

Blockchain Technology Adoption: Audit Firm readiness.

L'adoption de la technologie Blockchain : Préparation des cabinets d'audit.

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Abstract

The Blockchain technology (BCT) is a promising disruptive technology highly applicable in a large number of sectors. Many recent studies argue that the emergence and growing interest in this technology will have several implications on the audit profession. Owing to its features such as: traceability, transparency and decentralization, BCT presents a great opportunity for the auditing sector. Therefore, it is important for Audit firms to assimilate and implement this technology in the context of digital transformation. We argue that there is a lack of studies in the body of literature relating the BCT adoption by audit firms. For that, this research paper aims to propose a research framework for the BCT adoption by audit firms. For this we consider two main theories: The Technology-Organisation-Environment (TOE) framework and the Diffusion of Innovation theory (DOI). This study focuses on profoundly interpreting these theories for the adoption of BCT in audit firms and proposes a BCT adoption framework in these firms by analyzing these firms readiness. To test and validate the proposed framework, a quantitative approach based on a survey addressed to audit firms is suggested.

Keywords: Blockchain technology; BCT readiness; Audit; TOE; DOI; adoption framework.

Résumé

La technologie blockchain (BCT) est une technologie disruptive prometteuse qui trouve de nombreuses applications dans un grand nombre de secteurs. De nombreuses études récentes affirment que l'émergence et l'intérêt croissant pour cette technologie auront plusieurs implications sur la profession d'auditeur. Grâce à ses caractéristiques telles que la traçabilité, la transparence et la décentralisation, la BCT représente une importante opportunité pour le secteur de l'audit. Il est donc important que les cabinets d'audit assimilent et mettent en œuvre cette technologie dans le contexte de la transformation numérique. Nous estimons qu'il existe un manque d'études dans la littérature relative à l'adoption de la BCT par les cabinets d'audit. C'est pourquoi ce document de recherche vise à proposer un cadre de recherche pour l'adoption de la BCT par les cabinets d'audit. Pour ce faire, nous prenons en compte deux théories principales : le cadre Technologie-Organisation-Environnement (TOE) et la théorie de la diffusion de l'innovation (DOI). Cette étude se concentre sur l'interprétation approfondie de ces théories pour l'adoption de la BCT dans les cabinets d'audit et propose un cadre d'adoption de la BCT dans ces cabinets en analysant leur état de préparation. Afin de tester et de valider le cadre proposé, une approche quantitative basée sur un questionnaire adressé aux cabinets d'audit est suggérée.

Mots clés : Technologie Blockchain ; préparation à la BCT ; Audit ; TOE ; DOI ; cadre d'adoption.

Introduction

Nowadays, the adoption of new technologies has become a necessary of the time. Various sectors are investing in technology because it has the potential to shape business and enhance their competitiveness. Blockchain is a distributed ledger technology, initially introduced by Satoshi Nakamoto in 2008, known by its main features such as: decentralization, traceability, transparency and security. The technology is now disrupting a wide range of sectors: finance, supply chain, healthcare, education and more. The use of the technology is growing in these domains thanks to the major advantages it has.

Sectors like auditing are considered at the heart of a whole ecosystem. An auditor guarantees trust, transparency, exactitude and other assertions. For auditors, such shift to a new innovation represents both a challenge and an opportunity. It is necessary that audit firms have a great understanding of the innovation in order to provide the assurance. According to (Karajovic, Kim, and Laskowski 2019), audit firms should prepare and consider this disruptive technology by Acquiring competency in BCT and governance of blockchain, move to continuous auditing and growing the advisory function.

Therefore, the lack of research addressing BCT adoption by audit firms and the growing interest and adoption of this technology by other sectors are the main motivations for investigating audit firms readiness for this innovation. This research aims to analyze the factors impacting the audit firms readiness for blockchain adoption, this paper address the research question: What factors impact audit firms readiness for Blockchain adoption?

The next section presents the literature review concerning the blockchain technology in auditing and the importance of readiness in innovation's adoption. The third section presents the research methodology. The last section presents the hypothesis and a proposed Blockchain adoption framework by audit firms.

1. Literature review:

1.1. Blockchain technology and auditing

Blockchain technology, originally known as the technology behind Bitcoin, is evaluating today and gaining attention and adoption in many fields: Finance, Supply Chain, healthcare, voting etc..). BCT provides a transparent, immutable, secure and distributed ledger of operations and transactions. The trust here is placed on the algorithm itself and not in an intermediary or a third party.

Blockchain particularity lies in its unique features, unlike traditional databases, the BCT is decentralized and it introduces new data architecture based on: consensus mechanisms,

cryptography and hashing. BCT promises to disrupt many sectors, especially the ones that depend on trustworthy and secure data. Also, the properties of this technology are disruptive because they offer to eliminate the third party or the intermediary in these sectors. However, the implementation of such unique technology needs a real understanding, technical efforts and a strategic change.

Financial Auditors, on the other hand, act as external validators who assess the assertions of financial statements and transactions (Hayes et al., 2014). To do this, they must have a serious understanding of client's businesses, procedures, systems, controls and technologies used. When it comes to Blockchain, the technology offers the automation of many auditor's tasks, According to (Gokoglan et Cetin, 2022), BCT impacts the audit field on so many levels: first, monitoring and control costs are reduced due to the transparency and real time data produced by blockchain. Secondly, Blockchain offers an audit trail using multiple databases instead of one centralized database. In addition to that, BCT is decentralized which means that data is objective and hardly manipulated it also help reduce the audit risk. BCT has important potential in the audit field, blockchain offers many solutions to existing problems in the audit industry (Cheng et Huang, 2019). Blockchain offers: Reduced costs, a short audit cycle, non-tamperable data, real time update and an improved audit quality (Cheng et Huang, 2019).

Blockchain adoption in auditing faces also some challenges: The main challenge resides in the change management whether its people management, culture alignment and change in existing processes (Han et al., 2023). Therefore, audit firms will need to be prepared for the impact of the Blockchain innovation not only for its potential advantages but the risks and challenges it might have. Therefore, the readiness of Audit firms for Blockchain adoption seems to be a strategic necessity. As BCT challenges traditional auditing and offer both significant opportunities and important risks for audit firms, it's a paradigm shifting technology and needs a serious alignment and readiness.

1.2. Organizational readiness and innovation adoption

Several studies have shown the importance of the organization readiness in innovation adoption. It encompasses both individual and firm level. According to (Alsheibani et al. 2018), IS/IT readiness depends on the organization's capabilities and preparedness to implement and adopt a new innovation. This includes an adequate infrastructure, strategy, skills, data and processes of an organization (Salleh et al. 2011). Therefore, Blockchain readiness includes not only the technology but various other important factors. Technological factors such as: relative advantage and compatibility (Chong et al. 2009 ; Yang, 2015; Zhai, 2010 ;Gangwar et al., 2015

; Wahsh & Dhillon 2015; Alsheibani et al. 2018). Organizational factors that have an influence on the innovation adoption: Top management support (Ramdani et al. 2008). From the literature (Gangwar et al., 2015 ; Yang et al. 2015 ; Idris, 2015; Alsheibani et al. 2018), Firm Size (Oliveira et al., 2014; Aboelmaged (2014); Alsheibani et al. 2018) and Resources (Emon, 2023 ; Hung et al.2016 ; Aboelmaged, 2014 ; Alsheibani et al. 2018). Environmental factors like: Regulatory framework and competitive pressure (Alsheibani et al. 2018).

2. Research Methodology

This paper aims to analyze theoretical models used in previous researches on the perspective of audit firms to adopt the blockchain technology in their practice. We intend to use Diffusion Of Innovation Theory (DOI) and The Technology-Organization-Environment (TOE) framework since these theories are the most used at a firm level (Oliveira & Martins, 2011). While DOI explains how innovations are perceived and adopted by individuals and organizations. The TOE framework completes the DOI theory by addressing the environmental context. The combination of DOI and TOE aims to add an innovation perception to a contextual multidimensional analysis. For blockchain, which is a disruptive technology and depends on a whole ecosystem collaboration, combining these two theories helps better understand adoption readiness by audit firms.

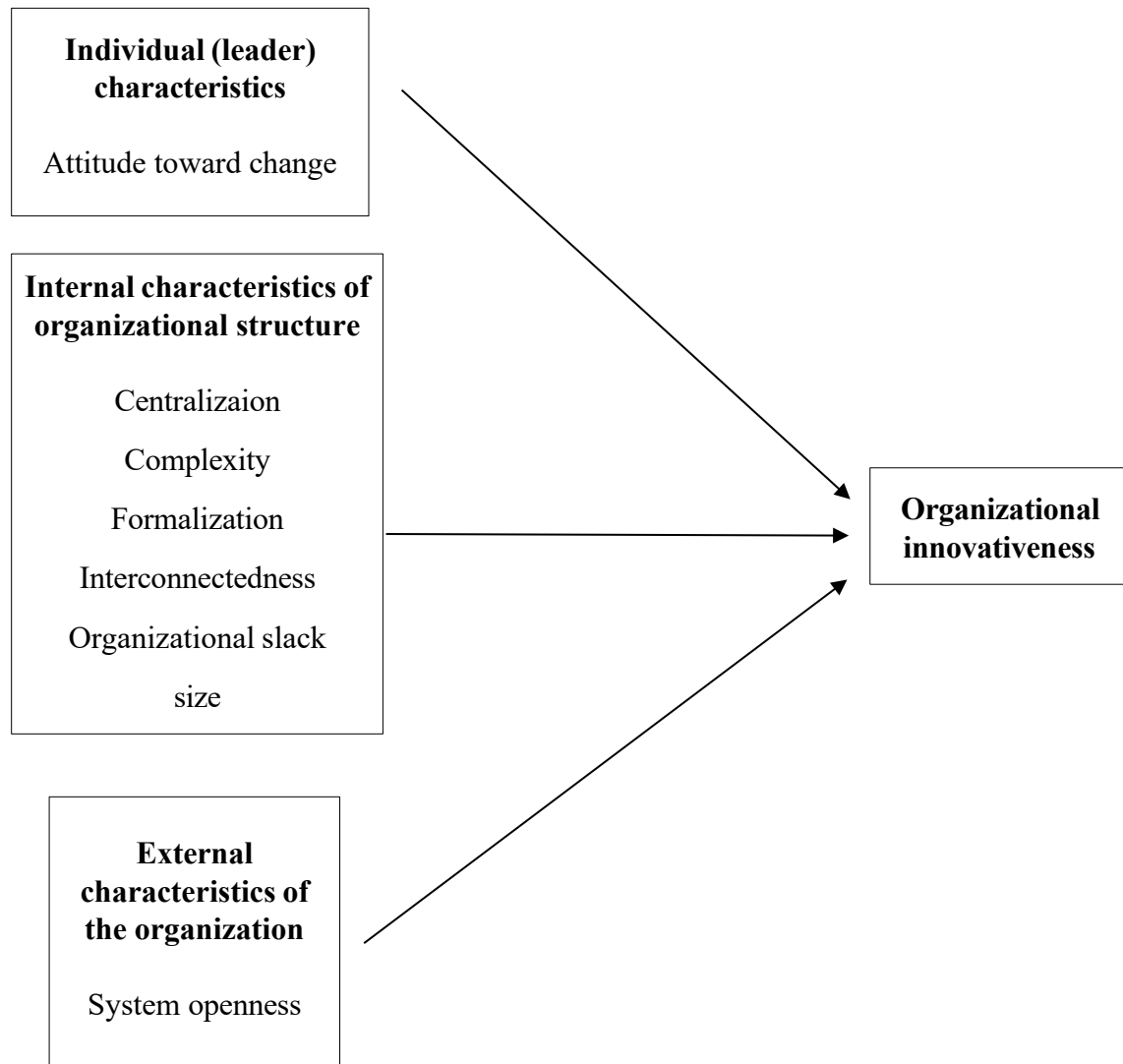
2.1. Diffusion of innovation theory

DOI was developed by Rogers in order to explain the diffusion of the innovation process. It considers innovations being communicated through channels. According to diffusion of innovation theory, five different attributes of innovations are considered. Each of these is somewhat empirically interrelated with the other four, but they are conceptually distinct (Rogers, 1995). (Rogers, 1995) develops a theory explaining how, why and at what rate a new innovation can be communicated through culture. According to the theory of Rogers, the adoption of any innovation depends on five attributions: Relative advantage, Compatibility, complexity, observability and trialability. Relative advantage refers to the idea that the new innovation is better than the idea it replaces.

Compatibility is the degree of consistency of the technology with the values, past experiences and needs of adopters. Complexity refers to how difficult the innovation is to understand and use. Trialability relates to the extent of which a new technology can be tested and experimented. Observability refers to the visibility of the results and impact of the innovation by others

(Rogers, 1995). The DOI framework addresses the organizational, individual and global levels of technology adoption (Taherdoost, 2022).

Figure 1: Diffusion of innovations



Source: (Rogers 1995)

2.2. TOE : Technology, organization, and environment context:

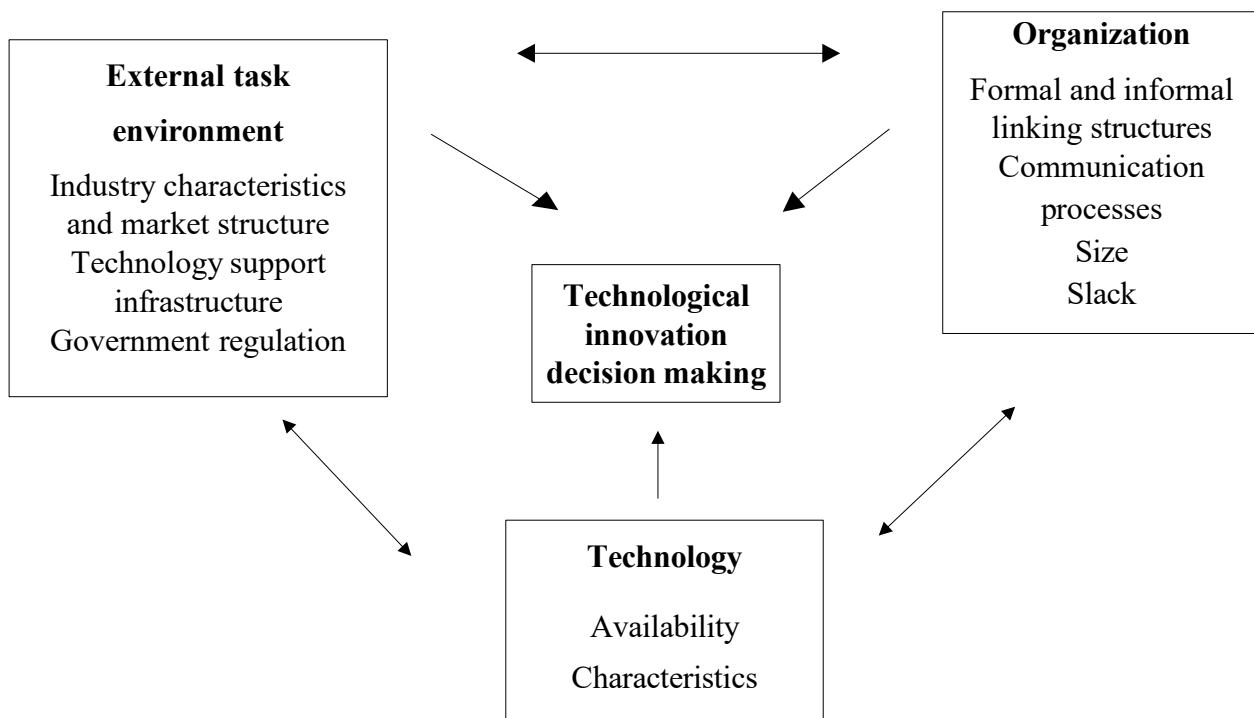
The TOE framework was developed in 1990 (Tornatzky and Fleisher 1990), it is used to study the adoption of technology on an organizational level. The model is an organization-level theory that develops three main elements that influence technology adoption in a firm (Baker, 2012). These three main components are: Technological context, Organizational context and environmental context.

The technological context includes internal and external technologies relative to the firm. The decision of a technology adoption depends on what technology is available and how the

available technology fits with the firm actual technology. The organization dimension includes measures that can influence an innovation adoption at a firm level such as: linkage structures, firm size, communication, managerial structure and human resources. The external environmental context includes market structure, competitors, suppliers, technology infrastructure and government regulation (Tornatzky & Fleischer 1990).

The TOE framework is considered as one of the most important frameworks that analyze the implementation of technologies. Several studies used TOE framework in order to understand IT adoption (Oliveira & Martins, 2011).

Figure 2: Technology, organization, and environment framework

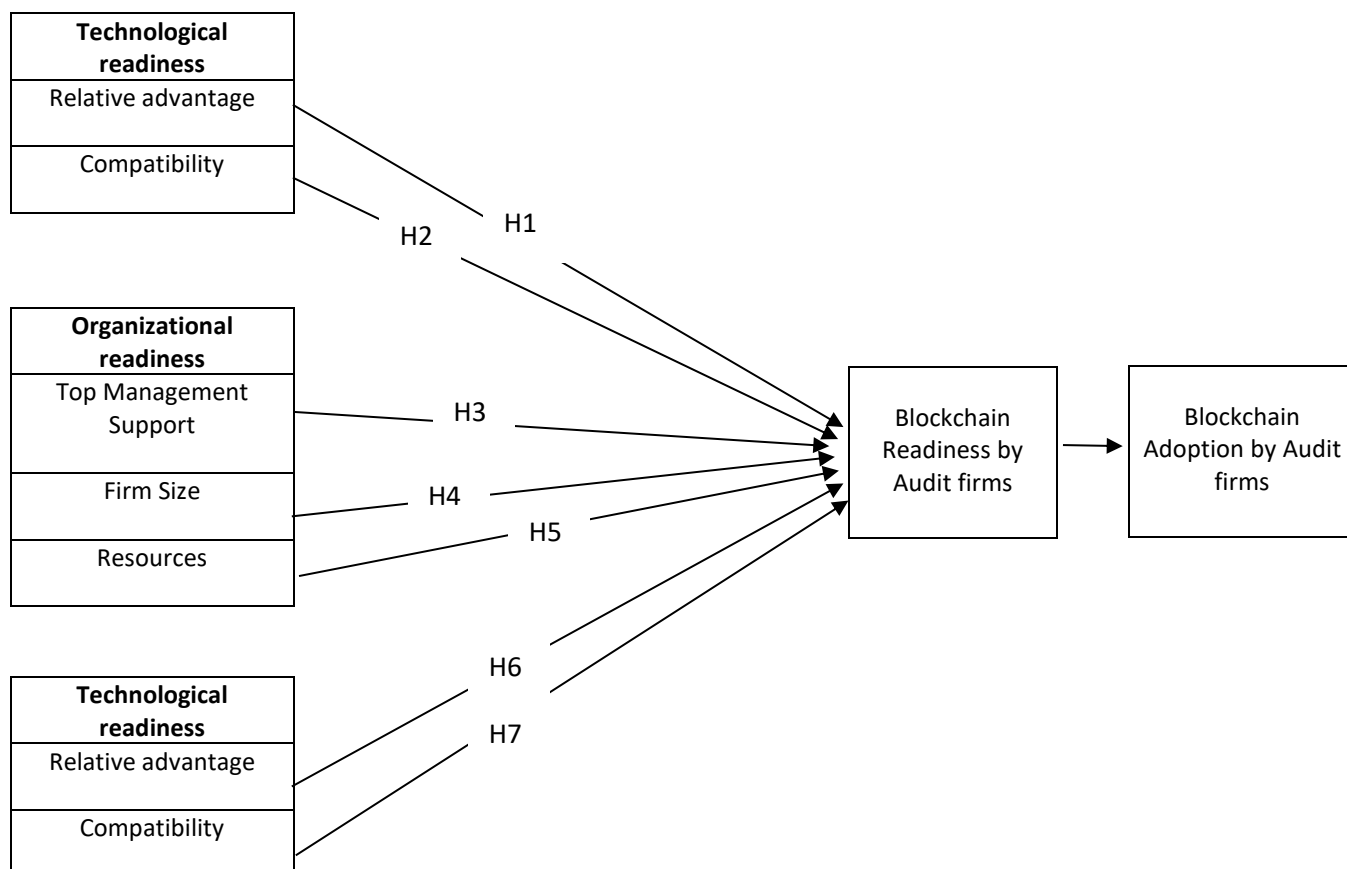


Source : (Tornatzky and Fleischer 1990)

3. Hypotheses and research framework

The proposed framework ties between the two main theories explained before DOI and TOE. The technological, organizational and environmental factors being the drivers of Blockchain readiness. Our research framework and hypothesis are justified based on previous theoretical and practical researches. We discuss them in this section.

Figure 3: Research framework for Blockchain adoption by Audit firms (Adapted from the TOE framework)



Source: Authors

Technological readiness:

The technological context of the TOE refers to internal and external technological aspects of the audit firm. Meaning, the technologies used by the audit firm and the existing technologies in the market. Audit firms when adopting a new technology should consider not only the benefits of an existing technology but also the complexities and challenges of its adoption.

Relative advantage:

Blockchain technology allows audit firms to obtain a relative advantage by the ability to audit blockchain based systems and applications. According to Rogers (2003), relative advantage implicates how new innovations provide value compared to existing ones. Many researches (Chong et al. 2009 ; Yang, 2015; Zhai, 2010) found a positive relationship between relative advantage of an innovation and its acceptance and usage.

Therefore, the hypothesis suiv is proposed :

H1: The relative advantage positively impacts Blockchain readiness for audit firms.

Compatibility:

As explained before, for Rogers, compatibility refers to how the new innovation is aligned with: firms values, past experiences and current needs. Therefore, Blockchain readiness relates to the compatibility of the firm systems with the technology. Previous studies found that there is a positive relationship between compatibility and technology adoption (Gangwar et al., 2015 ; Wahsh & Dhillon 2015; Alsheibani et al. 2018)

H2: Compatibility with existing firm systems influences positively blockchain readiness in auditing.

Organizational readiness:

Organization readiness plays a critical role in successful innovation adoption withing firms. Factors like Top management support, firm resources and firm size affect the adoption of new technologies. Based on previous studies (Gangwar et al., 2015 ; Yang et al. 2015 ; Idris, 2015; Alsheibani et al. 2018), we use top management support, firm size and resources as factors for studying organizational readiness.

Top Management Support

It refers to the willingness and engagement of leaders and managers to implement a new innovation. Top management can enhance change by reinforcing values through organization vision (Ramdani et al. 2008). From the literature (Gangwar et al., 2015 ; Yang et al. 2015 ; Idris, 2015; Alsheibani et al. 2018) top management support has been found to positively affects adoption of information technologies. So, following hypothesis is proposed

H3: Top Management positively influences Blockchain readiness.

Firm Size:

When it comes to organization side, many studies confirm that it has a positive influence on technology adoption (Oliveira et al., 2014; Aboelmaged (2014); Alsheibani et al. 2018). This can be explained by the fact that the bigger is a firm the more financial and technical resources it possess. Big audit firms are always the ones that adopt Fastly new innovations. Therefore, the following hypothesis is proposed:

H4 : Firm Size influences Blockchain readiness in a positive way.

Resources:

Human, technological and financial resources are also critical to the adoption of new technologies. In the context of Blockchain, BCT features very unique characteristics, its

implementation demands important costs and particular technical knowledge. (Emon, 2023 ; Aboelmaged, 2014 ; Alsheibani et al. 2018) found that firms with human, financial and technological resources are most likely to adopt new technologies. Thus, the following hypothesis is proposed:

H5: Human, technological and financial resources impact positively blockchain readiness.

Environmental readiness

Environmental readiness within the TOE framework refer to external factors that impact technology adoption. These factors include government regulation, market trends and structure. The importance of external factors lies in the need for these firms to align their innovation adoption strategy with environmental conditions (Isiaku et Adalier, 2025).

For the adoption of BCT, we consider two factors: Legal and regulatory compliance and competitive pressure.

Legal and regulatory framework

When adopting blockchain, a favorable legal and regulatory framework is crucial. A supportive legal framework for blockchain adoption will encourage the technology adoption by firms at an organizational level (Alsheibani et al. 2018). Lately, many governments encourage the adoption of BCT by returning to it in big government projects (US, Estonie, Georgia etc.).

Therefore, This study proposes the following hypothesis:

H6: Favorable legal and regulatory framework influences positively Blockchain readiness.

Competitive pressure:

According to studies in technology adoption, competitive pressure is known as an effective motivator for organizations to adopt a new innovation (Safari et al., 2015 ; Chong et al., 2009 ; Hsu et al, 2016). For Blockchain, an Audit firm proposing BCT solution or that hires skilled people that can audit Blockchain will give it a competitive advantage especially with the rise of usage of this new innovation in many sectors. Hence, this research proposes the following hypothesis:

H7: Competitive pressure has a positive influence on Blockchain Readiness.

Conclusion

This paper provides a research framework for Blockchain readiness for audit firms, using DOI theory and TOE framework. While this research provides a theoretical research framework, future empirical research is necessary to test, validate and refine the proposed hypothesis and framework. We propose a quantitative approach based on a survey addressed to audit firms (small, medium and big audit firms).

The limitations of this study need to be acknowledged. We think that the adoption of new technologies such Blockchain is quite complex, therefore a theoretical framework should combine more than two theories or frameworks in order to gain a better understanding of the detailed particularities of such technologies and their adoption.

Concerning the contribution of our study. From the theoretical side, our study will contribute to the exploration of disruptive innovation adoption theories and finding factors impacting the blockchain readiness for audit firms. On the practical side, this paper could help audit firms to be ready and prepared in implementing the Blockchain Technology.

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