rogers, 2003; Schuyler et al, 2021).

At the Persuasion stage, because the knowledge about the innovation is already formed at the knowledge stage, convincing individuals about the innovation starts with directing their feelings toward the innovation by letting them experience it.

This stage creates individuals' attitudes that are shaped by the opinions and reviews of peers and colleges about innovation, that's because individuals are continuously looking for innovation evaluation and feedback along the decision stage (Sahin, 2006, Schuyler et al, 2021).

The decision stage starts when the potential adopters choose to adopt or reject the innovation. Although adoption decision implies full usage of the innovation, still a rejection can come after first adoption. Since a decision has been made, the implementation stage involves bringing the innovation into practical use. With the actual use of the innovation uncertainty regarding the outcomes is involved. Technical support is critical during this stage to ensure continuous adoption and use (Schuyler et al, 2021). The final stage of decision-making process is the confirmation stage. This is an overly critical stage because adopters might change their decision regarding the innovation. If the innovation does not meet the needs and expectations of adopters, they might give up on it. Similarly, if another new innovation better than the current innovation arises, adopters might reject it in favor of the better one. Eventually, continuous support to the users of the innovation is vital (Rogers, 2003; Sahin, 2006; Schuyler et al, 2021).

Ultimately, on the one hand, the DOI theory offers a theoretical foundation for studying technology and innovation acceptance and adoption on individual, organizational, and global levels. The theory integrates critical characteristics for three important aspects of innovation adoption, which are innovation's characteristics, the adopters' characteristics, and the decision-making process. On the other hand, it is concluded that using DOI theory solely shows less explanatory power compared to combining it with other technology adoption models such as TOE model (Taherdoost, 2018; Baig, Shuib, &Yadegaridehkordi, 2021). Using DOI theory to explain the technology part of the TOE model represents more explanations to technology adoption studies (Amini, & Jahanbakhsh Javid, 2023).

### **2.2.2. TOE Framework**

Technology-organization-environment TOE model was proposed by Tornatzky and Fleischer (1990) for studying technology adoption at the organizational level. TOE is developed based on contingency theory of organizations that implies organizations should adapt and respond to the changes and innovations

in the environment that it operates in (Tornatzky and Fleischer, 1990). Moreover, they proposed three organizational characteristics that influence the decision to adopt certain technology. TOE model has three characteristics: Technological, Organizational, and Environmental characteristics.

Technological characteristics represent a set of technologies available for the organization and can influence its productivity positively. Organizational characteristics represent different characteristics of organizations such as organization size, structure, and human resources characteristics, which help the organization to accept the new technology. Finally, Environmental characteristics implies the place and context where an organization conducts its business, its competitors, and interactions with the government (Bhattacharya, & Wamba, 2015). More than that, TOE is the model that is commonly used as an analytical bases for technology adoption studies on the organizational level (Bhattacharya, & Wamba, 2015).

Different empirical studies used TOE model as the theoretical base for investigating organizational adoption of new technological innovations. For example, following two studies that used TOE model for studying organizational technology adoption. Siew, Rosli, and Yeow (2020) examined how organizations adopt computer-assisted audit tools and techniques using the TOE model. They explored various factors within the technological, organizational, and environmental categories. Technological factors investigated included Relative Advantage, Observability, Compatibility, Complexity, and Trialability. Organizational factors examined were Firm size, Top Management Commitment, and Employees' IT Competency. Environmental factors included Clients' System Complexity, Competitive Pressure, and Perceived Level of Professional Body Support. The findings indicated that the adoption of these tools was influenced by factors such as Clients' System Complexity, Perceived Level of Professional Body Support, Firm size, Top Management Commitment, Employees' IT Competency, Relative Advantage, Compatibility, Observability, and Trialability.

Moreover, Nghah, Thurasamy, Salleh, Jeevan, Hanafiah and Eneizan (2021) studied organizational adoption of halal transportation by manufacturers in Malaysia by applying TOE model. Under technological category Cost, and Perceived Usefulness factors were tested. Under organizational category Readiness factor was tested. Under the environmental category Customer Pressure factor was tested. Results of the study showed that adoption was influenced by Cost, Perceived Benefit, and Customer Pressure.

Institutional theory presents additional explanations to the Environmental factor. Also, institutional theory explained that organizational decisions are based on social and cultural factors in addition to rational factors (Oliveira & Fraga, 2011). By offering this explanation institutional theory bridges the gap in TOE model (Soares, Mendes-Fillo& Gretzel, 2020), as this will be explained in the next section.

### **2.3. Institutional Theory**

Institutional theory is used widely in literature to explain the motives behind technology adoption in organizations. Institutional theory explains why organizations operating their business in the

same institutional environment are similar. Basically, institutional theory is a theory to study how organizations can increase their ability to grow and survive in a competitive environment by gaining legitimacy and being legitimate in the eyes of their stakeholders. This theory views organizations to operate in institutional environment that is characterized by its rules, norms, and values that govern the behavior of organizations. A key concept in this theory is the organizational isomorphism, which is: the similarity among organizations in a population. Isomorphism is presented in the form of institutional powers (DiMaggio & Powell, 1983).

The institutional theory presented three institutional powers that lead organizations to change and become more like each other, these powers are: mimetic, normative, and coercive powers. Mimetic powers: are the power or pressure that results from the belief that what competitors at the same environment are doing is beneficial. Mimetic pressures lead organizations to imitate each other which results in similar organizational structures and norms (DiMaggio & Powell, 1983). In the context of technology adoption, deciding to adopt a new technology has a risky side, so organizations tend to follow or imitate a leading competitor at the same environment in adopting or not adopting an emerging technology (Soares, Mendes-Fillo & Gretzel, 2020).

Coercive Powers: coercive pressures cause organizations to change due to pressure from another organization which might be dependent on or by government (DiMaggio & Powell, 1983). This type of pressures in the context of adoption of new technologies lead organizations to adopt some type of technology in order to conform to government rules or to be able to interoperate with other organizations partners working together (Soares, Mendes-Fillo & Gretzel, 2020).

Normative powers: pressures that are caused by norms and standers in the institutional environment that each organization in that context should follow in an effort to be legitimized and able to operate in the environment (DiMaggio & Powell, 1983). In the context of technology adoption organizations should adopt some technologies and norms stated by trade associations or certification programs for example (Soares, Mendes-Fillo & Gretzel, 2020).

Combining institutional theory with the TOE model is found to be helpful in identifying factors of technology adoption in organizations. Environmental characteristics in the TOE model are better explained when institutional theory is applied. The three powers of institutionalization are used for explaining and studying the environmental characteristics in the TOE model (Gibbs & Kraemer, 2004; Mezghani, Alsadi, & Alaskar, 2022; Elghdhan, Azmy, Zulkiple, & Al-Sharafi, 2023).

Many studies employed institutional theory in an attempt to study technology and innovation adoption in organizations. Some studies applied institutional theory only, other studies combined it with other technology adoption models. Mezghani, Alsadi, and Alaskar (2022) studied big data analytics BDA adoption within supply chain management systems in organizations in Saudi Arabia by combining institutional theory and TOE model. Their model focused on the environmental factors that influence BDA adoption. Institutional theory in their study was represented by three factors, trading partner readiness, vendor support, and competitive pressure. Results of the study



showed that competitive pressure and vendor support have a direct effect on the intention to adopt BDA in firms in Saudi Arabia. But within the context of their study trading partner readiness had no effect on the intention to adopt BDA in firms in Saudi Arabia. This study highlighted the importance of considering environmental factors of institutional theory within technology adoption research.

More than that, Gupta, Modgil, Gunasekaran and Bag (2020) in their research studied the moderation effect of institutional pressures on Industry 4.0 and digital supply chain adoption in organizations in India. They concluded that among the three pressures, only coercive pressures moderate the relationship between industry 4.0 adoption and exploration and exploitation to orientation. This conclusion highpoints the power of regularity bodies on organizations in India to adopt latest technological innovations. Importance of this study lies in highlighting the importance of considering institutional theory and institutional powers while studying technology adoption factors.

Yoon and George (2013) studied Virtual Worlds adoption in organizations by combining TOE model with institutional theory. Their model had the three categories of TOE model. Institutional theory was used to explain the environmental category by testing the following institutional factors: Competitors Pressure, Customers Pressure, Normative Pressure, Intensity of Competition. Results of the study showed that mimetic – competitors – pressures and normative pressures had a significant influence on organizations in virtual worlds adoption where technological factors did not have any influence on adoption decision. This conclusion highlights the importance of considering institutional theory while studying technology adoption in organizations.

In addition, Soares-Aguiar and Palma-Dos-Reis (2008) applied institutional theory as a lens in addition to TOE model with a focus on exploring e-procurement systems adoption factors in organizations. Environmental category was explained by institutional theory and included: Trading Partner Readiness, Extent of Adoption amongst Competitors, and Perceived Success of Competitor Adopters. Results showed that all the factors under the environmental category have a critical influence on e-procurement systems adoption. Also, technology competence, and firm size have influence and can explain the adoption decision in organizations.

### **3. Proposed Conceptual Framework**

In this section, the objective is to present a model that integrates the insights of diffusion of innovation theory, the TOE framework, and institutional theory. This model is designed to facilitate the comprehension and examination of the adoption of blockchain technology within organizations. This model can be applied to different industries. A study conducted in seven industries in Turkey in order to see how suitable and how well blockchain could work for in these industries. It has been concluded that industries like logistics, healthcare, and finance are the best fit for using blockchain. These three industries are the most promising areas for more research on blockchain technology (Erol et al, 2020).

As discussed in the literature review, both the Diffusion of Innovation (DOI) and Technology-Organization-Environment (TOE) models have been employed to analyze technology adoption within organizational contexts. As seen in figure 1 we propose a model founded on the TOE model mainly, where DOI theory will be used for explaining the technological part of TOE model, and institutional theory will be used for explaining the environmental part of TOE model. Based on previous literature review and our model in Figure 1, we can state the following propositions:

### 3.1. Technological Factors

Integrating DOI theory for explaining the technological part of TOE model will support the proposed model by including the five factors proposed by Rogers (2003) that result in the adoption of new innovations. These factors are:

*Trialability* denotes the opportunity to test and modify an innovation (Sahin, 2006). In reference to blockchain technology, when individual users and organizations have the opportunity to try it before deciding on adopting it or not, they will have higher chances to adopt the technology (AL-Ashmori, Dominic, & Singh, 2022).

P1: Managers who have the chance to try blockchain may be more inclined to have the adoption intention.

*Relative advantage* is the extent to which an innovation is perceived superior to the existent or previous innovation it replaces (Sahin, 2006). Regarding blockchain technology, when its benefits and advantages are clear to the managers, they will have higher chances to adopt it (Malik, Chadhar, Chetty & Vatanasakdakul, 2020).

P2: Managers who perceive advantages of blockchain may be more inclined to have the adoption intention.

*Complexity* refers to how difficult an innovation is perceived to be, making it challenging to comprehend and utilize (Sahin, 2006). When blockchain technology is perceived to be easy to use, less complex, and easy to integrate to existing information systems, individuals and organizations will have higher chances to adopt the technology (AL-Ashmori, Dominic, & Singh, 2022).

P3: Managers who perceive blockchain as complex and hard to use may be less inclined to have adoption intention.

*Compatibility* is viewed as the ability of the new innovation to be suitable for the organization's current values, past experiences, and the needs of the adopters of it (Sahin, 2006). When blockchain technology offers solutions that are compatible with organization's values and technologies, and fits organization's future plans and strategies, decision makers at these organizations will be more willing to adopt the technology (Taherdoost, 2022).

P4: Managers who find that blockchain is compatible with organization's existing technologies and values may be more inclined to have the adoption intention.

*Observability* is defined as the extent to which the new innovation or its results can be noticed by potential adopters (Sahin, 2006). In the case of blockchain technology, it offers tangible benefits and noticeable results, therefore in these cases managers are more likely to decide on adopting this technology (Taherdoost, 2022). P5: Managers who observe applications and uses of blockchain may be more inclined to have the adoption intention.

### 3.2. Organizational Factors

Applying this model at the organizational level requires studying perspectives of decision-taking managers at these organizations. Because managers' perspectives and attitudes toward technology adoption ultimately form organizational attitude regarding technology adoption (Siew et al., 2020). In this model, two factors will be considered:

*Decision maker's knowledge* refers to their experience and the information available to them. This information greatly affects how good their decisions are. Giving decision-makers enough details about new blockchain technology helps them understand better, so they can make smarter choices about whether to adopt them or not (Chandra& Kumar, 2018). P6: Managers who have more knowledge and experience related to blockchain may be more inclined to have the adoption intention.

*Innovativeness* refers to the extent to which someone or a group is ahead of others in adopting new ideas within a system (Rogers, 2003). In the case of blockchain technology, when managers are innovative in nature, they will be more likely to adopt the technology (Malik, Chadhar, Chetty& Vatanasakdakul, 2020; AL-Ashmori, Dominic& Singh, 2022). P7: Managers who are innovative in nature and working within innovativeness centered organizational culture may be more inclined to have blockchain adoption intention.

### 3.3. Environmental Factors

In the same way, integrating institutional theory with the TOE model is advantageous in pinpointing the determinants of technology adoption within the environment at these organizations. When applying institutional theory, a more comprehensive understanding of the environmental aspects outlined in the TOE model becomes apparent. The three dimensions of institutionalization are employed to explain and examine the environmental part within the TOE model (Gibbs & Kraemer, 2004), as follows:

*Competitive pressures* in the context of technology adoption, deciding to adopt a new technology has a risky side, so organizations tend to follow or imitate a leading competitor at the same environment in adopting or not adopting an emerging technology (Soares, Mendes-Fillo & Gretzel, 2020). This applies to blockchain technology too. Measuring the competitive pressure helps in indicating the likelihood of blockchain adoption (Hartley, Sawaya, & Dobrzykowski, 2022).

P8: Managers who work at organizations that are operating in highly competitive environments may be more inclined to have blockchain adoption intention.

*Coercive pressures* in the context of adoption of new technologies leads organizations to adopt some type of technology in order to conform to government rules or to be able to interoperate with other organizations partners working together (Soares, Mendes-Fillo & Gretzel, 2020). Conforming to this type of pressure, leads organizations to adopt new technologies such as blockchain (Hartley, Sawaya, & Dobrzykowski, 2022).

P9: Managers who works at organizations that are under pressure of using blockchain technology in order to conform to government rules or to be able to interoperate with other partners working together may be more inclined to have blockchain adoption intention.

*Normative pressures* in the context of technology adoption organizations should adopt some technologies and norms stated by trade associations or certification programs for example (Soares, Mendes-Fillo & Gretzel, 2020). In the case of blockchain technology, responding to normative pressures results in adopting the technology (Hartley, Sawaya, & Dobrzykowski, 2022).

P10: Managers who work at organizations should adopt some technologies and norms stated by trade associations or certification programs may be more inclined to have blockchain adoption intention.

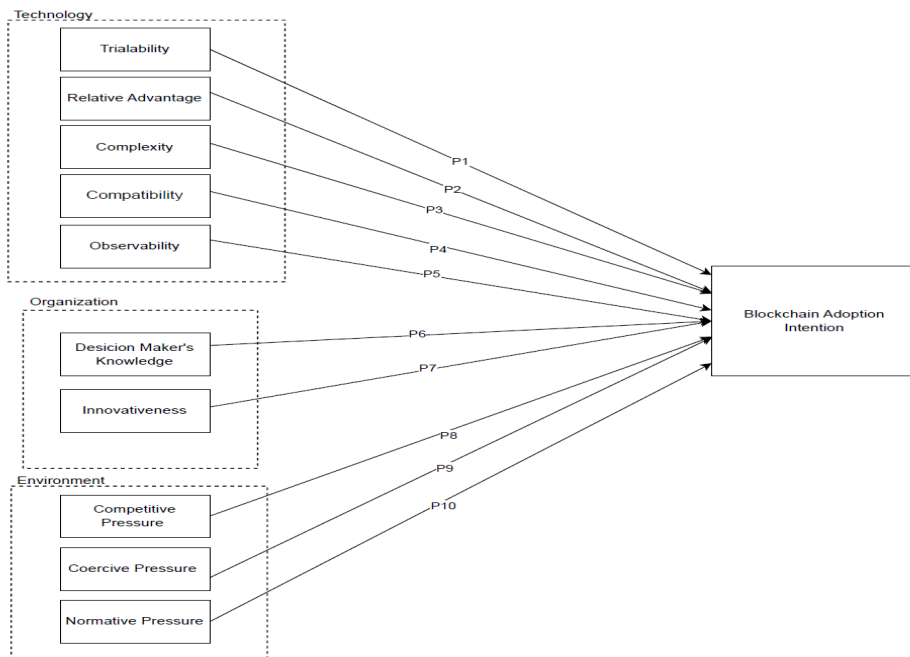


Figure 1. Proposed Conceptual Model

## 4. Discussion

As blockchain technology is gaining increasing attention globally, it is important to understand factors that affect its adoption and use both on the individual and organizational level. Many studies are dedicated to study its diffusion at the individual level. The existent literature highlights the need for comprehensive model to study blockchain innovation at the organizational level (Chittipaka et al, 2023). This motivated us to study available academic literature related to blockchain adoption, and to propose an integrated comprehensive model. The model is rooted in diffusion of innovation theory, TOE framework, and institutional theory. Our model is based on well-established theoretical frameworks. These theories have a solid foundation in the literature and are widely recognized as essential models for understanding technology adoption (Aldahwan& Ramzan, 2022). The integration of these theories into the proposed model provides a comprehensive approach for studying blockchain adoption.

Moreover, TOE framework with its three categories, gives the proposed model a holistic view of the factors influencing blockchain adoption. This comprehensive approach allows researchers to consider a wide range of variables and their effectson influencing adoption intentions. Similarly, Institutional theory highlights the importance of external norms, rules, and regulations in shaping organizational behavior. Blockchain adoption is closely tied to regulatory environments, industry standards, and institutional pressures (Hartley, Sawaya, & Dobrzykowski, 2022). By integrating institutional theory, the proposed model covers the critical role of external factors in influencing adoption intentions, which makes it highly relevant in real-world contexts.

The DOI theory offers valuable insights into the process of innovation adoption within organizations. Factors addressed by DOI theory are relevant to blockchain technology. This integration makes the proposed model valuable for assessing how these DOI factors interact with TOE and institutional factors in the context of blockchain. The proposed model has useful implications for practitioners and regulatory bodies. With the factors considered in the model, it is useful for organizations in assessing their readiness for blockchain adoption. And it allows them to develop suitable strategies for its successful implementation. Regulatory bodies can benefit from the proposed models to review institutional and regulatory factors that may delay or hinder the adoption of blockchain in organizations at national level.

The inclusion of several theories from different disciplines—management, sociology, and innovation—shows the interdisciplinary nature of the model. This approach enhances the explanatory power of the model and makes it interesting for future interdisciplinary studies. Consequently, we emphasize the importance of conducting rigorous, well-designed studies to empirically test the various relationships presented in this paper. The proposed model and the propositions in this paper lay the ground for understanding the context of blockchain technology adoption for future studies. Propositions are foundations in the process of research and analysis. They provide essential guidance to researchers for future research while they formulate hypotheses, design experiments or studies, and reach conclusions based on empirical evidence. These propositions start critical examination and

evaluation to discover their validity and relatedness in understanding and explaining diverse aspects of blockchain adoption in organizations as a social phenomenon. Future studies can be conducted in the public or private sector, indifferent countries. The insights gained from this proposed research will yield valuable knowledge that can inform the design and implementation of blockchain solutions, ultimately benefiting both individuals and organizations.

## 5. Limitations and Conclusions

In this paper we reviewed the available literature related to blockchain technology adoption, technology adoption frameworks; DOI, TOE, and institutional theory. And based on that we had proposed a model to study the factors that may affect blockchain adoption on the organizational level. As it is shown in the discussion part, the model's theoretical grounding, consideration of institutional influence, holistic perspective, and interdisciplinary theories inclusion in the model, makes it considerable for test in future research. Moreover, the inclusion of several theories from different disciplines—management, sociology, and innovation—shows the interdisciplinary nature of the model. This approach enhances the explanatory power of the model and makes it interesting for future interdisciplinary studies. More than that, the importance of this model for future research stems from its design to be applicable for studies of blockchain adoption on the organizational level, where a smaller number of studies are dedicated for understanding adoption on the level of organizations. However, as a limitation to the proposed model, it's important to highlight that the model focuses primarily on understanding blockchain adoption at the organizational level. But adoption decisions within organizations are influenced by psychological factors on the individual-level as well (Li, 2020). Future research could explore the interaction between individual and organizational factors in shaping adoption intentions and behaviors. Also, future research could extend the proposed model to include human factors as well.

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