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## **A Role Financial Inclusion in Moderating Digital Literacy, Innovation, and Certification for SMEs**

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### ***Abstract:***

*This study examines the moderating role of financial inclusion in the relationship between digital literacy, innovation, and certification in maintaining the sustainability of SMEs in Kendal Regency. A quantitative approach was used, with a sample of 210 SMEs operators in Kendal Regency who have been in operation for more than one year, possess business licenses, and hold product certifications. The findings indicate that digital literacy and certification positively influence SMEs sustainability. However, innovation did not show a positive effect on SMEs' sustainability. Furthermore, financial inclusion was found not to moderate the relationship between digital literacy and innovation concerning SMEs sustainability, but it did strengthen the relationship between certification and SMEs sustainability*

**Keywords:** *Digital Literacy, Innovation, Certification, Financial Inclusion, Sustainability of SMEs*

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## **1. Introduction**

SMEs are a source of livelihood and one of the key sectors of the Indonesian economy. The existence of SMEs is crucial for representing the Gross Domestic Product of each nation and significantly contributes to employment. Based on information obtained from the Ministry of Cooperatives and Small and Medium Enterprises, the number of micro, small, and medium enterprises (SMEs) reached 64.2 million. (Ministry of Cooperatives and Small and Medium Enterprises, 2021). It was noted that many SMEs continue to face several challenges, including struggles with advancing to a higher class, limited access to digitalization, difficulties in entering the global market, and insufficient financial services. Despite the challenges, Indonesian SMEs are able to employ 97% of the workforce, account for 57% of the Gross Domestic Product (GDP), and contribute 15% to national exports (Ministry of Cooperatives and Small and Medium Enterprises, 2021). Based on data quoted from Lingkarjateng.id (2023), the Kendal Regency government is currently focusing on providing training to MSME

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actors in the form of providing business capital, this is done in order to motivate MSME actors to continue to develop their businesses and their products are truly accepted by the community.

To enhance the long-term performance and sustainability of SMEs, it is essential to implement strategic initiatives. This includes increasing the knowledge of SME stakeholders regarding digital literacy and its impact on business sustainability. In the context of the 4.0 industrial era, where technological advancements are crucial, a digital-based business strategy is necessary (Edward et al., 2023). Digital literacy refers to individuals who possess the knowledge and understanding to effectively utilize information technology from digital platforms in their academic, career, and everyday life. (Shopova, 2014). Thus, the ability or understanding of MSME actors regarding the use of digitalization, of course, can increase the sustainability of MSMEs in an increasingly competitive era.

In addition, by carrying out innovation because innovation is the soul of a company, innovation can develop anywhere and be carried out by anyone (Agostini et al., 2020). Product innovation can also be interpreted as the process of designing a new product or updating an existing product (Calantone et al., 2010). Thus, with SMEs actors always innovating by creating new products or providing value to the products they make, this will certainly affect the sustainability of SMEs because consumers get quality products.

Then, by selling quality products, SME actors need to improve their products by making product certifications. Product certification, of course, has many benefits such as products having a halal guarantee, consumers getting a guarantee of safety, and consumer protection when consuming products from SMEs actors.

In general, SMEs in Indonesia frequently face delays in their growth due to limited access to digitalization. Currently, all business actors must keep up with technological advancements. Additionally, there is a lack of product innovation, and consumers are increasingly discerning in selecting products that ensure their safety. As a result, SME operators need to enhance their offerings through product certification. In Kendal Regency, there are 25,321 SME operators ( Data quoted from the Kendal Regency Trade, Cooperatives and Small and Medium Enterprises Service in 2022).

The data cited shows that 2700 SMEs products have been halal certified and 2300 have PIRT certificates in Kendal Regency (Radar Semarang, 2023; Tribun Banyumas, 2021). However, the obstacle to overcoming this problem is the difficulty of accessing financing because the financing requirements are not met, so this is a factor inhibiting the sustainability of SMEs. Therefore, to overcome the problems faced by SMEs, the decision that must be taken is to carry out financial inclusion (Yanti, 2019). Financial inclusion has been made a priority to overcome financial barriers, especially in developing countries. There is an opinion that financial inclusion is a key factor that has an impact on the success of SMEs (Iriobe et al., 2017).

Given the issues outlined above, this study aims to address how SME operators can sustain their businesses using the Resource-Based View (RBV) theory, influenced by digital literacy, innovation, and product certification, with financial inclusion serving as a moderating factor. The results of this study are expected to be a description and

recommendation for the community, especially so that SMEs can implement competitive strategies in the market to maintain the sustainability of their businesses. This study examines the moderating role of financial inclusion in the relationship between digital literacy, innovation, and certification in maintaining the sustainability of SMEs in Kendal Regency.

The novelty in this study is the research on the concept of financial inclusion with the moderation component of the framework of thought developed with the principle of SMEs sustainability. Research that uses the financial inclusion variable as a moderation is still limited, so in this study the researcher wants to use the financial inclusion variable as a moderation (Zauro et al., 2020).

## **2. Theoretical Background**

**Resource-Based View Theory.** The RBV The framework suggests that management should concentrate on the company's internal resources by addressing opportunities, countering external threats, or mitigating internal issues. These actions are vital for enhancing the potential to achieve a sustainable competitive advantage (Barney & Asli M. Arian, 2005).

**Sustainability on SMEs.** Business continuity refers to a company's capacity to maintain operations over an extended period in a sustainable manner (Mas-Verdú et al., 2015). Business continuity in SMEs can be seen from their success in seeing opportunities to carry out sustainable innovation (Hudson et al., 2001).

**Digital Literacy.** Digital literacy is defined as an individual who has the capacity to utilize digital technology effectively and appropriately (Gilster & Watson, 1999). Digital literacy refers to individuals who possess the knowledge and understanding to effectively utilize information technology from digital platforms in their academic, career and everyday life. (Shopova, 2014).

**Innovation.** Product innovation is any good, service, or idea that is considered to be something new (Kotler, 2007). In addition, product innovation can also be interpreted as the process of designing a new product or updating an existing product (Calantone et al., 2010).

**Certification.** Certification is an activity of assessing conformity related to the provision of written guarantees and products have met regulations (Disnakerperinkopukm, 2020). With the tendency or trend of consumers who are increasingly smart in choosing quality products, it has become a separate demand for SMEs to produce quality, safe products that are by consumer desires and of course guaranteed (Julianto, 2019).

**Financial Inclusion.** Financial inclusion is a process that ensures adequate and affordable access to financial services for all business actors and aims to improve economic welfare and support business development (J Aduda, 2012). It can empower communities to effectively use these services and benefit directly from financial institutions (Terzi, 2015).

**The Influence of Digital Literacy on Sustainability of SMEs**

Digital literacy is defined as an individual who has the capacity to utilize digital technology effectively and appropriately (Gilster & Watson, 1999). Digital literacy in a company or business sector needs to be improved. This aims to help SMEs adopt or utilize technology effectively and be able to provide added value to the products or services used (Tomczyk, 2020). Previous studies conducted by Marnoto et al. (2024) ; Putra et al. (2023) it was found that digital literacy has a positive effect on the sustainability of SMEs.

*H1: Digital Literacy has a positive effect on the Sustainability of SMEs*

**The Influence of Innovation on Sustainability of SMEs**

Product innovation is defined as an individual who can create a new product or update an existing product, and can provide added value to the product used (Calantone et al., 2010). Product innovation capabilities are needed for business continuity and competitive advantage (Eggert et al., 2014). Previous studies conducted by Hanaysha et al. (2022) ; Rahayu et al. (2021) found that innovation has a positive effect on the sustainability of SMEs.

*H2: Innovation has a positive effect on the Sustainability of SMEs*

**The Influence of Certification on Sustainability of SMEs**

Certification is an activity of assessing conformity related to the provision of guarantees and products that meet regulations (Disnakerperinkopukm, 2020). With the trend of consumers who are increasingly smart in choosing quality products, it has become a separate demand for SMEs to produce quality, safe products that meet consumer desires and are of course guaranteed (Julianto, 2019). Previous studies conducted by Ridha & Hidayat (2021) found that certification has a positive effect on the sustainability of SMEs.

*H3: Certification has a positive effect on the Sustainability of SMEs*

**The Influence of Financial Inclusion Moderates the Relationship between Digital Literacy, Innovation, and Certification on Sustainability of SMEs**

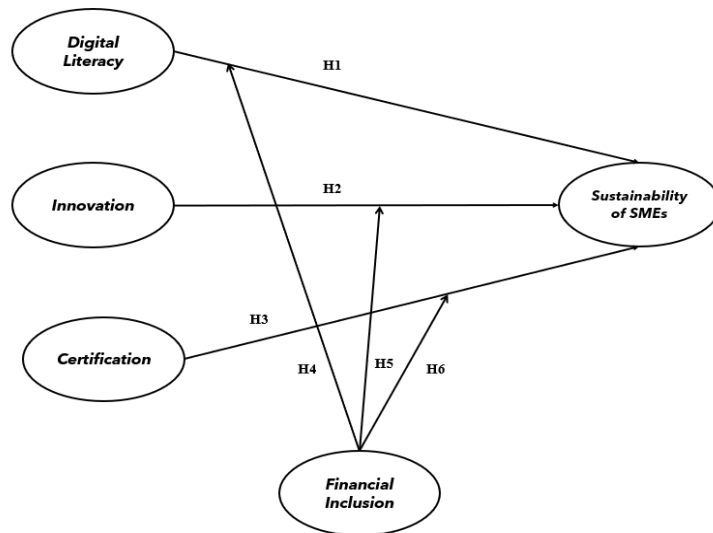
Financial inclusion refers to the accessibility of financial services which aims to make it easier for people to use financial services from an institution (J Aduda, 2012). Financial inclusion is a key factor that impacts the success of SMEs globally (Iriobe et al., 2017). Thus, easy financial access or being able to obtain financing (capital) which is the most important indicator in the sustainability of SMEs, will have implications for increasing business profits. In a study conducted by (Purnama, 2023), financial inclusion was used as a moderating variable in the relationship between digital accounting, financial literacy, and social capital on MSME performance and the results were able to strengthen.

*H4: Financial Inclusion strengthens the relationship between Digital Literacy and Sustainability of SMEs*

*H5: Financial Inclusion strengthens the relationship between Innovation and Sustainability of SMEs*

*H6: Financial Inclusion strengthens the relationship between Certification and Sustainability of SMEs*

This study is a study on the concept of financial inclusion with a moderation component of the framework of thought developed with the principle of MSME sustainability. There is still a limited amount of research that employs financial inclusion as a moderating variable, prompting the researcher in this study to incorporate financial inclusion as a moderating variable (Zauro et al., 2020).



**Figure 1. Research Model**

### 3. Methodology

Population is the entire individual for whom the obtained reality will be generalized (Ferdinand, 2013). The population in this study was all SMEs actors in Kendal Regency as many as 25.321 ( Data quoted from the Kendal Regency Trade, Cooperatives and Small and Medium Enterprises Service in 2022). From the existing population, a representative sample was taken using the purposive sampling technique, where the author sets certain criteria for drawing samples.:

1. SMEs located in Kendal Regency
2. SMEs that have been operating for more than 1 year
3. SMEs that have business permits and product certification

The sample size for this study is determined to be at least ten times the number of indicators used. (Roscoe JJ, 1975; Sugiyono, 2019). This study included 21 indicators across 5 tested variables, resulting in a minimum required sample size of 210 respondents. This aligns with Roscoe's view that a suitable research sample should consist of at least 30 participants and no more than 500 (Roscoe JJ, 1975; Sekaran dan Bougie, 2011).

The research data uses primary data obtained directly by the researcher (Schindler, 2019). This study uses primary data sources, where researchers collect information by

distributing questionnaires online via Google Forms. After that, researchers conduct direct surveys in the field and meet SMEs actors who meet the criteria to be used as samples.

The variables and measurement of research variables are as follows.

**Table 1.** Research Variables and Measurement

Variables	Code	Measurement	Supporting References
Sustainability of SMEs	SS1	My SMEs asset growth is stable	(Bruce et al., 2022; Mutanu, 2017)
	SS2	My SMEs income has increased in recent years	
	SS3	My SMEs make more profit compared to competitors	
	SS4	My SMEs use social media for marketing purposes	
Digital Literacy	DL1	I can learn new digital technologies easily	(Ng, 2012)
	DL2	I follow the development of new digital technologies that are useful	
	DL3	I know a lot about various digital technologies.	
	DL4	My SMEs possess unique expertise in utilizing digital technology	
Innovation	IN1	Customers regard my SMEs' new products and services as the best	(Prajogo & Ahmed, 2006)
	IN2	My SMEs incorporate the latest technological innovations into their new products	
	IN3	My SMEs is very fast in developing new products	
	IN4	My SMEs have a high level of novelty (innovation)	
Certification	CE1	Ownership of certification determines the quality of a product	(Kolkman, 2014)
	CE2	I feel calm and safe when selling certified products.	
	CE3	I feel afraid that making sales does not comply with government regulations.	
	CE4	I prefer to sell certified products rather than uncertified ones.	
	CE 5	My product has gone through a series of strict tests so there is no doubt about its suitability.	
Financial Inclusion	FL1	SMEs know very well how to access financial services from capital-providing institutions.	(Musa, 2022; Soriano, 2017)
	FL2	The availability of digital-based financial services enables faster service payments.	
	FL3	SMEs utilize financial services from capital providers to expand their businesses.	
	FL4	Financial institutions provide the best financial services to SMEs	

Source: Data processed, 2024

This study employed SmartPLS for statistical testing. PLS is recognized as the most appropriate method for predictive or exploratory modeling research. It is a multivariate statistical data analysis technique that allows for simultaneous testing of multiple response and explanatory variables (Garson, 2016).

Outer model testing is conducted to assess the feasibility of the research instrument using convergent validity, discriminant validity, and composite reliability tests. The

convergent validity test stipulates that the loading factor must be at least  $\geq 0.70$  to indicate a relationship between the indicator and the latent variables (Garson, 2016). Meanwhile, the discriminant validity test specifies that if the Average Variance Extracted (AVE) value for each construct is  $\geq 0.50$ , the research variable exhibits adequate discrimination (Garson, 2016). The composite reliability test is evaluated using both the Composite Reliability value and Cronbach's Alpha. A measure is considered reliable if the Composite Reliability exceeds 0.70 and Cronbach's Alpha is above 0.60 (Garson, 2016).

The inner model is utilized to assess the viability of the structural model through the R Square ( $R^2$ ) Test. This test measures the coefficient of determination, indicating how much of the endogenous construct can be explained by the exogenous construct. The criteria for interpretation are as follows: an  $R^2$  value of 0.67 is deemed strong, 0.33 is regarded as moderate, and 0.19 is classified as weak (Chin et al., 1998). The hypothesis testing uses multivariate statistical analysis with Smart PLS, employing the Estimation of Path Coefficients ( $\beta$ ) and T Statistics approach. The criteria applied are that if the significance value (sig) is  $\leq 0.05$  and the t statistic is  $\geq$  the t table value, the hypothesis is considered accepted. Conversely, if the significance value (sig) is  $\geq 0.05$  and the t statistic is  $\leq$  the t table value, the hypothesis will be rejected (Garson, 2016).

#### 4. Empirical Findings/Result

This study uses a questionnaire utilizing a Google form created on June 23, 2024, then the researcher requested a research permit application letter from the University LPPM and BAPERLITBANG to request MSME data from the Head of the Kendal Regency Trade, Cooperatives and Small and Medium Enterprises Service. After the researcher completed the documents used to collect research data, the researcher immediately went to the field to inform the public about the research being conducted, requiring assistance filling out the questionnaire. On July 30, 2024, the researcher obtained more than 50 respondents who had filled out the questionnaire, namely 210 MSME actors in Kendal Regency. And immediately we tested the results of the questionnaire with an instrument feasibility test (Validity and Reliability) using Smart-PLS.

**Table 2.** Respondent Demographic Characteristics

Information	Classification	Number of Respondents	Percentage
Gender	Man	73	34.76%
	Woman	137	65.24%
Age	Between 17-20 Years	39	18.57%
	Between 21-30 Years	106	50.48%
	Between 31-40 Years	20	9.52%
	Between 41-50 Years	33	15.71%
	Over 50 Years	12	5.71%
	SD	6	2.86%
Last education	Junior High School	4	1.90%
	High	132	62.86%

	School/Vocational School		
	Diploma	7	3.33%
Business fields	Bachelor and Master	61	29.05%
	Food and Drink	160	76.19%
	Fashion	15	7.14%
	Trading Business	6	2.86%
	Service Business	13	6.19%
	Skincare and Cosmetics	9	4.29%
	Craft	3	1.43%
	Livestock Business	4	1.90%
Length of Business Operation	Between 1-5 Years	166	79.05%
	Between 6-15 Years	30	14.28%
	Above 15 Years	14	6.67%
Types of Certification	HALAL	118	52.91%
	BRAND	17	7.62%
	BPOM	7	3.14%
	SKP	4	1.79%
	NIB	64	28.70%
	PIRT	13	5.84%

Source: Data processed, 2024

## Instrument Test

### Outer Model Test (Instrument Suitability Test)

#### Validity test

In this study, the validity testing includes the results of convergent validity and discriminant validity tests. The convergent validity test is conducted using loading factor values with a criterion of  $\geq 0.70$  (Garson, 2016). Meanwhile, the discriminant validity test is indicated by an AVE value of  $\geq 0.50$  for each construct (Garson, 2016). Here are the results of the validity test:

**Table 3.** Validity Test Results

Variables	Indicator	Loading Factor	AVE
Digital Literacy	DL1	0.800	0.666
	DL2	0.893	
	DL3	0.815	
	DL4	0.751	
Innovation	IN1	0.871	0.797
	IN2	0.945	
	IN3	0.906	
	IN4	0.845	
Certification	CE1	0.772	0.741
	CE2	0.894	
	CE3	0.934	



Sustainability of SMEs	CE4	0.893	0.743
	CE5	0.801	
	SS1	0.901	
	SS2	0.810	
	SS3	0.868	
Financial Inclusion	SS4	0.867	0.835
	FI1	0.934	
	FI2	0.919	
	FI3	0.929	
	FI4	0.873	

Source: Data processed, 2024

### Reliability Test

The reliability test in this study shows The Composite Reliability value should be greater than 0.70, while Cronbach's Alpha value should exceed 0.60 (Garson, 2016).

**Table 4.** Reliability Test Results

Variable	Composite Reliability	Cronbach's Alpha
Digital Literacy	0.888	0.832
Innovation	0.940	0.915
Certification	0.934	0.911
Sustainability of SMEs	0.920	0.889
Financial Inclusion	0.953	0.934

Source: Data processed, 2024

### Inner Model Test

The inner model is used to test the feasibility of the structural model by conducting three tests, namely:

### R Square Test ( $R^2$ )

The  $R^2$  test evaluates the coefficient of determination, which measures the extent to which the endogenous construct can be explained by the exogenous construct (Garson, 2016). The following are the  $R^2$  results of this study:

**Table 5.**  $R^2$  Test Results

Variable	R Square	R Square Adjusted
Sustainability of SMEs	0.527	0.511

Source: Data processed, 2024

## Q Square Test ( $Q^2$ )

The  $Q^2$  test known as predictive relevance is a test used to measure how good the predictive capability is in research (Garson, 2016). The following are the calculations in the  $Q^2$  test:

$$Q^2 = 1 - (1 - R^2)$$

$$Q^2 = 1 - (1 - 0.511)$$

$$Q^2 = 1 - (0.489)$$

$$Q^2 = 0.511$$

The  $Q^2$  test result shows a figure of 0.511. This result shows that the  $Q^2$  of this study is classified as strong.

## Hypothesis Testing

In this hypothesis testing, multivariate statistics were performed using Smart PLS, employing the Estimation of Path Coefficients ( $\beta$ ) and T Statistics methods. The criteria state that if the significance value is  $\leq 0.05$  and the t statistic is  $\geq$  the t table value, the hypothesis can be accepted (Garson, 2016). The following are the results of this research hypothesis test:

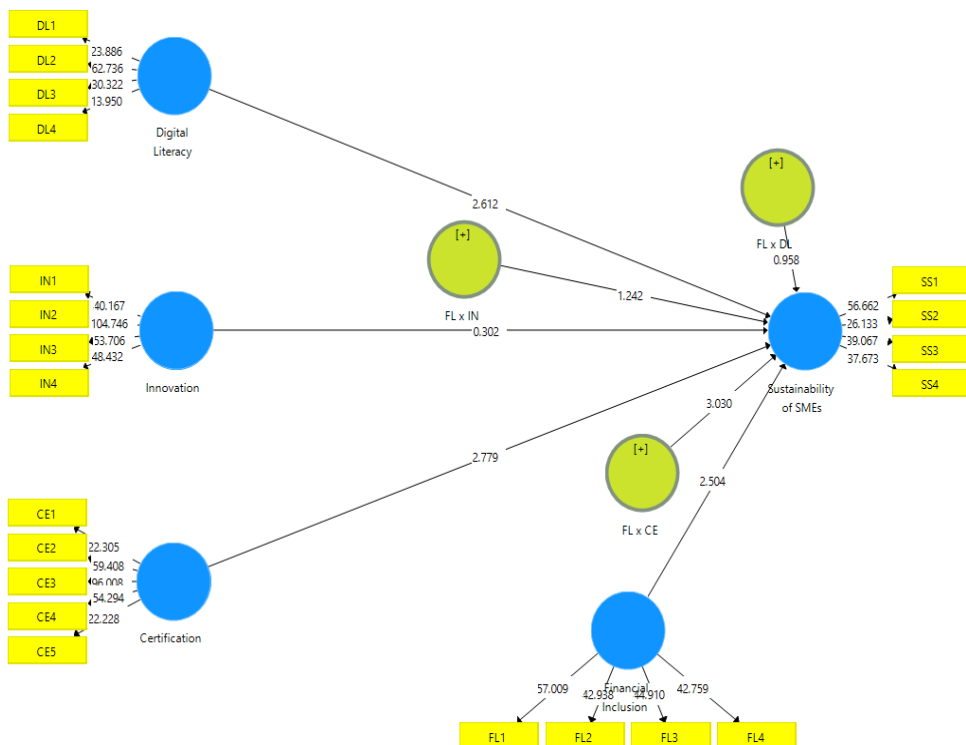


Figure 2. Hypothesis Testing Results

**Table 5.** Test Results Using Path Coefficients

Hypothesis	<i>Original Sample</i>	<i>T-Statistic</i>	<i>P-Values</i>	Description
Digital Literacy → Sustainability of SMEs	0.231	2.612	0.009	Accepted
Innovation → Sustainability of SMEs	0.029	0.302	0.763	Rejected
Certification → Sustainability of SMEs	0.283	2.779	0.006	Accepted
Financial inclusion strengthens the relationship between digital literacy and sustainability of SMEs	-0.208	0.958	0.338	Rejected
Financial inclusion strengthens the relationship between innovation and sustainability of SMEs	-0.205	1.242	0.215	Rejected
Financial inclusion strengthens the relationship between certification and sustainability of SMEs	0.412	3.030	0.003	Accepted

Source: Data processed, 2024

The results for hypothesis 1, which links digital literacy to the sustainability of SMEs, indicate an original sample value of 0.231, suggesting a positive relationship. The findings reveal that the T-statistic value is higher than the established threshold (1.960), reaching a result of 2.612. Additionally, the p-value is 0.009, which is less than the alpha level of 0.05. According to the results, there is a positive and significant relationship between digital literacy and the sustainability of SMEs, indicating that hypothesis 1 is accepted.

The results for hypothesis 2, which links innovation to the sustainability of SMEs, show an original sample value of 0.029, indicating a positive relationship. However, the T-statistic value is below the established threshold (1.960), yielding a result of 0.302. The p-value is 0.763, which exceeds the alpha level of 0.05. According to the results, the relationship between innovation and the sustainability of SMEs is not positive or significant, resulting in the rejection of hypothesis 2.

For hypothesis 3, which connects certification to the sustainability of SMEs, the original sample value is 0.283, indicating a positive relationship. The findings indicate that the T-statistic value surpasses the standard (1.960), with a result of 2.779. The p-value is 0.006, which is below the alpha value of 0.05. According to the results, there is a positive and significant relationship between certification and the sustainability of SMEs, indicating that hypothesis 3 is accepted.

Regarding hypothesis 4, which posits that financial inclusion strengthens the relationship between digital literacy and the sustainability of SMEs, the original sample value is -0.283, suggesting a negative impact. The T-statistic value is lower than the standard (1.960), with a result of 0.958, and the p-value is 0.338, which is greater than the alpha value of 0.05. Therefore, financial inclusion does not moderate the relationship between digital literacy and the sustainability of SMEs, leading to the rejection of hypothesis 4.

For hypothesis 5, which examines whether financial inclusion strengthens the relationship between innovation and sustainability of SMEs, the original sample value

is -0.205, indicating a negative impact. The T-statistic value is also below the standard (1.960), resulting in 1.242, while the p-value is 0.215, exceeding the alpha value of 0.05. Thus, financial inclusion does not moderate the relationship between innovation and sustainability of SMEs, resulting in the rejection of hypothesis 5.

Finally, for hypothesis 6, which asserts that financial inclusion strengthens the relationship between certification and sustainability of SMEs, the original sample value is 0.412, indicating a positive impact. The T-statistic value exceeds the established threshold (1.960), with a result of 3.030, and the p-value is 0.003, which is below the alpha value of 0.05. Hence, financial inclusion does strengthen the relationship between certification and sustainability of SMEs, leading to the acceptance of hypothesis.

## **5. Discussion**

The first hypothesis shows that digital literacy has a positive effect on the sustainability of SMEs accepted. The training and education related to product promotion through digital platforms and digitalization of SMEs carried out by the Government have a positive impact on the sustainability of SMEs in Kendal Regency. Thus, with SME actors having knowledge and understanding in promoting products through digital platforms and digitalization of SMEs, of course, SME products will be known by the wider community so that SME actors can survive and compete in a very competitive era.

The findings of this study add to previous research that indicates digital literacy positively impacts the sustainability of SMEs (Muhammad Taufik Hidayat, Anwar Ramli, 2024; Patria et al., 2023). Enhancing digital literacy within companies or the business sector can assist SME stakeholders in more accurately adopting technology and adding value to their products and services.

The second hypothesis shows that innovation has a positive effect on the sustainability of SMEs rejected. The quality of products owned by SMEs in Kendal Regency is still quite low and lacks innovation, because SMEs still have minimal literacy in creating new products, and not all SMEs are ready to utilize digitalization, so this affects the sustainability of SMEs in Kendal Regency.

The findings of this study add to previous research that indicates that innovation does not have a positive effect on the sustainability of SMEs (Saida Zainurossalamia et al., 2024). The motivation of SMES actors to innovate is still low, which has an impact on inadequate product quality. Therefore, the Kendal Regency government is expected to continue to strive to provide education and training to SMES actors to improve the quality of their products, so that the sustainability of SMES can be guaranteed.

The third hypothesis shows that certification has a positive effect on the sustainability of SMEs accepted. The training and product certification facilities provided by the Kendal Regency Government, have a positive impact on the sustainability of SMEs in Kendal Regency. So, with SMES actors being given facilities such as business licensing training, NIB, and product certifications, of course, more consumers will

believe in the quality of SMES products. With SMES products having certificates, of course, consumers will feel a guarantee of security when consuming SMES products, this will affect the sustainability of SMES and enable them to survive and compete in a very competitive era.

The findings of this study add to previous research that indicates that certification has a positive effect on the sustainability of SMEs (Cahyo et al., 2024). Therefore, having certification can be one of the foundations for SMEs to be able to survive in the long term by becoming more competitive. This is because product certification can protect customers, guarantee the quality of industrial goods, and uphold a safe working environment. (Anita & Iznillah, 2023).

The fourth hypothesis shows that financial inclusion strengthens the relationship between digital literacy and the sustainability of SMEs is rejected. The training and education on product promotion through digital platforms and the digitalization of SMEs provided by the Kendal Regency Government have a positive impact on the sustainability of SMEs in the region. Therefore, the presence or absence of financial inclusion does not affect the relationship between digital literacy and the sustainability of SMEs. This is because SME actors have received free training and education related to digitalization from the Kendal Regency Government.

Based on research conducted by (Suryanto et al., 2024), it states that SME actors still face difficulties in accessing financial products and service systems, so they have not fully utilized financial products and services in running their businesses. This shows that whether or not financial inclusion is created, business continuity does not have a significant effect on this.

The sixth hypothesis shows that financial inclusion strengthens the relationship between certification and sustainability of SMEs. The provision of training and product certification facilities provided by the Kendal Regency Government has a positive impact on the sustainability of SMEs in the Kendal Regency. Thus, with MSME actors being given facilities such as business licensing training, NIB, and product certifications, of course, more consumers will believe in the quality of MSME products. However, not all product certifications can be facilitated by the Kendal Regency Government, so the role of financial inclusion is needed in financing to obtain product certification so that it can affect the sustainability of SMEs in the Kendal Regency.

Based on research conducted by (Purnama, 2023), it states that financial inclusion allows MSME actors to more easily access sources of funds, such as bank loans or other financing. So, with the ease of accessing sources of funds, of course, MSME actors find it easier to improve the quality of their products by making product certifications, this is because of the tendency or trend of consumers who are increasingly smart in choosing quality products, it becomes a separate demand for SMEs in producing quality products, safe, according to consumer desires and can affect the sustainability of SMEs (Julianto, 2019).

## **6. Conclusions**

This study explores how SMEs can sustain their businesses in the 4.0 industrial era, acknowledging that all enterprises must adapt to technological advancements, enhance digital literacy, foster innovation, and offer security guarantees to consumers through certification. Additionally, easy access to financing from institutions plays a supportive role in this process.

This study uses a sample of SMEs operating in Kendal Regency that have been in operation for over one year and possess business licenses and product certifications. The total number of respondents in this study is 210 SME actors. Data was processed and analyzed using two software programs: Microsoft Excel and Smart PLS. Data collection and analysis were conducted in August 2024. This research examines the direct and indirect relationships between digital literacy, innovation, and certification in relation to the sustainability of SMEs. The results indicate that the first and third hypotheses, linking digital literacy and certification to SME sustainability, have a positive influence. Nonetheless, the second hypothesis related to innovation does not demonstrate a positive impact on the sustainability of SMEs. Additionally, the fourth and fifth hypotheses concerning the effects of financial inclusion indicate that it does not moderate the relationship between digital literacy and innovation with SME sustainability. Meanwhile, the sixth hypothesis suggests that financial inclusion can strengthen the relationship between certification and SME sustainability.

This study demonstrates that product certification is crucial for the sustainability of SMEs in Kendal Regency, particularly with the ease of access to financial services. As consumers become increasingly discerning in selecting quality products, SMEs are compelled to produce goods that are high-quality, safe, aligned with consumer preferences, and guaranteed. Therefore, it is hoped that this research will encourage the government to continue improving the quality of SME products to ensure their sustainability.

The findings of this study can be implied by practitioners and authorized parties as policy makers in this case the Kendal Regency Government. These parties can use this study to further see the importance of digital literacy, innovation, and certification on the sustainability of SMEs in Kendal Regency. In this study, innovation did not significantly impact the sustainability of SMEs. Consequently, it is the responsibility of the Kendal Regency Government to provide training and education to SME practitioners, enabling them to innovate and improve their product quality.

Further research, is expected to examine the halal certification variable to ensure whether halal certification is one of the supporting factors that can improve business sustainability. Further research is expected to conduct this research using a qualitative approach because the focus of this research is more on SMES actors so more in-depth research is needed so that researchers know the factors that influence business sustainability.

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## References:

- Agostini, L., Galati, F., & Gastaldi, L. (2020). The digitalization of the innovation process: Challenges and opportunities from a management perspective. *European Journal of Innovation Management*, 23(1), 1–12. <https://doi.org/10.1108/EJIM-11-2019-0330>
- Anita, N., & Iznillah, M. L. (2023). Pengaruh Sertifikasi dan Standardisasi Produk terhadap Peningkatan Penjualan dan Daya Saing UMKM. *Jurnal Akuntansi Dan Ekonomika*, 13(1), 29–35. <https://doi.org/10.37859/jae.v13i1.4591>
- Barney, J. B., & Asli M. Arian. (2005). The resource-based view. *The Strategic Manager*, 1, 63–86. <https://doi.org/10.4324/9781315228075-4>
- Bruce, E., Shurong, Z., Egala, S. B., Amoah, J., Ying, D., Rui, H., & Lyu, T. (2022). Social Media Usage and SME Firms' Sustainability: An Introspective Analysis from Ghana. *Sustainability (Switzerland)*, 14(15). <https://doi.org/10.3390/su14159433>
- Cahyo, S. D., Sari, V. I. P., & Patmasari, E. K. (2024). PENGARUH ENTREPRENURIAL MINDSET, DIGITAL LITERASI, DAN CERTIFICATION TERHADAP PERFORMANCE OF MSMEs: PERAN SELF EFFICACY SEBAGAI MODERATOR. 8(3), 1–14.
- Calantone, R. J., Harmancioglu, N., & Droge, C. (2010). Inconclusive innovation “returns” A meta-analysis of research on innovation in new product development. *Journal of Product Innovation Management*, 27(7), 1065–1081. <https://doi.org/10.1111/j.1540-5885.2010.00771.x>
- Chin, W. W., Chin, W. W., & Chin, W. W. (1998). The partial least squares approach to structural equation modelling. In Marcoulides G. A. (Ed.). *Modern Methods for Business Research*, 295(2), 295–336.
- Dinas Perdagangan Koperasi dan Usaha Kecil Menengah Kabupaten Kendal. (2022). *Perkembangan Data Usaha Mikro, Kecil, Menengah Kabupaten Kendal*. <http://disdagkopukm.kendalkab.go.id/>
- Disnakerperinkopukm. (2020). *Pelaku UMKM Kuliner Ikuti Pelatihan Produksi*. <https://disnakerperinkopukm.kuduskab.go.id/?s=umkm>
- Edward, E., Chairunnisa, F., & Perdana Siregar, A. (2023). Digitalpreneur Competency Model and Digital Literacy on MSME Business Performance in Jambi Province. *Dinasti International Journal of Management Science*, 4(3),

- 473–482.
- Eggert, A., Thiesbrummel, C., & Deutscher, C. (2014). Differential effects of product and service innovations on the financial performance of industrial firms. *Journal of Business Market Management*, 7(3), 380–405. <http://www.jbm-online.net/index.php/jbm/article/view/80>
- Ferdinand. (2013). *Metode Penelitian Manajemen*. Badan Penerbit Universitas Diponegoro.
- Garson. (2016). *Partial Least Squares Regression & Structural Equation Models*. Statistical Publishing Associates.
- Gilster, P., & Watson, T. (1999). Digital\_Literacy gilster. *Meridian: A Middle School Computer Technologies Journal a Service of NC State University, Raleigh, NC*, 141. [https://www.academia.edu/1354072/Digital\\_Literacy?bulkDownload=thisPaper-topRelated-sameAuthor-citingThis-citedByThis-secondOrderCitations&from=cover\\_page](https://www.academia.edu/1354072/Digital_Literacy?bulkDownload=thisPaper-topRelated-sameAuthor-citingThis-citedByThis-secondOrderCitations&from=cover_page)
- Hanaysha, J. R., Al-Shaikh, M. E., Joghee, S., & Alzoubi, H. M. (2022). Impact of Innovation Capabilities on Business Sustainability in Small and Medium Enterprises. *FIIB Business Review*, 11(1), 67–78. <https://doi.org/10.1177/23197145211042232>
- Hudson, M., Smart, A., & Bourne, M. (2001). Theory and practice in SME performance measurement systems. *International Journal of Operations and Production Management*, 21(8), 1096–1115. <https://doi.org/10.1108/EUM00000000005587>
- Iriobe, O. C., Akinyede, O. M., Iriobe, & Grace O. (2017). *West African Journal of Business and Management Sciences Faculty of Business Administration Financial Literacy and Financial Inclusion for Entrepreneurship Development in Nigeria*. 7(1), 63–69.
- J Aduda, E. K. (2012). Financial inclusion and financial sector stability with reference to Kenya. *Journal of Applied Finance and Banking*, 2(6), 95–120.
- Julianto, D. Y. (2019). PERSEPSI PENGUSAHA MUSLIM TERHADAP SERTIFIKASI HALAL (Studi Pengusaha Muslim UMKM Olahan Kentang di Kabupaten Kerinci, Provinsi Jambi). *Universitas Islam Indonesia, Studi Pengusaha Muslim UMKM*.
- Kementerian Koperasi dan Usaha Kecil dan Menengah. (2021). *Perkembangan Data Usaha Mikro, Kecil, Menengah*. <https://www.kemenkopukm.go.id/>
- Kolkman, D. M. (2014). Corporate Identity strength and its perceived influence on Halal food certification adoption Master business administration – International Management HALAL FOOD CERTIFICATION ADOPTION: CASE OF. *Master Thesis*.
- Kotler, P. (2007). Kotler on Marketing : How to Create , Win and Dominate Markets By. *Journal of the Academy of Marketing Science*, 29, 421–422. [http://scholar.google.com/scholar?as\\_q=Kotler+on+Marketing+:+How+to+Create+:+Win+and+Dominate+Markets+By%5Cnhttp://altfeldinc.com/pdfs/Kotler.pdf](http://scholar.google.com/scholar?as_q=Kotler+on+Marketing+:+How+to+Create+:+Win+and+Dominate+Markets+By%5Cnhttp://altfeldinc.com/pdfs/Kotler.pdf)
- Lingkarjateng.id. (2023). *Dorong UMKM Naik Kelas, Disdagkop UKM Kendal Perkuat Pelatihan hingga Pengawasan*. <https://lingkarjateng.id/berita-kendal-hari-ini/dorong-umkm-naik-kelas-disdagkop-ukm-kendal-perkuat-pelatihan->



- hingga-pengawasan/
- Marnoto, Asdar, A. S., Novaria, R., & Alisyahbana, A. N. Q. A. (2024). Entrepreneurial Literacy and Digital Literacy: A Key to Successful Business Sustainability of Clothing Merchants in the Modern Era. *Indonesian Journal of Business and Entrepreneurship Research*, 2(1), 27–37. <https://doi.org/10.62794/ijober.v2i1.1443>
- Mas-Verdú, F., Ribeiro-Soriano, D., & Norat Roig-Tierno. (2015). Firm survival: The role of incubators and business characteristics. *Journal of Business Research*, 151, 10–17. <https://doi.org/10.1016/j.jbusres.2014.11.030>. The
- Muhammad Taufik Hidayat, Anwar Ramli, M. H. (2024). *THE INFLUENCE OF ENTREPRENEURIAL LITERACY AND*. 4(5), 936–949.
- Musa, B. O. (2022). *Effect of Financial Innovations on Financial Inclusion: a Case of Small and Medium Enterprises in Urban Informal Settlements in Nairobi County, Kenya*. [http://erepository.uonbi.ac.ke/handle/11295/162416%0Ahttp://erepository.uonbi.ac.ke/bitstream/handle/11295/162416/Omar B. Musa - Project.pdf?sequence=1](http://erepository.uonbi.ac.ke/handle/11295/162416%0Ahttp://erepository.uonbi.ac.ke/bitstream/handle/11295/162416/Omar%20B.%20Musa%20-%20Project.pdf?sequence=1)
- Mutanu, K. G. (2017). Digital Marketing Strategies And Marketing Performance Of Top 100 Small And Medium Enterprises (SMES). In *Master Thesis* (Vol. 4, pp. 9–15).
- Ng, W. (2012). Can we teach digital natives digital literacy? *Computers and Education*, 59(3), 1065–1078. <https://doi.org/10.1016/j.compedu.2012.04.016>
- Patria, H., Fatchul Alam, M. A., Mulyadi, A., & Setyarko, A. (2023). The Influences of Digital Technology, Digital Literacy, and Digital Marketing On The Performance of SMEs in Bekasi. *Cakrawala Repositori IMWI*, 6(1), 401–419. <https://doi.org/10.52851/cakrawala.v6i1.235>
- Prajogo, D. I., & Ahmed, P. K. (2006). Relationships between innovation stimulus, innovation capacity, and innovation performance. *R and D Management*, 36(5), 499–515. <https://doi.org/10.1111/j.1467-9310.2006.00450.x>
- Purnama, W. (2023). Pengaruh Akuntansi Digital, literasi keuangan dan modal sosial terhadap kinerja UMKM dengan inklusi keuangan sebagai variabel moderasi. *Universitas Islam Sultan Agung*.
- Putra, A. T., Inanna, Tahir, T., Mustari, & Hasan, M. (2023). Analysis of Financial Literacy and Digital Literacy on the Sustainability of Micro, Small and Medium Enterprises (MSMEs). *International Journal of Asian Business and Management*, 2(6), 977–992. <https://doi.org/10.55927/ijabm.v2i6.6978>
- Radar Semarang. (2023). *Ada 2.700 Produk UMKM di Kendal yang Sudah Bersertifikat Halal*. <https://radarsemarang.jawapos.com/kendal/721769072/ada-2700-produk-umkm-di-kendal-yang-sudah-bersertifikat-halal>
- Rahayu, W. P., Kusumojanto, D. D., Martha, J. A., Ningsih, G., & Hapsari, N. T. (2021). the Role of Digital Marketing, Innovation, Self-Efficacy in Business Sustainability At the Rengginang Industrial Centre in the New Normal. *International Journal of Business, Economics and Law*, 24(6), 88–95.
- Ridha, R., & Hidayat, N. K. (2021). Impact of Innovation & Certification to Sme Performance in F&B Sector. *ADI International Conference Series*, 10(4), 337–360. <https://doi.org/10.34306/conferenceseries.v3i1.372>
- Roscoe JJ. (1975). *Fundamental research statistics for the behavioral science*. Holt,

- Rinehart and Winston.
- Saida Zainurossalamia, Z. A., Tricahyadinata, I., & Robiansyah, R. (2024). Does Creativity and Product Innovation Build Business Continuity? Investigation of Samarinda Weaving Craft. *ECONOMICS - Innovative and Economics Research Journal*, 12(2), 177–194. <https://doi.org/10.2478/eoik-2024-0024>
- Schindler. (2019). *Business Research Methods* (Thirteenth). McGraw Hill.
- Sekaran dan Bougie. (2011). *Research Methods for Business: A Skill-Building Approach* (6th ed.).
- Shopova, T. (2014). Digital literacy of students and its improvement at the university. *Journal on Efficiency and Responsibility in Education and Science*, 7(2), 26–32. <https://doi.org/10.7160/eriesj.2014.070201>
- Soriano, M. A. (2017). Factors Driving Financial Inclusion and Financial Performance in Fintech new ventures: An empirical study. *Dissertations and Theses Collection*, 258. [https://ink.library.smu.edu.sg/etd\\_coll/145](https://ink.library.smu.edu.sg/etd_coll/145)
- Sugiyono. (2019). *Metode Penelitian Kuantitatif, Kualitatif, dan R&D*. Alfabeta.
- Suryanto, R., Afif Nur Hanan, M., & Saniyatul Ummah, R. (2024). Pengaruh Literasi Keuangan, Inklusi Keuangan, dan Inovasi Terhadap Kinerja UMKM. *Reviu Akuntansi Dan Bisnis Indonesia*, 8(1), 20–32. <https://doi.org/10.18196/rabin.v8i1.21968>
- Terzi, N. (2015). Financial Inclusion and Turkey. *Academic Journal of Interdisciplinary Studies*, 4(1), 269–276. <https://doi.org/10.5901/ajis.2015.v4n1s2p269>
- Tomeczyk, Ł. (2020). Digital literacy and e-learning experiences among the pre-service teachers data. *Data in Brief*, 32. <https://doi.org/10.1016/j.dib.2020.106052>
- Tribun Banyumas. (2021). *Ini Pentingnya UMKM Miliki Izin PIRT Menurut Kun Cahyadi, Kendal Baru 2.300 Pelaku Usaha*. <https://banyumas.tribunnews.com/2021/06/01/ini-pentingnya-umkm-miliki-izin-pirt-menurut-kun-cahyadi-kendal-baru-2300-pelaku-usaha>
- Yanti, W. I. P. (2019). *Pengaruh Inklusi Keuangan Dan Literasi Keuangan Terhadap Kinerja Umkm Di Kecamatan Moyo Utara*. 2(1). <http://sahabatpegadaian.com/keuangan/inklusi-keuangan>
- Zauro, N. A., Saad, R. A. J., Ahmi, A., & Mohd Hussin, M. Y. (2020). Integration of Waqf towards enhancing financial inclusion and socio-economic justice in Nigeria. *International Journal of Ethics and Systems*, 36(4), 491–505. <https://doi.org/10.1108/IJOES-04-2020-0054>