



Digital Finance as a Mediator of the Influence of Financial Inclusion and Intellectual Capital on SME Financial Performance

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Abstract. This study aims to test the role of financial digitalization in mediating the influence of financial inclusion and intellectual capital on SME financial performance in the Special Region of Yogyakarta (DIY). The sample for this research is SMEs in DIY. The sampling technique uses cluster sampling based on district/city areas in DIY, which include Yogyakarta City, Sleman Regency, Bantul Regency, Kulon Progo Regency and Gunung Kidul Regency. A total sample of 227 SMEs was obtained. The data analysis technique used was Structural Equation Modeling. The results of data testing show that financial inclusion has an insignificant positive effect on SME financial performance, whereas intellectual capital and financial digitalization have a significant positive effect on SME financial performance. The results of this research found the evidence that financial digitalization is able to mediate the influence of financial inclusion and intellectual capital on SME financial performance in DIY. It means that financial digitization contributes significantly to improving SME financial performance.

Keyword: *Financial Digital, Financial Inclusion, Intellectual Capital, SME Financial Performance*

1 Introduction

Small and medium-sized enterprises (SMEs) play a vital role in the economy, particularly in developing nations like Indonesia. SMEs make substantial contributions by creating job opportunities, enhancing economic competitiveness, and promoting balanced development [1]. Despite being established with relatively modest capital, SMEs hold the potential for rapid growth when supported by appropriate policies, such as access to financing, entrepreneurship training, and technological adoption [2]. On a global scale, SMEs are often recognized as catalysts for innovation and key contributors to local economies due to their agility in responding to market demands. In Indonesia, SMEs also contribute to maintaining economic stability, especially during economic crises, as they are generally more resilient to global economic fluctuations compared to large corporations..

SMEs, however, encounter numerous obstacles, including limited access to financing, inadequate knowledge of modern management practices, and challenges in reaching broader markets, both domestically and internationally [1][4]. Consequently, extensive research has been dedicated to developing strategies to boost SME competitiveness, such as improving managerial skills, embracing digitalization, and strengthening business networks. Considering both the potential and challenges faced by SMEs, this study focuses on analyzing the role of digital finance in mediating the impact of financial inclusion and intellectual capital on their financial performance. The importance of digital finance in this context lies in its alignment with the current trend of digitalization in business transactions and marketing. Furthermore, previous studies have produced mixed findings regarding the influence of financial inclusion and intellectual capital on SME financial performance, highlighting the need for further investigation.

The Resource-Based View (RBV) concept has evolved into the Knowledge-Based View (KBV). RBV theory emphasizes that management plays a key role in coordinating, designing, and managing a firm's unique resources and capabilities to achieve optimal performance [1]. This explains why some companies perform better than others: the difference lies in the resources they possess and their ability to use them effectively. The same resources can yield different outcomes depending on the organization's capabilities, which are strongly tied to its knowledge base. Within the KBV framework, knowledge is considered the most critical and strategic resource for a company. This knowledge enhances the efficiency and effectiveness of utilizing other physical resources [2]. For SMEs, while physical resources are important, their success largely depends on how well they leverage knowledge to innovate products, services, and operational strategies in the marketplace. According to KBV theory, a firm's competitive advantage is rooted in its ability to acquire, accumulate, integrate, and apply knowledge. This knowledge is typically embedded in the company's human resources, technology, and database systems.

Financial inclusion aims to remove barriers that hinder communities from accessing financial services, whether monetary or non-monetary [3]. Many communities face difficulties because financial institutions impose complex requirements, making it challenging for SMEs to secure funding for business capital. Simplifying regulations and easing access to financing are crucial steps for financial institutions to enhance the financial performance of MSMEs. Through financial inclusion, SMEs gain access to financial products and services, which can be utilized to support their business activities. Research conducted by [4], [3], [5], and [6] demonstrates that financial inclusion positively and significantly influences SME performance. Based on this, the first hypothesis of this study is:

H1: Financial Inclusion has a positive effect on financial performance of SMEs.

Intellectual capital plays a critical role in the success of SMEs. It refers to the intangible and non-physical assets and resources of an organization, including process resources, innovative capabilities, proprietary knowledge, and collaborative networks and relationships. These intangible assets enable organizations to transform physical, financial, and human resources into cohesive and effective systems. Strong intellectual capital—comprising human capital, relational capital, and structural capital—can significantly

enhance SME performance. This is because SMEs benefit from skilled and motivated human resources, maintain strong relationships with suppliers, customers, and competitors, offer unique and diverse products, and possess robust organizational infrastructure. Studies conducted by [7] and [8] confirm that intellectual capital positively impacts SME performance. Based on this understanding, the proposed hypothesis is:

H2: Intellectual capital has a positive effect on the financial performance of SMEs

SME digitalization refers to the use of market intelligence in product development to drive the growth of small and medium enterprises (SMEs) through technological advancements [9]. Another perspective defines SME digitalization as leveraging technology to enhance business operations, including the production and sale of goods. Traditionally, marketing was conducted through single channels such as radio, television, or newspapers. With advancements in technology, promotion has transitioned to digital platforms, specifically through digital marketing.

Digital marketing enables efficient promotion by facilitating two-way interactions between businesses and customers via digital communication. This approach has proven to be a valuable asset for SMEs, as online trade significantly supports business continuity. The development of digital marketing positively impacts SMEs by making marketing and sales processes more effective, efficient, and accessible through technological tools. According to [8], information technology can mediate the relationship between investment and SME performance. Research by [10] highlights that sales turnover has increased for businesses that adopt digital marketing strategies. As consumer behavior evolves, particularly in decision-making and transactional processes, business operators are compelled to innovate and adapt to remain competitive and sustainable [11]. Based on this, the hypothesis proposed is:

H3: Financial digitalization has a positive effect on SME financial performance.

Financial digitalization serves as a link between financial inclusion and the financial performance of SMEs. Advances in information technology, coupled with the widespread availability of internet access, have given rise to various digital financial services that simplify access to financial knowledge and resources. These services aim to enhance public awareness and understanding of financial products, services, and institutions, enabling individuals to better manage their finances and improve their overall well-being. Based on this premise, the proposed hypothesis is:

H4: Financial digitalization is able to mediate the effect of financial inclusion on SME financial performance.

The expertise, skills, and innovative capabilities of employees allow organizations to effectively leverage digital technology in financial management, enhancing operational efficiency, decision-making processes, and adaptability to market dynamics. Financial digitalization further amplifies the value of intellectual capital by offering a platform that facilitates access to information and simplifies the processing of financial data. Based on this concept, the proposed hypothesis is:

H5: Financial digitalization is able to mediate the effect of intellectual capital on SME financial performance.

2 Method

2.1 Sample and Data Collection

The population in this study consists of SMEs located in the Special Region of Yogyakarta. The sampling method used was cluster sampling, with groups based on districts/cities within the region, namely Yogyakarta City, Sleman Regency, Bantul Regency, Kulon Progo Regency, and Gunung Kidul Regency. Out of 300 questionnaires distributed, 227 valid SME samples were collected. This sample size aligns with the recommendations of [11], which suggest a minimum sample size of 130 for the maximum likelihood estimation technique or Structural Equation Modeling (SEM), as applied using WarpPLS7. Data collection for this study was carried out through a survey using a structured questionnaire.

2.2 Definition and Measurement

The variables examined in this study include financial inclusion and intellectual capital as independent variables, financial digitalization as a mediating variable, and SME financial performance as the dependent variable. Financial inclusion refers to the process of facilitating convenient access to formal financial systems, such as banking services, and ensuring their utilization for societal benefit. This variable is assessed using five indicators availability, awareness, affordability, adequacy, and accessibility—based on the studies of [12], [3], and [13], incorporating a total of 10 statements.

Intellectual capital refers to an organization's intangible or non-physical assets and resources, such as patterns, process resources, innovative capabilities, intangible knowledge, collaborative networks, and organizational relationships. To measure intellectual capital, this study uses three indicators: human capital, relational capital, and structural capital based on the work of [7], [14], [15], and [16], with a total of nine statements. According to [7], the financial performance of SMEs is assessed using two key metrics: business sales and company profitability. These metrics are measured using six statements derived from the studies of [17], [18], [19], and [7].

Financial digitalization in SMEs refers to the application of market intelligence for product development, which can positively influence the growth of SMEs in the technology sector [20]. Information technology encompasses the capability to process, manage, edit, store, and modify data to produce high-quality, useful, and efficient information. The financial digitalization of SMEs involves the use of information and communication technology (ICT) in various business functions such as production, marketing, financial management, and administration. In practice, SME digitalization can be achieved through digital platforms like websites, social media, mobile applications, and e-commerce. The indicators for financial digitalization include payment systems, sales, and marketing, with six statements adopted from the research of [10].

2.3 Data Analysis

The research hypotheses were examined using the Partial Least Squares-Structural Equation Modeling (PLS-SEM) technique, implemented through WarpPLS software version 7.0. To evaluate the validity and reliability of the measurement model, the

relationships between indicators and each latent variable will be assessed. Additionally, the structural model will be tested to analyze the coefficients and significance of the constructs in relation to each other. The PLS-SEM method was selected for its capacity to simultaneously test both direct and indirect effects through mediation, its ability to handle multicollinearity among independent variables, and its requirement-free assumption of normal distribution [21].

3 Result And Discussion

3.1 Measurement Model Analysis

Construct testing utilizes first-order reflective models for the variables of financial inclusion, intellectual capital, digital finance, and SME financial performance. This involves assessing the indicator loadings of the items forming these variables. The test results show that three items in the financial inclusion construct—AV2, AF2, and AC1—do not meet the required threshold as their loading values are less than 0.70. In the intellectual capital construct, the item RC4 does not meet the criteria. However, all items in the digital finance and SME financial performance constructs qualify. Items with loadings below 0.70 are considered unqualified and are excluded from the analysis [11]. The results of the construct indicator testing, after removing the unqualified items, are shown in Table 1 below.

Table 1. Variable construct testing results

Latent Variable	Loading	P-value	Latent Variable	Loading	P-value	Latent Variable	Loading	P-value	Latent Variable	Loading	P-value
FI			IC			DF			FPSME		
AV1	0.934	<0.001	HC1	0.862	<0.001	PAY1	0.821	<0.001	OSME1	0.753	<0.001
AW1	0.926	<0.001	HC2	0.857	<0.001	PAY2	0.833	<0.001	OSME2	0.840	<0.001
AW2	0.925	<0.001	HC3	0.733	<0.001	SALE1	0.869	<0.001	OSME3	0.790	<0.001
AF1	0.812	<0.001	RC1	0.838	<0.001	SALE1	0.801	<0.001	PSME1	0.767	<0.001
KD1	0.922	<0.001	RC2	0.843	<0.001	MAR1	0.781	<0.001	PSME2	0.827	<0.001
KD2	0.969	<0.001	RC3	0.793	<0.001	MAR2	0.800	<0.001	PSME3	0.811	<0.001
AC2	0.899	<0.001	SC1	0.722							
					<0.001						
			SC2	0.823							
					<0.001						

Source: primary data processed by researchers

Based on the results of the composite reliability coefficients test as shown in Table 2 below, the value of Composite Reliability Coefficients and Cronbach Alpha > 0.7 for all constructs. So that the internal consistency reliability requirements of the research instrument based on composite reliability parameters and Cronbach alpha have been met. Likewise, the test results with average variance extracted (AVE) all show a value > 0.05 so that it meets the criteria for convergent validity. In addition, Table 3 shows that the test model has predictive validity according to [11] must be > zero (0), the results of the Q-square coefficient test can be seen in Table 3 below showing the Q-square coefficient value of DF = 0.311, and the Q-square coefficient FPSME = 0.369 which means > 0, so the conclusion is that the model has predictive validity.

Table 2. Internal Consistency Reliability Test Results

	FI	IC	DF	FPSME
<i>Composite Reliability Coefficients</i>	0.747	0.863	0.878	0.930
<i>Cronbach Alpha</i>	0.709	0.822	0.833	0.911
<i>AVE</i>	0.580	0.623	0.878	0.659
<i>Q-Square Coefficient</i>	-	-	0.311	0.369

Source: primary data processed by researchers

3.2 Hypothesis Testing Results

Because the p-value is significant at the 1% level and the coefficient value is positive, the findings of the hypothesis testing in Table 3 indicate that hypotheses 2 and 3 are accepted. This indicates that both financial digitization and intellectual capital have a major positive impact on business performance. Since the significance value is more than 0.10, Hypothesis 1 is rejected. The findings of this study indicate that financial inclusion has a favorable but negligible impact on firm performance.

The results of testing the hypothesis 4 and 5 model show partial mediation of the effect of FI on IC mediated by DF. because DF explains a significant portion of the variance in FPSME (or DF affects FPSME) and the effect of DF on FPSME is still significant with the sign of the coefficient not changing. In addition, the results of testing the hypothesis 4 and 5 models when calculated using VAF (variance accounted for) as the [11] with the formula $VAF = (\text{indirect effect}) / (\text{indirect effect} + \text{direct effect}) \times 100\%$. VAF value < 20% indicates no mediation effect, VAF value between 20-80% indicates partial mediation and VAF value > 80% indicates full mediation. The results of testing the mediating role of digital finance with VAF can be seen in Table 3 below.

Table 3. Results of Hypothesis Testing

Path	Coefficien	P Value	Conclusions
Direct Effect			
FI → FPSME	0.159	0.105	H1 rejected
IC → FPSME	0.503	<0.001***	H2 accepted
FI → DF	0.108	0.124	-
IC → DF	0.282	0.001	-
DF → FPSME	0.659	<0.001***	H3 accepted
Indirect Effect			
FI → DF → FPSME	0.105	0.004***	H4 accepted
IC → DF → FPSME	0.331	0.036**	H5 accepted

Source: primary data processed by researchers

Description:

*** sig at 1%

** sig at 5%

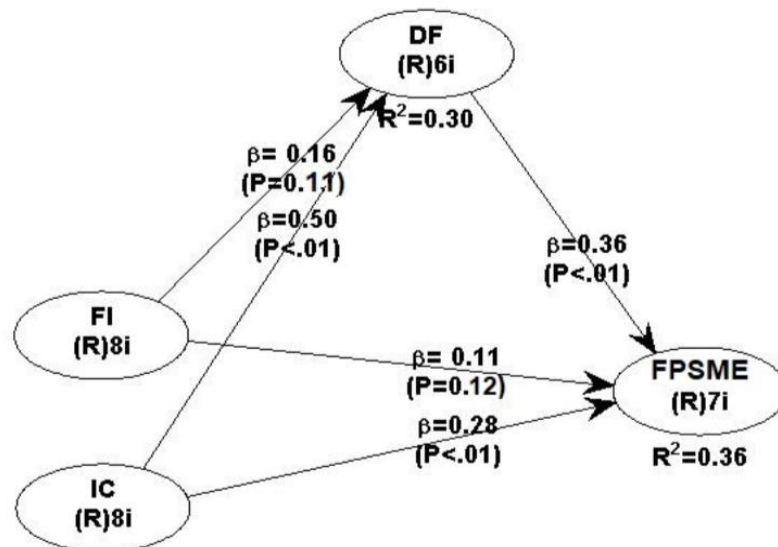
Table 4. VAF Calculations

	Indirect effect	Direct effect	VAF
FI → DF → FPSME	0.105	0.159	0.4924
IC → DF → FPSME	0.331	0.503	0.5403

Source: primary data processed by researchers

Based on the VAF calculation in Table 4 above, it can be concluded that there is partial mediation in all models because the VAF value of each model has a value between 20% - 80%, meaning that financial digitalization acts as a partial mediation in mediating the effect of financial inclusion on SME financial performance. This is indicated by the VAF value of VAF FI → DF → PMSE of 49.24%, so the fourth hypothesis is accepted. Likewise, testing the fifth hypothesis shows that IC → DF → FPSME is 54.03% which indicates that financial digitalization is able to mediate the effect of financial inclusion on financial performance. The complete model of this study can be seen in Figure 1 below.

Figure 1. Full Model of Research Results



Effect of Financial Inclusion on Financial Performance

Financial inclusion encompasses the ease of access, quality, and utilization of financial services by SMEs. Consequently, traditional financial institutions' operations have been increasingly replaced by Fintech [22]. The findings indicate that although SMEs' ability to access financial services is positively related to their performance, the effect is not significant. SMEs have integrated fintech into their daily operations, enabling them to seize opportunities that could enhance their financial performance. As a result, financial inclusion in this study does not have a significant impact on SME performance. This aligns

with the findings of research by Fintech [22] and [23], which suggest that the level of financial inclusion does not significantly affect SME performance.

Effect of Intellectual Capital on Financial Performance

For SMEs, managing intellectual capital is crucial. Intellectual capital can provide competitive advantages that enhance organizational performance, as these resources are hard to replicate and are considered valuable strategic assets [4]. If SMEs continue to develop their employees' skills and competencies, supported by the implementation of operational standards aligned with the organization's vision and mission, foster a positive work culture, and maintain strong relationships with customers and relevant external stakeholders, it will lead to improved business performance and help achieve organizational objectives [24]. This is consistent with the findings of [24], which indicate that intellectual capital has a positive and significant impact on SME performance.

Effect of Financial Digitalization on Financial Performance

To drive the technological advancement of SMEs, the digitalization process involves utilizing market intelligence for product development [9]. With technological progress, digital tools are increasingly being employed for promotional purposes, including the use of digital marketing. By adopting digital marketing, the promotion and marketing processes become a two-way interaction between sellers and consumers, with communication taking place through digital platforms. This approach allows for broader and more extensive promotion. According to [5], the viability of SMEs is positively influenced by e-commerce and digital media.

The Impact of Financial Inclusion, Financial Performance and Financial Digitalization

With the introduction of fintech into the financial market, SMEs have gained access to more secure and reliable formal financial services, which boosts financial institutions' confidence in them. This shift occurs because financial inclusion promotes broader adoption of financial technologies, such as digital payments, online banking, and app-based financial platforms. As more people use financial services inclusively, the demand for digital financial solutions rises, thereby stimulating the development of digital infrastructure and technological innovation within the sector. This aligns with research findings indicating that financial inclusion positively influences business performance, mediated by financial digitalization.

Influence of Intellectual Capital, Financial Performance and Financial Digitalization

Financial digitalization serves as a mediator that enhances the impact of intellectual capital on business performance. By incorporating digital technology into financial management, companies can maximize their intellectual capital, such as by speeding up decision-making, improving accuracy in financial data analysis, and expanding access to relevant, real-time financial information. The combination of intellectual capital and financial digitalization allows businesses to improve operational efficiency, cut costs, and deliver faster, more targeted services. This positive effect ultimately leads to improved business performance in terms of profitability, competitiveness, and market expansion. Therefore, the research suggests that financial digitalization effectively mediates the relationship between intellectual capital and business performance.

4 Conclusion

Based on the analysis of the data, it can be concluded that financial inclusion has not yet been effective in enhancing the financial performance of SMEs. Some financial services, particularly digital-based ones, may impose additional costs that burden SMEs, reducing their profits and hindering the growth of their financial performance. The study also concludes that intellectual capital can improve the financial performance of SMEs, as effective management of intellectual capital boosts their competitiveness. Furthermore, the findings indicate that financial digitalization serves as a mediator between financial inclusion, intellectual capital, and SME financial performance. This is because financial digitalization plays a key role in facilitating the positive impact of financial inclusion and intellectual capital on the financial performance of SMEs. Through financial digitalization, SMEs can access financial services more easily, quickly, and efficiently, which enables them to better utilize their intellectual capital, such as employee knowledge and skills, for improved financial management. Additionally, digitalization helps SMEs achieve greater operational efficiency, reduce costs, and fully leverage their intellectual potential to enhance their competitiveness and financial performance. The government should focus on increasing awareness of financial inclusion among the public, particularly SMEs, and improve their access to financial institutions.

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