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Readiness for Digital Financial Transformation: The Case of Micro, Small and Medium Enterprises in Indonesia

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ABSTRACT

Micro, Small, and Medium Enterprises (SMEs) play an important role in Indonesia's economy because they contribute significantly to the country's GDP and are key drivers of employment, absorbing a large portion of the workforce. To boost their competitiveness and enhance performance, it is essential for SMEs to embrace technology. This study investigates SMEs' readiness for digital financial transformation in Indonesia, as technology is vital for achieving efficiency and effectiveness. This study surveyed 411 SMEs in the country to assess their readiness for digital financial transformation. It examined their use of various digital tools, including marketplaces as selling platforms, fintech payment solutions, P2P lending for capital access or investment, and other digital investment accounts. We discovered that SMEs are bankable and use mobile/internet banking, but they require greater readiness to adopt fintech solutions. Moreover, we found that technological knowledge, market demand, and owner education significantly influence readiness for digital transformation. This study indicates that the government should enhance SMEs' literacy in technology to support their business success.

JEL Classification: L26, Q55, O12

Keywords: Digital financial transformation; Fintech adoption; Technology Readiness Index (TRI); SMEs in Indonesia; Financial inclusion

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INTRODUCTION

The role of micro, small, and medium enterprises (SMEs) in economic development is widely recognized. Their contributions to job creation, innovation, GDP growth, and poverty reduction are pivotal to fostering a more diversified, resilient, and inclusive economy (Haini, 2020). Therefore, supporting SMEs through access to finance, training, and infrastructure is viewed as crucial for maximizing their potential and achieving long-term economic progress. In the case of Indonesia, SMEs appears to be an important element of development process. Until 2021, Indonesia's SMEs have reached 64.2 million, contributing 61.07% of gross domestic product (GDP) or 8,573.89 trillion rupiahs. Moreover, SMEs absorb 97% of the workforce[1]. Several theories suggest that by giving SMEs better access to financing, financial services, and resources, financial development will stimulate economic growth by empowering SMEs to grow, innovate, and create jobs (Beck and De La Torre, 2007).

Although SMEs contribute significantly to economic growth, they face several challenges related to infrastructure, social, cultural, and regulatory issues (Terziovski, 2010). Abor et al. (2014) find that the presence of banks as a primary source of capital for SMEs can significantly enhance their performance by providing them with the financial resources needed to invest in business operations, expand their market reach, and adopt innovative technologies. With advancements in financial technology (fintech),SMEs can now obtain funding from alternative sources, such as peer-to-peer lending platforms. The technological revolution has transformed nearly every aspect of human life, from how we communicate to how we work and live daily. For example, during the COVID-19 pandemic, people relied more on technology as social restrictions and lockdown measures shaped behavior and enforced physical distancing (Trinugroho et al., 2022). In Indonesia, the impact of technological advancement is significant, with 73.3% of the population (approximately 202.6 million people) connected to the internet and around 170 million actively using social media.[2] (Databoks, 2020).

Several studies have investigated the link between technology adoption and SMEs. For instance, Duch-Brown et al. (2017) found that SMEs must adopt technology to improve their competitiveness and performance. Moreover, Ayyagari et al. (2011) also found that corporate innovation positively impacts access to external financing. However, internet adoption in the SMEs sector remains limited (Lestantri et al., 2021). Although digitalization is advancing rapidly, SMEs struggle to quickly adopt new technologies, experiment, innovate, and optimize production due to their small size, limiting their ability to fully benefit from the digital economy (Eller et al., 2020). Moreover, Fintech is widely recognized for its potential to drive financial inclusion, especially in areas where traditional banks fall short in integrating people into the financial system. However, its success is constrained by limited user acceptance and insufficient adoption (Mahmud et al., 2023).

This study investigates the readiness of SMEs in Indonesia to use fintech and the factors that influence their use of fintech. We surveyed 411 SMEs from a variety of industries. We asked questions about SMEs' current use of technology in their business, which allows us to clearly understand their acceptance of fintech, as well as SMEs' readiness in digital financial transformation, such as the use of marketplaces as selling platforms, fintech payment, P2P lending for access capital or investing, and the other digital investment account. The results demonstrate that SMEs in Indonesia are bankable. People with a bank account and internet access will undoubtedly have easy access to other digital platforms such as fintech payment and marketplaces. However, the use of fintech platforms in Indonesia needs to be improved. Moreover, we find that SMEs are also less likely to use peer-to-peer lending platforms to raise capital.

The remainder of this paper is structured as follows. Section 2 provides a review of the Fintech literature and the readiness index. Section 3 describes the research methodology. Section 3 presents the empirical findings and discussion, and Section 4 concludes and suggests policy implications.

[1] Ministry of Cooperatives and UMKM RI. (2021). *Laporan tahunan: Perkembangan UMKM di Indonesia*. Jakarta: Ministry of Cooperatives and UMKM RI.
[2] Databoks. (2020). *Jumlah pengguna media sosial di Indonesia*. Retrieved from https://databoks.katadata.co.id

LITERATURE REVIEW

Fintech is an emerging sector that leverages innovative technology to enhance and streamline financial services. According to Schueffel (2016), fintech enhances traditional financial transactions by offering more efficient, accessible, and secure methods for conducting financial activities. It offers user-friendly and innovative financial services and products (Pizzi et al., 2021). Moreover, it provides consumers greater convenience in managing their finances. Gomber et al. (2018) suggest that the foundation of the fintech revolution consists of three pillars: i) a large amount of capital for technology innovation in financial services; ii) start-ups that have developed and designed technology for the finance industry that have different offers and address consumers in very direct, valuable, and future-forward ways; and iii) the transformation of business models, intermediation of financial, services beyond banking hours, personalization by digital sensing and big data analytics, and financialized business processes in new ways.

Although the fintech revolution has significantly impacted the financial industry, no evidence suggests it will supplant traditional finance (Bollaerozilit et al., 2021). Anifa et al. (2022) find that fintech aims to complement the traditional financial system, not replace it. For instance, fintech can resolve barriers to financial access for underserved populations by enhancing traditional banking services rather than supplanting them. This collaboration is critical in developing countries, where fintech can bridge the gap between financial institutions and unbanked populations (Ozili, 2018). Furthermore, integrating fintech and established financial institutions will foster a collaborative environment that encourages innovation and customer-focused strategies. It contributes to financial inclusion and specific sectors like public health. Meiling et al. (2021) find that fintech healthcare users can access funds faster with lower interest rates that can meet patient needs. Aboalsamh et al. (2023) highlight that using fintech enhances access to finance and promotes sustainability in healthcare by encouraging investments in renewable technologies, leading to lower operational costs and improved financial health for healthcare providers.

Fintech significantly enhances the efficiency of SMEs by improving access to financial services, streamlining operations, and fostering innovation. By integrating fintech solutions, SMEs overcome traditional banking barriers, facilitating faster loan approvals and reducing financial discrimination (Najib et al., 2021). Sheng (2021) finds that fintech can effectively facilitate SMEs' credit supply while increasing banking sector credit. By using fintech, lending institutions can improve the accuracy and availability of information, expand channels and sources of information, and reduce the friction between them and small businesses (Sedunov, 2017). Moreover, fintech has a positive impact on the efficiency of SMEs. Furthermore, it has become a strength for SMEs to survive during the Covid-19 pandemic (Karim et al., 2022).

According to the Indonesia Fintech Association or AFTECH (2020), there are four fintech business models based on regulations in Indonesia: 1) digital payment, which includes e-money, e-wallet, remittance, payment gateway, POS solutions, payment agent network, bill payment, and payment issuer support; 2) online lending, comprising off-balance sheet lending for consumers and businesses and on-balance sheet lending for consumers; 3) Fintech under digital financial innovation (DFI), consisting of transaction settlement, capital gathering, investment management, insurance, market support, and other digital financial service activity; and 4) equity crowdfunding that defines as the implementation of shares public offering services conducted by issuers to sell shares directly to investors through an open electronic system network, which is offered and managed by a provider.

The SMEs sector can implement digitalization in various ways. Some popular applications in Indonesia are fintech payment (QRIS or Quick Response Code Indonesian Standard), marketplace, peer-to-peer lending, and other crowdfunding applications. QRIS is a national QR code standard launched by the Central Bank of Indonesia and the Indonesian Payment System Association to integrate all non-cash payment methods in Indonesia. Users can use QRIS via any smartphone that has a QR code scanner. SMEs in Indonesia have adopted the QRIS system in response to customer demands for cashless payments. This system enables a payment system that is simpler, faster, and more secure. In February 2023, the number of merchants using QRIS reached 24.9 million, totaling 30.87 million QRIS users (bi.go.id, 2023). The presence of e-commerce also supports the SME industry's rapid growth as the digital economy's primary platform. In line with this, digital payment activities through banking, also known as digital banking, are rapidly increasing[3].

[3] DKSP. (2020). *Booklet Perkembangan Digital Payment di Indonesia*. Jakarta: Bank Indonesia.

Currently, SMEs can use peer-to-peer lending as the capital source. In developing countries, financing access is more difficult for households and small businesses (Beck and De La Torre, 2007). The prevailing peer-to-peer lending platform or online loans in Indonesia provides easy access to financing for SMEs with more favorable terms and faster processes than traditional financial institutions[4]. Deng (2022)states that peer-to-peer lending improves SMEs' access to capital in OECD countries. SMEs struggling to raise debt financing may be able to meet their needs through P2P lending fintech. With society's rapid adoption of technology, it is critical to understand users' readiness to capture human-technology interactions. Technology is crucial to achieving effectiveness and efficiency. Trinugroho et al. (2022) reported that businesses adopting digital technology had higher revenues and sales during the COVID-19 pandemic.

There are several existing studies on technology readiness. A Technology Readiness Index (TRI), developed by Parasuraman in 2000, measures people's readiness to adopt new technologies based on four dimensions: optimism, innovativeness, discomfort, and insecurity. Favorable views of technology's potential are reflected in optimism, while innovativeness is demonstrated by a willingness to explore new technologies. Discomfort refers to the unease caused by unfamiliar and complex technologies, while insecurity concerns privacy and security. These factors define an individual's overall technological readiness, influencing their likelihood of adopting or resisting technological innovations. TRI is widely used in professional and personal contexts regarding technology adoption behaviors.

In addition, Mahmud et al. (2023) investigated customer fintech readiness in Bangladesh, measuring seven key dimensions: demographics, financial health, financial literacy, e-readiness, mental preparedness, existing fintech use, and overall sentiment. Fintech readiness is multifaceted, emphasizing the interplay between individual, technological, and systemic factors. Demographic factors play an important role, with young, well-educated, and higher-income individuals more inclined to adopt fintech, exposing a digital divide. To engage in digital financial activities, stability and resilience are important. Similarly, financial literacy is pivotal, especially in underserved areas, where gaps limit adoption, so more education is needed. E-readiness is a measure of access to and familiarity with digital technologies, and greater competence is associated with higher adoption rates, demonstrating the importance of investing in digital infrastructure. The level of mental preparedness and overall sentiment reveal psychological factors influencing adoption, such as trust and embracing change, emphasizing the importance of addressing concerns about security and reliability. Using fintech in the existing economy facilitates readiness by fostering familiarity and reducing apprehension, underscoring the value of incremental adoption strategies. Overall, Mahmud et al.'s (2023) framework provides stakeholders with a guide to enhancing financial inclusion and digital adoption.

METHODOLOGY

This research examines the factors that affect the adoption of digital financial transformation for SMEs. In Indonesia, the micro sector accounts for most of the output. It accounts for 98.67% of all businesses. According to data from the Indonesia Statistic Bureau, the number of micro and small enterprises in Central Java in 2022 is 862,926 enterprises. Central Java was chosen as the focus area because the province has a diverse economic background, with SMEs playing a significant role in urban and rural economies. This diversity is expected to illustrate the factors that can influence the digital financial transformation of SMEs. We conducted an online survey of 456 SMEs in Central Java, Indonesia. We clean our data by dropping the outliers and data errors and avoiding the respondent’s mistakes while entering the data. This cleaning leaves us with 411 data, representing a 90.13% response rate.

Furthermore, while the micro sector employs the most people, small and medium-sized businesses need more preparation to use technology. Therefore, this study investigates Indonesia's micro sector's readiness for digital transformation. There have been various studies on technology readiness. Parasuraman (2000) developed the technology readiness index (TRI) using optimism, innovativeness, discomfort, and insecurity indicators. It describes a person's tendency to use and apply new technology to accomplish their goals in either their personal or professional lives.

[4] Otoritas Jasa Keuangan, (2022). *Sikapi Uangmu: Peer-to-peer Lending in Improving Financing Access for SMEs in Indonesia*. Jakarta: Financial Services Authority.

Moreover, Mahmud et al. (2023) explored customer fintech readiness in Bangladesh. It measures seven critical dimensions: demographics, financial health, financial literacy, e-readiness, mental preparedness, existing fintech use, and overall sentiment. This study assesses readiness to adopt and use fintech products, platforms, and customer-facing services. These works attempt to integrate the theories proposed by Parasuraman (2000) and Mahmud et al. (2023) as the theoretical foundation.

The requirements for evaluating the determinant of SMEs' use of technology to test our hypothesis using the following fitted model:

$$\begin{aligned} Fintechuse = {} & \alpha + \beta_1\, finhealth_i + \beta_2\, techknowledge_i + \beta_3\, marketdemand_i + \beta_4\, insecurity_i \\ & + \beta_5\, gender_i + \beta_6\, ownerage_i + \beta_7\, edu_i + \beta_8\, form_i + \beta_9\, category_i + \beta_{10}\, sme_i \\ & + \beta_{11}\, revenue_i + \beta_{12}\, firmage_i + \beta_{13}\, employee_i + \varepsilon \end{aligned} \quad (1)$$

We focus on the coefficient and significant sign, with data tested using STATA 17. Many factors influence SMEs' readiness to use fintech, including demographic, economic, and other variables. We built the model with five indicators based on existing literature and the state of SMEs in Indonesia. We built the model with five indicators based on existing literature and the state of SMEs in Indonesia. First, we evaluate SMEs' current fintech use as the dependent variable of this study and a measure of their readiness for digital transformation, particularly in finance. Second, we examine the impact of the remaining four indicators: 1) financial health, 2) technological knowledge, 3) market demand, and 4) insecurity.

We also consider the backgrounds of the owners and SMEs' profile to better understand their readiness to use technology. Owner-related factors include gender, age, and education level, which influence digital adaptability and financial literacy. Meanwhile, SMEs' profiles cover business entity type, sector, business classification, company age, number of employees, revenue, and capital source. The business entity type (e.g., sole proprietorship, PT, CV) and sector (e.g., culinary, fashion, crafts) shape operational and digital needs. Business class classification (micro, small, medium) and company age affect flexibility in adopting fintech, while employee count reflects operational complexity. Revenue and capital source determine SMEs' financial capacity for investing in technology. Analyzing these factors helps us assess SMEs' fintech adoption readiness.

RESULT AND DISCUSSION

We divide descriptive statistics into three categories. First, we describe the profiles of the SME owners. Then, we specify the SMEs' characteristics. The owners' and SMEs' profiles would affect their tendency to use technology. Based on the demographic characteristics listed in Table 1, the samples are dominated by SME owners aged 41 to 50 with senior high school education. Aside from the description for the SMEs profile in Table 2, approximately 33% are in the food and beverage category, and the majority are micro-businesses. Most of the revenue is less than two million rupiahs, with fewer than 20 employees. Approximately 84% of SMEs have private capital, compared to only 6% from banks.

Table 1 Descriptive statistics of SME owner

Demographic Characteristic		Frequency	Percentage
Gender	MEN	192	47%
	WOMEN	219	53%
Owner's age	<20 y.o.	28	7%
	20-30 y.o.	84	20%
	31-40 y.o.	96	23%
	41-50 y.o.	120	29%
	more than 50 y.o.	83	20%
Owner's education	no educational background	8	2%
	elementary	29	7%
	junior high school	50	12%
	senior high school	191	46%
	3-year diploma	34	8%
	bachelor	88	21%
	master and doctoral	11	3%

Table 2 Descriptive Statistics of SMEs Profile

Demographic Characteristic		Frequency	Percentage
Business entity type	INDIVIDUAL	391	95%
	CV (Limited partnership)	13	3%
	PT (Limited liability company)	7	2%
Sector	Food and Beverages	136	33%
	Fashion	44	11%
	Furniture	12	3%
	Manufacturing	8	2%
	Agriculture	10	2%
	Trade	100	24%
	Livestock	9	2%
	Automotive	10	2%
	Service	66	16%
	Others	16	4%
Business classification	Micro enterprises	386	94%
	Small enterprises	18	4%
	Medium enterprises	7	2%
Revenue	Less than 2 million rupiah	136	33%
	2-5 million rupiah	128	31%
	5-10 million rupiah	53	13%
	20-50 million rupiah	46	11%
	20-50million rupiah	32	8%
	More than 50 million rupiah	16	4%
Age of company	1889 - 1990	17	4%
	1990 - 2000	24	6%
	2001 - 2010	98	24%
	2011 - 2023	272	66%
Number of employees	1 - 20	273	66%
	21 - 50	7	2%
	51 - 300	2	0%
	No employee	129	31%
Capital Source	Private capital	351	84%
	Shared capital	30	7%
	Banks/rural banks	27	6%
	Other financial ins	6	1%
	P2P lending	0	0%
	Predatory lender	0	0%
	Other	4	1%

As presented in Table 3, the findings revealed that 85% of respondents are bankable, but only 56% use m-banking or internet banking. Twenty-six percent of the total 411 respondents sell their products on the marketplace, with 39% using fintech to complete the transaction. The marketplace serves as a platform for offering products to meet customers and making fintech payments via bank accounts. The bank's m-banking or internet banking facility will make it easier for customers to check and receive their earnings. As a result, if most respondents are eligible for banking, they should be able to gain more market share by increasing their access to the marketplace and providing digital payment options.

Table 3 SMEs' Current Use of Fintech

Current Use of Fintech	In percent	Level of use
Having a bank account	85%	adequately used
Selling the product on the marketplace	26%	low used
Using fintech payment	39%	low used
Using m-banking/internet banking	56%	averaged
Having accessed online loan applications as a borrower	5%	not used at all
Having accessed online loan applications as investors	1%	not used at all
Having a digital investment account	6%	not used at all

Furthermore, the results indicate that 6% of respondents have a digital investment account. The investment platform offers online mutual fund investing, state bonds, capital markets, and other services. The findings additionally suggest that the owners of SMEs in Indonesia are knowledgeable about investment. Based on the data, the owners of SMEs use peer-to-peer lending accounts to invest their money. The data also confirmed that while the number of SMEs investing in online loan applications remains low, they know the benefits of investing in their assets.

Peer-to-peer lending is currently a viable source of capital. Peer-to-peer lending has several advantages, including ease of access and use. It also allows for faster funding. However, the amount of money available

through peer-to-peer lending is limited compared to banks. Our findings indicate that 5% of respondents use peer-to-peer lending as a source of capital.

The next step of our analysis is to identify factors that influence SMEs' readiness to adopt technology. We asked respondents about their financial health, technological knowledge, SME market demand, and insecurity as independent variables. Three models were estimated with different combination of control variables. Table 4 presents the regression results of factors that influence SMEs' readiness to adopt technology.

Table 4. Results of Regression Analysis

	(1) fintechuse	(2) fintechuse	(3) fintechuse
Financial health	0.300	0.527	0.463
	(0.040)	(0.039)	(0.040)
Technology knowledge	0.178***	0.192***	0.225***
	(0.042)	(0.042)	(0.041)
Market demand	0.285***	0.300***	0.315***
	(0.035)	(0.034)	(0.035)
Technology Insecurity	0.572	0.096*	0.110*
	(0.042)	(0.042)	(0.043)
Gender	-0.069	-0.042	
	(0.089)	(0.089)	
Owner's age	-0.109*	-0.125**	
	(0.047)	(0.042)	
Owner's education	0.145***	0.158***	
	(0.037)	(0.038)	
Type of Business entity	0.155		0.187
	(0.209)		(0.205)
Sector	-0.003		-0.005
	(0.014)		(0.014)
Business classification	0.114		0.132
	(0.129)		(0.136)
Revenue	0.084*		0.098**
	(0.037)		(0.037)
Age of Company	-0.001		-0.007
	(0.004)		(0.003)
Number of employees	0.000		0.000
	(0.002)		(0.002)
Constant	-0.946*	-0.597*	-1.120***
	(0.408)	(0.297)	(0.273)
N	411	411	411
R^2	0.350	2,343	0.332
adj. R^2	0.339	0.331	0.323
RMSE	0.617	0.624	0.631

Notes: Standard errors in parentheses* p < 0.05, ** p < 0.01, *** p < 0.001.

SMEs' finances are healthy when they have a financial record, can manage their finances, generate profits, increase their business assets, have an emergency fund, and can pay off any outstanding credits. According to Mahmud et al. (2023), financial health and literacy affect people's readiness to use technology. On the contrary, financial health does not influence technology adoption. The results remained the same when we tested the relationship between financial health and fintech adoption while considering the characteristics of SMEs and their owners. This finding suggests that SMEs' readiness to use fintech is unaffected by their financial health.

The market demand variable determines whether SMEs' customers must shop through digital media such as barcode payments or marketplaces. We find significant evidence that market demand affects the use of fintech. The number of respondents selling their products or services through the marketplace was 26%, indicating that it needs to be more utilized. However, they believe that customers will access their products online. So, they are motivated to market it online. At that time, they must be ready to use technology, especially fintech.

We also evaluate the role of technological knowledge. We explored information about their use of smartphones, internet connection in their business locations, interest in keeping up with fintech development, and capability to learn technology. As a result, the variable of technological knowledge has a significant impact on how SMEs use fintech. People accustomed to using smartphones are better equipped to use fintech. They will have a better chance of accessing fintech if they live in an area with a good internet connection and

are eager to learn about technology. These results remained the same when we tested the profiles of SMEs and their owners.

The insecurity variable seeks to understand the perspectives of SME owners on technology security. Of 411 respondents, 48% believe digital technology is unsafe, frequently fails when used, and is difficult to understand. However, this variable has no significant impact on the use of technology or fintech. This result could also be explained by the demographics of the most significant respondents, aged 40 to 50.

We also evaluate several control variables to better understand the significance of the owner's and SMEs' profiles. The owner's age influences SMEs' use of technology. Younger owners tend to adopt technology more intensely. Younger people are more adaptable to new experiences and environments. The regression result in Table 4 show that owner's age is negatively and significantly related to fintech adoption. This means that younger owners are more ready for fintech adoption. The results of this study also suggest that SME owners with higher educational levels have a greater level of readiness for fintech adoption. Higher education levels will lead to greater use of fintech. This finding is consistent with the report of Trinugroho et al. (2021) that younger businesses, owners, and other owner characteristics are associated with a greater probability of adopting digital technology.

The regression result also shows that the profile of SMEs affects their readiness to use fintech. Revenue has a positive and significant effect on SMEs' fintech adoption. Revenue plays a critical role in SMEs' readiness to adopt fintech. As a business's revenue increases, it supports business expansion, technology investment, product development, operational stability, and marketing efforts.

CONCLUSION

This study examines the readiness of Indonesian SMEs to use fintech, evaluates the factors that influence SMEs' use of fintech, and investigates the impact of SME's profile and owner's profile on technology readiness. The finding reveals that SMEs are bankable but have low fintech readiness. The number of SMEs selling their products on the marketplace, using fintech payment, and adopting m-banking and internet banking remains low. People with a bank account and internet access may have easier access to other digital platforms such as fintech payment and marketplaces. Furthermore, fintech peer-to-peer lending has become one of the capital sources for SMEs, but the number of SMEs that use fintech peer-to-peer lending as a capital source is minimal and even nearly zero. Technological knowledge, market demand, and owner education influence readiness. This study also suggests that the profiles of the owners and SMEs affect technology adoption.

This study contributes to the literature by delving into the factors affecting SMEs' use of fintech. The results of the study offer policy implications. Financial technology regulators and actors can assess micro-businesses readiness and educate micro-actors on using financial technology to support business success.

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