Technology Readiness of Blockchain Technology for MSMEs in Bandung

Ayu Endah Wahyuni[1], Anita Juraida[2]
{ayu.endah@ittelkom-sby.ac.id[1]}

Institut Teknologi Telkom Surabaya, Indonesia[1,2]

Abstract. Blockchain technology provides benefits for improving performance, service and data security, as well as facilitating digital transactions and financial records. The main problems for MSMEs in Indonesia are related to limited working capital and low financial literacy. Blockchain technology can solve the problems faced by MSMEs in Indonesia. However, this technology has not been fully used by MSMEs. Therefore, this study aims to measure the readiness of business actors to use blockchain technology through the Technology Readiness Index approach. The data collection technique in this study used a questionnaire with a sample of 120 respondents (MSMEs). The data processing of this research uses cluster analysis with TRI segmentation results including: explorers (37.5%), Laggards (9.2), Skeptics (15%), Pioneers (38.3%). In addition, the TRI score is included in the High Technology Readiness category of (3.77). This shows that business actors as blockchain technology have a good level of readiness to adopt blockchain technology.

Keywords: Blockchain, Digital, Technology, TRI, MSMEs

1 Introduction

Blockchain technology is predicted to be able to help Indonesia integrate large amounts of data without any third party and support other technologies to work effectively. In addition, this technology can be implemented in various industrial sectors [1]. Likewise, in the MSME sector in Indonesia, blockchain technology is predicted to make it easier for MSME actors to save on production and logistics costs by managing digitally [2]. Meanwhile, there are many problems encountered in MSMEs, including aspects: capital, distribution of goods, licensing, manual bookkeeping, marketing [3].

One of the problems faced by business actors is failure in the process of lending business capital to financial institutions, which is caused by weak financial literacy and inaccurate financial records. In addition, the limited knowledge of business actors in aspects of business management and administration, causes the recording of expenses and income not to be recorded properly, as well as the ability to calculate production prices and calculate profits that are not accurate [4]. One of the roles of blockchain for MSME actors is to facilitate business actors in recording transactions, reporting, funding and financial analysis, as well as transparency [5]. Thus, MSME actors will be facilitated in lending funds to financial institutions because the transaction process is stored and properly recorded through applications that implement blockchain technology.

ICE-BEES 2021, July 27-28, Semarang, Indonesia

DOI 10.4108/eai.27-7-2021.2316822

The use of blockchain technology in MSMEs is predicted to have a good impact on business performance. This is because, transparency of information needed by customers and transaction security can build loyalty. In addition, blockchain technology offers marketplace data security and protects customer identities. Then, the elimination of third parties in the transaction process, as well as the effectiveness of customer, supplier and partner relationships through Smart contracts [6].

Actually blockchain technology is very beneficial for MSME actors to increase business. In addition, improving the performance and profits of MSMEs will have a positive impact on the country's economy. Currently, 60% of the country's GDP comes from MSMEs and more than 90% of the workforce is absorbed by MSMEs [7]. The role of MSMEs is currently very helpful for the government in keeping the national economy stable in the face of the Covid-19 pandemic. Meanwhile, consumer behavior has changed in the current situation, online purchases of goods and services were increasing before the Covid-19 pandemic occurred, so business actors must be able to adapt and transform digitally [7]. If MSME actors apply blockchain technology in current conditions, it will make it easier for business actors to transact safely and effectively, as well as make it easier to borrow business capital.

This study aims to measure the level of readiness of MSME actors before adopting blockchain technology. The research model uses the Technology Readiness Index (TRI) variable approach, including: optimism, innovativeness, discomfort and insecurity.

Parasuraman [8] revealed that the technology readiness index (TRI) can measure the readiness associated with a person's psychometric attitude through a multi-item scale in his understanding when using new technology to achieve goals. There are four dimensions of the technology readiness index, including:

a) Optimism, a person feels confident about the benefits offered by new technology.
b) Innovativeness, someone feels confident to issue new ideas and innovations when using new technology.
c) Discomfort, someone feels uncomfortable and not confident when using new technology.
d) Insecurity, someone feels distrustful and insecure when making transactions using new technology.

Meanwhile, the technology readiness index is categorized into three levels of readiness for MSME actors when using blockchain technology, including [8]:

a) Low Technology Readiness (TRI =<2.89).
b) Medium Technology Readiness (2.90 =<TRI =< 3.51).
c) High Technology Readiness (TRI >3.51).

The technology readiness index consists of several segments that describe a person's belief in the new technology. The segmentation includes: Explorers, Pioneers, Skeptics and Hesitators, and Avoiders [9][8].

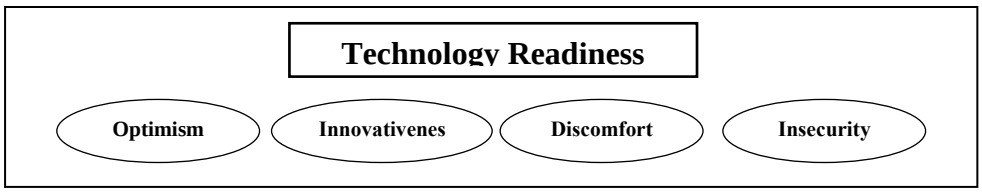

Fig 1. Technology Readiness Model [8]

2 Method

The stages in this research start from problem identification, literature review, operationalization of variables, data collection and analysis. Problem identification starts from observation through data, information and literature which results in problem formulation and research objectives. Then, this study refers to previous research from various literatures and produces a basic research model. The next stage is the preparation of elements and operationalization of research variables that produce research instruments in the form of questionnaires used to collect data and information. The research questionnaire consists of two parts, including: demographic data and questions related to the technology readiness index. The number of questions posed to the respondents was 16 questions. Each question on the research instrument was measured using a Likert scale, namely a scale of "1" (strongly disagree) to a scale of "5" (strongly agree). Research questionnaires were distributed online and offline to respondents. Online distribution of 40 respondents and 80 respondents offline. The next stage, research data processing using SPSS and cluster methods for data analysis process. This study consists of four Technology Readiness Index (TRI) variables, including: optimism, innovativeness, discomfort, insecurity. This variable will be measured to determine the level of readiness of MSMEs in accepting blockchain technology.

The respondents of this research are MSME actors who have used digital technology for their business processes and have used the marketplace for marketing. Meanwhile, the sample of this research is MSME actors in the city of Bandung, which consists of several sectors, including: fashion / textile, automotive, culinary, electronic, services, agriculture and shoes. The survey data collection was carried out for one month starting in November 2020.

This study tested the validity and reliability of the research instrument. The level of reliability is measured based on the parameter of the Cronbach alpha coefficient with a minimum level of 0.70 [10]. This research instrument, shows a level value of 0.774 of all question items. Table 1 shows that, all question items and all research instruments can be declared reliable, because the value is greater than 0.07.

Table 1. A Test of Reliability – The Cronbach's Alpha

Reliability Statistics	
Cronbach's Alpha	N of Items
.774	16

TRI Dimensions	Cronbach's Alpha
Optimism	
OPT 1	0.759
OPT 2	0.752
OPT 3	0.758
OPT 4	0.754
Innovativeness	
INO 1	0.755
INO 2	0.762
INO 3	0.765
INO 4	0.759
Discomfort	
DIS 1	0.764

	DIS 2	0.761
	DIS 3	0.754
	DIS 4	0.774
Insecurity		
	INS 1	0.756
	INS 2	0.777
	INS 3	0.771
	INS 4	0.780

3 Result and Discussion

In Table 2 Shows descriptive demographic data of respondents or business actors. Most of the business actors are managed by men with 53% male and 47% female. In addition, the most dominant business fields carried out by business actors in the fashion sector are 40% and culinary 30%. Then, the majority of the last education business actors are senior high school 60.8%. In addition, most of the MSME actors in the city of Bandung are in the micro-enterprise group, 83%, small 15% and medium-sized 2%. Based on the demographic data, it shows that most business actors are managed by men. Most of the business filed in the city of Bandung is in the fashion/textile sector, this field has been a trend for a long time, because the city of Bandung is famous for its fashion that is always up to date. Then, most of the business actors have a senior high school education, because public awareness to continue higher education is still low. Meanwhile, the majority of MSMEs in Indonesia are in the micro-enterprise group, which means that the number of labour and capital is limited.

Table 2. Demography Data

Characteristics	Freq	%
Gender		
Male	67	53
Female	33	47
Business Fields		
Culinary	50	30
Fashion	66	40
Automotive	6	4
Electronic	2	1
Service	21	13
Furniture	4	2
Agriculture	4	2
Shoes	13	8
Education		
SD	4	3.3
SMP	3	2.5

SMA	73	60.8
Diploma/Sarjana	40	33.3
Number of employees		
< 10 person	100	83
11-50 person	15	15
>51 person	5	2

Table 3 shows the statistical value of the technology reading index (TRI) dimension. The optimistic dimension presents an average score of 3.92, meaning that business actors are quite confident in the benefits offered by blockchain technology for improving their business. The innovativeness dimension presents an average score of 3.60, meaning that business actors are quite confident that they can innovate or come up with new ideas when using blockchain technology. On the discomfort dimension, it presents an average score of 3.62, meaning that business actors feel paranoid about the services or benefits offered by blockchain technology. The insecurity dimension presents an average score of 3.96, meaning that business actors are not sure about the security of data and transactions when using blockchain technology. Overall, business actors are quite confident about the benefits and contributions of blockchain technology when implemented in business. This could be due to their lack of knowledge about this technology and it has not been implemented in Indonesia. Thus, MSME actors are quite ready and ready to use blockchain technology if it is implemented in Indonesia.

Table 3. Summary Statistics for the Technology Readiness Index

TR Dimensions	Mean	Std	OPT	INN	DIS	INS
Optimism	3,92	0,63	1			
Innovativeness	3,60	0,65	0.601**	1		
Discomfort	3,62	0,69	-0,076	-0,088	1	
Insecurity	3,96	0,56	0,073	0,011	.466**	1
Overall TRI	3,78	0,38	0.656**	0.634**	0.547**	0.605**

Table 4 shows the results of data analysis using a cluster analysis approach which provides information about the tendency of MSME actors to fall into the five dominant segments. There are five segments in the technology readiness index (TRI), including: explorers, laggards, sceptics, pioneers. In data analysis, segmentation results were obtained, including: explorers (37.5%), laggards (9.17%), sceptics (15%) and pioneers (38.33). This shows that the dominant segmentation of MSME actors is included in the "pioneers" segment. The explorer segment (37.5%) revealed that MSME actors belonging to this segmentation are very motivated by the benefits offered by blockchain technology and are very confident, and motivated to apply this technology to their business. Then, in the Laggards segment (17%) revealed that MSME actors belonging to this segmentation are very unsure, paranoid about blockchain technology and are worried about the risks posed by using this technology. In addition, the sceptics (15%) revealed that MSME players belonging to this segmentation are still unsure about the benefits offered by blockchain technology and must be convinced that this technology is very useful and profitable. Likewise, in the pioneers segment (38.33), most of the MSME actors in the City of Bandung belong to this segment, meaning that MSME

actors want the uses and benefits of blockchain technology, expect this technology to be safe, practical, and guarantee the confidentiality of company data, and can develop business.

Table 4. Five segments TRI

	Explorer	Laggards	Sceptics	Pioneers
Optimism	4,35	2,55	3,78	3,89
Innovativeness	4,22	2,57	3,29	3,38
Insecurity	3,51	3,86	2,72	4,03
Discomfort	4,08	4,11	3,29	4,07
Frequency	45	11	18	46
Percentage	37,50	9,17	15,00	38,33

Table 5 shows the Technology Readiness Index (TRI) category which consists of: low technology readiness, medium technology readiness and high technology readiness. Based on data analysis and processing, the readiness of MSME actors in the city of Bandung is included in the high technology readiness category with a score of 3.78 or greater than > 3.51.

The score on the optimism dimension is 0.98, innovativeness is 0.9, discomfort is 0.91 and insecurity is 0.99. The score on the optimism dimension shows that MSME actors have a positive perception of blockchain technology. They believe that the benefits that blockchain technology will provide can solve problems that occur in companies. In addition, the score on the innovativeness dimension indicates that business actors can develop ideas and be innovative with all the benefits offered by blockchain technology. Meanwhile, the dimensions of discomfort and insecurity are considered opposite (reverse loading) because they have a negative value, meaning that business actors feel insecure and uncomfortable in using blockchain technology which is relatively new and has not been implemented in Indonesia. Thus, MSMEs in Bandung City are very ready to adopt blockchain technology based on the measurement of the technology readiness index. In addition, the government must encourage business actors to maximize current technology and prepare business actors to use new technology in MSMEs [11].

Table 5. Score Technology Readiness Index (TRI)

Variable	Nilai
Optimism	0,98
Innovativeness	0,90
Discomfort	0,91
Insecurity	0,99
Overall TRI	3,78

4 Conclusion

The results of this study provide information about the readiness of MSME actors in the city of Bandung when blockchain technology is implemented. Based on data analysis, it was found that most of the MSME actors in the city of Bandung were managed by male entrepreneurs, 53%. Then, the majority of business fields are in the fashion/textile sector 40%

and culinary 30%. Most of the business actors have a senior high school education level of 60.8%. Then, the majority of business actors in the city of Bandung are at the micro-business level of 83%. In the statistical value of the technology reading index (TRI) dimension, the optimism dimension with a score of 3.92, business actors are quite confident about the benefits offered by blockchain technology for business improvement. Meanwhile, on the insecurity dimension with a score of 3.96, business actors are not sure about the security of data and transactions when using blockchain technology. Meanwhile, based on cluster analysis, MSME actors in the City of Bandung are included in the "pioneer" segmentation, MSME actors want the uses and benefits of blockchain technology, expect this technology to be safe, practical, and guarantee the confidentiality of company data, and can develop business. If you look at the overall technology readiness index (TRI) score, MSMEs in the city of Bandung are included in high technology readiness.

References

[1] J.-D. Gauthier, "Mengintip Eksistensi Blockchain di Indonesia dan Peluangnya," *cnbcindonesia.com*, 2020. https://www.cnbcindonesia.com/tech/20200227130233-37-140844/mengintip-eksistensi-blockchain-di-indonesia-dan-peluangnya.

[2] R. Rustombi, "Blockchain Diarahkan Bantu UMKM Hemat Biaya Produksi," *republika.co.id*, 2019. https://www.republika.co.id/berita/pvejgw383/emblockchainem-diarahkan-bantu-umkm-hemat-biaya-produksi.

[3] K. Sabrina, "Kenali 5 Masalah Utama yang Dihadapi Para Pelaku UMKM," *qasir.id*, 2018. https://www.qasir.id/inspirasi/kenali-5-masalah-utama-yang-dihadapi-para-pelaku-umkm.

[4] I. Supriyatna, "Lewat Tokoin Laporan Keuangan UMKM Dicatat Menggunakan Teknologi Blockchain," *suara.com*, 2019. https://www.suara.com/pressrelease/2019/03/04/091659/lewat-tokoin-laporan-keuangan-umkm-dicatat-menggunakan-teknologi-blockchain?page=all.

[5] P. Sastrowardoyo, "Teknologi Canggih Blockchain Mulai Diterapkan di UMKM," *cnbcindonesia.com*, 2019. https://www.cnbcindonesia.com/tech/20190124121323-37-52164/psst-teknologi-canggih-blockchain-mulai-diterapkan-di-umkm.

[6] A. Arif, "Pemanfaatan Blockchain untuk UMKM," *kompasiana.com*, 2020. https://www.kompasiana.com/ariftrick/5e7c2616d541df620e516132/pemanfaatan-blockchain-untuk-umkm?page=all.

[7] A. A. Hartika, "Pandemi Dorong Pelaku UMKM Adaptasi Menuju Digitalisasi," *covid19.go.id*, 2021. https://covid19.go.id/p/berita/pandemi-dorong-pelaku-umkm-adaptasi-menuju-digitalisasi.

[8] A. Parasuraman, "Technology Readiness Index (TRI) a multiple-item scale to measure readiness to embrace new technologies," *J. Serv. Res.*, vol. 2, no. 4, pp. 307–320, 2000.

[9] Rockbridge, "The Technology Readiness Index Primer," 1999. https://rockresearch.com/technology-readiness-index-primer/.

[10] M. Chang and W. Wu, "Revisiting perceived risk in the context of online shopping: An alternative perspective of decision-making styles," *Psychol. Mark.*, vol. 29, no. 5, pp. 378–400, 2012.

[11] N. C. Astuti and R. A. Nasution, "Technology readiness and e-commerce adoption among entrepreneurs of SMEs in Bandung City, Indonesia," *Gadjah Mada Int. J. Bus.*, vol. 16, no. 1, pp. 69–88, 2014.