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A Conceptual Analysis of Factors That Lead to Blockchain Technology Adoption in A Developing Country Context; Morocco.

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ABSTRACT
The Blockchain is a relatively new concept that finds its source in the first cryptographic currency known as Bitcoin. The BC is essentially known as a decentralized ledger that records every transaction made in a network called a "block", which contains the encrypted data of the entire transaction history. It had a wider range of applications than the simple digital cryptographic platform. The Blockchain technology adoption depends on different factors. Several research papers and reports have focused on this technology over the past decade. In Morocco, many companies do not consider the importance of their information system strategic alignment, which makes the blockchain technology difficult to manage and implement. This paper provides a systematic literature review of the factors that lead to blockchain applications in multiple domains and captures the complex relationships between trust, risk, security and Blockchain technology adoption in the Moroccan context. Thus, this paper will also highlight the link between BC implementation and IS strategic alignment.

Keywords—*Blockchain technology, Applications, Adoption, Trust, Risk, Security, IS strategic alignment, Moroccan context.*

1. INTRODUCTION

The blockchain technology has attracted a great deal of attentions as an effective way to innovate business processes [1]. It can record transactions in a secure, transparent, decentralized, efficient, and low-cost way [2].

Although Bitcoin is the most known of blockchain applications [3]. this technology can be applied into various domains far beyond cryptocurrencies, since it allows payments without any bank or any intermediary [4]. Bitcoin invention aimed to demonstrate the feasibility of a currency based on a trust distributed system [5] .The algorithms for transaction encryption are open source, which reinforce the idea of money trust.

This new technology revolutionized the currency with bitcoins in the financial sector in 2008, but as the research on digital money has been developed, the underlying blockchain technology was separated from Bitcoin and further developed as a technology related to existing technologies such as cryptography, network topology, and consensus algorithms [6].BC now involves several fields of activity such as banks, construction industry, administrations, tourism, health [7]. Measuring the maturity of a blockchain system presents issues in the adoption of the technology because “If you can’t measure it, you can’t manage it” [8]. A business approach for adopting a blockchain application involves an assessment of the current state in the studied context.

The aim of this paper is to focus on the factors driving the blockchain technology adoption in Morocco as a developing country and captures the complex relationships between trust, risk, security as crucial variables related to its adoption. Thus, we will start by defining the BC technology, then identifying determinants and factors that lead to its adoption.

2. RESEARCH BACKGROUND

The Blockchain technology can be defined as a digital database containing information, (such as records of financial transactions), that can be simultaneously used and shared within a large decentralized, publicly accessible network [9]. The potential benefits of the BC are more than just economic; they extend into political, humanitarian, social, scientific and several domains. The technological capacity of this technology is already being harnessed by specific groups to address real-world issues [10]. The key properties of integrity, resilience, and transparency of the blockchain make it an attractive option for enterprises to revolutionize their business processes. But despite the fact that this technology has great potential for the appearance and construction of the future internet systems, it is facing several technical challenges related to trust, security and risk [11]. Otherwise we can summarize the BC risks as three typical challenges: scalability, privacy leakage and selfish mining.

Scalability: With the large number of transactions increasing daily, the blockchain becomes heavy. And all transactions have to be stored for their validation. Besides, due to the restriction of block size and the time interval used to generate a new block, the blockchain can only process nearly seven transactions per second, which cannot fulfill the requirement of processing millions of transactions in a real-time. However, large block size would slow down the propagation speed and lead to blockchain branches [12].

Privacy leakage: The Blockchain is known to be very safe as users only make transactions with generated addresses rather than their real identity. Users also can generate many addresses in case of information leakage. However, it is shown in [13] and [14]. that blockchain cannot guarantee the transactional privacy since the values of all transactions and balances for each public key are publicly visible. Besides, the recent study [15]. Has shown that a user's Bitcoin transactions can be linked to reveal user's information.

Selfish mining: The blockchain is susceptible to face attacks of colluding selfish miners. Generally, it is convinced that nodes with over 51% computing power could reverse the blockchain and transactions. However, recent research shows that even nodes with less 51% power are still dangerous. In particular, Eyal and [16] showed that the network is vulnerable even if only a small portion of the hashing power is used to cheat.

These risks make blockchain adoption quite difficult and complex within several domains. In the next section we will present the situation of the blockchain technology implementation in Morocco as a developing country.

2.1. Blockchain Technology in Moroccan Context

The blockchain must ally trust, risk and security; a global alignment which is not always easy in a developing country. Blockchain also requires information system strategic alignment [17]. In Morocco, the concept of IS strategic alignment is not yet widespread, which makes the adoption of blockchain difficult to envisage in several sectors. The BC revolution that is manifesting in the horizon will impose new challenges to overcome and new opportunities that Morocco should not miss. Until near time, the situation in Morocco was not favorable for the emergence and prosperity of this technology but the situation tends towards an unblocking. Last year was marked by the publication of a press release issued by the exchange office prohibiting the use of Cryptocurrencies [18].

However, after a year, the situation has experienced a course correction. The current CEO of Al Maghrib Bank, recently confirmed in a press conference that he is no longer against Cryptocurrencies since even the financial institutions he refers to, are no longer. He also said that blockchain and cryptos are included in the digitization charter that the bank will follow for the next few years. This release brought its first results quickly. For example, Banque Al Maghrib, in collaboration with Mchain company (a startup which has been active in the blockchain field since 2015) and Microsoft, has implemented a blockchain project, for cash management. In the same positive direction, the Digital Development Agency (ADD) has included the blockchain in its roadmap and it has announced funding supports to enable research in this area [19] .All these initiatives are on the right track and show the will to seize the opportunities presented by Blockchain technology to promote the digital economy in Morocco.

Morocco has all the ingredients (infrastructure, human capital, etc.) to succeed in the challenge of adopting the blockchain technology.

3. MATH AND EQUATIONS

3.1. Perceived Risk

The term perceived risk was first introduced into the literature by Bauer in 1960. The literature defines this concept as the perceived uncertainty in a purchase situation that affects consumer confidence in their decisions (Im et al., 2008). It is notable that perceived risk is considered difficult to capture as an objective reality [20]. Therefore, it is defined as a subjective belief by the consumer to face a loss in the achievement of a desired outcome [21]. If the consumer perceives an outcome that is inferior to a baseline situation, he will have a sense of loss. Several types of risk have been identified: performance risk [22], financial risk, time-related risk

[23], psychological risk [24], social risk [25], confidentiality risk [26], physical risk, and global risk [26] . The perceived risk would negatively affect a user's intention to purchase products or services [27]. However, perceived risk is likely to be shaped or influenced by cultural context and experience [28].

H1. Perceived risk positively influences users' trust in blockchain.

H2. Perceived Risk positively influences the behavioural intentions of users towards the blockchain.

3.2. Security

The aim of information security management is to ensure the confidentiality, integrity and availability of valuable information that may be strategic, protected, sensitive or proprietary [29] . There are various concerns about security in blockchain [30], this study focuses on the influence of recognized users' security on their intention to adopt blockchain. Shin [31] shows that security is perceived as the extent to which a user considers that doing things in certain contexts is safe and secure. Subjective security can be seen as a reflection of an affinity for [32] risk. show that perceived security is fundamentally determined by the user's sense of control in an online system. The security of an online platform may not depend on the technical aspects only [31]. Low subjective security may be the initial reason for refusing to adopt technological services [33]. Many studies have confirmed that negative and subjective security prevents users from accepting online services [31]. This research has been elaborated to conceptualize and theorize a set of factors that help to elucidate the role of security in the intention to use blockchain technology.

H3. Security positively influences users' trust in blockchain.

H4. Security positively influences the behavioural intentions of users towards the blockchain.

3.3. Trust

[38] Mentioned that trust is an important variable and can affect behaviour in adopting a technology. Trust is proposed as a key factor in the adoption of blockchain technology [34].

It can be seen as a consistent privacy and security factor that predates attitudes towards chain locks. Research on e-commerce and digital technologies has consistently shown that trust is closely related to user acceptance [5] [34]. Research by Shin, Lee and Hwang [5] has shown that trust has a significant impact on behavioural outcomes. With a trusted service, users would benefit from comfort and ease of use, as they would have less need to verify or examine authenticity and legitimacy [33] . Recently, trust also been seen as a key element in digital media and technologies, it is crucial to ask whether trust in a blockchain service influences or is influenced and by which factors, it is also essential to test what promotes and generates this variable in a blockchain service [34].

H5. Trust positively influences users' behavioural intention toward the blockchain.

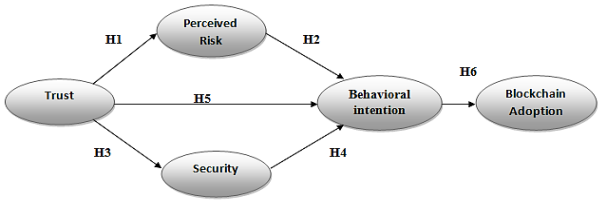
3.4. Behavioural intention towards the blockchain

Behavioral intention is defined as "the extent to which a person has formulated conscious plans to perform or not perform a specified future behaviour [35]. According to [36]. behavioral intent is defined as a measure of the strength of an individual's intention to engage in a specific behavior. Intentions represent the desire, wish, determination, or willingness to engage in a behavior. They involve ideas such as "I must do", or "I will do" [37]. Behavioral intention has a direct influence on the use of technologies ([38]; [39]; [40]). Therefore, our study argues that BI predicts behavioral expectations, defined as the employee's intention of adopting a particular behavior associated with the use of the blockchain in the future. Previous studies by ([41]; [42].) show that "motivation to adopt a target behavior arises from an individual's internal assessment of the behavior". Thus, behavioral intention precedes behavioral expectation, [41].

H6. Behavioral intention toward blockchain has a positive influence on the blockchain adoption.

Our conceptual framework can be used by organizations to adopt Blockchain applications. BC adoption requires organizational change and introduction of new governance mechanisms. This framework can be used to understand the broader implications of adoption within developing countries such as the Moroccan context.

Figure 1 Blockchain adoption research Model



4. CONCLUSION AND LIMITS

Although blockchain applications are widely deployed at the international scale, many problems still

need to be solved in Morocco to promote and facilitate its adoption. Blockchains are not only becoming more scalable and efficient, but also more durable. The features they offer are not unique if judged individually, and most of the mechanisms they rely on have been known for years.

However, as we have seen in this paper, a global vision is needed before adopting the blockchain. Our literature presented the current state of its adoption in Morocco, which allowed us to identify three factors, namely trust, perceived risk and security that impact the intent and the adoption process of this technology.

The proposed framework is conceptual and has not been empirically tested due to the constraints of the COVID19 pandemic. Future research will test the proposed framework in different domains in the Moroccan context, including health and tourism sectors based on the Delphi Method, which will enable us to collect and analyze experts' opinion in the blockchain field. The present analysis has identified factors that affect the blockchain adoption, but a future research is still needed to address these challenges by exploring, refining and testing the link between our variables and expand the framework based on practical evidence.

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