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Unveiling the Technology Readiness and Financing Preferences of MSME Owners in Padang City: Implications for Designing Effective Educational Interventions to Foster Innovation Adoption

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Abstract. This study aims to assess the Technology Readiness Index (TRI) among Micro, Small, and Medium Enterprises (MSMEs) in Padang city and classify user technology based on their technology readiness using the K-Means clustering technique. The TRI 2.0 model was employed to measure the technology readiness of 371 MSME owners who participated in the research. The findings revealed that the average TRI score was at a medium level (3.06). K-means clustering identifies five distinct user groups: explorers (24%), paranoids (31%), pioneers (12%), skeptics (12%), and laggards (21%). Interestingly, only 9% of the total respondents expressed an interest in utilizing Fintech Peer-to-Peer (P2P) lending as a financing source, which aligns with the higher numbers of paranoids, skeptics, and laggards, indicating their slower adoption of new technologies.

Keywords: Exploring Technology, Educational Intervention, Enhancing Innovation

1. Introduction

Micro-, small-, and medium-sized enterprises (MSMEs) play an essential role in the global economy. MSMEs are drivers of economic development, innovation, and employment (Bruhn et al. , 2017) . Nine out of ten new jobs worldwide are created by MSMEs (Bruhn et al. , 2017). SMEs in ASEAN are predicted to cover 98% of the entire company and contribute 40% of the total GDP (Nemoto & Yoshino, 2019). MSMEs play an essential role in the Indonesian economy; 99% of the total business units in Indonesia are MSMEs, and their contribution to employment is 96.99% (KPMG Siddharta Advisory, 2017). In addition, MSMEs contribute 60.34% of Indonesia's total GDP (KPMG Siddharta Advisory, 2017). Other data shows that the number of MSMEs in 2014 was 59.4 million units, the contribution to employment was 96.7%, GDP was 57.6%, exports was 15.7%, and investment was 56.2% (Ministry of VAT, 2016). The results of the BPS survey show that the number of MSE businesses is more than 26 million, which is equivalent to 98.68 non-agricultural businesses in Indonesia (BPS, 2019). Therefore, MSEs can absorb more than 59 million workers, or approximately 75.33% of the total non-agricultural workforce. Meanwhile, specifically for West Sumatra Province, MSE account for more than 580 thousand or 98.88% of the total non-agricultural businesses. Therefore, MSEs can absorb more than 1.29 million workers or 87.57% of the total non-agricultural workforce.

SMEs have a great economic potential. However, it is still often constrained in terms of Thing capital, especially access to banking(Wanof & Gani, 2023). One of the problems faced by MSMEs in various countries, including Indonesia, is the low access to financing in formal financial institutions (banks). The World Economic Forum report related to inhibiting factors in running a business in Indonesia; in 2017, access to finance was third place, and in 2016, it was fourth place (Schwab, 2016, 2017). This research is also in line with the research of Irjayanti and Agus (2012) on the ten inhibiting factors for MSMEs; access to finance is in the second position. Along with the development of financing platforms based on financial P2P Lending technology, SMEs are expected to take advantage of this platform as a source of funding (Financial Services Authority, 2020). However, technology adoption remains low at the company's trim level (OECD, 2021). Another study on the acceptance of P2P lending platforms by MSMEs in Indonesia found that the low level of utilization of this technology was due to the low awareness of MSME owners (Alzubi, Farea, and Al-Dubai, 2017; Rosavina et al., 2019).

Micro-, small-, and medium-sized enterprises (MSMEs) play a critical role in driving economic growth and fostering innovation. The success and sustainability of MSMEs are increasingly intertwined with their ability to adopt and effectively use technology. This study examines the adoption of technology by MSME owners, particularly in the context of fintech peer-to-peer (P2P) lending, and identifies the factors that influence their adoption decisions.

Although MSMEs are significant contributors to the economy, they often face challenges with access to finance for their growth and expansion. The integration of technology can address this issue by providing a more accessible and efficient avenue for financing, particularly through fintech P2P lending. However, the willingness to adopt technology, including P2P lending, is dependent on their technology readiness, which includes their beliefs, attitudes, and behavioral patterns related to the use of technology. The Technology Readiness Index (TRI) 2.0, conceptualized by Parasuraman and Colby, promises to be an appropriate framework for assessing MSME owners' readiness to adopt technological innovations. By focusing on the internal and external factors that influence technology adoption, the TRI can help identify potential users and predict their likelihood of adopting fintech P2P lending (Fasihah et al., 2023; Lam et al., 2008; J.-S. C. Lin & Hsieh, 2006; J. C. Lin & Hsieh, 2007; Parasuraman, 2000)

Existing studies often focus on technology adoption in larger organizations, neglecting the unique challenges and dynamics of MSMEs. This study addresses this gap by investigating technology readiness in the MSME context.

2. Literature

2.1. Technology-Readiness Index (TRI)

Parasuraman (2000), in collaboration with Rockbridge Associates, a company that specializes in services and technology research to conduct the National Technology-Readiness Survey (NTRS), developed a model called the Technology-Readiness Index (TRI) to assess a person's readiness to accept technology called the Technology-Readiness Index (TRI). The first TRI model is then named TRI 1.0. In 2014, it was updated and simplified to become TRI 2.0 (Parasuraman & Colby, 2014).

Technology-readiness refers to the tendency of people to embrace and use new technologies to achieve goals in life at home and work (Parasuraman, 2000). TRI aims to predict and explain a person's response to technology. Technology-readiness (TR) varies from person to person and is highly dependent on the level and nature of technology. Some people may actively seek technology-related information, while others need to help understand technology (Parasuraman and Colby, 2001) .

The Technology Readiness Index (TRI) was developed by Parasuraman (2000) to measure a person's beliefs and thoughts about technology in general (Walczuch, Lemmink and Streukens, 2007; Nugroho, 2015). The TRI construct is based on the assumption that a person will have a positive or negative view of technology (Parasuraman, 2000). Although positive feelings about technology encourage someone to use it, negative feelings may hold them back. Positive interactions with technology include flexibility, convenience, efficiency, and fun(Chasani et al., 2023). Negative factors that hinder adoption include security, risk of obsolescence, identity fraud, and insufficient oversight. Based on these assumptions, Parasuraman (2000) built a TRI model with four elements: optimism (optimism), innovativeness (innovativeness), discomfort (feeling uncomfortable), and insecurity (feeling insecure) (Fig. 1). Optimism and innovativeness drive technology acceptance(Lobschat et al., 2021).

Furthermore, discomfort and insecurity hinder a person from accepting technology. The combination of the values of the four TRI elements/dimensions represents an individual’s overall technology readiness. Technology readiness refers to a state of mind rather than a measure of competence or technical ability.

Optimism is a positive view of technology and the belief that technology will increase control, flexibility, and efficiency (Lin and Chang, 2011) . This indicates a positive view of technology. This element generally indicates the feeling that technology is good thing (Tsikriktsis, 2004). It is important for consumers to feel in control of technology services (Dabholkar, 1996; Bateson, 2000).

Innovativeness is the tendency to be at the forefront of technology. Another opinion states that innovativeness refers to a person's tendency to try something (Agarwal and Prasad, 1998; Shih and Venkatesh, 2004). This construct measures a person’s level of innovation to identify who prefers to adopt a technology faster than others. Innovativeness is the most studied variable compared with other TR variables (Liljander et al. , 2006).

Discomfort is a perceived lack of control and feeling overwhelmed by technology (Parasuraman, 2000). Another definition states that discomfort is a person's tendency to feel worried, afraid, or anxious about using a technology (Rose and Fogarty, 2006). This element is used to measure this level. This construct measures the extent to which people have general prejudice against technology-based products and services.

Insecurity is the effect of low trust in technology and its ability to work well (Parasuraman, 2000). This dimension focuses on a person's level of trust in technology-based transactions (Lin and Chang, 2011).

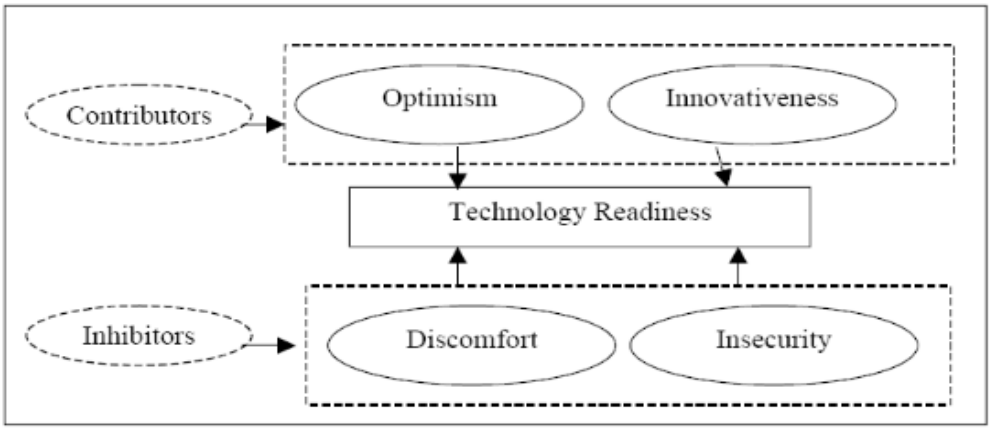

Fig 1: TRI Concept
Source: (Parasuraman and Colby, 2001)

2.2. Classification User Technology

The TRI 2.0 concept consists of 16 questions, using a Likert scale. The total statement consisted of four measures of optimis, four measures of innovativeness, four measures of discomfort, and four measures of insecurity. The results of the TRI score are helpful for companies in determining technology strategies related to consumer services. Based on the results of the four TR dimensions of technology, user types were divided into five segments (Parasuraman & Colby, 2001). The five segments were explorers, pioneers, skeptics, paranoids, and laggards.

When a new technology is introduced, consumers react differently. First, their beliefs are greatly influenced by their beliefs in technology. The group that will be the first to adopt technology are those with high scores on the dimensions of optimism and innovativeness of the explorers and pioneer types (Parasuraman & Colby, 2001; Rose & Fogarty, 2010). Explorers are highly motivated and confident in their ability to use technology. Pioneers score highly on the driving dimension, but there is little resistance to technology.

The next group is the type of skeptics; this type is not against or against technology, is less enthusiastic, and does not believe that technology provides better control over their lives. This group will decide to use the technology if its benefits have been proven. In the TRI model, the skeptical type was low in contributor and inhibitor dimensions.

The following two types are paranoids and laggards, which have high scores for the dimensions of discomfort and insecurity. Paranoids have an optimistic view of technology, but are not inclined to innovate. The last type of acceptance technology is lagging. This group is the opposite of the explorer type, which is high in the dimensions of discomfort and insecurity but low in optimism and innovativeness.

3. Methodology

3.1. Population and Sample

The population of this study was SMEs in the city of Padang, Indonesia. As many as 400 questionnaires were distributed, and only 392 were returned, which could be used in this study were 371 questionnaires.

3.2. Methods of data analysis

The descriptive method is an analytical method used to view the decision to use P2P Lending. Meanwhile, to determine the technology user group type, cluster analysis with K-means was used.

3.3. Description of data

Data in this study were obtained by distributing questionnaires to MSME owners in Padang, Indonesia.

Before use, the research instrument was tested to ensure its validity and reliability. Thirty respondents were owners of MSMEs in Padang, Indonesia.

3.4. Validity and Readability Test

A test was conducted to measure the validity of the questionnaire. In table 1, the validity test results for the four variables in this study indicate that all indicators are valid. The reliability test aims to identify the extent to which the testing tool can provide a similar score if the measurement is repeated on the same subject (Hair et al., 2014). A construct can be considered reliable if its Construct Reliability (CR) score is ≥ 0.7 (Table 2). The reliability test results showed that all variables were reliable.

Table 1. Validity Test

Optimism (X1)	X11	0,884	Valid
	X12	0,920	Valid
	X13	0,845	Valid
	X14	0,925	Valid
Innovativeness (X2)	X21	0,828	Valid
	X22	0,868	Valid
	X23	0,782	Valid
	X24	0,648	Valid
Discomfort (X3)	X31	0,759	Valid
	X32	0.833	Valid
	X33	0.864	Valid
	X34	0.601	Valid
Insecurity (X4)	X41	0.789	Valid
	X42	0.842	Valid
	X43	0.780	Valid
	X44	0.531	Valid

Table 2. Test of Readability

Variable	**Cronbach Alpha**
Optimism	0,904
Innovativeness	0,792
Discomfort	0,753
Insecurity	0,730

4. Discussion

4.1. Technology Readiness Index

Analysis of technology acceptance with the TRI instrument shows that the technology readiness of MSME owners in Padang City is at a medium level, at a value of 3.06. This value was obtained from four variables:

Table 3. TRI Score

TRI Dimensions	Score
Optimism	3.66
Innovativeness	2.99
Discomfort	3.00
Insecurity	3.46

The analysis results show that optimism has the highest value, which means that SMEs have a positive outlook on technology. Furthermore, innovativeness and discomfort had the same score. This shows the level of innovation and discomfort experienced by SMEs with technology at a medium level. Finally, score insecurity is at a sufficient level, showing that the sense of insecurity SME owners use technology sufficiently high.

Technology Readiness Index (TRI) has three categories for its application. The TRI values at each TRI level were based on the overall values of the respondents:

1. Low Technology Readiness Index
   User readiness was considered low if the TRI value was less than or equal to 2.89 (TRI ≤ 2.89). In Padang, 38% of respondents were at this level.

2. Medium Technology Readiness Index
   TRI values between 2.90 and 3.51, respectively, corresponding to medium levels of user readiness (2.90 = TRI = 3.51). The survey results revealed that 54% of the MSMEs in Padang had a medium degree of technology acceptance.
3. High Technology Readiness Index
   User readiness was rated as high if the TRI value was greater than 3.51 (TRI > 3.51). According to the study data, only 9% of respondents had a high level of readiness for technology acceptance.

The city of Padang consists of 11 sub-districts, and the results of the TRI score showed no significant difference in the level of reception technology between these various regions (Figure.2)

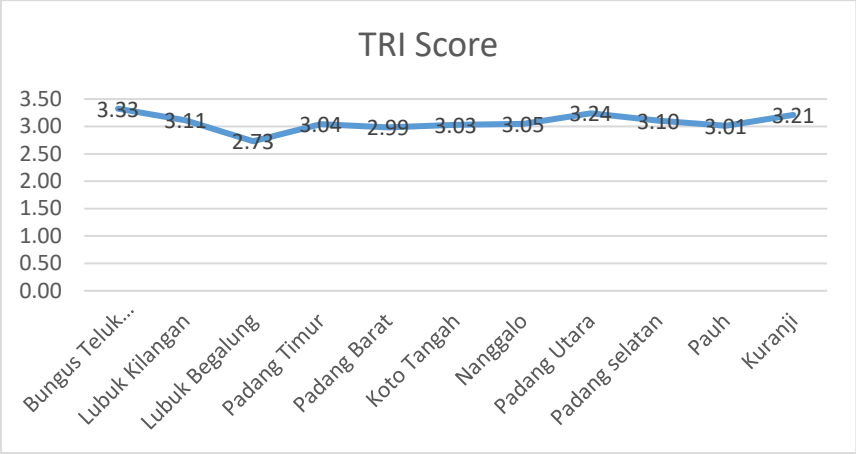

Fig 2. TRI Score according to District in Padang City.

4.2. Classification user technology

User technology is shared in 5 (five) groups: Explorers, Pioneers, Skeptics, Paranoids, Laggards (Parasuraman, 2000). Classification of TRI components using K-means algorithm The final classification results are presented in Table. 4 with an interpretation, if the value is positive, then the data means that it is above the average (high), while if the value is negative, then the data are below the average (low) of the MSME population of Padang City. Therefore, the interpretation of the results of the analysis classification can be seen in Table.6 and Table.7.

Cluster analysis can be concluded that classification 1 is the Explorers group, which includes users who have confidence in the benefits of technology and are the first to take advantage of technology because they do not resist technology acceptance. Group 2 was the group of paranoids. Although the paranoid group was positive about the technology's advantages, they felt constrained by their concerns about security threats and technological incompatibilities. Group 3 is the pioneer (pioneers) who believes in the benefits of technology but has obstacles or resistance in the form of discomfort and insecurity. Classification 4 is the skeptics category, a group that does not have the motivation to use technology but also does not have resistance to technology. The fifth category, known as laggards, is the group that adopts technology the slowest because it has a significant resistance to it.

Table 4. Final Cluster Centers

	Cluster				
	1	2	3	4	5
Zscore (Optimism)	,58230	,28862	,87950	-,87889	-1,10832
Zscore (Innovativeness)	,75594	-,55206	1,11430	-1,15017	-,03293
Zscore (Discomfort)	-,88483	,55328	,95810	-,92930	,15564
Zscore (Insecurity)	-,74376	0.01590	1.18578	-,98741	,69493

Table 5. Interpretation of cluster analysis results

	Cluster				
	1	2	3	4	5
Zscore: Optimism	High	High	High	Low	Low
Zscore: Innovativeness	High	Low	High	Low	Low
Zscore: Discomfort	Low	High	High	Low	High
Zscore: Insecure	Low	High	High	Low	High

Table 6. User classification technology

	Drivers		Inhibitors	
	Optimism	Innovativeness	Discomfort	Insecurity
Explorers (Explorers)	High	High	Low	Low
Pioneers (Pioneers)	High	High	High	High
Skeptic (Skeptic)	Low	Low	Low	Low
Paranoid (Paranoid)	High	Low	High	High
Slow (Laggards)	Low	Low	High	High

The distribution of Padang City SMEs into five groups of technology acceptance readiness is shown in table 7. The explorer group included 88 respondents (24%), paranoid group 115 (31%), pioneer group 46 (12%), skeptic group 45 (12%), and slow group 77 (21%) (Fig.3).

Table 7. Number of Cases in each Cluster

Cluster	1	88,000
	2	115,000
	3	46,000
	4	45,000
	5	77,000
Valid		371,000
Missing		,000

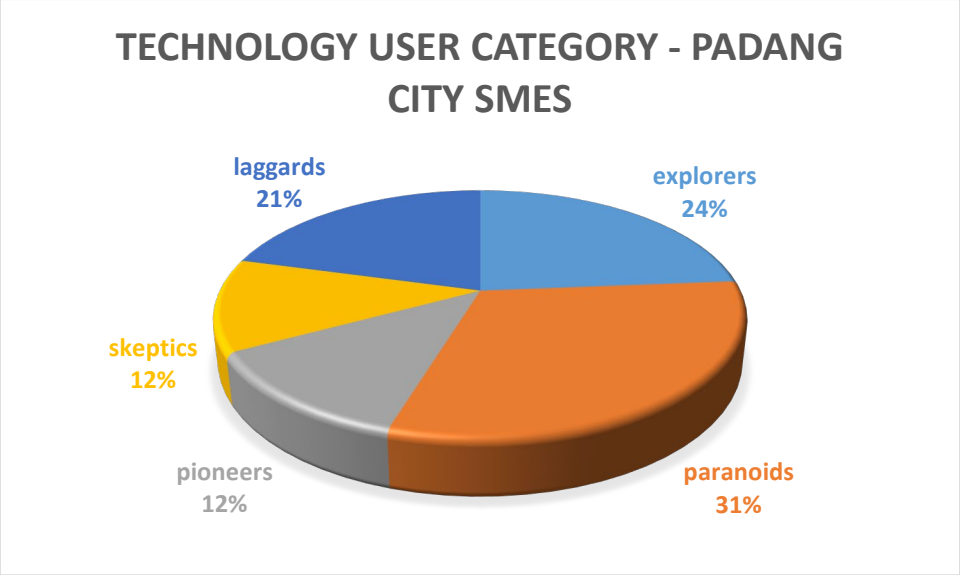

Fig 3. Technology User Category

4.3. Intention of Using P2P Lending

The results show that only 33 (9%) respondents who owned SMEs in the city of Padang wanted to use peer-to-peer lending as a source of finance, and 338 (91%) respondents did not want to use this type of lending (Table.8). If the variable TRI is linked, it would be possible to determine how the level of user insecurity is technology. Further, as seen from the classification of users based on technology, 64% of users did not have positive views regarding technologies that have high obstacles but low side-pushers. These users were further divided into the following groups: paranoids (115 people; 31%), laggards (77 people; 21%), and skeptics (45 people;12%). Here, skeptics are those who are unenthusiastic about technology.

Table 8. Predicted Table

			Predicted		
			The decision to use P2P		Percentage Correct
	Observed		Not	Yes	
Step 0	The decision to use P2P	Not	338	0	100.0
		Yes	33	0	,0
	Overall Percentage				91.1
a. Constant is included in the model.					
b. The cut value is 500					

5. Conclusion

Research conducted with SME owners through questionnaires to assess their technology readiness reveals that the overall level of technology reception among SMEs in the city of Padang is at a medium level. Optimism and insecurity emerged as significant factors influencing technology readiness.

The classification of user technologies identified several groups with varying degrees of obstacles to technology adoption. This finding aligns with the decision regarding the use of technology-based financing, particularly Fintech P2P Lending, wherein only 9% of respondents expressed an interest in its utilization. The study indicates that these technology adoption barriers, represented by a higher number of users categorized as paranoids, skeptics, and laggards, contribute to the relatively low willingness to embrace Fintech P2P Lending.

Therefore, it is imperative for SMEs to enhance their knowledge and use of technology, including

technological advancements in the financial sector. The availability of Fintech P2P Lending as a financing source holds the potential to support and facilitate the growth of SMEs, empowering them to bolster their business endeavors. By improving technology adoption and integrating technological solutions into their operations, SMEs can enhance their overall performance, ultimately leading to a more substantial contribution to the economy. Embracing technological innovations in the financial domain can foster greater financial inclusion, efficiency, and competitiveness for SMEs, thereby contributing to their sustainable development and economic impact. Policymakers, financial institutions, and stakeholders should collaboratively work to create a conducive environment that promotes technology adoption and facilitates the integration of Fintech P2P Lending in the financing landscape for SMEs in Padang and beyond.

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