

The Influence of FinTech Continuance Intention, Financial Access, Financial Literacy, and Innovation on Microenterprise Sustainability

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Abstract: Microenterprises play a vital role in economic development in Indonesia, especially in creating jobs and supporting the local economy. The majority of microenterprises, especially in the food sector, still suffer from financial literacy, limited access to finance and financial technology (FinTech), and low innovation level, which may threaten sustainability. The study aims to explore the effects of FinTech, financial literacy, financial access, and innovation with the mediation of microenterprise performance on microenterprise sustainability. The research design used is explanatory research with a quantitative research approach. Primary data were collected using structured questionnaires from 280 microenterprise owners using FinTech applications. The data were analyzed using Partial Least Squares Structural Equation Modeling (PLS-SEM). The results reveal that FinTech continuance intention, financial literacy, financial access, and innovation have both direct and indirect impacts on microenterprises sustainability through performance. This highlights the importance of strengthening financial literacy, digitalization, and innovation.

Keywords: financial access, financial literacy, FinTech, innovation, microenterprise sustainability

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INTRODUCTION

Microenterprises have a large contribution in increasing the economic growth in Indonesia by creating jobs and reducing poverty (Bongomin et al., 2025; Statistics Indonesia [Badan Pusat Statistik], 2024b). Coordinating Ministry for Economic Affairs of the Republic of Indonesia (2022), representing 99.18% of total enterprises units that contributed 60.50% to GDP, employ 96.90% of the workforce. Microenterprises are a promising strategy in reducing economic and social inequality through empowerment (Sentoso et al., 2024). Statistics Indonesia [Badan Pusat Statistik] (2024b) stated that most micro and small enterprises are in food manufacturing, with an employment of around 3.7 million workers. According to (Statistics Indonesia [Badan Pusat Statistik], 2024a), microenterprises in the food and beverage sector in the Riau Islands represent 99.20%. One of the main economic sectors in the Riau Islands is food, which still plays an important role in supporting local employment and the gross domestic product (GDP) of the Riau Islands, and Batam.

In the midst of Indonesia's economic dynamism, the digital transformation process has changed the way microenterprises operate (Krah et al., 2024). Microenterprises fall mainly into the informal sector, and they usually have low productivity and low technology utilization (Statistics Indonesia [Badan Pusat Statistik], 2024b). Market Research Indonesia (2025) reported a decline in cash usage from over 70% in 2020 to around 51% in 2025, which shows the rapid adoption of digital payments and wider adoption of FinTech. FinTech is the strategic use of technology in financial services to improve efficiency and reliability (Bank Indonesia, 2017), has become essential for enhancing financial inclusion and business sustainability (Nugraha et al., 2022).

Adopting FinTech enhances operational efficiency, competitiveness, and financial management (Gupta et al., 2022; Krah et al., 2024; Rahadjeng et al., 2023), and it promotes digital transactions contributing to economic development (Widagdo & Sa'diyah, 2023). However, adoption is still uneven due to the lack of financial knowledge and access (Statistics Indonesia [Badan Pusat Statistik], 2024b). Despite the growing digitalization of financial services, financial literacy among Indonesian micro entrepreneurs remains relatively low (Kurniasari et al., 2023). Data from Statistics Indonesia [Badan Pusat Statistik] (2024a) indicate that 48.59% of the owners have only completed primary education or lower. According to the Financial Service Authority (2024), micro entrepreneurs with a higher education level had higher financial literacy. University graduates have the highest level of financial literacy (98.54%), while high school graduates had 88.29%, and secondary school graduates had the lowest level of financial literacy (73.18%). Those who had no formal education had the lowest levels of financial inclusion (51.53% for secondary school graduates and 62.58% for those having no education), highlighting education's crucial role in financial capability.

Financial literacy has been identified as the financial knowledge and attitudes of micro entrepreneurs, which can affect the success of their businesses to achieve better financial decisions, so that their businesses will be sustainable (Mujiatun et al., 2023). Individuals with low literacy are often incapable of handling finances properly and disrupt the business sustainability (Bongomin et al., 2025). Literacy improvement leads to managerial and analytical capability enhancement and ultimately better sustainable financial performances (Aripin & Zuhriyah, 2025; Rahmawati et al., 2023).

Cholil et al. (2024) stated that microenterprises in Indonesia have capital constraints and face challenges in balancing the short-term performance of finances with long-term sustainability. As shown by the data of Statistics Indonesia [Badan Pusat Statistik] (2024b), the percentage of food industry enterprises that rely on self-owned capital was 40.60%, and many still have limited external financing access. Financial access is an important factor in enhancing business performance and resilience by providing enterprises with the opportunity to obtain external financing and invest in productive activities (Abdallah et al., 2025). There are many programs by the government, such as the people's business credit program, productive micro business assistance, and revolving fund management institution, that aim to provide capital support (Coordinating Ministry for Economic Affairs of the Republic of Indonesia, 2022).

However, the effectiveness is still limited because of uneven implementation and lack of awareness (Widyastuti et al., 2023). Many microentrepreneurs in Indonesia still have difficulty in handling financial decisions and securing external funding, which is a challenge to their sustainability (Budiarto et al., 2023; Kurniasari et al., 2023, 2025). Data from Statistics Indonesia [Badan Pusat Statistik] (2024a) show that the food and beverage industry operates in an intensely competitive environment, compelling the enterprises to innovate to sustain their market

presence. Financial Service Authority (2024) indicates that only 166,948 out of the 1,800,827 enterprises in the food industry had carried out innovation. Innovation is an activity that is considered strategic, in order to sustain microenterprises and achieve competitive advantage in a competitive environment (Mulyaningrum et al., 2025; Purwanto et al., 2022). The enterprises need to develop the entrepreneurial spirit, which is resilient and innovative, in order to enhance the performance of the enterprise (Sentoso et al., 2024). It also serves as a key driver of economic prosperity and sustainable development through its contribution to employment creation and poverty alleviation (Heenkenda et al., 2022). To sustain performance and profitability, the enterprises must pay attention to quality, price, innovation, and good customer service (Cuandra & Candy, 2024). The ability to develop innovation is crucial for sustaining performance and competitiveness.

Previous studies have looked at the impact of financial literacy, financial access, FinTech continuance intention, and innovation on microenterprise performance and sustainability. Given that all respondents in this study had already adopted at least one FinTech service, the construct was operationalized as FinTech continuance intention, reflecting enterprises' willingness to continue, recommend, and expand their use of FinTech services rather than their initial adoption decision. The measurement captures post-adoption behavioral intention instead of initial adoption. However, most studies focus on broader SME (Small and Medium Enterprise) in general or at the national level, with limited attention to the food microenterprises. Therefore, this study is important to fill the gap, in order to provide empirical and policy knowledge about how to sustain the performance of food microenterprises in Batam through continued FinTech use, financial literacy, financial access, and innovation.

Dynamic Capabilities Theory

The dynamic capabilities theory explains that firms achieve and sustain competitive advantage by integrating, building, and reconfiguring internal and external competencies in dynamic environments (Teece et al., 1997). These capabilities enhance enterprises' sustainability performance through innovation and profitability enabled by sensing, seizing, and transforming processes (Siddik et al., 2023). They also enable the renewal of competencies and transformation of resources into strategic assets that drive innovation and performance (Dejardin et al., 2023). As an important dynamic capability, absorptive capacity facilitates sustainability through the effective utilization of knowledge, whereas the adoption and innovation of FinTech serve as responses to technological change (Ledi et al., 2023; Siddik et al., 2023). The development of knowledge-based and innovation capabilities strengthens an enterprise's ability to maintain long-term sustainability and performance (Heenkenda et al., 2022; Siddik et al., 2023).

Financial Inclusion Theory

Financial inclusion theory emphasizes equitable access, availability, and effective utilization of financial services as fundamental enablers of economic participation and sustainable development (OECD, 2016; Thathsarani & Jianguo, 2022). It provides a framework that promotes the expansion of financial access, affordability, consumer protection, and responsible usage to ensure that financial systems benefit individuals and enterprises inclusively (OECD, 2016). Thathsarani & Jianguo (2022) maintain that an inclusive financial system has to provide accessibility, affordability, and quality of financial services and products so that microenterprises can participate productively in the economy. Access to finance enables microenterprises to overcome liquidity constraints, invest productively, and enhance competitiveness (Rajamani et al., 2022). Through improved access to affordable and reliable financial services, financial inclusion fosters business growth, operational efficiency, and

resilience (Rahadjeng et al., 2023). It also enhances sustainability through stable financing, better risk management, and improved cash flow (Elmi et al., 2025). Financial Inclusion Theory positions equitable financial access as a developmental mechanism that strengthens enterprise performance and accelerates inclusive and business sustainability (Thathsarani & Jianguo, 2022).

Microenterprise Performance Mediates FinTech Continuance Intention Toward Sustainability

FinTech enhances financial efficiency, transparency, and adaptability, strengthening microenterprise performance and long-term sustainability (Kurniasari et al., 2023; Widagdo & Sa'diyah, 2023). Digital payments and mobile applications improve cash flow management, reduce costs, and support business stability (Kurniasari et al., 2025). Kurniawan et al. (2023) emphasize that technological innovation also increases access to financial resources and resilience. Similarly, Siddik et al. (2023) find that FinTech utilization enhances firms' sustainability by facilitating financing, risk mitigation, and continuity of operations. Empirical evidence from Indonesia shows FinTech improves efficiency, sales, and profitability, enhancing sustainability (Menne et al., 2022; Rahadjeng et al., 2023). Similar findings in India and Cameroon confirm its positive impact on enterprise performance (Kunal et al., 2025; Lontchi et al., 2023). Improved performance functions as a central mechanism linking continued FinTech use to long-term enterprise sustainability (Bajwa et al., 2025; Kurniasari et al., 2025). In other words, FinTech initially strengthens microenterprise performance, which subsequently supports sustainability through stable growth and resilience (Menne et al., 2022; Siddik et al., 2023). Therefore, we hypothesized that:

H1: FinTech continuance intention positively influences microenterprise performance.

H2: FinTech continuance intention has a positive impact on microenterprise sustainability.

H3: FinTech continuance intention positively influences microenterprise sustainability through microenterprise performance.

Microenterprise Performance Mediates Financial Literacy Toward Sustainability

Financial literacy is a crucial factor influencing microenterprise performance, especially in developing economies, by enabling rational financial decisions and effective resource allocation (Abdallah et al., 2025; Aripin & Zuhriyah, 2025). It encompasses the knowledge, skills, and attitudes that enable entrepreneurs to make effective financial decisions and utilize financial resources efficiently (Budiman et al., 2025; Kurniasari et al., 2023; OECD, 2025). Financial literacy enhances management quality and decision-making among entrepreneurs, which directly enhances performance (Dwijayanty et al., 2025; Kurniasari et al., 2025; Widagdo & Sa'diyah, 2023) and sustainability (Bongomin et al., 2025; Budiarto et al., 2023).

Lontchi et al. (2023) indicate that entrepreneurs with higher levels of financial literacy demonstrate better control over cash flow, record keeping, and financial decision-making, which significantly strengthens business performance and growth. Empirical evidence from Indonesia further shows that financial literacy significantly increases sales, customer base, and profit margins in microenterprises by strengthening cash flow management (Kurniasari et al., 2025; Widyastuti et al., 2023). Consistent findings across developing countries reveal that financial literacy supports enterprise performance through better cost control, risk management, and decision-making capabilities (Culebro-Martínez et al., 2024; Masdupi et al., 2024; Rahmawati et al., 2023). Improved financial literacy fosters positive financial behavior, enabling microenterprises to plan, save, and reinvest wisely, which strengthens performance and growth (Supramono et al., 2025). Empirical evidence confirms that financially literate microenterprise owners are more capable of achieving business sustainability because their improved

performance supports innovation, productivity, and market adaptability (Aripin & Zuhriyah, 2025; Bongomin et al., 2025). Strong performance further sustains enterprises by providing financial resources for expansion and long-term stability (Kurniasari et al., 2025). Accordingly, we hypothesized that:

H4: Financial literacy positively influences microenterprise performance.

H5: Financial literacy has a positive impact on microenterprise sustainability.

H6: Financial literacy positively influences microenterprise sustainability through microenterprise performance.

Microenterprise Performance Mediates Financial Access Toward Sustainability

Financial access serves as a foundational driver of microenterprise performance by enabling firms to obtain necessary capital for daily operations and long-term (Rajamani et al., 2022; Siddik et al., 2023). Access to affordable financial services, including credit, savings, and digital payments, enables microenterprises to meet working capital needs, invest in productive assets, and improve operational efficiency and financial outcomes (Abdallah et al., 2025; Bajwa et al., 2025; Widyastuti et al., 2023). In Indonesia, empirical evidence shows that access to formal credit and financial services significantly enhances microenterprise performance by strengthening working capital availability and business resilience (Kurniasari et al., 2025). Improved access enhances performance through timely funding and operational stability (Bajwa et al., 2025; Rajamani et al., 2022; Thathsarani & Jianguo, 2022).

Financial access is not merely a funding mechanism but a vital enabler of sustainable entrepreneurship across diverse business sectors (Masdupi et al., 2024; Siddik et al., 2023). Similarly, empirical findings demonstrate that financial accessibility contributes directly to sustainability by providing capital for expansion and resilience building (Aripin & Zuhriyah, 2025). When entrepreneurs have easier access to credit and funding opportunities, they can better align business strategies with enhancing both economic and non-financial sustainability outcomes (Cholil et al., 2024). Kurniawan et al. (2023) emphasized that accessible financial support and inclusive banking policies enhance business performance and promote sustainable financial practices among Indonesian microenterprises. Improved performance subsequently contributes to enterprise sustainability by ensuring consistent profitability, innovation capacity, and the ability to withstand economic (Aripin & Zuhriyah, 2025; Masdupi et al., 2024). Furthermore, sufficient financial access allows entrepreneurs to allocate resources strategically, supporting long-term viability and sustainable growth (Cholil et al., 2024). Financial access is conceptualized as a microenterprise's overall perception of its ability to obtain financial resources; although the indicators represent different financing channels, they reflect the same underlying perception of financial accessibility rather than distinct financing mechanisms (Aripin & Zuhriyah, 2025). Therefore, financial access is modeled as a single reflective construct. Therefore, we hypothesized that:

H7: Financial access positively influences microenterprise performance.

H8: Financial access has a positive impact on microenterprise sustainability.

H9: Financial access positively influences microenterprise sustainability through microenterprise performance.

Microenterprise Performance Mediates Innovation Toward Sustainability

Innovation in microenterprises refers to the capability to create and apply new ideas, products, or technologies that enhance adaptability, competitiveness, and efficiency (Becerra-Vicario et al., 2023). Empirical studies have confirmed that innovation positively influences financial and operational performance, as it stimulates product differentiation, customer

satisfaction, and profitability (Pasaribu et al., 2023; Rosyidiana & Narsa, 2024). Empirical evidence by Le et al. (2023) also confirmed that Incremental innovation, such as improving existing products, has a strong impact on growth and profitability. Effective innovation management strengthens performance and long-term viability (Saptono et al., 2024; Valdez-Juárez et al., 2022). Moreover, innovation capability enhances sustainability by fostering adaptability, competitiveness, and resilience in dynamic environments (Cholil et al., 2024; Heenkenda et al., 2022; Zuñiga-Collazos et al., 2025). Accordingly, we hypothesized that:

H10: Innovation positively influences microenterprise performance.

H11: Innovation has a positive impact on microenterprise sustainability.

H12: Innovation positively influences microenterprise sustainability through microenterprise performance.

Microenterprise Performance and Sustainability

Enterprise sustainability reflects an organization's ability to maintain resilience and long-term viability through financial strength, innovation, and adaptive strategies (Masdupi et al., 2024). Kurniasari et al. (2025) stated that financial performance measured through profitability, liquidity, and debt management, serves as a key indicator of growth and sustainability. Sustainability is achieved when enterprises maintain stable financial outcomes, enhance productivity, integrate technological, and innovative practices (Menne et al., 2022). Strong performance enhances competitiveness and business continuity in dynamic markets (Budiarto et al., 2023; Kurniasari et al., 2023). Furthermore, financial performance supports sustainable development and mediates the relationship between enterprise capabilities and long-term sustainability (Gao et al., 2023; Menne et al., 2022). Therefore, we hypothesized that:

H13: Microenterprise performance influences sustainability.

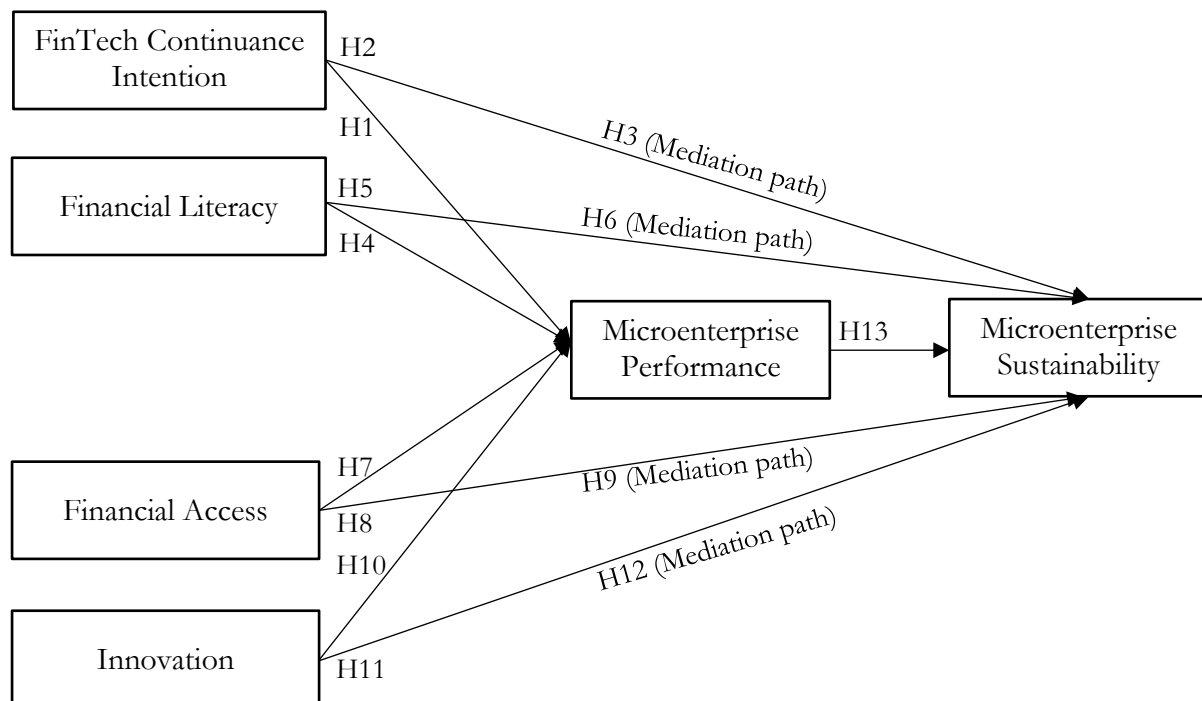


Figure 1. Research Frameworks

METHOD

In this study, quantitative methodology with an explanatory research design was used. Quantitative research is the systematic investigation of the relationships between measurable variables in order to test theories in an objective way by means of a statistical analysis of numerical data (Mulisa, 2022). Primary data were collected through a structured questionnaire using a five-point Likert scale ranging from 1 (strongly disagree) to 5 (strongly agree) and analyzed based on respondents' perceptions. This study focuses on microenterprise actors in the food sector in Batam, Indonesia, examining FinTech continuance intention, financial access, financial literacy, and innovation in relation to microenterprise sustainability, with enterprise performance as a mediating variable.

Purposive sampling was used to determine the sample comprising owners or managers of active microenterprises in the food sector that use at least one FinTech application, such as digital payments, digital lending, digital banking, or digital bookkeeping. Since all respondents had already adopted at least one FinTech application, this study operationalizes the construct as FinTech continuance intention in this study refers to users' continued utilization and expansion of FinTech services rather than initial adoption. Therefore, the construct captures post-adoption behavior, reflecting respondents' commitment to continuously using and recommending FinTech services in their business activities. Researchers intentionally select participants based on their own judgment and expertise to ensure that the sample aligns with the specific objectives of the study (Ahmed, 2024; Zickar & Keith, 2023).

Data collection was carried out from November 2025 to March 2026 from 280 microenterprise owners that meet the criteria through a questionnaire distributed both online (WhatsApp, Instagram, and TikTok) and offline through direct visits to business locations to ensure broader participation and higher response rates. Online samples or respondents have become the primary method of collecting research data (Zickar & Keith, 2023). To minimize common method bias, respondents were informed that their responses would remain anonymous and confidential, participation was voluntary, and there were no right or wrong answers. Clear instructions were provided to encourage honest responses. The minimum sample size was initially determined using the ten-times rule, which suggested a minimum of 240 respondents ($24 \times 10 = 240$), a post hoc statistical power analysis confirmed that the final sample of 280 respondents provided sufficient statistical power to detect the expected effects, exceeding the recommended minimum threshold of 0.80 (Hair Jr et al., 2021).

Data analysis was conducted using the PLS-SEM approach, following the procedures recommended by Setiabudhi et al. (2025). PLS-SEM analysis is performed because the research model is complex with multiple latent constructs and indicators (Magno et al., 2024). The analysis was performed by the measurement model (outer model) assessment and the structural model (inner model). The measurement model was assessed to determine convergent validity, discriminant validity, and construct reliability (Fauzi, 2022). Meanwhile, the structural model will be used to determine the strength and significance of the hypothesized relationships between variables by means of path coefficients and p-values.

Table 1. Variable Description

Code	Variable	References	Indicator
FCI1	FinTech Continuance	(Nugraha et al., 2022)	Our enterprise is willing to continue utilizing FinTech services.
FCI2	Intention		Our enterprise will recommend the use of FinTech services to other businesses or colleagues.

FCI3			Our enterprise would like to use additional FinTech services in the future.
FL1	Financial Literacy	(Aripin & Zuhriyah, 2025)	I am able to evaluate various investment opportunities to develop business assets.
FL2			I regularly plan my budget to achieve specific financial goals, such as saving or investing a set amount of money.
FL3			I am capable of systematically monitoring and regulating cash inflows and outflows to ensure business stability.
FL4			I possess a clear understanding of fundamental financial concepts, including interest rates, inflation, and investment risk.
FL5			I have expertise in various financing options and strategies for responsibly managing business debt.
FL6	Financial Access	(Aripin & Zuhriyah, 2025)	I understand potential financial risks and strategies to mitigate them.
FA1			I find it easy to obtain loans from banks or financial institutions.
FA2			I possess the capability to attract external investors to support business expansion.
FA3			I have access to financial assistance provided through government programs. [Ex: People's Business Credit (KUR), Productive Micro Business Assistance (BPUM), Revolving Fund Management Institution (LPDB-KUMKM)].
FA4			Our enterprise is regarded as credible by financial institutions, which allows us to obtaining capital.
FA5			I effectively utilize personal or family financial resources as an alternative means to finance business development and sustainability.
I1	Innovation	(Le et al., 2023)	Our enterprise has improved an existing product.
I2			Our enterprise has introduced a new product.
I3			Our enterprise has introduced new production processes/technology.
I4			Our enterprise has at least one innovation activity.
P1	Microenterprise Performance	(Hasani et al., 2023)	Our enterprise's sales continue to grow.
P2			Our enterprise's net income increased.
P3			Our customers are increasing.
S1	Microenterprise Sustainability	(Aripin & Zuhriyah, 2025)	Our enterprise is capable of maintaining operations and growth over the long term in a sustainable manner.
S2			Our enterprise is able to sustain profitability while ensuring sound financial management and security.
S3			

Our enterprise demonstrates the ability to adapt and respond effectively to economic fluctuations and operational challenges.

RESULTS AND DISCUSSION

Research Results

The demographic data collected in this study presents a general description of the respondents' characteristics, including several variables that provide important insights and require further analysis to support the research findings.

Table 2. Descriptive Statistics of Respondents

Demographic Variable	Categories	Frequency	Percentage (%)
Gender	Male	133	47.50
	Female	147	52.50
Length of time the business has been operating	More than 6 months - less than 1 year	8	2.86
	1 - 3 years	108	38.57
	4 - 6 years	112	40.00
	7 - 10 years	34	12.14
	More than 10 years	18	6.43
Number of employees	1 - 2 people	241	86.07
	3 - 4 people	39	13.93
Highest education	Elementary school graduate	3	1.07
	Junior high school graduate	91	32.50
	High school graduate	152	54.29
	Bachelor Graduate	34	12.14
	Magister Graduate	0	0.00
Monthly sales revenue	Less than Rp10.00.000	89	31.76
	Rp10.000.000 – Rp30.000.000	135	48.21
	Rp30.000.001 – Rp50.000.000	45	16.07
	Rp50.000.001 – Rp100.000.000	10	3.57
	Rp100.000.001 – Rp150.000.000	0	0.00
	More than Rp150.000.000	1	0.36
FinTech currently used	Digital payments and e-wallets	268	82.21
	Digital lending platforms	0	0.00
	Digital banks	55	16.87
	Digital bookkeeping	3	0.92

Based on the descriptive statistics, the majority of respondents are female (52.50%) over male respondents (47.50%). Regarding the length of operation of businesses, most businesses have been operating for 4 - 6 years (40.00%) and 1 - 3 years (38.57%), indicating that these businesses can survive for a long period of time. The number of employees is mostly dominated by small businesses with 1 - 2 employees (86.07%). Regarding the level of education, most respondents have a high school diploma (54.29%), followed by junior high school graduates (32.50%) and bachelor's degree holders (12.14%). In terms of monthly sales revenue, most respondents receive a monthly revenue of between Rp10,000,000 and Rp30,000,000 (48.21%), followed by those earning less than Rp10,000,000 (31.76%).

For FinTech usage, the majority of respondents use digital payments and e-wallets (82.21%), while the use of digital banks remains limited (16.87%), and no respondents reported using digital lending platforms. The low adoption of digital lending does not necessarily mean limited access to finance. Prior studies show that the adoption of FinTech lending is mainly influenced by behavioral factors (Appiah & Agblewornu, 2025; Irimia-Diéguez et al., 2023).

Table 3. Validity and Reliability Test

Variable	Indicator	Outer Loadings	Cronbach's Alpha	Composite Reliability	Average Variance Extracted
Fintech Continuance Intention	FCI1	0.731	0.843	0.904	0.760
	FCI2	0.950			
	FCI3	0.919			
Financial Literacy	FL1	0.844	0.926	0.942	0.729
	FL2	0.839			
	FL3	0.814			
	FL4	0.866			
	FL5	0.880			
	FL6	0.880			
Financial Access	FA1	0.899	0.917	0.941	0.799
	FA2	0.905			
	FA3	0.885			
	FA4	0.886			
Innovation	I1	0.858	0.880	0.918	0.736
	I2	0.883			
	I3	0.813			
	I4	0.876			
Microenterprise Performance	P1	0.832	0.751	0.858	0.668
	P2	0.837			
	P3	0.782			
Microenterprise Sustainability	S1	0.858	0.791	0.878	0.705
	S2	0.836			
	S3	0.825			

The measurement model assessment results show that all constructs are valid and reliable as they required the standard. During the evaluation process, the indicator FA5 from the financial access construct was removed because its outer loading value was 0.670, which was below the acceptable threshold for convergent validity. Following its removal, the remaining indicators consistently represented entrepreneurs' perceived abilities to access financial resources from various financing channels, providing a more conceptually coherent representation of the financial access construct. Convergent validity was subsequently established, as all remaining indicator loadings exceeded the recommended threshold of 0.700 (Setiabudhi et al., 2025). Additionally, the average variance extracted (AVE) values for all variables are between 0.668 and 0.799, all of which are above the benchmark of 0.50, which means that each construct explains more than half of the variance of its (Hair Jr et al., 2021).

In terms of reliability, the values of cronbach's alpha (CA) and composite reliability (CR) are above the minimum threshold of 0.700 across all constructs. Specifically, CA values range from 0.751 to 0.926, and CR values range from 0.858 to 0.942, which indicate a high level of internal

consistency for all indicators. Therefore, the results show that the constructs are valid and reliable, and the measurement model is suitable for subsequent analysis.

Table 4. Discriminant Validity Test (Fornell-Larcker)

Construct	FCI	FA	FL	I	P	S
FinTech Continuance Intention	0.872					
Financial Access	-0.138	0.894				
Financial Literacy	-0.132	0.186	0.854			
Innovation	0.158	-0.051	0.054	0.858		
Microenterprise Performance	0.185	0.359	0.390	0.314	0.817	
Microenterprise Sustainability	0.283	0.340	0.417	0.366	0.678	0.840

The discriminant validity assessment shows that each construct is empirically distinct from the other constructs in the model (Cheung et al., 2024), as the square root of the AVE is higher than the correlations with other constructs in accordance with the Fornell–Larcker criterion. These results confirm that the constructs are well differentiated and measure distinct concepts in accordance with the underlying theoretical framework.

Table 5. Discriminant Validity Test (Heterotrait–Monotrait Ratio)

Construct	FCI	FA	FL	I	P	S
FinTech Continuance Intention						
Financial Access	0.155					
Financial Literacy	0.173	0.196				
Innovation	0.177	0.075	0.066			
Microenterprise Performance	0.214	0.425	0.464	0.383		
Microenterprise Sustainability	0.337	0.392	0.484	0.435	0.877	

The HTMT results demonstrate adequate discriminant validity. All HTMT values remain below the commonly accepted threshold. This indicates there is no sign of critical construct overlap or multicollinearity between the variables. These results show that the constructs are well differentiated and measure distinct concepts. Consequently, the discriminant validity assumption has been adequately met, and the measurement model is suitable for the structural model analysis.

Table 6. R-square Test

Independent Variable	R-square	R-square adjusted
Microenterprise Performance	0.386	0.377
Microenterprise Sustainability	0.582	0.575

The R-square (R^2) test functions to measure how well the independent variables explain the variance of the dependent variables in the model (Hair Jr et al., 2021). Based on Table 6, the R^2 values indicate the explanatory power of the independent variables on the dependent variables. For microenterprise performance, the R^2 value is 0.386 (adjusted 0.377), meaning about 37.7% of the variation in performance can be explained by the variables in the model, and the remainder can be explained by other factors that were not investigated. For microenterprise sustainability, the R^2 value is 0.582 (adjusted 0.575), which means that 57.5% of the variation in

sustainability can be accounted for by the variables in the model, which shows a better explanatory power.

Table 7. f-square Test

Relation	f-square	Category
FinTech Continuance Intention → Microenterprise Performance	0.084	Small effect
FinTech Continuance Intention → Microenterprise Sustainability	0.115	Small effect
Financial Literacy → Microenterprise Performance	0.181	Medium effect
Financial Literacy → Microenterprise Sustainability	0.113	Small effect
Financial Access → Microenterprise Performance	0.180	Medium effect
Financial Access → Microenterprise Sustainability	0.070	Small effect
Innovation → Microenterprise Performance	0.119	Small effect
Innovation → Microenterprise Sustainability	0.080	Small effect
Microenterprise Performance → Microenterprise Sustainability	0.248	Medium effect

The effect size offers the results showing that most relationships show small to medium effects. As Hair Jr et al. (2021) propose, f-square (f^2) values 0.02, 0.15, and 0.35 correspond to small, medium, and large effect sizes, respectively, reflecting the relative influence of each exogenous construct on the endogenous variable. Financial literacy ($f^2 = 0.181$) and financial access ($f^2 = 0.180$) demonstrated a medium effects on performance. Similarly, performance exhibited a medium effect on sustainability ($f^2 = 0.248$). On the other hand, the rest of the relationships show small effects, meaning that they only have a small contribution to the endogenous constructs.

Table 8. Full Collinearity VIF

Construct	Full Collinearity VIF
FinTech Continuance Intention	1.098
Financial Literacy	1.327
Financial Access	1.301
Innovation	1.228
Microenterprise Performance	1.854
Microenterprise Sustainability	1.934

The full-collinearity VIF assessment was conducted to evaluate the potential presence of common method bias in the study. As presented in the table, the full-collinearity VIF values range from 1.098 to 1.934, with the highest value observed for Microenterprise Sustainability (1.934). All values remain below the recommended threshold of 3, indicating that no substantial full collinearity concerns are present among the constructs (Hair Jr et al., 2021).

Table 9. Collinearity diagnostics

Construct	Microenterprise Performance	Microenterprise Sustainability
FinTech Continuance Intention	1.059	1.148
Financial Literacy	1.056	1.246
Financial Access	1.052	1.242
Innovation	1.033	1.157
Microenterprise Performance		1.627
Microenterprise Sustainability		

Collinearity diagnosis was conducted using internal VIF values to assess potential multicollinearity among predictor constructs in the structural model. As shown in Table 9, VIF values ranged from 1.033 to 1.627, with the highest value observed for the microenterprise performance variable in predicting microenterprise sustainability. The structural model is

considered free from collinearity issues, thereby supporting the reliability of subsequent structural path estimates, as none exceeding the recommended threshold of 3.

Table 10. PLS Predict Assessment

Indicator	Q ² _predict	RMSE PLS-SEM	RMSE LM
P1	0.281	0.757	0.778
P2	0.232	0.811	0.829
P3	0.213	0.811	0.825
S1	0.311	0.747	0.759
S2	0.317	0.780	0.810
S3	0.334	0.765	0.773

The PLSpredict results demonstrate positive predictive relevance, with all Q²_predict values ranging from 0.213 to 0.334. Furthermore, the RMSE values generated by PLS-SEM are lower than those of the linear model for all six indicators, indicating that the model exhibits strong out of sample predictive performance regarding the performance and sustainability of microenterprises (Hair Jr et al., 2021).

Table 11. Model Fit Assessment

Index	Saturated Model	Estimated Model
SRMR	0.057	0.057

The model fit assessment yielded an SRMR value of 0.057 for both the saturated and estimated models, indicating an acceptable level of model fit. These results provide further evidence that the proposed structural model is reasonably consistent with the observed data.

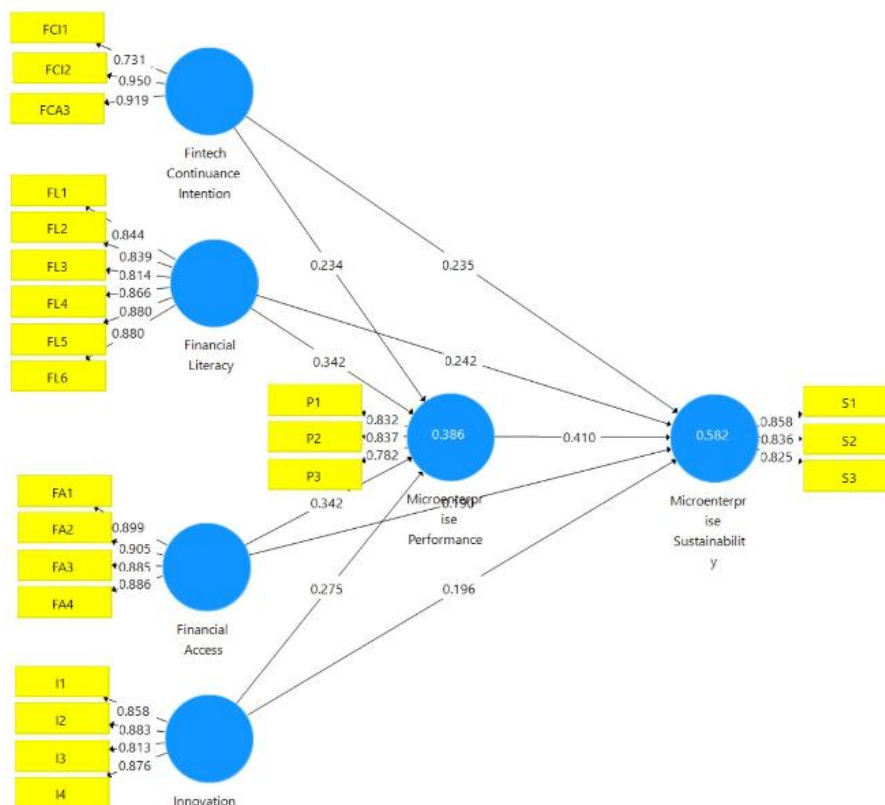


Figure 2. Hypothesis Results

Table 12. Direct Effect Test

Direct Effect	Original Sample (β)	Sample Mean (M)	Standard Deviation	T statistics (T)	p- value	Decision
H1: FinTech Continuance Intention → Microenterprise Performance	0.234	0.239	0.048	4.829	0.000	Supported
H2: Fintech Continuance Intention → Microenterprise Sustainability	0.235	0.236	0.046	5.100	0.000	Supported
H4: Financial Literacy → Microenterprise Performance	0.342	0.342	0.045	7.597	0.000	Supported
H5: Financial Literacy → Microenterprise Sustainability	0.242	0.239	0.047	5.153	0.000	Supported
H7: Financial Access → Microenterprise Performance	0.342	0.341	0.044	7.716	0.000	Supported
H8: Financial Access → Microenterprise Sustainability	0.190	0.189	0.048	3.923	0.000	Supported
H10: Innovation → Microenterprise Performance	0.275	0.278	0.048	5.750	0.000	Supported
H11: Innovation → Microenterprise Sustainability	0.196	0.197	0.042	4.637	0.000	Supported
H13: Microenterprise Performance → Microenterprise Sustainability	0.410	0.411	0.052	7.943	0.000	Supported

H1 suggested that FinTech continuance intention would positively influence microenterprise performance, and the results presented in Table 12 indicate that this relationship is supported, with $\beta = 0.234$, $T = 4.829$, and a p -value = 0.000. This finding suggests that higher levels of FinTech continuance intention lead to improved micro business performance. The use of FinTech improves the efficiency of processes, the speed of transactions and financial management, and thus leads to higher revenues, profitability, and customer growth. H2 proposed that FinTech continuance intention positively influences microenterprise sustainability. Table 12 indicates that FinTech continuance intention not only improves performance but also strengthens long-term business sustainability, as reflected by $\beta = 0.235$, $T = 5.100$, and a p -value < 0.001. The use of FinTech improves the financial management of cash flow, increases access to financial services, and improves the resilience of the business in facing environmental changes.

H4 is proved according to the results, which show that financial literacy positively influences microenterprise performance, based on the indicators that capture financial knowledge, abilities, and attitudes of micro business owners or managers. The results in Table 12 show strong support for this hypothesis, indicated by $\beta = 0.342$, $T = 7.597$, and a $p\text{-value} < 0.001$. This suggests that entrepreneurs with higher levels of financial literacy are better able to manage their business. Better decision making, cost control, and resource allocation lead to better performance results. H5 is supported by the results, which show that financial literacy has a significant positive effect on microenterprise sustainability ($\beta = 0.242$, $T = 5.153$, and $p\text{-value} = 0.000$). This underscores the importance of financial competence for the survival of a business. Business owners with financial competence are better equipped to plan for the future and to avoid possible risks.

H7 proposed that financial access would positively influence microenterprise performance. The findings demonstrate that financial access plays a crucial role in improving an enterprise's performance, as reflected by $\beta = 0.342$, $T = 7.716$, and $p\text{-value} < 0.001$. Availability of funding sources can provide the capital required for expansion of business operations, productive investment, and increased efficiency. H8 proposed that financial access positively influences microenterprise sustainability. The statistical results also show that financial access contributes positively to the sustainability, with $\beta = 0.190$, $T = 3.923$, and $p\text{-value} < 0.001$. This implies that the availability of financial resources enhances the resilience of firms and enables better handling of financial challenges and hence the long-term survival of the business.

H10 is proved according to the results, which show innovation has a significant positive effect on microenterprise performance ($\beta = 0.275$, $T = 5.750$, and $p\text{-value} = 0.000$). This implies that the enterprises that are involved in innovative activities tend to perform better. The release of new products, processes, or technology increases their competitiveness and attracts more customers. H11 suggested that innovation positively influences microenterprise sustainability. Table 12 demonstrates that the effect is positive, as shown by $\beta = 0.196$, $T = 4.637$, and $p\text{-value} < 0.001$. This finding emphasizes that continuous innovation of the business enables microenterprises to respond to the market changes and to continue their relevance over time.

H13 proposed that microenterprise performance would have a positive effect on microenterprise sustainability, and the results reveal that performance has the strongest positive impact on its sustainability, with $\beta = 0.410$, $T = 7.943$, and $p\text{-value} < 0.001$, which indicates a well performing businesses tend to continue functioning well in the long term. Positive financial and operational results provide a strong base for future growth and stability.

Table 13. Confidence Intervals of Direct Effect

Direct Effect	Original Sample (β)	95% Confidence Interval
H1: FinTech Continuance Intention → Microenterprise Performance	0.234	[0.150, 0.336]
H2: Fintech Continuance Intention → Microenterprise Sustainability	0.235	[0.150, 0.326]
H4: Financial Literacy → Microenterprise Performance	0.342	[0.248, 0.422]
H5: Financial Literacy → Microenterprise Sustainability	0.242	[0.136, 0.324]

H7: Financial Access → Microenterprise Performance	0.342	[0.255, 0.428]
H8: Financial Access → Microenterprise Sustainability	0.190	[0.097, 0.292]
H10: Innovation → Microenterprise Performance	0.275	[0.186, 0.366]
H11: Innovation → Microenterprise Sustainability	0.196	[0.114, 0.276]
H13: Microenterprise Performance → Microenterprise Sustainability	0.410	[0.315, 0.508]

The 95% confidence intervals for all direct effects do not include zero, confirming the statistical significance of all hypothesized relationships (Hair Jr et al., 2021). FinTech continuance intention, financial literacy, financial access, and innovation positively influence microenterprise performance and/or microenterprise sustainability, while microenterprise performance also positively affects microenterprise sustainability. These findings provide additional evidence supporting the proposed direct relationships in the structural model.

Table 14. Indirect Effect Test

Indirect Effect	Original Sample (β)	Sample Mean (M)	Standard Deviation	T statistics (T)	p-value	Decision
H3: FinTech Continuance Intention → Microenterprise Performance → Microenterprise Sustainability	0.096	0.099	0.025	3.800	0.000	Supported
H6: Financial Literacy → Microenterprise Performance → Microenterprise Sustainability	0.140	0.141	0.028	4.991	0.000	Supported
H9: Financial Access → Microenterprise Performance → Microenterprise Sustainability	0.140	0.141	0.028	5.088	0.000	Supported
H12: Innovation → Microenterprise Performance → Microenterprise Sustainability	0.113	0.115	0.027	4.236	0.000	Supported

The mediation analysis revealed that microenterprise performance partially mediates the relationships between FinTech continuance intention, financial literacy, financial access, innovation, and microenterprise sustainability. Specifically, the indirect paths from FinTech continuance intention to microenterprise sustainability ($\beta = 0.096$, $T = 3.800$, and $p\text{-value} = 0.000$), financial literacy to sustainability ($\beta = 0.140$, $T = 4.991$, and $p\text{-value} = 0.000$), financial

access to sustainability ($\beta = 0.140$, $T = 5.088$, and $p\text{-value} = 0.000$), and innovation to sustainability ($\beta = 0.113$, $T = 4.236$, and $p\text{-value} = 0.000$). These results indicate that microenterprise performance is a significant mediator mechanism that can be used to explain the exogenous variables' effects on sustainability.

The indirect effects of financial literacy and financial access on microenterprise sustainability among the tested effects have the largest magnitude ($M = 0.141$) than FinTech continuance intention and innovation. The results show that all indirect paths are positive and statistically significant. The indirect effects on the dependent variable through the mediator are all supported by empirical data.

Table 15. Mediation Analysis

Indirect Effect	Indirect Effect	Total Effect	95% Confidence Interval	VAF (%)	Mediation Type
H3: FinTech Continuance Intention → Microenterprise Performance → Microenterprise Sustainability	0.096	0.331	[0.247, 0.419]	29.00	Partial
H6: Financial Literacy → Microenterprise Performance → Microenterprise Sustainability	0.140	0.383	[0.286, 0.462]	36.55	Partial
H9: Financial Access → Microenterprise Performance → Microenterprise Sustainability	0.140	0.330	[0.244, 0.427]	42.42	Partial
H12: Innovation → Microenterprise Performance → Microenterprise Sustainability	0.113	0.310	[0.218, 0.391]	36.45	Partial

Table 15 presents a mediation analysis examining the mediating role of microenterprise performance in the relationship between the intention to continue using FinTech, financial literacy, financial access, innovation, and microenterprise sustainability. The results indicate that all indirect effects are statistically significant, as the 95% confidence intervals do not include zero (Setiabudhi et al., 2025). The VAF values show that microenterprise performance partially mediates the effects of the intention to continue using FinTech (29.00%), financial literacy (36.55%), financial access (42.42%), and innovation (36.45%) on microenterprise sustainability. This indicates complementary mediation, as both direct and indirect effects are positive and significant.

Discussion

The findings demonstrate that FinTech continuance intention significantly improves both microenterprise performance and sustainability among food microenterprises in Batam. The positive impact of FinTech continuance intention supports prior studies emphasizing its role in enhancing efficiency, financial management, and business resilience (Gupta et al., 2022; Rahadjeng et al., 2023). This result is consistent with Dynamic Capabilities Theory, which highlights the importance of technological adaptation in achieving competitive advantage (Ledi et al., 2023). However, the descriptive results indicate that FinTech continuance intention in this study is primarily represented by digital payment services, as 82.21% of respondents use digital payments or e-wallets, while the use of digital banks and bookkeeping was considerably lower, whereas no respondents reported using digital lending platforms. Since all respondents had adopted at least one FinTech application, the findings reflect variations among existing FinTech users rather than differences between adopters and non-adopters. This suggests that continued FinTech use among Batam's micro food enterprises is primarily transactional, rather than financing-oriented. Digital payment systems improve cash flow, simplify transaction recording, and enhance operational efficiency, thereby strengthening business performance and sustainability. Conversely, the lack of digital lending adoption may indicate a preference for personal savings or conventional financing and greater caution toward online lending. Therefore, the positive impact of FinTech continuance intention primarily reflects the benefits of digital payments, not digital lending. 03/09/2026

Financial literacy also shows a strong influence, indicating that better financial knowledge improves decision-making and business outcomes (Abdallah et al., 2025; Aripin & Zuhriyah, 2025). In this context, business owners typically perform multiple managerial functions simultaneously, including purchasing raw materials, setting selling prices, recording transactions, and managing cash flow. Improved financial literacy enables entrepreneurs to prepare budgets, control production costs, and respond more effectively to fluctuations in raw material prices. Consequently, this strengthens operational performance, further supporting long-term business sustainability. And financial access contributes significantly by enabling capital acquisition and strengthening operational stability (Bajwa et al., 2025; Rajamani et al., 2022). Although access to external financing positively impacts performance and sustainability, descriptive evidence suggests that formal digital lending has not been utilized by respondents. This suggests that financial access among Batam's food microenterprises is likely obtained through conventional banking services, government financing programs such as People's Business Credit (KUR), or personal and family resources, rather than through FinTech loans.

Innovation likewise positively affects performance and sustainability, as innovative enterprises are more adaptable and competitive in dynamic markets (Cholil et al., 2024; Heenkenda et al., 2022; Le et al., 2023). Among Batam food microenterprises, innovation mainly involves improving existing products, introducing new products, and adopting new production processes. This adaptability is crucial in Batam's competitive food market, where customer preferences are rapidly evolving and product differentiation is crucial for long-term survival. Furthermore, microenterprise performance partially mediates the relationships between FinTech continuance intention, financial access, financial literacy, innovation, and sustainability (Gao et al., 2023; Kurniasari et al., 2025; Menne et al., 2022). The strong direct effect of performance on sustainability also suggests that profitable and growing businesses are more likely to be sustainable in the long term (Budiarto et al., 2023; Kurniasari et al., 2023).

The findings extend Dynamic Capabilities Theory by demonstrating that financial literacy, digital technology, and innovation function as complementary organizational capabilities that improve microenterprise performance and sustainability. Furthermore, the findings extend Financial Inclusion Theory by providing empirical evidence that financial access contributes to business outcomes not only directly but also through continued FinTech utilization, highlighting the complementary role of financial capability and digital technology in supporting microenterprise sustainability.

CONCLUSIONS

This study demonstrates that microenterprise sustainability is strongly influenced by FinTech continuance intention, financial literacy, financial access, and innovation. The study also confirms that microenterprise performance is significant to its sustainability and serves as a mediating variable between FinTech continuance intention, financial access, financial literacy, innovation, and microenterprise sustainability. Moreover, financial literacy and financial access are the two factors that contribute the most towards microenterprise sustainability. In addition, microenterprise performance emerges as a crucial determinant, indicating that improvements in profitability, sales, and customer growth are essential for long-term sustainability.

The study results suggest that microenterprises need to enhance financial literacy, access to financing, and continue innovating to be competitive and sustainable. This study is limited to microenterprises in the food sector in Batam, Indonesia, which may restrict the generalizability of the findings to other sectors or regions. In addition, the study only included microenterprises that had adopted at least one FinTech application. Therefore, the findings reflect the variations among existing FinTech users and cannot be generalized to those who have not adopted the technology.

Future studies are recommended to examine other business sectors and include additional variables to provide a broader understanding of microenterprise sustainability. Furthermore, future studies should include both FinTech adopters and non-adopters to examine whether the effects of FinTech continuance intention on microenterprise performance and sustainability differ across adoption groups.

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