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The Influence of Financial Inclusion, Financial Literacy, and Financial Behavior on MSME Financial Performance: The Moderating Role of Financial Technology Adoption in Indonesia and Malaysia

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ABSTRACT

This study is designed to explore the mediating role of financial technology adoption in shaping the influence of financial inclusion, financial literacy, and financial behavior on overall economic outcomes. The study employed a survey using a questionnaire and collected 200 valid responses. The survey was distributed to informants in Malaysia and Indonesia. The data were examined through SEM using partial least squares, revealing that financial inclusion, literacy, behavior, and the adoption of technology significantly influence financial performance. Financial technology adoption moderated the effects of inclusion and literacy on performance. Meanwhile, adopting financial technology did not moderate the linkage between behavior and performance. The results further revealed that MSMEs continuously enhance financial inclusion, literacy, behavior, and the adoption of technology. MSMEs are able to adapt and utilize these factors appropriately and quickly to reduce costs and improve their performance.

Keywords: Adoption of financial technology, Inclusion, Literacy, Financial Behavior, MSME Performance

INTRODUCTION

One of the biggest lessons from the coronavirus disaster is that financial transaction patterns have quickly changed from initially using a manual system through using an ATM or making direct transactions at the bank to a faster and more effective online system or financial transaction system. Several payment systems are available, Such as digital-based payment platforms and mobile banking accessibility. Of course, digital-based payment systems are highly recommended to minimize crime and prevent virus attacks (Allam, 2020).

The emergence of this new transactional landscape directly results from COVID-19 restrictions on gatherings and rapid technological advancements. The increasing sophistication of smartphones and the extensive use of the internet has facilitated all transactions within individual limits much more accessible. Empowering a significant portion of the Indonesian population, data from APJII (2022) reveals that around 210 million Indonesians, which accounts for roughly 77% of the nation's 272 million people, gained internet access in 2021.

The potential of the digital economy in Southeast Asia menurut (Temasek, Bain & Co, 2022) is immense, with the region witnessing a rapid growth of digital technology across various aspects, articularly technology-based financial services. This exciting trend is particularly pronounced in Indonesia, where online payments, digital investment insurance, and transfers are experiencing exponential growth. Such a scenario provides significant prospects for companies, policymakers, and researchers interested in the digital economy and financial sector of the region.

Access to bank services at this higher level reflects the advancement of inclusion, particularly within the Indonesian context. Inclusion, in accordance with OJK regulations, is Financial institutions provide access facilities adapted to the needs and circumstances of the whole community to achieve prosperity. Ensuring financial inclusion is crucial, requiring speed, low cost, sustainability, effectiveness, and efficiency.

The importance of financial inclusion represents a massive influence on a country's economic. In principle, financial inclusion has created jobs, encouraged sustainable economic growth, reduced inequality, and improved community welfare. The central aim of inclusion is to enhance societal welfare. Research results have proven the role of inclusion in driving economic growth (Khera et.al, 2021).

Furthermore, Liu's (2021) research results state that In China, digital inclusion exerts a positive effect on economic development and can increase even higher because of the sophisticated and wide-reaching internet infrastructure. Likewise, Yanti (2019); Ozturk & Ullah (2022), according to Tay et.al, (2022), developing Asian nations encourage the advancement of digital inclusion as a means to alleviate poverty.

According to SNLIK (2022), there exists a significant disparity between Indonesia's literacy index and its financial inclusion index. However, this disparity also signifies a significant opportunity for improvement, as a considerable portion of the population is utilizing financial service products without a comprehensive understanding of their nature (Nisaputra, Rezkiana, 2022).

Given the substantial positive impact of inclusion on economic growth, the government has determined high financial inclusion growth. It is not easy to achieve this target because there are several significant challenges that the government has not been able to overcome. (1) the availability and procurement of Internet infrastructure still need to improve in Indonesia. (2) low human resource capabilities in the use IT, especially in the regions. (3) inequality in access to digital infrastructure by communities residing on Java and outside Java. Initiatives to increase financial literacy have limited accessibility for people living outside Java, while financial technology has arisen to facilitate broader availability of financial services and products, is a response to the substantial population of Indonesians who currently lack access to financial services, as reported by the World Bank's 2015 survey (Sanistasya et.al, 2019).

According to Shafi et al. (2020), stated that the development of MSMEs is promising, but they are still developing into large-scale businesses. These MSMEs grapple with many problems, such as conventional business models and low human resources, financing, marketing, and financial management. Improving MSME performance is crucial and should be a concern for the government and investors. For MSMEs, the continued development of financial technology is unavoidable because it will continue to exist in business practices. If MSMEs cannot adjust their financial behavior, they cannot improve their performance (Lu,L 2018).

This research aims: (1) to examine whether inclusion, literacy, behavior, and technology affect performance, and (2) to determine whether technology moderates the impact of inclusion, literacy, and behavior on performance.

Hypothesis Development

The influence of inclusion on the performance of MSMEs

Research of The World Bank (2014) emphasizes that inclusion goes beyond mere individual access to financial products, but it also has significant societal implications. Similarly, the Financial Services Authority, through POJK (2016), describes inclusion as a mechanism to ensure access to banking and financial services, service or products that contribute to social welfare and foster economic progress.

Based on previous studies, inclusion refers to viewed from various angles. Gerdeva and Rhyne (2011) define it as a condition in which every individual can access financial products. On the other hand, Zins and Weill (2016) present a more specific definition, describing inclusion as a comprehensive financial plan intended to deliver services to underprivileged communities.

Financial inclusion (Durai & Stella, 2019): (Swamy, 2014) ; (Aritonang et al., 2023); (Fomum & Opperman, 2023) is not a goal that can be achieved by a single entity. It requires the collective efforts of financial institutions, policymakers, and the community. Its aim is to improve company performance and the community's economy by reducing economic inequality through increased and ensuring equal access for the public to financial services and products. From the research presented above, the hypothesis derived is:

H1: Inclusion influences the performance of MSMEs Financial

The influence of financial literacy on the financial performance of MSMEs

According Lusardi & Mitchell (2014) define literacy as the capacity to interpret economic condition for accurate decision makingConsiderable studies have focused on identifying the key determinants of SMEa significant relationship between literacy and performance of small and medium enterprises a crucial determinant. rior studies have repeatedly indicated a significant association between financial literacy and small business performance, underscoring the importance of this relationship (Dahmen & Rodriguez, 2014; Agyapong & Attram, 2019; Chamwada, 2015;; Kimundu et al, 2016).

Small businesses possessing solid financial literacy are able to reach their business objectives, focus on growth, and remain resilient under challenging economic conditions. According to Draxler et al. (2014), small business owners participate in intricate financial decisions that are strategic in nature to meet business goals and maintain sustainability. Hypothesis developed:

H2**: The level of literacy has an impact on MSME performance**

The influence of behavior on performance of MSMEs Financial

Behavioral finance, the study of how people behave when making financial decisions, is where the intrigue lies. It's a field that investigates how psychology, a discipline that delves into the human mind, influences corporate financial decisions and financial markets (Baker & Nofsinger, 2010). Financial behavior refers to the way individuals manage and invest their money, which is strongly shaped by psychological factors.

Research results from Haryadi et al. (2023) show that financial behavior influences performance in investment decisions. Likewise, the research results of Feng & Reich (2021) highlights an immediate relationship between well-being and behavior, noting that positive financial behavior enhances individuals' feeling of financial security when applied in financial activities. Behavior encompasses a person's responsibilities in handling their financial matters, where financial accountability involves the productive management of financial, and management of financial resources refers to the administration and utilization of financial resources. Therefore, the development of a hypothesis is made:

H3: Financial behavior influences the performance of MSMEs financial

The influence of Technology Adoption On The Performance of MSMEs Financial

Bank Indonesia defines financial technology as the adoption of technological innovations in finance to create innovative services, business models, and products, potentially affecting financial system stability, efficiency of operations, security, and confidentiality in payment transactions. Meanwhile, FSB (Nizar, 2017) describes fintech as technological advancements within the financial services industry that produce business system, program, or service that significantly shape the provision of bank and financial.

According to Elmira (2022); Chenguang et.al, (2024), Fintech developments impact various areas of the the financial product, insurance, capital markets, and other. Current financial technology uses digital tools to offer various new and innovative services, thereby influencing company performance (Dinh et al., 2020).

Mabula's research results (2018) and Ozili's (2018) show that The use of technology by companies is strongly correlated with their recording practices and overall performance, while financial literacy positively influences company risk management. Regarding the formulation of the hypothesis:

H4: Adoption of fintech influences the performance of MSMEs financial

The Effect of Inclusion on the Performance of MSMEs Financial Mediated by The Adoption of FinTech

According to Efan et.al, (2022), inclusion positively relates to performance of MSME by facilitating Access to financial services and support for more adaptable financial operations. Nonetheless, adoption fintech variables do not serve as a mediator in this relationship. Rahmi (2019); Kunt and Klapper (2013) which concluded that financial inclusion needs fintech in accelerating its development, particularly in Indonesia's digital era. By playing fintech, we can accelerate the achievement of the Indonesian government's 2020 vision goal, namely Digital Vision 2020.

Research by Leong et al. (2017) regarding the case of microloans shows that The adoption of financial technology can enhance financial inclusion for individuals obtaining loans from fintech companies. Fintech serves segments overlooked by banks while also offering improved services to existing bank customers. The adoption of fintech has become increasingly influential in transforming the financial and banking sectors (Batunanggar, 2019); (Faith, 2018); Soriano (2017); Jagtiani & Lemieux (2017) and Caeli et.al (2021). Based on the earlier statement, the fifth hypothesis is formulated as:

H5: Inclusion influences the performance of MSMEs financial mediated by the adoption of financial technology

The Influence of Literacy on the Performance of MSMEs Financial Mediated by the Adoption of Technology

With increasing financial penetration, fintech will undoubtedly create competition in the banking subsector. A 2016 survey by Pricewaterhouse Coopers (PwC) cited in Setiawan (2016) shows that approximately according to 83% of established banking and financial institutions, there is concern that fintech could overtake their enterprise. Fintech thus poses potential challenges to the banking subsector. This is in line with Kennedy (2017), who states that fintech can disrupt banking. Fintech is generally appreciated for the simplicity of financial transactions in comparison to the rigid and complex administrative procedures in banking. Complex administrative processes and stringent regulations are among the reasons why banks are still not optimal in carrying out financial penetration.

Peter and Long's research result (2019) observed that greater financial literacy strongly and positively influences individuals' awareness of fintech products. These results still hold when we use a set of instrumental variables for the financial literacy variable.

Azmi and Harmain (2022); Ladi et al. (2024) stated that financial literacy positively affects interest in adopting fintech payments (pay later) on Shopee. Convenience positively affects an interest in utilizing fintech payment options, such as "pay later," on Shopee. Risk exerts a positive effect on the interest when utilizing Shopee's financial pay-later fintech payment option, where the convenience variable and risk variable have the most dominant influence regarding the interest in using Shopee's pay-later fintech payment option. The following is the development of the hypothesis:

H6: Literacy influences the performance of MSMEs financial mediated by the adoption of fintech

The Impact of Financial Behavior on the Performance of MSMEs Financial Mediated by the Adoption of Financial Technology

FinTech's important role in Indonesia is to increase financial mobility and promote the development of MSMEs. Technologi of Financial makes payments more efficient, fast, and easy, enables access to financial transactions from anywhere via applications, and allows monitoring of investments anytime, anywhere (Bundner & Harefa, 2018)

Research by Irmawati (2022) indicates that financial behavior has an insignificant effect on performance of company when fintech functions as a moderator. In contrast, Putu and Kadek (2021) found a significant and favorable effect of behavior on MSME investment decisions through the use of Fintech Lending. This reseacrh emphasizes that financial management behavior is vital in daily activities. Proper management of finances offers the potential to secure a prosperous future, with financial literacy functioning as an important tool for individuals in handling their financial resources. Thus, the development of the hypothesis is:

H7: Financial Behavior affects MSME financial performance through the mediation of financial technology adoption.

METHODOLOGY

Research Respondents

This study uses a survey research design, gathering data via distributed questionnaires both in person and via an online platform (Google Docs) to reveal data about company performance as seen and affected by entry to financial prodict information, financial knowledge and behavior of medium-sized enterprises, with financial technology adoption serving as a moderator. The respondents of this research are MSME owners who live in Indonesia, including cities on the islands of Java and Madura, as well as cities in Malaysia. There were 200 questionnaires from MSMEs from each country that were collected.

Definition of variables and their measurement

This study examines how inclusion, literacy, and behavior influence performance MSME financial, with financial technology serving as a mediating factor. The research, MSME performance is described as the outcome of strategies applied by companies to attain market targets and achieve both market and financial objectives. Performance measurement draws on items originally designed Khandwalla (1977), supported by

Miller (1987), so that later used researchers result Cragg et.al, (2002) and Pollard & Morales (2015). Operational performance was evaluated with the application of a 5-point Likert scale.

In the present study, financial technology adoption was measured follows the research of Sianggaran et al. (2019): Angelina (2020), which measures aspects of (a) Perceived usefulness from the aspect of usefulness for its users, (b) Perceived ease of use, that technology makes it easier to complete work. (c) Perception of risk, a person's condition for doing or not using online technology.

Financial inclusion depends on the ability to access existing and diverse types of financial institutions and services. Furthermore, such accessibility fosters prosperity by lowering transaction and information costs, enhancing asset liquidity, and supporting activities with greater added value, which ultimately stimulates economic growth (Sharma, 2016). The financial inclusion variable is measured with nine question items developed by David and Noelia (2014) and Hilman and Nasrudin (2019).

According to OJK (2019) and Etty & Manurung (2021), financial literacy encompasses awareness and as well as the comprehension of financial concepts and risks, along with the motivation and ability to implication this knowledge in making sound decisions that improve personal financial welfare. Measurement of literacy in the current study utilized tools created by Kelmara et al. (2020) and Adele and Flore (2021).

Behavior of financial pertains to an individual's competence in managing daily financial activities, including planning, organizing, actuating, controlling, and storing funds (Khairani & Alfarisi, 2019). Behavior of financial pertains to how an person handles, manages, and utilizes their financial resources (Susanti et. al, 2017). In current research, behavior was measured following the approaches of Baranidharan (2023) and Haryadi (2023).

Analysis of the Collected Data and Hypothesis Testing

The hypotheses in this research were tested using statistical methods applies a SEM through the partial least squares (PLS) technique. This study examines (1) the direct effects of inclusion, literacy, behavior, and technology adoption on MSME financial, and (2) the indirect effects of inclusion, literacy, and behavior on MSME financial mediated by adoption of fintech.

PLS 3.0 software was employed to conduct the path analysis. The analysis followed SEM procedures in five steps: (1) model specification, (2) selection of the algorithm, (3) determination of the resampling approuch, (4) construction of the structural path diagram and subsequent assessment of the model (Ghozali, 2014).

RESULTS

Characteristics of Informance MSMEs

The business entities sampled in this research are MSMEs in Indonesia and Malaysia. The cities are across 2 locations of many MSMEs. These locations include Madura and Java in Indonesia and Selangor and Terengganu in Malaysia. The company characteristics based on business characteristics are in Table 1.

Table 1 Descriptive Analysis of the Sampled Companies

No	Type of Bisnis	Total	Persentase
1	Retail	51	26%
2	Wholesale	43	22%
3	Service	49	25%
4	Others	57	29%

Based on business type, respondent characteristics are classified into four groups: retail business, wholesale business, service, and other businesses. The four business categories from these respondents are all MSMEs that have used financial technology. Table 1 indicates that respondents were distributed across four group: 26% in retail businesses, 22% in wholesale businesses, 25% in service businesses, and 29% in other business types.

The respondents in this study had quite diverse characteristics. These characteristics which is presented in Table 2. Respondent categories show an almost equal distribution by region. Cities in Madura reached 26%, cities in Java as much as 24%, Selangor 31% and Trengganu city as much as 20%. The composition of respondents based on gender is almost equal between men and women (56% and 44% respectively). Based on educational background, most of them consisted of a bachelor's degree (48%), secondary school 37%, diploma 10% and there were also respondents with master's degrees (6%). Meanwhile, In terms of respondent age, most were between 18 and 22 years old, 27%, 23% aged 23-27, 24% aged 28-32 years and 26% aged 33-37 years.

Table 2 Respondent Demographic Attributes

No	Respondent of Demographic Attributes	Total	%
1	Demographic Area		
	Madura (Indonesia)	52	26%
	Java (Indonesia)	48	24%
	Selangor (Malaysia)	61	31%
	Trengganu (Malaysia)	39	20%
2	Gender		
	Male	112	56%
	Female	88	44%
3	Education		
	Senior high school	74	37%
	Diploma	19	10%
	Undergraduate	95	48%
	Master/Doctoral	12	6%
4	Age		
	18 - 22	52	27%
	23 - 27	48	23%
	28 - 32	49	24%
	33 - 37	51	26%

Hypothesis Testing

This study employs PLS-SEM analysis utilizing the Smart PLS. The analysis is divided into two sub-models: the measurement (outer) model and the structural (inner) model. The structural model, in PLS does not require assumptions regarding parameter distribution, meaning parametric methods are unnecessary (Ghozali, 2014).

Validity and reliability of the measurement model are evaluated using the outer model. Convergent and discriminant validity were employed to assess validity, while Cronbach's alpha and composite reliability were used to examine construct reliability, using SmartPLS 3.0. Following data analysis, Table 3 illustrates the results that the outer model evaluation shows that all indicators of the constructs are valid, with loading factors exceeding 0.70. In addition, Table 3 indicates that each construct yields an AVE score above 0.50, satisfying the convergent validity criterion. All reflective constructs show Cronbach's alpha and composite reliability values above 0.70, demonstrating that the indicators are dependable.

Tabel 3 Construct of Reliability & Validity

Contruct	Indicator	Loading	Cronbach's Alpha	Composite Reliability	AVE
Financial Inclusion	X.1.1.2	0,794	0,901	0,924	0,670
	X.1.1.3	0,834			
	X.1.1.4	0,860			
	X1.1.5	0,831			
	X1.2.1	0,833			
	X1.2.3	0,755			
Financial Literacy	X2.1.3	0,741	0,901	0,922	0,630
	X2.1.6	0,813			
	X2.2.1	0,799			
	X2.2.2	0,748			
	X2.2.3	0,864			
	X2.2.4	0,810			
	X2.3.2	0,773			
Behavioral Finance	X3.2.3	0,890	0,856	0,913	0,777
	X3.3.1	0,852			
	X3.3.2	0,902			
Performance	Y.4.1	0,888	0,862	0,906	0,709
	Y.4.2	0,865			
	Y.4.3	0,758			
	Y3.3	0,850			

Financial Technology Adoption	Z.1.1	0,878	0,949	0,956	0,688
	Z.1.2	0,910			
	Z.1.3	0,923			
	Z.1.4	0,831			
	Z.2.1	0,867			
	Z.2.3	0,813			
	Z.2.4	0,864			
	Z.3.1	0,715			
	Z.3.2	0,743			
	Z.3.4	0,720			

Evaluation of the inner model was carried out through an analysis of the proportion of variance explained, represented by the R-square value of the endogenous latent construct. T The R-square values are presented in Table 4.

Tabel 4 R-Square of the Inner Model

Variable	R Square
Financial Technology Adoption	0,652
Performance	0,332

As presented in Table 4, the R-square coefficient for fintech adoption is reported 0.652, and performance is 0.332. Fintech adoption is classified as high, and the level of performance is classified as low.

Hypothesis Test Results

Hypotheses were tested by examining the T-statistics and value of significance of the path coefficients. The complete results are presented in Tables 5 and 6.

Tabel 5: Direct Effect Hypothesis Test Results

Test of Hypothesis Result (direct - effect)							
Hypo thesis	**Relationship**	**Original Sample (O)**	**Sample Mean (M)**	**Standard Deviation (STDEV)**	**T Statistics (|O/STDEV|)**	**P Values**	**Decision**
H1	Financial Inclusion -> Performance	0,096	0,097	0,127	1,759	**0,048**	Supprorted
H2	Financial Literacy _ -> Performance	0,523	0,511	0,100	5,210	**0,000**	Supprorted
H3	Behavioral Finance -> Performance	0,053	0,066	0,100	1,833	**0,046**	Supprorted
H4	Financial Technology Adoption -> Performance	0,166	0,169	0,102	1,682	**0,022**	Supported

In this hypothesis test, The analysis employed a T-table value of 1.652, based on 200 degrees of freedom at a 0.05 significance level. As presented in Table 10, the results reveal a direct association between inclusion and performance, evidenced by a computed T-value of 1.759 with a significance level of 0.048. Hypothesis 1 is confirmed, suggesting that financial inclusion exerts a direct influence on financial performance. Furthermore, as presented in Table 10, literacy records a T-value of 5.210 with p-value = 0.000. Accordingly, Hypothesis 2 is supported, establishing that literacy has a significant impact on performance of financial

The analysis indicates that financial behavior significantly affects financial performance (T = 1.833, p = 0.046), supporting Hypothesis 3. Likewise, financial technology adoption significantly affects financial performance (T = 1.682, p = 0.022), supporting Hypothesis 4, as summarized in Table 5.

Tabel 6 Results of Hypothesis Testing (Mediating/Indirect Effect)

Hypothesis testing result (indirect effect)							
Hypo thesis	**Relationship**	**Origin al Estima te (O)**	**Sample Mean (M)**	**Standard Deviation (STDEV)**	**T Statistics (|O/ST DEV|)**	**P Valu es**	**Decission**
H5	Financial Inclusion-> Financial Technology Adoption-> Performance_	0,101	0,101	0,062	1,662	0,001	Supprorte d
H6	Financial Literacy-> Financial Technology Adoption -> Performance	-0,196	-0,192	0,097	1,998	0,046	Supprorte d
H7	Behavioral Finance-> Financial Technology Adoption -> Performance	0,089	-0,089	0,108	0,822	0,412	Not Supported

Financial technology adoption moderates the impact of inclusion on performance of financial.

The findings of the financial technology adoption result are presented in Table 6, serves as a moderating variable in terms of how inclusion relates to financial performance. The results show a T-value of 1.662 with a significance level of 0.001, suggesting that Hypothesis 5 is supported, confirming that fintech adoption moderates this relationship.

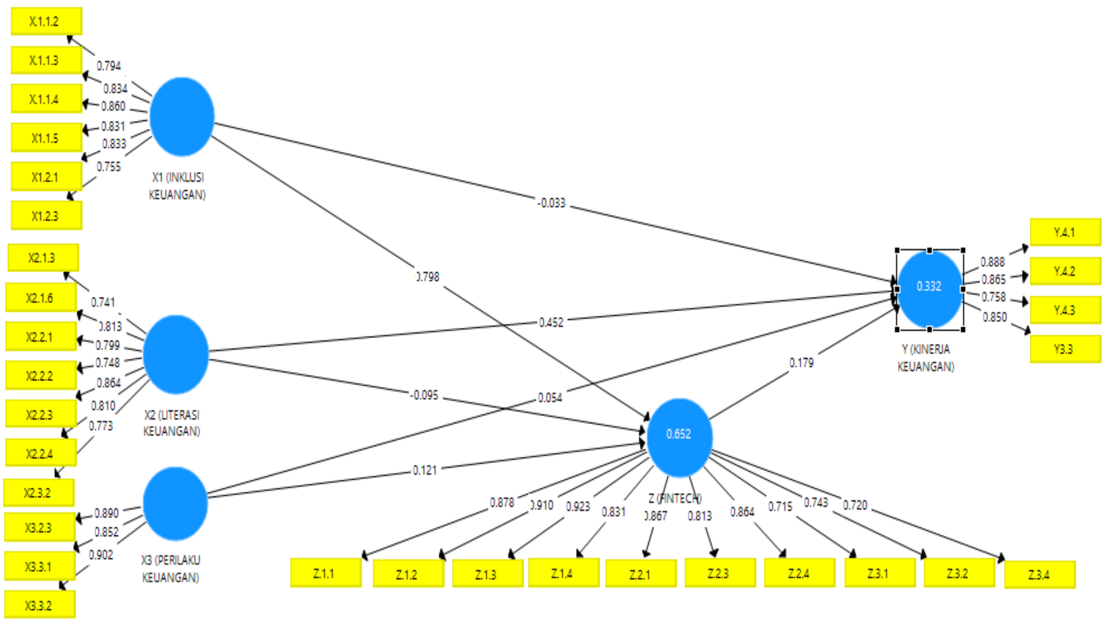

Figure: Confirmatory Factor Analysis (CFA) Model

Fintech adoption moderates the role of financial literacy in shaping financial performance.

Table 6 shows the results of testing fintech adoption as a moderating variable in terms of how literacy conected to performance. The findings show a T-value of 1.998, at the 0.046 level of significance, implying that Hypothesis 6 is supported, confirming that fintech adoption moderates this relationship.

The adoption of fintech fails to moderate the effect of behavior on performance of financial.

Table 6 shows the results of testing the moderating role of fintech adoption in the link between behavior and performance. The analysis resulted in a T-value of 0.822 and a significance level of 0.412, implication that Hypothesis 6 is not supported, meaning fintech adoption does not moderate this relationship.

DISCUSSION

The results of hypothesis testing reveal that inclusion exerts a positive and direct influence on performance of MSMEs. Enhancing financial inclusion by providing accessible and cost-effective financial products enables businesses to better meet the demands of the enterprise sector. These needs encompass savings, payments and savings (World Bank, 2016), which, when utilized responsibly and sustainably, can substantially improve MSME performance.

Earlier studies examining the link between inclusion and performance likewise concluded that inclusion contributes positively on the financial outcomes of MSMEs (Fomum & Opperman, 2023; Aritonga et al., 2023). Further studies conducted by Mohamad et.al, (2015) and Fanta et.al, (2017) emphasize that inclusion influences business performance, as restricted access to financing represents a significant obstacle to the growth of micro-enterprises.

Access to finance exerts a greater influence on MSME growth than on larger firms, though its impact on the performance of MSMEs shows no statistical significance (Lakuma et.al, 2019). Other studies by Lee et.al, (2020) confirm that financial inclusion supports Increase in sales and Exerts a significant positive impact on MSME performance and expansion in both developed and developing countries (Lee et.al, 2019).

Inclusion will significantly reduce financial constraints, encourage investment, and increase production and employment (Morgan & Pontines, 2014). If effectively applied, financial inclusion can boost the economic performance of MSME businesses (Mbuotor & Uba, 2013 and Onaolapo, 2015). Literacy refers to the skills, and knowledge that influence behavior, improving financial decision-making and administration to support community financial prosperity. The hypothesis testing results show a favorable relationship between literacy and MSME performance. Greater skills, confidence and knowledge in financial matters among business owners correspond to improved business performance. hese findings align with studies by Agyapong & Attram (2019); Chamwada (2015); Dahmen & Rodriguez (2014); and Kimunduu et.al, (2016), which investigated factors affecting the performance of small and medium-sized enterprises (SMEs), among them, literacy. The results validate the relationship between literacy and SME performance.

Literacy of financial contributes to improved financial management practices while reducing the likelihood of financial mistakes. It also enables managers to be more innovative in their decision-making in using credit, debt and variable costs, and than using stock promptly. Furthermore, Lusardi & Mitchell (2014) and Priyanto et.al, (2023) showed that firms with greater financial literacy tend to implement more effective financial management practices, thereby enhancing MSME performance.

Hypothesis testing indicates that financial behavior positively affects MSME performance. In other words, individuals who manage their finances responsibly, realistically, and systematically tend to achieve better business performance. Financial behavior represents a fundamental aspect of an individual's life. Engaging in positive behaviors, such as saving, investing, and budgeting, promotes long-term financial stability and security. By understanding and practicing these behaviors, Individual can effectively oversee their finances efficiently and create well-informed decisions that align with the organization's financial objectives (Baranidharan, 2023).

Yong et al. (2018) found that the pursuit of higher company profits is driven by managers' growing interest in understanding business information and organizational conditions, which in turn aligns personal financial behavior more closely with company performance. In addition, research by Atkinson and Messy (2012) states that a person's positive behavior significantly impacts the financial well-being of individuals. Hence, recognizing the factors that drive SME success is essential for enhancing their sustainability (Jalali et al., 2020).

Findings from Erik et al. (2021) and Iwan & Ida (2024), indicate that for companies to progress and become leaders, Adopting fintech services from software development providers is crucial and essential, reflecting the growth of a sector where innovative technological solutions are developed and applied to streamline traditional financial operations.

With technological maturity at its peak, businesses are collaborating with fintech consultants to develop innovative strategies, including fintech solutions, to achieve their objectives. Fintech solutions refer to how innovation in banking, insurance, or other financial services industries has resulted in new technologies that make customer transactions cheaper, faster, and more effective. This revolution changes our work by providing new services and products (Yuang, 2023).

Baker et.al, (2024) examined the effect of fintech adoption on performance, finding that fintech contributes positively to bank profitability. Similarly, other studies also report a significant link between fintech adoption and profitability, as modern financial institutions capitalize on technological advancements to enhance earnings in the digital era (Dong et.al, 2020). Furthermore, Jarah et.al (2022) indicates that financial technology can maximize profits and reduce transaction costs. Meanwhile, research (Gellweiler & Krishnamurthi, 2020) found that companies must implement an optimal organizational structure to reduce costs, especially agency costs.

Researh result analyzing the impact of inclusion on MSME performance, with fintech adoption as a variable of mediating, reveals a positive and statistically significant correlation. Moreover, the mediating role of fintech adoption is significant at the 5% level, validating the mediating effect of fintech adoption on the relationship between inclusion and MSME performance. This provides evidence that effective inclusion enhances MSME performance, which can be further amplified by advanced financial technology. Financial inclusion can be optimized and developed if supported by various uses of financial technology (Fitriani & Santi, 2023).

Promising financial technology is characterized by utilizing information technology to offer financial solutions while emphasizing adherence consistent based on prudential and risk management guidelines. Fintech should facilitate quick access to loans, simplify payments, and allow fee-free transactions. Additionally, fintech should serve as an investment tool and support better financial management. It should also contribute to the economic development of middle- and lower-income communities, including students, thereby promoting improved financial management (Subagiyo, 2021). Inclusion is vital in enhancing the performance of MSMEs financial. Effective financial inclusion guarantees that businesses or individuals can utilize financial products and services that are both affordable and advantageous —such as transactions, savings, payments and credit - provided in a responsible and sustainable manner. Access to a transaction account is a key indicator of inclusion, as it enables individuals to send payments. Moreover, access to financial resources supports everyday needs while allowing households and enable businesses to strategize for both long-term objectives and unforeseen contingencies (World Bank, 2022).

The empirical testing of literacy effect on MSME performance of financial, incorporating fintech adoption as a mediating variable, shows positive and significant relationship results. The findings confirm that adoption of technology acts as a crucial mediator in the link between literacy and MSME performance with the effect supported at a 5% significance threshold, indicating that the indirect effect of financial literacy on MSME performance through fintech adoption is validated.

According to Fenty and Fitri (2023), the literacy impacts the effectiveness of decisions of financial management. Financial literacy contributes to improves your skill, knowledge, and self-confidence in all matters related to finance, so that all business decisions made become more appropriate and positively impact improving performance. Conversely, a lack of financial understanding tends to make individuals unable to choose appropriate financial services, so efforts to improve performance are hampered.

Based on these findings, strong financial literacy is likely to enhance MSME performance. The performance of MSMEs will be much higher if they continue to be supported by the use of sophisticated, easy, and effective financial technology. Financial literacy can be optimized and developed if supported by various uses of financial technology (Sennou et al., 2019 and Ozili, 2023).

Financial technology (Fintech), according to Hasan (2023), is a financial technology that facilitates financial transactions and services. However, easy access to fintech needs to be balanced with adequate financial literacy to impact financial performance positively. More financial literacy will encourage unwise financial decisions, such as taking on debt without considering the interest risk, investing without considering the risk of loss, and not thinking comprehensively. Furthermore, an incomprehensive understanding of fintech service products also makes users vulnerable to fraud and loss of funds. Literacy makes us understand the application of financial management. literacy education can imparted to all groups. Because fintech can be accessed by anyone (Bachrudin & Hendi, 2022).

In the data testing section, the effect of behavior on the performance of MSMEs financial mediated by financial technology as a mediating variable shows positive but not significant relationship results. These findings align with Dewi (2020), who reported that fintech adoption does not significantly affect financial behavior in MSMEs, due to a lack of sufficient understanding and knowledge among business owners in utilizing such technology. Apart from that, the many cases related to adopting financial technology tend to make business actors doubt and feel worried about leaking their privacy, resulting in a lack of attraction to utilizing financial technology. Even though business actors feel the ease of adopting financial technology, provided that it does not exert a significant effect on MSMEs behavior in enhancing performance, they will lose their attraction to utilizing financial technology (Wiyono & Kirana, 2020).

CONCLUSION

This study seeks to investigate the mediatory function of fintech within relationship between literacy, behavior and inclusion, on financial performance. According to the PLS-SEM testing, the findings suggest that (1) literacy, inclusion, the adoption of fintech and behavior collectively exert a meaningful impact on financial performance. (2) Fintech adoption moderates the effects of financial inclusion and financial literacy on financial performance, but shows lays no mediating role in the relationship between behavior and financial performance.

The findings indicate that MSMEs should continuously enhance inclusion, behavior, literacy, and adoption of fintech to continue improving their financial performance. Furthermore, with the ongoing advancement of financial technology, MSMEs must adapt and leverage it efficiently to reduce costs and enhance performance. The progress of fintech innovations for MSMEs is defined by speed and dynamism. Therefore, it must be balanced with their commitment to being willing and aware of how to behave responsibly in managing their finances effectively.

The current study encounters a number of constraints. First, despite the relatively large study sample, consisting of 200 respondents, it is not evenly distributed across the cities in Indonesia and Malaysia. It is primarily due to the time constraints of reaching all cities in these two countries. Subsequent studies should expand the scope and coverage of the current research to enlarge the study sample, thereby providing an enhanced comprehension of the subject matter. Secondly, the demographic composition of respondents is uneven, this limits an accurate representation of conditions across the four studied regions. It is recommended that future research ensure sample equality using proportional sampling methods.

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