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FACTORS FOR INFLUENCING INTENTION TO ADOPT BLOCKCHAIN TECHNOLOGY: IN PERSPECTIVE OF FINANCIAL TECHNOLOGY COMPANIES IN INDONESIA

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Abstract. Blockchain is one of the potentially life changing technology in Indonesia and yet only a few know and able to apply the technology. There is still a lot of questions around blockchain about its real benefit and why the adoption is still low. This study is to explore the influencing factors towards blockchain adoption on financial service industry in Indonesia. This study mainly integrates the TOE (Technology-Organization-Environment) framework model to understand the issue on firm's level as Blockchain as it is still on introduction stage in Indonesia and few instances is adopting this technology. The information for this study is collected with an exploratory qualitative research by conducting a semi-structured interviews to Financial Technology industry players in Indonesia. This study aims to interview people with triangulation to ensure the data validity and reliability. The outcome for this study is that the proposed model of TOE frameworks is confirmed but there are six additional factors derived consists of availability and observability from technological context, business model readiness from organizational context. Lastly, there are four additional factor emerged from environmental context which consists of customers, competitive environment, trading partner supports, hype and image. Indonesia needs a supportive environment in order to be able to expand and accelerate blockchain adoption.

Keywords: Blockchain ; adoption; TOE framework

INTRODUCTION

Digital economy in Indonesia had shown enormous achievement, it is shown by the current market size is almost 40% of total Southeast Asia digital economy (Google and Temasek's e-Conomy SEA 2018). This data indicate that digital economy is an important factor to drive Indonesia forward. The rapid growth of digital economy leads to many implementation of technologies. One of the emerging technology is Blockchain. Blockchain is also considered as one of the top 10 strategic technology of 2019 (Gartner, 2019).

The blockchain is a feature of a distributed ledger, which means that it is not controlled by any single actor, but maintained by several participants which allows people who do not know or even have trust in each other to form a trustworthy ledger, where information is recorded (The Economist, 2016). The information is available to everyone and tamper proof, which allows the blockchain to be a transparent machine that makes and preserves the truth (The Economist, 2015). The financial sector could have a benefit from blockchain technology in terms of efficiency, speed and security (Dyulgerova, 2019).

The transformation of digital economy revolutionize business to go digital including financial service industry. When finance and technology evolve together, it leads to what is called as "FinTech" or Financial Technology which leads to numerous innovation such as Internet Banking, mobile payments, crowdfunding, peer to peer lending, etc (Arner, et al., 2015). The evolution of Financial Technology growth could be an opportunity too for financial services instances to adopt blockchain technology. In additional, Indonesia had shown significant growth towards blockchain adoption shown by Blockchain companies in Indonesia increased more than 30 percent in 2018-2019 (Maulana,2019). According to Rick Bleszynski on liputan6.com (2019), the most prepared industry for blockchain

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technology is financial services. Meanwhile, the number of Indonesia's financial service that utilize blockchain on their business is still limited. However, the real value of a technology can be realized when it is being adopted at a broader level. Thus, this study intends to discover what constitutes the drivers of Blockchain adoption on Indonesia's financial services.

LITERATURE REVIEW

1. Evolution of Financial Technology
   Financial services organizations are transforming their financial service industry with emphasizing customer-centric services that would be capable of combining speed and flexibility, backed by forward-looking strategies and cutting-edge business model (Nicoletti,2017). Arner (2017) defines "FinTech" or financial technology when financial service organisations transform their business with utilising technology to deliver financial solutions.
2. Blockchain
   According to Seebacher & Schüritz (2017), Blockchain is a distributed database where every data is shared among and agreed by a peer-to-peer network. This technology allows group of users to record their transactions in a shared ledger among their group and the data cannot be altered which makes Blockchain into an immutable activity record.
3. Technology Adoption Theories
   There are many theories used to analyse technology adoption. Among these theories, the theory that discussed technological adoption on firm level are DOI and TOE. Meanwhile, TPB, TAM, and UTAUT discussed individual level of adoption. However, DOI is much focused on the technological alone, leaving the other aspect. This study use TOE framework for its primary model due to the. TOE framework has been used by many studies regarding technology adoption due to its useful analytical framework for studying adoption of different types on IT innovation (Oliviera & Martins, 2011). This framework emphasizes on technological, organizational and environmental factors to study firm level on adopting a technology (Sila,2013).
   In this study, we use TOE framework as the main theoretical lens to study influencing factors on intention to use Blockchain technology by organizations of Indonesia's company. The main proposed model is below:

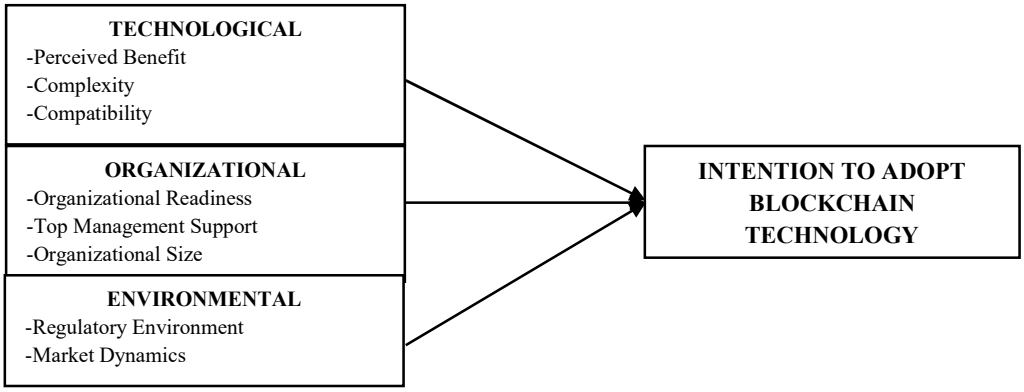

Figure 1. Proposed Model (adapted from Proposed Research Model, (Tornatzky and Fleischer, 1990) adapted by (Clohessy, et al., 2018)

Technological Context

According to Tornatzky and Fleischer (1990), the most discussed technology that is significantly important for successful adoption are: relative advantage, complexity, compatibility with existing infrastructure and perceived benefits. For this study, the technology discussed is Blockchain technology. According to Karayanni (2003),

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Perceived benefit is the degree to which an innovation is perceived to be better than the previous idea. Complexity is the degree to which an innovation is perceived as relatively difficult to understand and to be used (Rogers, 1995). Compatibility defines the way technology matches with the existing values, past experiences and needs of adopter (Rogers, 1995).

Organizational Context

According to Tornatsky and Fleischer (1990), organisational context refers as the most significant factor of organisation adoption to IT innovation. Organizational readiness varies according to the internal characteristics and property of a firm in relation to the type of new technology to be adopted (Muhammad Hashim et al., 2016). Top management support plays a pivotal role in the initiation, implementation, and adoption of information technology (Parasuraman,2000). Organizational size is often positively significant with adoption due to its effect on adoption. A study by Clohessy, et al., (2018) suggest that larger organizations are more flexible to adopt Blockchain technology than smaller organizations.

Environmental Context

The environmental context consists of industry structure, presence or absence of technology service producer and the regulatory environment (Baker, 2011). Regulatory environment is related to government action towards new technology through reviewing and resolving related issues such as consumer protection, financial integrity and lack of legislation specifically regarding distributed ledger technology or blockchain (Clohessy, et al., 2018). According to Clohessy (2018), market dynamic refers to the rapidly changing Blockchain technological landscape which push forward the usage of the technology.

METHODOLOGY

The purpose of this study is to explore the technological, organizational and environmental factors that may influence the adoption of blockchain technology in financial service industry. Therefore, a qualitative multiple case study is chosen for this study in order to understand the phenomenon better. This research utilized semi-structured interview as its method. Therefore, the interviewer has a question guideline that the respondents able to follow. Non-probability method with Purposive sampling is used for this study to determine the sampling method. Purposive sampling involves the choice of the most beneficial subjects placed or in the best position to provide the necessary information (Sekaran, 2002). Due to the unknown representative of population, the participants are obtained based on recommendation from financial industry player that has intention towards blockchain usage which is selected from the member of Indonesian Blockchain association. The number of respondents can keep going until there are no more emerging new themes found from the interviewed Participants, as the data has reach its saturation (Marshall, 1996). The participants are obtained based on recommendation from financial industry player that has intention towards blockchain usage which is selected from the member of Indonesian Blockchain association. This study has interviewed 10 people that comes from various sectors and roles which comes from the recommendation from the previous participant. Based on the data transcript, the content analysis can be executed. This research uses coding method to analyze the data from interview. This research will perform a combination of open-axial-selective coding to analyze the factors obtained from the interview. It requires researchers to label the data showing a particular idea with a certain descriptive name that would help to organize and categorize the data into categories. In categorizing the narrative data, the researcher uses preset categories as a guideline. Triangulation is also performed in order to ensure the validity and reliability. As in this research, triangulation done by literature review and gathers the data from key person who understands the phenomenon. Researcher then transcribed the interview and done the analysis with codings and categorizing. Finally, through the data analysis, researcher constantly comparing data and codes iteratively.

FINDINGS AND ARGUMENT

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TOE Framework

Table 1 consist of author's content analysis from TOE framework with some additional findings. To arrive at proposed research model, a content analysis summary with extensive word table is used. There is some symbols used to represent the results, "+" for positive influence, "-" for negative influence, "+/-" either positive or negative influence , "0" for no influence.

Table 1 Cross Case Analysis

	PARTICIPANT →	P1	P2	P3	P4	P5	P6	P7	P8	P9	P10
Technological Context (T)	Perceived Benefit	+	+	+	+	+	+	-	+	+	+
	Complexity	0	-	-	-	-	n.a	0	n.a	0	0
	Compatibility	-	-	+	+	+	-	-	+	-	+
Organizational Context (O)	Organizational Readiness	+	+	+	+	n.a	+	+	+	n.a	+
	Top Management Support	+	+	0	+	+	+	+	+	+	+
	Organizational Size	-	0	0	-	0	n.a	+/-	-	0	+
Environmental Context (E)	Market Dynamic	n.a	n.a	+	+	n.a	n.a	n.a	n.a	n.a	+
	Regulatory Environment	n.a	+	-	-	+	0	+/-	+	+	+/-
Additional Findings	Availability and Observability(T)	-	-	+	n.a	n.a	+/-	-	n.a	n.a	n.a
	Customers (E)	-	-	n.a	n.a	0	-	-	n.a	0	n.a
	Competitive Environment (E)	+	n.a	n.a	+	n.a	+/-	n.a	+	n.a	+
	Trading Partner Support (E)	n.a	n.a	n.a	n.a	n.a	n.a	n.a	n.a	n.a	-
	Hype and Image (E)	-	n.a	n.a	n.a	n.a	n.a	n.a	n.a	-	+
	Business Model Readiness (O)	-	n.a	+	n.a	n.a	-	n.a	+/-	n.a	+

Reference: Author analysis, 2019

Technological Context

According to the participant results, it shows that the perceived benefit of blockchain that influence the intention are speed of transactions, cost efficiency, transparency, interoperability, less fraud, trustable, no intermediary needed, integrating data and security. Meanwhile, the negative influence happens because it feels that blockchain's benefit do not match the company need. Compatibility could affect positively and negatively. It affects positively towards to intention on adopting blockchain if there is a relevance between the technology and customer needs. It affects negatively in terms of blockchain incapability to fulfil business model needs, company's problem and insufficient skills. Complexity could affect negatively if there is lack of resource and knowledge about blockchain in the company. Meanwhile, it has no influence when the company already have a sufficient experience and knowledge about blockchain. However, there is one additional factor included. Availability and observability of blockchain is considered to influence negatively or positively. It is perceived that there is no real success application of blockchain in Indonesia and the use cases is also minimum. It affects positively when a company can see the real good example of blockchain implementation outside Indonesia and they are able to develop the technology.

Organisational Context

Organisational readiness positively influence towards blockchain adoption in a company. In order to adopt high technology like blockchain, it really matters to be financially ready, high capability of resources, and supporting infrastructure. There has to be a balance between these three things in order to be easier to adopt blockchain technology. Most of the participants see top management support as a significant influence towards blockchain adoption because top management is the decision maker of the company which is important to prepare the

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resource and infrastructure. For an existing organization, change in the organization must be started from the senior managements. Therefore, they also need to figure out the customer value perspective to adopt technologies like blockchain. It had no effect when a company has core value in technological innovation which all the organizations already positive towards technology adoption. Organizational size may influence or not influence towards blockchain technology adoption depending on the situation. It may not influence for organizations that thinks that quality matters more than quantity, as long as the company has the great IT team than it would be easy despite of the size. There are two sides for both large and small companies, it can influence positively or negatively according to internal conditions and other external factors. Business model readiness is additional findings for the organizational context. Business model fit or business model readiness is important to adopt blockchain technology. In order to implement a new technology to the company, the technology has to be fit with the business model of a company. If there is a mismatch, then it would not be effective.

Environmental Context

Market dynamic become a positive influence when someone find a significant transformation of environment that was not really ready for blockchain adoption up to now that is more ready for blockchain adoption. On the other hand, Indonesia has not experience a huge blockchain network effect, so only people who look up the global market that experience a positive effect of market dynamic. Supporting regulatory environment does influence towards an organisation intention to adopt technological innovation because it is easier for businesses to grow when regulator is supporting. Some also see that regulatory support is as important as top management supports. On the other hand, if the regulator is not supporting then it has the probability to slowing down the adoption. Based on the findings, for blockchain right now is unregulated and the government is supporting towards its usage. There are four additional findings for environmental context. First, customers are crucial for a company decision to adopt blockchain technology in terms of customer demand and readiness. Meanwhile, it affects negatively because there is no visible market demand and customers in Indonesia is perceived as not ready yet to use blockchain technology. Second, competitive environment is also being positive influence because when a company see a competitor that used blockchain technology, they want to review and update their business. Meanwhile, it also can have perceived negatively when blockchain is perceived to be not compatible with current needs. Third, trading partner support is also important as an influence to adopt blockchain technology. However, it became a negative influence due to unwillingness of many business parties because they still have lack awareness of blockchain technology. Last is hype and image also have an influence because currently blockchain is a trending technology. On the other hand, hype and image has both positive and negative influence. Hype and image positively influence because using blockchain technology is perceived as up to date. Meanwhile, it became a negative influence because blockchain technology has a negative image because there are some unfinished project that cause a loss for some investors.

CONCLUSIONS

Based on our finding and arguments, we can conclude that based on the interview that the previous model it matches with the interview results. From technological context, perceived benefit is the most significant factors that positively influencing towards blockchain adoption. Observability and availability is added to the technological context which negatively influence blockchain adoption due to lack of visibility of blockchain use cases. From organizational context, top management support and organizational is positively significant towards blockchain adoption. Business model readiness is added as additional which can effect positively and negatively depending on the company business model fit to blockchain. From environmental context, both regulatory environment and market dynamic is important. however, another four factors emerged which consist of customers, competitive environment, trading partner support, hype and image. This shows that environment is the primary enabler towards blockchain broad adoption in Indonesia. Therefore, in order to be able to spread blockchain awareness in Indonesia, a supporting and collaborative environment have to be made.

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Based on the findings, there are two types of company's value. The first one is company who values customers problems and the other one is the company who values technology in terms of blockchain. The company who values technology first is easier to adopt blockchain as they value the technology more than the market demand. Meanwhile, for company who values customer demand they are more vulnerable and slower towards the adoption because they do not see Indonesian consumer ready to adopt this technology. From this we recommend that further studies should conduct quantitative studies to determine which factor is the most significant when blockchain technology is started to be adopted on broader level. In additional, for further qualitative study it should focus on one sector of financial services as this study found that blockchain technology implementation is depending on the business model characteristic of a financial services sectors that matches with the blockchain fundamental.

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