

Risk Management in SMEs: A Resilience-Based Approach for Business Sustainability

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ABSTRACT

This study aims to examine the influence of risk management practices, financial literacy, and digital capability on business sustainability, with business resilience as a mediating variable in the context of small and medium enterprises (SMEs) in East Java, Indonesia. Using a quantitative approach, data were collected from 150 SME owners through structured questionnaires and analyzed using Partial Least Squares Structural Equation Modeling (PLS-SEM). The results reveal that all three independent variables have a significant positive effect on business sustainability, both directly and indirectly through business resilience. Among them, digital capability shows the strongest total effect. Furthermore, business resilience is confirmed to partially mediate the relationship between internal capabilities and sustainability outcomes. These findings highlight the critical role of resilience as a dynamic capability in sustaining SMEs under uncertain conditions. The study contributes to the development of a resilience-based sustainability framework and offers practical insights for policymakers and development agencies to design more integrated SME empowerment programs focusing on risk preparedness, financial competence, and digital transformation.

ABSTRAK

Penelitian ini bertujuan untuk menguji pengaruh praktik manajemen risiko, literasi keuangan, dan kapabilitas digital terhadap keberlanjutan bisnis, dengan resiliensi bisnis sebagai variabel mediasi pada usaha mikro, kecil, dan menengah (UMKM) di Provinsi Jawa Timur, Indonesia. Penelitian menggunakan pendekatan kuantitatif dengan pengumpulan data melalui kuesioner terstruktur kepada 150 pelaku UMKM, dan dianalisis menggunakan metode *Partial Least Squares Structural Equation Modeling* (PLS-SEM). Hasil penelitian menunjukkan bahwa ketiga variabel independen berpengaruh positif dan signifikan terhadap keberlanjutan bisnis, baik secara langsung maupun tidak langsung melalui resiliensi bisnis. Di antara ketiganya, kapabilitas digital memiliki pengaruh total terbesar. Resiliensi bisnis terbukti memediasi secara parsial hubungan antara kapabilitas internal dan keberlanjutan usaha. Temuan ini menegaskan pentingnya resiliensi sebagai kapabilitas dinamis dalam menjaga kelangsungan UMKM di tengah kondisi ketidakpastian. Penelitian ini memberikan kontribusi terhadap pengembangan kerangka keberlanjutan berbasis resiliensi serta menawarkan implikasi praktis bagi perancang kebijakan dan lembaga pemberdayaan UMKM dalam merancang program yang terintegrasi, mencakup kesiapan risiko, kompetensi finansial, dan transformasi digital.

1. Introduction

Business sustainability has become a strategic agenda in the business world, particularly for micro, small, and medium enterprises (SMEs), which play a vital role in national economic development. Sustainability in the context of SMEs encompasses not only economic continuity but also social and environmental dimensions that must be managed in balance [1]. Sustainable SMEs demonstrate the ability to maintain business operations over the long term through adaptation to external changes, internal efficiency, and optimal resource utilization [2]. Factors such as financial governance, risk management, and technological innovation are key components in

shaping sustainable business resilience [3]. Especially in the post-COVID-19 era, sustainability has become a serious challenge for SMEs across various regions, including Indonesia, due to cash flow pressures, market uncertainty, and limited access to technology [4]. Therefore, understanding the determinants of business sustainability is essential, as it can guide policies and strategies to enhance SME resilience.

SMEs in Indonesia, particularly in East Java Province—one of the country's economic growth centers—face significant challenges in maintaining their business sustainability. According to data from the East Java Office of Cooperatives and SMEs, many SMEs have experienced revenue decline and even

closure over the past two years due to economic shocks and limited adaptive capacity to change. Although the government has launched training programs and stimulus assistance, the recovery rate among SMEs remains relatively slow, indicating the presence of both internal and external factors affecting business resilience in complex ways [5].

The urgency of this research lies in the need to understand how SMEs can survive and grow amid an uncertain business environment. As the backbone of the national economy, the sustainability of SMEs is not only a concern for business owners but also for the government and society at large [6]. Several studies have highlighted that a resilience-based approach is key to improving business sustainability, but the integration of risk management practices, financial literacy, and digital capabilities has rarely been studied simultaneously in the context of Indonesian SMEs [7], [8]. Therefore, this research is crucial in addressing literature gaps while providing practical contributions to the development of resilient and sustainable SMEs.

Risk management in the context of SMEs is a systematic process of identifying, analyzing, and responding to risks that may affect business objectives, both in the short and long term. Effective risk management practices enable SMEs to reduce vulnerabilities to market uncertainties, financial fluctuations, and external operational disruptions such as pandemics or natural disasters [9]. Unfortunately, many SMEs lack the capacity to implement adequate risk management systems due to resource constraints and limited access to professional knowledge [10]. Recent studies show that strengthening risk management practices directly impacts business stability and sustainability, especially through more rational and data-driven decision-making processes [11]. Moreover, previously unrecognized risks, such as cyber threats and supply chain disruptions, are now gaining attention in SME risk planning [12]. In this context, it is important to understand the extent to which risk management practices influence SME business sustainability, and whether this influence is direct or mediated by adaptive capacities such as business resilience.

Financial literacy is a fundamental aspect of sound business decision-making, especially for SME owners who often rely on intuition and experience rather than data-based financial planning. Financial literacy includes understanding cash flow management, investment decisions, financial planning, and the ability to read financial statements effectively [13]. Low levels of financial literacy cause many SMEs to struggle in accessing financing, managing debt, and formulating long-term growth strategies [14]. Several studies confirm that financial literacy is strongly and positively correlated with business performance and sustainability [15], [16]. In times of crisis, SME owners

with high financial literacy are better equipped to manage financial risks and adjust strategies quickly [17]. Therefore, in this study, financial literacy is hypothesized as an important determinant in enhancing SME sustainability. Further investigation is needed on how financial literacy interacts with other variables, particularly in its role in strengthening business resilience.

Digital capability refers to the capacity of SMEs to utilize digital technology to improve operational efficiency, expand markets, and enhance connectivity with customers and business partners. Digital transformation has proven to be a lifeline for many SMEs during the COVID-19 pandemic, as digitalization enabled business continuity despite physical restrictions [18]. However, not all SMEs have access to or the ability to adopt technology effectively [19]. Empirical studies show that digital capability significantly contributes to business continuity, especially by enhancing adaptability to external environmental changes [20]. In addition, digitalization facilitates data integration and management information systems that support data-driven decision-making [21]. Therefore, in this research, digital capability is identified as a key variable influencing SME business sustainability, with the potential to strengthen resilience as a mediating factor.

Business resilience describes an organization's capacity to absorb disruptions, adapt to changes, recover quickly from crises, and even grow from such experiences [22]. In the SME context, resilience is a crucial factor in determining whether a business can survive in a dynamic and uncertain business environment [23]. Resilience is not merely about surviving, but also about the ability to innovate and realign business models to face an uncertain future. Various studies affirm that business resilience functions as a mediating mechanism linking internal resources (such as financial literacy and digital capability) with business sustainability [24]. Resilient SMEs exhibit higher competitiveness and are able to create long-term value despite capital constraints and external pressures. Therefore, in this study, business resilience is positioned as a mediating variable that strengthens the relationship between risk management practices, financial literacy, and digital capability in influencing SME sustainability in East Java.

This study aims to analyze the influence of risk management practices, financial literacy, and digital capability on SME business sustainability in East Java, with business resilience as a mediating variable. Theoretically, this study contributes to the literature by enriching the resilience-based sustainability model for SMEs that integrates risk management, financial capacity, and digital capability. Empirically, the findings are expected to serve as a foundation for designing more effective SME development and

empowerment policies that promote adaptability and sustainability in response to evolving external challenges.

2. Research Method

This study employs a quantitative approach using a causal research design to examine the influence of independent variables—risk management practices, financial literacy, and digital capability—on the dependent variable, business sustainability, with business resilience serving as a mediating variable. A quantitative approach was chosen as it allows for objective testing of relationships among variables using inferential statistical analysis [25]. The causal design enables the identification of both direct and indirect effects among variables and the testing of a conceptual model developed based on theoretical and empirical foundations [26].

The population of this study consists of micro, small, and medium-sized enterprise (MSME) owners operating in East Java Province, Indonesia. This region was selected because it is one of the largest economic hubs in the country and has a significant number of SMEs across diverse sectors. A purposive sampling technique was used to select respondents based on the following criteria: (1) the SME has been operational for at least three years, (2) has a simple organizational structure, and (3) operates in the trade, services, or manufacturing sectors. The total sample size was 150 respondents, which meets the minimum threshold [27].

Data were collected using structured questionnaires distributed both in-person and online. The questionnaire was designed using a 5-point Likert scale (1 = strongly disagree to 5 = strongly agree) to measure respondents' perceptions of the indicators for each variable. This method is efficient and suitable for collecting a large amount of data in a relatively short time. Content validity of the questionnaire was assessed through expert judgment involving professionals in SME management and managerial accounting.

Each variable in the study was measured using indicators adapted from previous research. Risk management practices were measured using indicators adapted from [9], [12], including risk identification, risk assessment, and mitigation strategies. Financial literacy was measured using indicators from [28], covering cash flow understanding, debt management, and financial planning. Digital capability was assessed using indicators from [29], including technology adoption, utilization of digital platforms, and digital literacy. The mediating variable, business resilience, was measured using scales developed by [22], encompassing adaptive capacity, recovery ability, and innovation during crises. The dependent variable, business sustainability, was measured using indicators

from [3], [30], which include economic, social, and environmental sustainability dimensions.

Data analysis was conducted using the Partial Least Squares Structural Equation Modeling (PLS-SEM) method, facilitated by SmartPLS version 4.0. This method was chosen due to its advantages in analyzing complex structural models and its suitability for studies with moderate sample sizes [27]. The analysis process began with evaluating the outer model, assessing convergent validity (via AVE), construct reliability (composite reliability), and discriminant validity. Subsequently, the inner model was tested to examine the relationships among variables through path coefficients, R^2 values, effect size (f^2), and significance levels using a bootstrapping procedure with 5,000 subsamples. Mediation analysis was conducted using the indirect effect approach to test the indirect impact of the independent variables on the dependent variable through business resilience. The mediation effect was considered significant if the confidence interval of the bootstrapped indirect effect did not include zero [31].

3. Result and Discussion

A total of 150 SME respondents from East Java participated in this study. The majority of respondents were engaged in the trade and service sectors (72%), with most businesses having been in operation for over three years. A large proportion of business owners had attained secondary to tertiary education (80%), and 60% reported using digital platforms in their business operations. Descriptive statistics showed that perceptions toward all variables were in the high category, with average Likert scale scores ranging from 3.85 to 4.25.

The measurement model was evaluated to assess the validity and reliability of the constructs. The outer model results, which can be seen on Table 1, revealed that all indicators had loading values above 0.70, indicating strong indicator validity [27]. All constructs also met the criteria for convergent validity, with Average Variance Extracted (AVE) values above 0.50.

Table 1. Construct Reliability (CR) and Convergent Validity

Construct	Cronbach's Alpha	CR	AVE
Risk Management Practices	0.86	0.90	0.65
Financial Literacy	0.88	0.91	0.68
Digital Capability	0.84	0.89	0.63
Business Resilience	0.87	0.91	0.66
Business Sustainability	0.90	0.93	0.71

In addition, the HTMT ratio between constructs was below 0.90, confirming adequate discriminant validity for all constructs. The inner model evaluation, which can be seen on Table 2, showed that all endogenous constructs had good R^2 values, with Business Resilience $R^2 = 0.56$ and Business Sustainability $R^2 = 0.64$.

Table 2. Coefficient of Determination (R^2) and Predictive Relevance (Q^2) for Endogenous Constructs

Endogenous Construct	R^2	Q^2
Business Resilience	0.56	0.41
Business Sustainability	0.64	0.48

The Q^2 values above zero further confirm the model's predictive relevance. The path analysis results, based

on bootstrapping with 5,000 subsamples, are as follows on Table 3. The mediation analysis, which can be seen on Table 4, indicates that Business Resilience significantly mediates the relationship between the exogenous variables and Business Sustainability.

Table 3. Path Coefficients, T-Statistics, and Significance of Structural Model Relationships

Path	Coefficient (β)	T-Statistic	P-Value	Significant
RMP $\rightarrow$ BS	0.19	2.82	0.005	Yes
FL $\rightarrow$ BS	0.15	2.41	0.017	Yes
DC $\rightarrow$ BS	0.22	3.26	0.001	Yes
RMP $\rightarrow$ BR	0.28	4.12	0.000	Yes
FL $\rightarrow$ BR	0.31	3.76	0.000	Yes
DC $\rightarrow$ BR	0.35	4.59	0.000	Yes
BR $\rightarrow$ BS	0.37	5.02	0.000	Yes

Table 4. Indirect Effects and Mediation Analysis Results

Mediation Path	Indirect β	T-Statistic	P-Value	Mediation
RMP $\rightarrow$ BR $\rightarrow$ BS	0.10	2.64	0.009	Yes
FL $\rightarrow$ BR $\rightarrow$ BS	0.11	2.87	0.004	Yes
DC $\rightarrow$ BR $\rightarrow$ BS	0.13	3.21	0.001	Yes

These findings confirm that Business Resilience acts as a partial mediator [31]. The results of this study demonstrate that risk management practices, financial literacy, and digital capability significantly influence SME business sustainability, both directly and through the enhancement of business resilience.

These findings align with study which emphasized the central role of organizational resilience in sustaining businesses amid external pressures [22]. In particular, digital capability was found to have the strongest total effect on sustainability, both directly and through resilience, highlighting the critical role of technology adoption in SMEs' post-pandemic recovery [32]. Meanwhile, financial literacy was also shown to be a significant factor, supporting the view that sound financial understanding serves as the foundation for healthy business decision-making [16]. Although risk management practices had the smallest direct effect, they remain crucial in establishing the groundwork for resilience and long-term strategic planning [12].

4. Conclusion

This study concludes that Risk Management Practices, Financial Literacy, and Digital Capability positively and significantly influence the Business Sustainability of SMEs in East Java, both directly and indirectly through Business Resilience as a mediating variable. The findings highlight that these three factors represent critical internal capabilities that collectively enhance SMEs' adaptive capacity in facing external pressures and uncertainties, with Business Resilience confirmed as a partial mediator that strengthens the impact of internal capabilities on sustainability. Practically, the results imply that SME development programs should go beyond technical training or capital provision and systematically foster managerial competencies and a

resilient mindset through integrated interventions in risk management, financial literacy, and digital transformation, facilitated by local governments, financial institutions, and business incubators. Theoretically, this study contributes to the development of a resilience-based sustainability framework within the context of SMEs in developing countries and enriches the understanding of how dynamic capabilities operate in small and medium business environments.

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