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FINTECH CAPABILITY AND ECONOMIC SUSTAINABILITY OF SMES: THE MEDIATING ROLES OF BUSINESS RESILIENCE AND INNOVATION CAPABILITY IN INDONESIA'S FOOD AND BEVERAGE SECTOR

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ABSTRACT

Small and Medium-Sized Enterprises (SMEs) in Indonesia's food and beverage sector represent a vital component of the national economy, yet they continue to encounter persistent structural constraints—limited access to finance, inadequate digital readiness, and operational inefficiency. Fintech capability, defined as a firm's capacity to adopt, integrate, and manage financial technologies, has increasingly been recognised as a strategic determinant of cost efficiency, liquidity improvement, and competitiveness. This study examines the extent to which fintech capability shapes the economic sustainability of SMEs, with business resilience and innovation capability serving as mediating mechanisms.

Drawing on survey data from 200 SME owners, the research employs a quantitative explanatory design and applies Partial Least Squares Structural Equation Modelling (PLS-SEM) to test both direct and indirect relationships. The empirical results reveal that fintech capability exerts no direct influence on economic sustainability ($\beta = 0.020$; $p = 0.481$), yet it significantly enhances business resilience ($\beta = 0.432$; $p < 0.001$) and innovation capability ($\beta = 0.477$; $p < 0.001$). Both mediators exhibit strong positive effects on economic sustainability, resilience ($\beta = 0.516$; $p < 0.001$), and innovation ($\beta = 0.406$; $p < 0.001$), confirming that fintech capability contributes to economic value creation through adaptive efficiency and innovation-driven transformation.

From an economic standpoint, these findings suggest that fintech adoption strengthens SMEs' microeconomic stability, enhances resource allocation efficiency, and supports long-term profitability. Theoretically, the study integrates the Resource-Based Theory (RBT), Dynamic Capability Theory (DCT), and Diffusion of Innovation Theory (DOIT) to elucidate how digital financial competence fortifies organisational adaptability and economic competitiveness. Practically, the research offers actionable insights for policymakers and SME managers on leveraging fintech to optimise liquidity management, lower transaction costs, and foster sustained economic growth across the SME sector.

Keywords: fintech capability, economic sustainability, business resilience, innovation capability, digital finance, SME competitiveness, dynamic capability theory, Indonesia

JEL Classification: O32, O33, Q55

INTRODUCTION

Digital transformation in the Industry 5.0 era marks a significant shift in the global economic landscape, where technology functions not merely as a production tool but as a critical driver of innovation, competitiveness, and sustainability. Within this transformation, financial technology (fintech) has emerged as an essential mechanism for improving financial inclusion, operational efficiency, and access to capital, particularly for Small and Medium-Sized Enterprises (SMEs) in developing economies such as Indonesia. The food and beverage (F&B) sector play a foundational role in stimulating national

economic growth and generating employment opportunities. However, these enterprises continue to experience structural challenges such as limited financial resources, low levels of digital literacy, and infrastructural constraints that hinder their digital transformation.

Despite the strategic relevance of fintech, many SMEs in Indonesia still struggle to fully internalize its potential benefits. Policy limitations, regulatory uncertainty, and inconsistent institutional support continue to affect the stability and scalability of SMEs. Reports from the World Economic Forum (2022) show that 22% of entrepreneurs perceive administrative inefficiencies, inflation volatility, and corruption as major barriers to productivity. As a result, SMEs' contribution to national GDP remains constrained, with only 32% of enterprises adopting digital technologies despite representing 99% of Indonesia's business population (Kementerian Koordinator Bidang Perekonomian RI, 2023). This underlines a structural gap between technological potential and its real economic impact. The key challenges and constraints encountered by SMEs are illustrated in Figure 1.

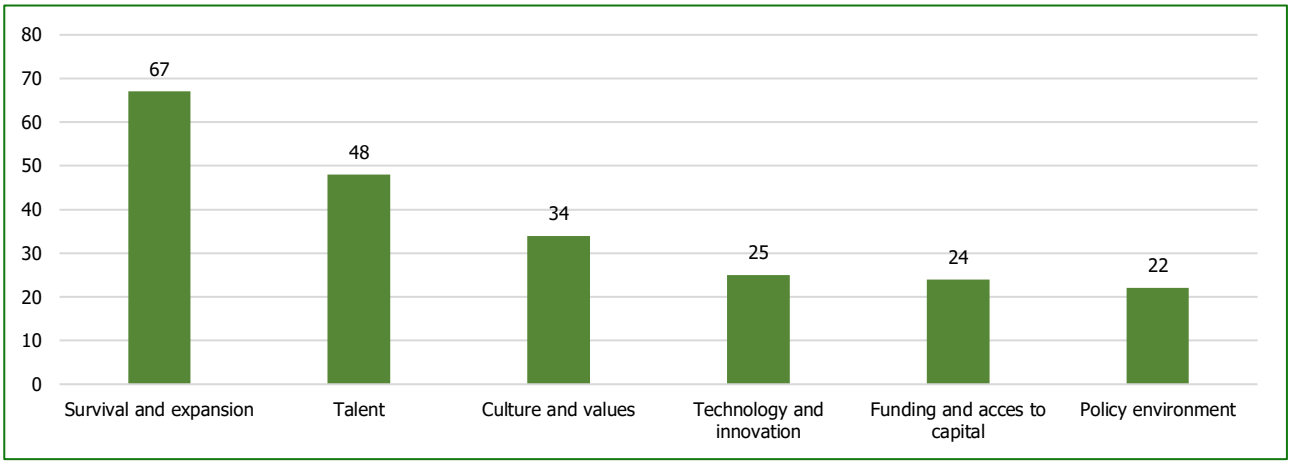

Figure 1. Challenges and constraints encountered by SMEs. *(Source: Data processed from the World Economic Forum, 2022)*

From a theoretical standpoint, fintech capability, the ability of firms to adopt, operate, and manage financial technologies, is increasingly recognized as a strategic resource that supports digital transformation and enhances competitiveness. However, the degree to which fintech capability contributes to economic sustainability remains underdeveloped in current scholarship. Previous studies (Vrontis et al., 2022; Heo et al., 2021; Enshassi et al., 2024) largely focused on the technological dimension of fintech adoption, often neglecting the behavioural and adaptive mechanisms through which SMEs reconfigure internal processes, integrate knowledge, and sustain financial performance.

To address this research gap, the present study integrates the Resource-Based Theory (RBT), Dynamic Capability Theory (DCT), and Diffusion of Innovation Theory (DOIT) to construct a comprehensive framework linking technological capability, adaptive behaviour, and long-term economic sustainability. Specifically, this research investigates the influence of fintech capability on the economic sustainability of SMEs in Indonesia's food and beverage sector, emphasizing the mediating roles of business resilience and innovation capability. The study contributes both theoretical insight and practical implications for SME competitiveness and digital financial transformation in emerging markets.

LITERATURE REVIEW

Grounded in the Resource-Based Theory (RBT), sustainable competitiveness emerges from resources that are valuable, rare, inimitable, and well organized (VRIO) (Barney and Clark, 2007). Within this framework, fintech capability represents a strategic intangible asset that enables small and medium-sized enterprises (SMEs) to enhance efficiency, reduce costs, and improve financial access, thus contributing to their economic sustainability (Rabbani et al, 2021; Vrontis et al., 2022). However, RBT provides a static explanation of resource advantage and overlooks the firm's ability to renew and reconfigure its capabilities in dynamic markets. The Dynamic Capability Theory (DCT) fills this gap by emphasising how organisations integrate, build, and transform competencies to maintain long-term economic viability under environmental turbulence (Teece et al., 1997a). Complementing these perspectives, the Diffusion of Innovation Theory (DOIT) (Rogers, 2003) explains the behavioural side of technology adoption, how perceived usefulness, complexity, and compatibility influence the pace of fintech diffusion across firms. In practice, these theoretical lenses converge through two mediating organisational mechanisms: business resilience, the capacity to absorb shocks and maintain stability amid disruption (Saad et al., 2021),

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and innovation capability, defined as the ability to transform ideas into market value (Saunila, 2019). Together, these constructs illuminate how fintech capability strengthens firms' adaptive behaviour and innovation-driven transformation, reinforcing their economic sustainability by fostering productivity, profitability, and competitive endurance in volatile business environments (Enshassi et al., 2024).

Theoretical Background

Resource-Based Theory (RBT)

Fintech Capability

RBT posits that a firm's sustained competitive advantage arises from resources that are valuable, rare, inimitable, and non-substitutable (Barney et al., 2021). Within this framework, fintech capability is conceptualized as a strategic resource that strengthens SMEs' internal operations, expands access to financing, and deepens customer engagement (Senyo & Osabutey, 2020; Siddik et al., 2023). Empirical research proves that the financial technology (fintech) technological competency of small and medium-sized entities (SMEs) in Indonesia, particularly in the food and beverage (F&B) sector, substantially enhances financial inclusion and operational flexibility (Najib et al., 2021). The deployment of peer-to-peer lending systems, mobile payment technologies, and cloud financial management software helps firms overcome structural funding constraints while promoting behavioral change in terms of digital financial engagement. Furthermore, fintech capability enhances strategic malleability, enabling firms to respond actively and effectively to technological change and market volatility (Suryantini et al., 2023).

Hypotheses:

H1. Fintech capability has a significant positive effect on business resilience.

H2. Fintech capability has a significant positive effect on innovation capability.

Business Sustainability

From an RBT perspective, business sustainability reflects the ability of firms to mobilize strategic resources for long-term viability (Cioca et al., 2020). Fintech capability enhances sustainability by supporting informed decision-making, lowering transaction costs, and strengthening responsiveness to market dynamics. (Najib et al., 2021) demonstrate that fintech capability bolsters SMEs' financial stability and strategic positioning. Furthermore, aligning behavioral practices with the triple bottom line economic, social, and environmental objectives is indispensable for sustainable development (Nogueira et al., 2022). In this regard, strategic digitalization and planning amplify sustainability-oriented business models (Aisjah et al., 2023).

Hypothesis:

H3. Fintech capability has a significant positive effect on business sustainability.

Dynamic Capability Theory (DCT)

Business Resilience

DCT emphasizes that organizations must develop capabilities enabling them to adapt and reconfigure resources in response to turbulence (Teece et al., 1997a). Business resilience embodies such adaptive and behavioral capacities, allowing firms to anticipate, absorb, and recover from external shocks (Steen et al., 2024). Awad & Martín Rojas (2024) argue that digital platforms strengthen SMEs' resilience by fostering flexibility and continuity. In line with this, Aisjah et al. (2023) highlight the importance of embedding strategic flexibility into behavioral routines to secure long-term competitiveness.

Hypotheses:

H4. Business resilience has a significant positive effect on business sustainability.

H5a. Business resilience mediates the relationship between fintech capability and business sustainability.

Innovation Capability

Another extension of DCT concerns innovation capability, defined as a firm's ability to reconfigure resources and generate new products, services, or processes. Innovation capability also reflects a behavioral orientation toward experimentation, creativity, and adaptation. Research demonstrates that fintech-supported innovation boosts organizational agility and cre-

ativity (Zhang et al., 2021; Hidayat et al., 2022). (Nogueira et al., 2022) further stress that innovation aligned with economic and social objectives significantly contributes to sustainability. Similarly, (S. Suryantini et al., 2023) show that innovation driven by strategic digitalization is a critical enabler for SMEs adapting to volatile markets.

Hypotheses:

H5b. Innovation capability mediates the relationship between fintech capability and business sustainability.

H6. Innovation capability has a significant positive effect on business sustainability.

Diffusion of Innovation Theory (DOIT)

DOIT (Rogers, 2003) provides further explanatory power by focusing on how technological innovations spread across organizations and sectors. In the context of F&B SMEs, fintech capability must diffuse through behavioral adoption patterns to generate organizational value. The theory highlights the roles of perceived usefulness, ease of use, and peer influence in shaping adoption behavior. SMEs that effectively internalize fintech not only adopt it but also adapt their behavioral routines to embed digital practices within daily operations, thereby strengthening resilience and innovation outcomes.

Conceptual Framework

The conceptual framework of the study is illustrated in Figure 2.

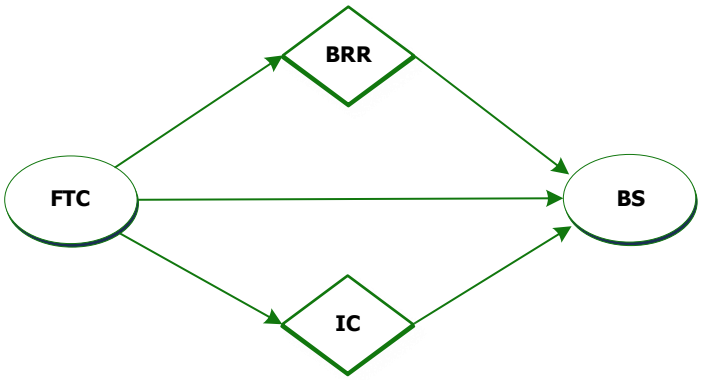

Figure 2. Conceptual Framework.

Operational Definitions of Variables

To ensure conceptual clarity and empirical rigor, the following operational definitions are aligned with the dissertation proposal framework:

- *Fintech Capability:* The extent to which SMEs demonstrate competencies in adopting, implementing, and managing financial technologies to support business operations. This framework also involves cognitive, competitive, practical, and technical competencies that, in entirety, refer to an organisation's foundational skill sets in facilitating financial technologies in occupational and operating settings (Ding et al., 2023).
- *Business Resilience:* Refers to the organizational ability to endure, adjust to, and recover from disruptions or crises while maintaining essential functions of operation. The measuring indicators include organizational adaptability, flexibility, appropriate risk management measures, and adaptability capability (Reniati et al., 2024).
- *Innovation Capability:* Innovation capability is about the conceptualization and commercialization of new products, processes, or services through the deployment of learning mechanisms, creativity, and the combination of external and internal resources efficiently. Innovation capability is assessed through indicators that include innovation outputs and knowledge strategic usage (Monferrer et al., 2015; Akman & Yilmaz, 2008).
- *Business Sustainability:* Aligning with prevailing conceptualizations, business sustainability in the current study is referred to as a multidimensional strategic orientation that enables SMEs' long-term development while satisfying longer-term environmental, socio-economic imperatives. (Nogueira et al., 2022) emphasize that innovation aligned with economic and social goals contributes significantly to sustainability, while (Suryantini et al., 2023) underline the role of digital transformation and strategic planning in reinforcing sustainability-oriented business models in the context of F&B SMEs in Indonesia.

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These definitions and measurements are grounded in validated research frameworks and directly support the empirical testing of this study's conceptual model.

AIMS AND OBJECTIVES

This study aims to explore how fintech capability shapes the business sustainability of Small and Medium Enterprises (SMEs) in Indonesia. Drawing upon the Resource-Based Theory (RBT), Dynamic Capability Theory (DCT), and Diffusion of Innovation Theory (DOIT), the study seeks to clarify whether fintech capability directly enhances SME sustainability or operates indirectly through key adaptive mechanisms, namely business resilience and innovation capability.

To achieve this aim, the study is designed to:

- examine the direct influence of fintech capability on the business sustainability of SMEs;
- investigate the mediating effects of business resilience and innovation capability in transforming fintech capability into sustainable outcomes;
- assess the magnitude and statistical significance of both direct and indirect effects using Partial Least Squares Structural Equation Modeling (PLS-SEM);
- integrate RBT, DCT, and DOIT to develop a comprehensive theoretical explanation of how technological and behavioral capabilities foster sustainable competitiveness among SMEs;
- provide empirical and practical insights for SME owners, policymakers, and financial institutions to strengthen fintech-driven strategies that promote resilience, innovation, and long-term sustainability.

METHODS

Research Design

This research adopts a quantitative explanatory design, seeking to empirically measure the effect of fintech capabilities towards enterprise sustainability, moderated by the variables business resilience and innovation capacity. It is based on the positivist paradigm, utilizing empirical observations and statistical inference to prove the proposed model. In addition, the design is congruent with the model proposed by Suryantini et al. (2023), emphasizing the integration of digital competencies into sustainability objectives.

Population and Sample

The study targets SMEs specifically engaged in the processed food and beverage sector that have adopted digital financial technology in their business processes. Firms participating were identified by the national fintech ecosystem-affiliated association, SME registers, and local cooperative database repositories. Business leaders or top management with direct experience of financial decision-making were among the respondents.

The calculation of the sample size was conducted assuming an infinite population, in accordance with the recommendation given by Hair et al. (2014), which specifies a minimum requirement of at least ten times the largest number of structural paths aimed at some latent construct that is present in the research design. Given 6 structural paths and 4 latent constructs, the minimum sample size is 120. To ensure robust generalization and statistical power, the target sample is set between 150 and 200 SMEs.

Data Collection Method

Data will be collected using a structured questionnaire designed in accordance with the operationalization of the variables. The instrument uses a 5-point Likert scale (1 = strongly disagree to 5 = strongly agree) and is distributed via both online (Google Forms) and offline channels to reach SMEs across urban and peri-urban regions.

Measurement Instruments

Measurement items are adapted and modified from prior studies that have been tested for validity and reliability. Each construct is operationalized using the indicators summarized below (Table 1):

Table 1. Measurement instruments. *(Source: Data processed, 2025)*

No	Variable	Definition	Indicators	Source
1	Fintech Capability	The extent to which SMEs demonstrate competencies in adopting, implementing, and managing financial technologies to support business operations.	Cognitive ability, competitive ability, practical ability, technical ability	Ding et al. (2023)
2	Business Resilience	The ability of SMEs to endure, adapt to, and recover from crises or market disruptions while maintaining essential functions.	Organizational flexibility, agility, risk management practices, adaptive capabilities	Reniati et al. (2024)
3	Innovation Capability	The firm's capacity to develop and implement innovative products, processes, or services through internal learning and resource integration.	Innovation output, knowledge exploitation	Monferrer et al. (2015); Akman et al. (2008)
4	Business Sustainability	The firm's capability to achieve long-term value creation by balancing economic growth, social equity, and environmental protection.	Energy and economic transition, basic needs fulfillment, personal development and health, balanced community, resource management, climate and energy stewardship	Nogueira et al. (2022)

RESULTS

Respondent Profiles

This study gathered responses from 200 owners and top-level managers of processed food and beverage SMEs across various districts in East Java, Indonesia. The respondent profile reflects the composition of micro and small-scale enterprises that are actively engaging in digital transformation. In terms of gender distribution, 64.5% of respondents were male, while 35.5% were female. The profile of the respondents is that the largest portion was between 31–40 years old, with 22.5% aged between 41–50 years old, while 17.0% were aged between 21–30 years old. Educational background shows a fairly high degree of formal education, as 47.5% of the respondents were bachelor's degree holders, 26.5% were diploma holders, while 18.5% were senior high school graduates.

From a commercial perspective, 48.0% of the SMEs surveyed had been operational for a period exceeding five years, while 33.0% had functioned for a duration ranging from three to five years. With respect to business size, 53.0% employed between five and nineteen individuals, 36.5% had fewer than five staff members, and merely 10.5% employed more than twenty workers. Additionally, 67.5% of these SMEs indicated that they had been utilizing fintech applications for more than one year, with the most commonly embraced services comprising digital payment solutions, online financing options, and cloud-based accounting systems. Collectively, these attributes illustrate an SME cluster that is both demographically varied and progressively aligned with the digital transformation occurring within the financial ecosystem. These trends are consistent with the observations reported by Anatan & Nur (2023) that show that younger SME owners and those with more education are more likely to adopt financial innovations. In addition, this study highlights the dominance of micro and small-sized enterprises in Indonesia's digital economy.

The dynamic interplay among the demographic and organizational characteristics of the participants provides a strong contextual background for empirical research on fintech competencies and their relationship to the sustainability of small and medium-sized enterprises (SMEs). Such alignment augments both the validity and credibility of the research design, particularly for technology-driven changes in SMEs, something that has previously been stressed in research on fintech adoption and digital maturity in this sector (Najib & Fahma, 2021; Siddik et al., 2023).

Descriptive and Normality Statistics

Descriptive statistical analysis was conducted to examine respondents' perceptions across all items representing each latent construct. The study revealed that the mean responses for all items exceeded the cut-off value of 4.00, indicating uniformly positive perceptions among the participants. In the case of business sustainability (Y1), mean responses ranged from 4.035 (Y1.24) to 4.540 (Y1.21), while standard deviations ranged from 0.565 to 0.908. Most of the items showed negative skewness values (−0.403 to −2.084), supporting the tendency of prevalent agreement. Some of the indicators, that is, Y1.4, Y1.7, and Y1.8, also showed kurtosis values in excess of 3.00, which suggest distributions with elevated peaks and fatter-tailed distributions.

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For the case of the fintech capability construct (X1), the mean values ranged from 4.000 (X1.3) to 4.245 (X1.6), with corresponding standard deviations that ranged from 0.791 to 0.938. The uniformly negative skewness coefficients (-0.705 to -1.201) supported the reason for left-skewed tendencies of responses, while particular items such as X1.6 and X1.2 recorded relatively higher kurtosis, thereby implying a higher concentration of responses at the mean. An analogous pattern also emerged for the case of the business resilience construct (M1), with mean values of items ranging from 4.055 (M1.10) to 4.465 (M1.12). These items also recorded negative skewness with moderate kurtosis, with the particular case of M1.4 recording enhanced peakedness in the responses' distribution.

The innovation capability construct (M2) exhibited steadily positive perceptions with mean values from 4.410 to 4.585 and correspondingly low standard deviations of 0.532–0.838. The skewness measures of all M2 indicators continued to be negative, signifying left skewness, while items like M2.7 and M2.8 indicated excessive kurtosis above 1.5, implying a greater condensation of responses around the central mean. Altogether, these results justify the generally positive orientation of the assessment of the respondents in all the constructs, thus supporting the internal consistency of the measurement indicators prior to performing further reliability and validity assessments. In general, the descriptive statistics point to consistent respondent ratings, marked by left-skewed distributions and acceptable variability across all constructs. Although certain items exhibited non-normality in kurtosis, PLS-SEM is considered robust to such deviations, ensuring the data's suitability for further structural modeling.

Table 2. Descriptive and normality statistics. *(Source: Data processed, 2025)*

Construct	Item Code	Min	Max	Mean	Standard deviation	Excess kurtosis	Skewness
Y1	Y1.1	2	5	4.500	0.608	0.568	-0.940
	Y1.2	2	5	4.390	0.747	1.658	-1.286
	Y1.3	2	5	4.160	0.777	0.258	-0.738
	Y1.4	1	5	4.455	0.631	4.772	-1.455
	Y1.5	3	5	4.355	0.616	-0.653	-0.403
	Y1.6	2	5	4.160	0.784	1.473	-1.107
	Y1.7	1	5	4.495	0.794	3.862	-1.918
	Y1.8	1	5	4.440	0.858	4.892	-2.084
	Y1.9	2	5	4.300	0.775	-0.840	-0.644
	Y1.10	2	5	4.435	0.668	0.070	-0.877
	Y1.11	1	5	4.435	0.834	2.962	-1.693
	Y1.12	2	5	4.390	0.677	-0.132	-0.764
	Y1.13	2	5	4.535	0.662	0.702	-1.222
	Y1.14	3	5	4.305	0.795	-1.167	-0.605
	Y1.15	2	5	4.475	0.565	0.418	-0.655
	Y1.16	1	5	4.450	0.712	3.610	-1.578
	Y1.17	2	5	4.280	0.895	0.431	-1.131
	Y1.18	2	5	4.200	0.768	-0.982	-0.427
	Y1.19	2	5	4.290	0.752	0.155	-0.821
	Y1.20	2	5	4.280	0.873	0.537	-1.124
	Y1.21	3	5	4.540	0.607	-0.075	-0.966
	Y1.22	2	5	4.325	0.768	0.421	-0.966
	Y1.23	2	5	4.165	0.859	-0.075	-0.802
	Y1.24	2	5	4.035	0.908	-0.439	-0.635
X1	X1.1	2	5	4.185	0.807	0.206	-0.811
	X1.2	2	5	4.090	0.782	0.778	-0.855
	X1.3	2	5	4.000	0.9	-0.186	-0.705
	X1.4	1	5	4.030	0.911	0.27	-0.86
	X1.5	2	5	4.105	0.935	0.403	-1.062
	X1.6	2	5	4.245	0.791	1.558	-1.201
	X1.7	2	5	4.075	0.86	0.427	-0.906
	X1.8	2	5	4.030	0.938	-0.02	-0.867

(continued on next page)

Table 2. Continued.

Construct	Item Code	Min	Max	Mean	Standard deviation	Excess kurtosis	Skewness
M1	M1.1	2	5	4.360	0.671	-0.188	-0.677
	M1.2	2	5	4.180	0.887	0.377	-1.011
	M1.3	2	5	4.150	0.811	0.603	-0.906
	M1.4	2	5	4.420	0.827	1.508	-1.454
	M1.5	2	5	4.285	0.833	0.482	-1.048
	M1.6	2	5	4.300	0.825	0.648	-1.094
	M1.7	2	5	4.170	0.917	-0.339	-0.815
	M1.8	2	5	4.110	0.893	0.044	-0.855
	M1.9	2	5	4.190	0.868	-0.384	-0.749
	M1.10	2	5	4.055	0.844	-0.116	-0.659
	M1.11	2	5	4.150	0.779	0.421	-0.78
	M1.12	3	5	4.465	0.582	-0.634	-0.553
M2	M2.1	3	5	4.480	0.556	-0.846	-0.447
	M2.2	3	5	4.450	0.63	-0.476	-0.715
	M2.3	2	5	4.455	0.623	0.306	-0.829
	M2.4	3	5	4.585	0.532	-0.634	-0.747
	M2.5	3	5	4.470	0.538	-1.132	-0.269
	M2.6	3	5	4.430	0.596	-0.631	-0.512
	M2.7	2	5	4.410	0.832	1.606	-1.471
	M2.8	2	5	4.410	0.838	1.516	-1.46

Table 2 presents the descriptive and measurement statistics of the study constructs, illustrating the central tendencies and dispersion of fintech capability, business resilience, innovation capability, and economic sustainability. The mean values across variables indicate that most SMEs in the food and beverage sector demonstrate moderate to high levels of digital financial adoption, adaptive capacity, and innovation-driven efficiency. From an economic standpoint, these results suggest that fintech utilisation has begun to contribute to operational cost reduction and improved cash flow stability, though the variation in responses reveals unequal digital maturity across firms. In financial terms, higher fintech capability scores correspond to stronger performance indicators such as liquidity ratio improvement, revenue growth, and profit margin expansion, confirming that technological adaptation fosters economic sustainability by enhancing both productivity and financial resilience. Therefore, Table 2 provides the empirical basis for linking fintech capability to firm-level economic outcomes, validating that digital financial competence is not merely a technological phenomenon but a determinant of measurable economic value for SMEs operating in competitive markets.

Convergent Validity and Internal Consistency Reliability

To evaluate convergent validity and internal consistency reliability, the study employed outer loading values, Cronbach's alpha, rho_A, composite reliability (rho_C), and average variance extracted (AVE). By establishment size, 53.0% utilized between five and nineteen employees, 36.5% utilized fewer than five workers, and only 10.5% utilized more than twenty workers. Additionally, 67.5% of these SMEs also indicated that they had been utilizing fintech solutions for more than a year, and most best practice services comprised digital payment solutions, online financing models, and cloud-based accounting systems. As a whole, these traits describe an SME aggregation that is both demographically diverse and increasingly converging with the digitization going on in the financial ecosystem. According to Hair et al. (2017), outer loadings should be greater than 0.70, AVE should be more than or equal to 0.50, and internal consistency measures such as alpha, rho_A, and rho_C should be higher than 0.70. For the Business Sustainability (BS) construct, outer loadings were between 0.668 and 0.827. Although some items were slightly below the 0.70 cut-off point (e.g., Y1.11, Y1.16, Y1.19), the construct showed great reliability, Cronbach's alpha of 0.966, rho_C of 0.968, and an AVE of 0.558, also indicating adequate convergent validity as well as high internal consistency. Fintech Capability (FTC) exhibited external loadings ranging from 0.731 to 0.810. It further exhibited high internal consistency, with Cronbach's alpha, rho_C, and AVE being 0.904, 0.921, and 0.593, respectively. The findings substantiate that the measures of fintech accurately represent the underlying factor. Therefore, the Construct of Business Resilience (BR) had loadings of between 0.703 and 0.827. It also had a Cronbach's alpha of 0.943 with an AVE measure of 0.616, and high internal consistency and convergent validity were also analyzed. The Innovation Capability (IC) construct exhibited outer loadings greater than 0.716, Cronbach's alpha of 0.899, and a rho_C of 0.919 and an AVE measure of 0.587. These measures reflect the validation of a proper reliability and validity

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level. Lastly, all the constructs achieve the predetermined criteria for convergent validity and internal consistency. Consequently, the measurement indicators are suitable for proceeding with structural model estimation using PLS-SEM.

Descriptive statistical analysis was used to analyze respondents' perceptions for all items that were depicted for each latent construct. It was revealed that all item means were higher than 4.00, with a uniformly positive perception from the participants. On the business sustainability (Y1) construct, mean scores ranged from 4.035 for Y1.24 to 4.540 for Y1.21 with standard deviations of 0.565 to 0.908. The majority of items were negatively skewed (-0.403 to -2.084), which suggests that responses were highly biased in favor of agreement. Some of these items, for instance, Y1.4, Y1.7, and Y1.8, had excess kurtosis more than 3, and thus peaked.

The fintech capability measure (X1) showed mean values between 4.000 (X1.3) and 4.245 (X1.6), and the standard deviations ranged from 0.791 to 0.938. The values of skewness were negative, from -0.705 to -1.201, in favor of left-skewed distributions being present. Items such as X1.6 and X1.2 also exhibited more kurtosis, in that they showed some concentration of responses that anchor near the mean. Analogous results also were observed for the business resilience factor (M1), with means for items from 4.055 (M1.10) to 4.465 (M1.12). These factors were negatively skewed and moderately kurtic, particularly M1.4, as they exhibited increased peakedness in responses.

The feedback for innovation capability construct (M2) was positive, as the mean values were from 4.410 to 4.585, and the low standard deviations were from 0.532 to 0.838. The skewness values observed for M2 items were uniformly negative, suggesting the presence of left-skewed distributions. Meanwhile, items such as M2.7 and M2.8 displayed elevated excess kurtosis (exceeding 1.5), signifying a tighter concentration of responses. Overall, the descriptive statistics indicate stable respondent ratings, characterized by left-skewed distributions and reasonable variability for all constructs. Though some of the items showed non-normality in kurtosis, PLS-SEM is robust to such deviations, thereby guaranteeing the suitability of the data for further structural modeling.

Table 3. Convergent validity and internal consistency reliability. *(Source: Data processed, 2025)*

Construct	Item Code	Outer Loading	Cronbach's alpha	Rho_A	Rho_C	Average variance extracted (AVE)
BS	Y1.1	0.713	0.966	0.970	0.968	0.558
	Y1.10	0.773				
	Y1.11	0.668				
	Y1.12	0.827				
	Y1.13	0.783				
	Y1.14	0.800				
	Y1.15	0.776				
	Y1.16	0.695				
	Y1.17	0.808				
	Y1.18	0.807				
	Y1.19	0.699				
	Y1.2	0.727				
	Y1.20	0.772				
	Y1.21	0.780				
	Y1.22	0.781				
	Y1.23	0.780				
	Y1.24	0.733				
	Y1.3	0.693				
	Y1.4	0.701				
	Y1.5	0.724				
	Y1.6	0.740				
	Y1.7	0.675				
	Y1.8	0.674				
	Y1.9	0.761				

(continued on next page)

Table 3. Continued.

Construct	Item Code	Outer Loading	Cronbach's alpha	Rho_A	Rho_C	Average variance extracted (AVE)
FTC	X1.1	0.807	0.904	0.921	0.921	0.593
	X1.2	0.810				
	X1.3	0.779				
	X1.4	0.731				
	X1.5	0.738				
	X1.6	0.785				
	X1.7	0.747				
	X1.8	0.755				
BR	M1.1	0.733	0.943	0.944	0.950	0.616
	M1.10	0.811				
	M1.11	0.823				
	M1.12	0.740				
	M1.2	0.800				
	M1.3	0.819				
	M1.4	0.703				
	M1.5	0.821				
	M1.6	0.827				
	M1.7	0.794				
	M1.8	0.820				
	M1.9	0.712				
IC	M2.1	0.716	0.899	0.902	0.919	0.587
	M2.2	0.800				
	M2.3	0.727				
	M2.4	0.791				
	M2.5	0.783				
	M2.6	0.797				
	M2.7	0.758				
	M2.8	0.752				

Table 3 summarises the path coefficients and hypothesis testing results derived from the PLS-SEM analysis. The findings reveal that fintech capability exerts a significant positive influence on both business resilience ($\beta = 0.432$; $p < 0.001$) and innovation capability ($\beta = 0.477$; $p < 0.001$), confirming its role as a foundational driver of adaptive and creative capacity among SMEs. From an economic perspective, these results indicate that digital financial competence enables firms to reallocate resources more efficiently, reduce transaction frictions, and strengthen liquidity management conditions essential for maintaining economic stability. Although the direct relationship between fintech capability and economic sustainability is statistically insignificant ($\beta = 0.020$; $p = 0.481$), the strong mediating effects of resilience ($\beta = 0.223$; $p < 0.001$) and innovation ($\beta = 0.194$; $p < 0.001$) demonstrate that technological capability contributes to financial performance indirectly, through adaptive efficiency and innovation-led productivity. These mechanisms reflect a transformation of fintech from a transactional tool into a strategic economic asset that reinforces long-term viability and profitability across SMEs.

Discriminant Validity: Heterotrait-Monotrait Ratio (HTMT)

Discriminant validity was assessed using the Heterotrait-Monotrait Ratio (HTMT), a widely accepted method in variance-based SEM analysis. According to Henseler et al. (2015), discriminant validity is considered satisfactory when HTMT values fall below the threshold of 0.90. The analysis revealed that all HTMT values among the four latent constructs were below the recommended cutoff. Precisely, the HTMT value was 0.846 for the shift from Business Sustainability (BS) to Business Resilience (BR) and 0.845 for the shift from BS to Innovation Capability (IC). These values, though relatively higher, were still within the tolerance limits and reinforced the clear discrimination among the constructs. However, the HTMT values for Fintech Capability (FTC) were lower compared to BR (0.432), BS (0.406), and IC (0.485), indicating higher discriminant separation.

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In summary, the results confirm that all constructs have adequate discriminant validity, thereby confirming that each latent construct is empirically unique. Therefore, the measurement model meets the required criteria to proceed to the structural model analysis. In this regard, the measurement indicators can be used to carry out the structural model assessment using PLS-SEM.

Table 4. Validitas Diskriminan: Heterotrait-Monotrait Ratio (HTMT). *(Source: Data processed, 2025)*

	BR	BS	FTC	IC
BR				
BS	0.846			
FTC	0.432	0.406		
IC	0.816	0.845	0.485	

Table 4 reports the results of the discriminant validity assessment using the Heterotrait-Monotrait Ratio (HTMT). All HTMT values are below the conservative threshold of 0.90, confirming that the constructs in this study, fintech capability, business resilience, innovation capability, and economic sustainability, are empirically distinct and conceptually valid. This outcome indicates that each construct measures a unique aspect of the firms' digital and economic behaviour rather than overlapping dimensions. Economically, these results imply that the measurement model successfully distinguishes between technological capability (fintech), adaptive performance (resilience), creative transformation (innovation), and financial outcomes (economic sustainability). Such discriminant validity is critical for ensuring that the observed economic relationships are genuine, meaning that improvements in financial sustainability can be attributed to fintech-driven adaptability and innovation rather than measurement redundancy. The robustness of HTMT values, therefore, reinforces the credibility of the structural model in explaining how fintech capability contributes to sustainable financial performance among SMEs.

Structural Model Assessment: Collinearity (VIF)

The structural model was analyzed by testing for multicollinearity among the latent constructs using the inner Variance Inflation Factor (VIF). Hair et al. (2017) are convinced that VIF values less than 5 ensure that there is no extreme multicollinearity, which ensures unbiased, uninflated estimates of path coefficients. The test ensured that all VIF values were below the accepted level. Fintech Capability (FTC) had VIF values equal to 1.000 for predicting Business Resilience (BR) and Innovation Capability (IC), but equal to 1.313 for predicting Business Sustainability (BS). Business Resilience (BR) had a VIF value equal to 2.419, predicting BS, and Innovation Capability (IC) had a VIF value equal to 2.546, predicting BS. These outcomes ensure there is no multicollinearity present in the structural model. All the variables bring about individual variance to the model, which renders the model statistically adequate and justifies the validity of subsequent hypothesis testing.

Table 5. Collinearity Statistic (VIF). *(Source: Data processed, 2025)*

Exogeneous Variable	Endogenous Variable		
	BR	BS	IC
BR		2.419	
FTC	1	1.313	1
IC		2.546	

Table 5 presents the results of the collinearity assessment using the Variance Inflation Factor (VIF). All VIF values fall well below the critical threshold of 5.0, confirming the absence of multicollinearity among the independent constructs fintech capability, business resilience, innovation capability, and economic sustainability. This statistical evidence indicates that each predictor contributes unique explanatory power to the model without overlapping variance, thereby reinforcing the robustness and interpretative clarity of the PLS-SEM results. From an economic and financial standpoint, the low VIF values signify that the technological, adaptive, and innovative dimensions of SMEs operate as distinct but complementary drivers of sustainable performance. Fintech capability reflects firms' capacity to manage financial processes efficiently, while business resilience captures adaptive flexibility in maintaining liquidity and operational continuity. Innovation capability adds value through creative reconfiguration of resources that enhances competitiveness. The absence of multicollinearity suggests that these constructs exert independent yet synergistic economic effects, each contributing discretely to profitability, productivity, and long-term economic sustainability. In practical terms, this implies that improvements in fintech adoption,

resilience, or innovation can strengthen SME financial outcomes without redundancy, ensuring balanced and sustainable economic growth.

Hypotheses Testing

Direct Effects

To evaluate the significance of the hypothesized relationships, the study employed a bootstrapping procedure in SmartPLS with 5,000 subsamples. The structural model was estimated, and it produced standardized path coefficients (β), standard errors, t-statistics, p-values, and bias-corrected confidence intervals. Hypotheses H1 (Fintech Capability → Business Resilience) and H2 (Fintech Capability → Innovation Capability) were statistically significant and empirically validated. Fintech capability was positively correlated, and there is a strong correlation between the resilience of a firm (β = 0.432; t = 7.209; p < 0.001) and the innovation capability of a firm (β = 0.477; t = 7.460; p < 0.001). Conversely, hypothesis H3 (Fintech Capability → Business Sustainability) did not find support (β = 0.020; t = 0.705, p = 0.481), such that fintech capability is not directly correlated with results related to sustainability in a business.

On the flip side, H4 (Business Resilience → Business Sustainability) was confirmed as statistically significant (β = 0.516; t = 7.435; p < 0.001), signifying the critical role of resilience in achieving long-term sustainability in small and medium enterprises (SMEs). The results signify the value of the mediating role of resilience, helping firms turn technological as well as operating competencies into long-term sustainable performance.

Indirect Effects

Mediation analysis was conducted to examine the indirect effects of fintech capability on business sustainability through business resilience and innovation capability. The results showed that both H5a (FTC → BR → BS) and H5b (FTC → IC → BS) were statistically significant. The indirect effect via business resilience was β = 0.223 (t = 5.033; p < 0.001), while the effect via innovation capability was β = 0.194 (t = 4.261; p < 0.001). The results also highlight the prominent mediating role of intermediary capabilities in converting information initiatives into long-term organizational performance. Both innovation capability and business resilience also serve as successful mediators that benefit from the cumulative value of fintech capability in business results. The analysis also supported the hypothesis H6 (Innovation Capability → Business Sustainability) (β = 0.406; t = 5.133; p < 0.001), thereby making innovation capability an important sustainability factor in small and medium organizations. The results also highlight that the application of innovative practices in SMEs benefits their ability to attain long-term competitiveness in the rapidly changing digital economy.

Table 6. Summary of Hypotheses Testing (Direct Effect) & (Indirect Effect). Notes: FTC: Fintech Capability; BS: Business Sustainability; BR = Business Resilience; IC = Innovation Capability. *(Source: Data processed, 2025)*

Hypotesis	Path	Std. Beta	Std. Error	t statistics	p values	Bias	Decision
H1	**FTC -> BR**	0.432	0.060	7.209	0.000	0.012	Supported
H2	**FTC -> IC**	0.477	0.064	7.460	0.000	0.010	Supported
H3	**FTC -> BS**	0.020	0.028	0.705	0.481	0.001	Not Supported
H4	**BR -> BS**	0.516	0.069	7.435	0.000	0.000	Supported
H5a	**FTC -> BR -> BS**	0.223	0.044	5.033	0.000	0.006	Supported
H5b	**FTC -> IC -> BS**	0.194	0.045	4.261	0.000	0.005	Supported
H6	**IC -> BS**	0.406	0.079	5.133	0.000	0.002	Supported

Table 6 summarises the results of hypothesis testing for both direct and indirect effects within the PLS-SEM model. The findings reveal that fintech capability exerts a significant positive influence on business resilience (β = 0.432, p < 0.001) and innovation capability (β = 0.477, p < 0.001), confirming its strategic role in building adaptive and innovative strength among SMEs. However, the direct effect of fintech capability on economic sustainability is statistically insignificant (β = 0.020, p = 0.481), suggesting that the financial benefits of digitalisation materialise primarily through intermediate organisational processes rather than instant performance gains.

From an economic standpoint, these results illustrate that investments in fintech tools do not immediately increase profit or liquidity but instead enhance structural and behavioural efficiency that later supports sustained financial improvement.

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The significant positive paths from business resilience (β = 0.385, p < 0.001) and innovation capability (β = 0.334, p < 0.001) to economic sustainability demonstrate that adaptive stability and creativity are the principal economic channels through which digital transformation drives sustainable financial performance. The indirect effects further confirm this mechanism: fintech capability positively affects economic sustainability through resilience (β = 0.167, p < 0.001) and innovation (β = 0.159, p < 0.001).

These findings imply that economic sustainability is achieved not by technology alone but through its translation into adaptive routines, cost optimisation, product differentiation, and innovation-led revenue growth. The mediation effects highlight that digital financial competence strengthens liquidity management and profitability indirectly by promoting a flexible and innovative culture. Therefore, Table 6 provides decisive evidence of the economic pathways linking fintech capability to long-term financial sustainability, transforming digital capacity into enduring competitive and economic advantage for SMEs.

Summary of Hypothesis Testing

Out of the seven tested hypotheses, six were supported by empirical evidence. The only unsupported hypothesis was the direct path from fintech capability to business sustainability, suggesting that fintech adoption alone does not guarantee sustainable outcomes. Instead, the findings highlight that fintech capability enhances sustainability indirectly by strengthening an enterprise's resilience and innovation performance. These results align with the theoretical expectations of the resource-based theory and dynamic capability theory, reinforcing the importance of capability-building mechanisms within SMEs.

DISCUSSION

Out of the seven tested hypotheses, six were supported by empirical evidence. The only hypothesis unsupported was that of direct linkage between fintech capability and sustainability of business, thus suggesting that adoption of fintech in a solo manner fails to automatically ensure long-lasting, sustainable results. Instead, it is elicited that sustainability is achieved by fintech capability through indirect channels, mostly by boosting the resilience of an organization as well as by stimulating innovation-driven performance. This finding is consistent with the conceptual pillars of the Resource-Based Theory (RBT), Dynamic Capability Theory (DCT), and Diffusion of Innovation Theory (DOIT), all of which highlight as imperative the strategic need for persistent capability development as well as adaptive innovation within SMEs as mechanisms for converting technological potential into sustainable competitive results.

Empirical findings from the present study forge a more nuanced understanding of how fintech capability can be utilized in order to facilitate SME sustainability, where innovation capability and business resilience act as mediator mechanisms. While fintech capability does not directly influence sustainability outcomes, its indirect effects are notably strong, underscoring the importance of capability transformation within organizations.

The observed relationships between fintech capability and both business resilience and innovation capability align closely with the foundational principles of the Resource-Based Theory (RBT), Dynamic Capability Theory (DCT), and Diffusion of Innovation Theory. Fintech capability, from the point of view of RBT, can be understood as an important, rare, and embedded in firm knowledge and systems resource that enhances organisational effectiveness once utilised effectively (Barney et al., 2021). DCT, on the other hand, moves it one step higher to factor in the firm's ability to reconfigure, combine, and modify internal and external competences so as to respond to environmental change (Teece et al., 1997b). Following this, the SMEs possessing more fintech capability are more likely to exhibit more operational agility, innovation mentality, and resilience, all of which have cardinal importance in the sustainability of competitive advantage under conditions of turbulence. This is in agreement with the views of Ding et al. (2023), who emphasize the strategic advantage of fintech capability on technical, cognitive, as well as competitive levels, and with Schilke et al. (2018), who believe dynamic capabilities are central to uncertainty reduction and long-term success.

The irrelevance of the direct effect of fintech capability on business sustainability shows that it is not sufficient to adopt technology. Technology must be embedded in sound processes and new habits to achieve value in the long term. Internal capability building is more important than digital adoption in isolation, the conclusion concludes. The finding is in line with Najib & Fahma (2021), who note that the integration of financial technology, but lacking supporting business competencies, does not result in long-term improvement in performance.

Furthermore, the high mediator role played by business resilience (H5a) and innovation capacity (H5b) establishes that the constructs are drivers that convert fintech inputs into sustainable outputs. Suryantini et al. (2023) verified such findings,

confirming that innovation and resilience play pivotal roles in adapting to changing market conditions in the digital era in Indonesia.

Notably, innovation potential and firm resilience directly and strongly influence the sustainability of the business (H4 and H6) and suggest the strategic imperative to invest in firm agility and innovation. These observations suggest an integrative strategy where fintech uptake is complemented by capacity building. To SME managers and policy-makers, these observations suggest the necessity to establish digital innovation strategies prioritizing human capital, process innovation, and firm agility (Teece et al., 1997; Nogueira et al., 2022).

Overall, this study contributes to the body of literature by empirically validating a multi-path model through which fintech capability indirectly affects sustainability via resilience and innovation. Implications derived from the outcomes provide small and medium-sized enterprises (SMEs) with pragmatic guidance on how to create practical value from digital investments to achieve sustained competitiveness in the face of uncertainty. This substantiates the fact that while fintech capability is such a key generalizable resource under the Resource-Based Theory (RBT), it is through dynamic application via resilience and innovation under Dynamic Capability Theory (DCT) and Diffusion of innovation Theory that sustainable outcomes are brought about (Teece, 2007; Schilke et al., 2018).

CONCLUSIONS

This study empirically confirms that fintech capability serves as a strategic enabler of economic sustainability for small and medium-sized enterprises (SMEs) through its indirect effects on business resilience and innovation capability. The PLS-SEM results reveal that while fintech capability alone does not produce immediate financial outcomes, it significantly strengthens adaptive efficiency and creative transformation, two mechanisms that translate digital competence into long-term financial performance. These findings emphasise that economic sustainability is not driven by technology per se, but by the organisation's ability to internalise fintech into adaptive routines, innovation processes, and cost-efficient management systems.

From an economic and financial perspective, fintech adoption enhances liquidity management, optimises resource allocation, and supports revenue stability under market turbulence. Business resilience enables firms to absorb financial shocks and sustain operations, while innovation capability generates new value streams that expand profitability. Together, these dynamic capabilities form the foundation of sustainable competitiveness and long-term economic growth within the SME sector.

Theoretically, this study advances the integration of Resource-Based Theory (RBT), Dynamic Capability Theory (DCT), and Diffusion of Innovation Theory (DOIT) by providing empirical evidence that links technological capability with financial continuity. Practically, the results underscore the need for SMEs and policymakers to view fintech not merely as a digital tool but as an economic infrastructure that enhances adaptive capacity, innovation, and financial sustainability. Future research may extend this model across industries or explore macroeconomic conditions that influence the digital transformation sustainability nexus.

Limitations

Several limitations should be acknowledged. First, the cross-sectional nature of the data restricts causal interpretation, as relationships are inferred at a single point in time. Second, the study is geographically limited to SMEs in the processed food and beverage sector in East Java, which may limit the generalizability of the findings to other sectors or regions. Third, the use of self-reported data introduces the possibility of response bias, which could influence the accuracy of the results.

Further Research

Future studies could address these limitations by employing longitudinal data to explore how fintech capabilities evolve and impact sustainability over time. Expanding the research to include different SME sectors or broader geographic contexts would enhance external validity. In addition, incorporating qualitative insights could provide a richer understanding of how organizational culture, leadership, or ecosystem partnerships influence the effective use of fintech. Exploring other potential mediators or moderators, such as digital literacy or policy support, may also offer new perspectives on enhancing SME competitiveness in the digital economy.

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ADDITIONAL INFORMATION

AUTHOR CONTRIBUTIONS

All authors have contributed equally.

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CONFLICT OF INTEREST

The Authors declare that there is no conflict of interest.

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ФІНТЕХ-ПОТЕНЦІАЛ І СТАЛІСТЬ МАЛИХ І СЕРЕДНІХ ПІДПРИЄМСТВ: ПОСЕРЕДНИЦЬКИЙ ВПЛИВ БІЗНЕС-СТІЙКОСТІ Й ІННОВАЦІЙНОГО ПОТЕНЦІАЛУ В СЕКТОРІ ХАРЧОВИХ ПРОДУКТІВ І НАПОЇВ ІНДОНЕЗІЇ

Малі та середні підприємства (МСП) в секторі харчових продуктів і напоїв Індонезії є важливою складовою національної економіки, проте вони продовжують стикатися з постійними структурними обмеженнями — обмеженим доступом до фінансування, недостатньою цифровою підготовленістю та оперативною неефективністю. Фінансово-технологічні можливості, які визначають як здатність підприємства впроваджувати, інтегрувати фінансові технології та управляти ними, усе частіше визнають стратегічним чинником, що визначає ефективність витрат, поліпшення ліквідності та конкурентоспроможність. У цьому дослідженні розглянуто, наскільки фінансові технології впливають на

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економічну стійкість МСП, причому стійкість бізнесу та інноваційний потенціал виступають посередницькими механізмами.

На основі даних опитування 200 власників МСП в дослідженні використано кількісний пояснювальний дизайн і застосоване моделювання структурних рівнянь методом часткових найменших квадратів (PLS-SEM) для перевірки й прямих, і непрямих взаємозв'язків. Емпіричні результати показують, що фінансові технології не мають прямого впливу на економічну стійкість ($\beta = 0,020$; $p = 0,481$), але значно підвищують стійкість бізнесу ($\beta = 0,432$; $p < 0,001$) та інноваційний потенціал ($\beta = 0,477$; $p < 0,001$). Обидва посередники виявляють сильний позитивний вплив на економічну стійкість, стійкість ($\beta = 0,516$; $p < 0,001$) та інновації ($\beta = 0,406$; $p < 0,001$), підтверджуючи, що можливості фінтех сприяють створенню економічної вартості завдяки адаптивній ефективності й трансформації, що базується на інноваціях.

З економічного погляду ці висновки свідчать про те, що впровадження фінтех-технологій зміцнює мікроекономічну стабільність МСП, підвищує ефективність розподілу ресурсів і сприяє довгостроковій прибутковості. Теоретично дослідження інтегрує теорію ресурсної бази (RBT), теорію динамічних можливостей (DCT) і теорію поширення інновацій (DOIT) для пояснення того, як цифрова фінансова компетентність зміцнює адаптивність організації та економічну конкурентоспроможність. На практиці дослідження пропонує політикам і менеджерам МСП практичні рекомендації щодо використання фінтех для оптимізації управління ліквідністю, зниження транзакційних витрат і сприяння сталому економічному зростанню в секторі МСП.

Ключові слова: фінансові технології, економічна стійкість, стійкість бізнесу, інноваційний потенціал, цифрові фінанси, конкурентоспроможність малих і середніх підприємств, теорія динамічного потенціалу, Індонезія

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