Determinants of MSME Sustainability: A Regression-Based Study in Labuhanbatu

Mulkan Ritonga[1]*, Ade Parlaungan Nasution[1], Rahma Muti'ah[2]

[1]Departemen Ekonomi dan Bisnis, Universitas Labuhanbatu, Rantauprapat, North Sumatera, Indonesia

[2]Departemen Sains dan Teknologi, Universitas Labuhanbatu, Rantauprapat, North Sumatera, Indonesia

*r.mulkan17@gmail.com

Abstract. This study aims to identify factors that influence the development of healthy and independent MSMEs in Labuhanbatu Regency, Indonesia. The research method uses a quantitative approach with primary data collection through interviews and questionnaires distributed to 342 MSME actors in Labuhanbatu Regency. The sample was taken using a stratified random sampling technique based on the 2019 MSME population. The data were analyzed using multiple regression techniques to test the effect of the independent variables partially and simultaneously on the dependent variable. The results showed that education and skills ($\beta = 25.299$, $p < 0.01$), locus of control ($\beta = 4.452$, $p < 0.01$), government support and policies ($\beta = 18.001$, $p < 0.01$), and access to capital and financial resources ($\beta = 9.332$, $p < 0.01$) have a positive and significant influence on the development of healthy and independent MSMEs. In contrast, financial literacy ($\beta = 1.025$, $p > 0.1$), partnership networks ($\beta = 1.005$, $p > 0.1$), and infrastructure and technology ($\beta = 1.087$, $p > 0.1$) did not contribute significantly in this study. These findings emphasize the need for human resource capacity building and government policies that support access to capital as key strategies to encourage the sustainability and self-reliance of MSMEs in the region.

Keywords: MSME Resilience, Regression Analysis, Entrepreneurship Development, Small Business Sustainability, Entrepreneurial Autonomy.

1.   Introduction

Small business empowerment is directed at developing businesses that are based on science and technology and have strong competitiveness, as stated in the 2005-2025 RPJPN, with the aim of increasing business productivity. Regulation of the Minister of Cooperatives and SMEs No. 06/Per/M.KUKM/XI/2012 emphasizes the importance of accelerating the empowerment of cooperatives and SMEs to improve their competitiveness. The strategy applied to small businesses includes creating independent, healthy and resilient businesses [1], as well as strengthening their capacity to drive quality economic growth, expand employment and reduce poverty in order to realize economic democracy. The

industrial sector has a vital role in national development by contributing to regional progress and improving people's welfare [2].

However, currently MSMEs face problems such as weak organizational systems, difficult product marketing, limited business facilities, inadequate equipment, small business capital, low entrepreneurial spirit, lack of concern for the environment, and inadequate services [3, 4] The decline of MSMEs certainly cannot be separated from inconsistent government policies in the field of managing and strengthening MSMEs [5]. The weakness of regulations in the SME sector is the absence of regulations that are important for dynamic and innovative SME management [6]. Especially in Indonesia, Law No. 20/2008 and Ministerial Decree 19/per/M.KUKM/VIII/2006 failed to protect MSMEs and even left MSMEs helpless in facing competition.

Lack of competitiveness, unsupportive regulations, limited access to capital, and lack of government attention hinder the growth of MSMEs. In fact, MSMEs are very important for the government in driving economic growth and improving people's welfare [6, 7] Therefore, the right strategy with a professional management approach is needed so that MSMEs can be independent and have healthy financial stability in the future [9]. However, in Labuhanbatu Regency, many MSMEs are growing but difficult to develop or survive as expected, in contrast to conditions in other regions.

Table 1. Growth of Labuhanbatu Regency MSME Business Units

Year	Number of Business Units
2019	4,286
2020	16,275
2021	9,024
2022	9,412
2023	8,283

The data in table 1. shows that the growth of MSMEs in Labuhanbatu increased sharply in 2020 by 279.72%, from 4,286 business units in 2019 to 16,275 business units. However, in 2021 there was a significant decline of 44.55%, to 9,024 business units. In 2022, it recorded another growth of 5.41% to 9,512 business units, but in 2023 it again decreased by 12.92%, to 8,283 business units. This condition occurred even though the Labuhanbatu Regency government, through the Cooperatives and MSMEs Office, has consistently organized training and capacity building programs for MSMEs, including training in digital marketing, product innovation, as well as network development and business collaboration. This phenomenon indicates a gap between government support and the resilience of MSMEs in the field.

Despite a number of regional government programs designed for MSMEs in Labuhanbatu, the businesses have experienced a decline rather than growth. These special programs seem to have failed to make a significant difference for most of the MSMEs in the area. Therefore, an in-depth study of the factors that influence the development of MSMEs is needed so that the goal of independent and healthy MSMEs can be achieved gradually. This is based on the assumption that regional differences may lead to different factors influencing MSME development, such as differences in mindset, habits, character, or consumer behavior [10,11] . Adapting solutions from one region to another without considering the local context could potentially be ineffective or even create new problems.

In order to find this, this research attempts to formulate gaps or dominating factors that will possibly encourage the development of MSMEs, specifically in Labuhanbatu. So that this matter can be resolved and the right solution provided so that it can be used as a new force in improving and developing MSMEs in Labuhanbatu into independent and healthy MSMEs, which will later increase the economic level of the Labuhanbatu community globally and support sustainable economic growth.

2. Methods

Using a mixed-method research approach, this study analyzes the factors that contribute to the growth and development of MSMEs. The ultimate aim is to help these businesses become independent, healthy, and ready to transform into digital enterprises. The research was carried out by collecting primary data using the direct interview method as well as filling out questionnaires for each research subject/respondent. This population is based on the number of MSMEs in Labuhan Batu Regency in 2019, which was 16,275 MSMEs. This population was selected to obtain the most complete data of MSMEs that have gone out of business, MSMEs that have been in business for less than three years, and MSMEs that have been in business for more than three years. Stratified random sampling was applied, and the number of samples was calculated according to the Krejcie table with a 5% level of significance [12, 13] From a population of 16,275, a sample size of 342 MSMEs was obtained. So it can be determined that the distribution of the selected sample is 114 MSMEs that have closed, 114 MSMEs that have been running < 3 years, and 114 MSMEs that have been running > 3 years, spread across 9 sub-districts and 22 villages/districts.

Data was gathered through one-on-one interviews and a semi-structured questionnaire. The questionnaire's questions were largely based on previously validated and reliable research, with minor adjustments made to address the unique features of the regional sector [14]. The study employed a five-point Likert scale, adapted from Schwartz, to assess each indicator of the research variables [15]. Following data collection, the mean score for each variable was calculated based on the respondents' ratings. These continuous data were subsequently used as input for the multiple linear regression analysis [16].

Descriptive statistics and multiple linear regression were chosen for the analysis because they allow for the comparison and measurement of the predictive strength of multiple independent variables on a single dependent variable [17]. Before moving forward with the analysis, the researchers conducted essential assumption tests to ensure validity. They checked for normality with skewness and kurtosis values, looked for linearity in scatterplots, used the Breusch-Pagan/Cook-Weisberg test for homoscedasticity, and examined the Variance Inflation Factor (VIF) to detect multicollinearity. Reporting of extreme values such as high standard deviation (SD = 423) was reviewed and if significant outliers were found, the data went through a transformation or removal process to maintain the validity of the results. The study also applied four different regression models to test the effect of variables partially and simultaneously. Each model has a different theoretical basis and variable focus according to the pillars of MSME development (SOP, ECP, ENVP), so the justification for using the models separately is tailored to the characteristics and analytical objectives of each model to obtain a more detailed and accurate picture of the factors influencing healthy and independent MSMEs.

3. Results and Discussion

3.1 Profil responden

Table 1 summarizes the characteristics of MSME owners, who are mostly women (93.8%). The largest group is aged 36-45 (43.85%), and most have a secondary education (78.5%). A significant portion (39.5%) had no prior business management experience. The majority of entrepreneurs (38.21%) had 1-5 years of prior business experience.

Table 2. Background profile of MSME actors

Characteristics	Frequency	%
Seks Man	321	93.8
Women	21	6.2
Age 18–25	13	3.85
26–35	83	24.36
36–45	150	43.85

46–55	73	21.28
56–65	19	5.64
66 ke atas	4	1.03
Level of education Nothing	8	2.3
Main	268	78.5
Secondary	59	17.2
Certificate	3	1.0
Degrees	3	0.8
Masters	1	0.3
Type of previous business experience Nothing	11	3.1
Opening a new business	51	14.9
Managing business	135	39.5
Opening and managing a business	46	13.6
Others	99	29.0
Years of previous business experience 0	100	29.23
1–5	130	38.21
6–10	67	19.49
11–15	23	6.67
16–20	8	2.31
21–25	7	2.05
26 - up	7	2.06

3.2   Data exploration and robustness testing

To ensure the reliability of the Likert-scale items, a factor analysis was conducted on all latent variables, including education, skills, financial literacy, and government support. The results showed that most variables met the recommended thresholds for internal consistency [18]. Specifically, item communalities were generally above 0.5, the Kaiser-Meyer-Olkin (KMO) measure was over 0.5 for all variables except proactiveness (0.486), and the determinant of the correlation matrix was greater than 0.00001. The significant p-values (0.000) also confirmed that the variables were correlated [17].

Based on the Cronbach's Alpha test in Table 2, the reliability of the variables was acceptable, with all scores at or above the 0.60 threshold [19]. The results in Table 3 indicate that the data's skewness was less than ±2 and kurtosis was less than ±3, which confirms normality. Furthermore, a significant Breusch-Pagan/Cook-Weisberg test (p-value = 0.0054) showed that the assumptions of normality and homoscedasticity for the multiple regression were not met [20]. In response to the issues found in the assumption tests, some variables underwent a logarithm transformation, and the researchers utilized robust standard errors for the multiple regression analysis.

Based on Table 4, the "healthy and independent MSMEs" variable had the highest mean (4.30), with most respondents scoring between 3.6 and 4.5 (Figure 2). The lowest mean was for "government support and policies" (0.04). "Networks and partnerships" showed the most consistent responses with the lowest standard deviation (0.10), while "locus of control" had the highest (423.00), reflecting a wide range of entrepreneurial confidence.

Next, the correlation matrix in Table 5 reveals that "healthy and independent MSMEs" has a positive and significant relationship with several independent variables: education and skills, financial literacy, access to capital, locus of control, and government support. In contrast, its positive correlation with networks, partnerships, infrastructure, and technology is not significant. Financial literacy (0.529) and government support (0.413) show the strongest correlations.

Table 3. Test reliability

Variable	Item number	Alpha Cronbach
Healthy and Independent MSMEs	10	0.79
Education and skills	7	0.63
Financial literacy	7	0.80
Access capital and financial resources	6	0.78
Networking and partnerships	5	0,65
Infrastructure and technology	5	0.72
Locus of control	5	0.61
Government and policy support	10	0,68

Table 4. Skewness and kurtosis

Variable	Skewness	Kurtosis
Healthy and Independent MSMEs	− 0,067	2.642
Education and skills	− 3.649	14.316
Financial literacy	0.414	3.524
Access capital and financial resources	1.682	4.146
Networking and partnerships	0.128	2.031
Infrastructure and technology	− 0,430	1.185
Locus of control	− 0,786	2.673
Government and policy support	− 1.605	5.426

Table 5. Mean and standard deviation

Variable	Mean	standard deviation
Healthy and Independent MSMEs	4.30	0.34
Education and skills	0.94	0.24
Financial literacy	40.91	9.55
Access capital and financial resources	7.62	2.46
Networking and partnerships	5.30	6.45
Infrastructure and technology	0.61	0.49
Locus of control	0.99	0.10
Government and policy support	0.04	0.19
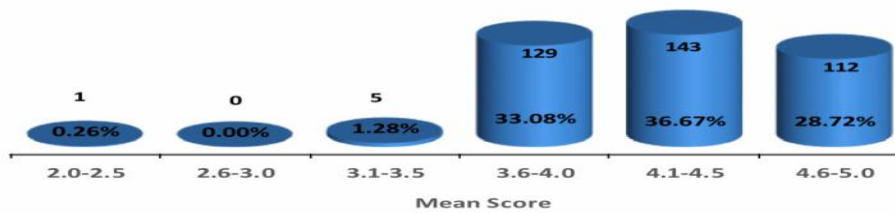
Figure 1. Average score of healthy and independent MSME variables

3.3 Multiple linear regression analysis

To examine the partial and simultaneous impact of the independent variables on healthy and independent MSMEs, four separate regression models were utilized.

Table 6. Test of Collinearity

Independent Variable	Tolerance	VIF
Educational and Skills	0.383	2.608
Financial Literacy	0.562	1.779
Access to Capital and Financial Resource	0.421	2.375
Networking and Partnerships	0.532	1.880
Infrastructure and Technology	0.398	2.515
Locus of Control	0.318	3.141
Government Support and Policy	0.534	1.871

The results in Table 6 show the study's regression models are statistically sound, with no multicollinearity issues (tolerance > 0.10, VIF < 10). Furthermore, Table 7 presents the F-statistics for each model. The first three models show values of 35.190 ($p < 0.01$), 22.02 ($p < 0.01$), and 6.07 ($p < 0.01$), respectively, while the fourth model records an F-statistic of 24.67 ($p < 0.01$). These results indicate that all four statistical models provide a strong fit to the data and exhibit significant relationships. Regarding the coefficient of determination (R^2), the findings reveal that model 1 explains 50% of the variance in SOP, leaving the other 50% to be influenced by variables outside the model. Model 2 accounts for 41% of the variance in ECP, with the remaining 59% explained by other factors. For model 3, only 11% of the variance in ENVP is captured, meaning 89% is due to other influences. Lastly, model 4 explains 42% of the variance related to healthy and independent MSMEs, while the other 58% is attributable to factors not included in the model.

Tabel 7 Multiple Regression Results

Independent Variables	SOPs (Model 1) Beta	SOPs (Model 1) P values	ECPs (Model 2) Beta	ECPs (Model 2) P values	ENVPs (Model 3) Beta	ENVPs (Model 3) P values	SE (Model 4) Beta	SE (Model 4) P values
Education and Skills	0.538	0.000***	0.510	0.000***	0.326	0.015**	25.299	0.000***
Financial Literacy	0.019	0.120	0.039	0.005**	0.004	0.835	1.025	0.127
Access to Capital and Financial Resources	0.128	0.008**	0.154	0.005**	0.189	0.221	9.332	0.000***
Networking and Partnerships	0.019	0.120	0.039	0.005**	0.004	0.835	1.025	0.127
Infrastructure and Technology	0.022	0.129	0.039	0.045**	0.043	0.089	3.87	0.041**

Locus Of Control	0.014	0.140	0.051	0.320	0.320	0.012***	4.475	0.010**
Government Support and Policy	0.479	0.000***	0.393	0.022**	0.176	0.450	18.201	0.010**
R2	0.500		0.410		0.110			
F Statistics	35.190		22.020		6.670		24.67	

Table 7's findings indicate that education and skills, locus of control, and government support and policies positively and significantly influence Model 1 (SOP). Education and skills was found to have the greatest effect among the three. In Model 2 (ECP), in addition to education and skills, financial literacy, access to capital and financial resources, networks and partnerships, and infrastructure and technology also have significant effects, indicating that these factors are more complex in influencing aspects of MSME economic growth. Model 3 (ENVP) is significantly influenced by education and skills, access to capital and financial resources, locus of control, and government support and policies.

In Model 4 (SE), which integrates the three preceding pillars SOP, ECP, and ENVP the variable with the strongest effect on the achievement of healthy and independent MSMEs is education and skills ($\beta = 25.299$, $p < 0.01$). This is followed by government support and policies ($\beta = 18.001$, $p < 0.01$), access to capital and financial resources ($\beta = 9.332$, $p < 0.01$), and locus of control ($\beta = 4.452$, $p < 0.01$). These coefficients highlight that enhancing education and skills greatly contributes to MSME self-reliance, while government assistance and improved access to financing are also vital for ensuring business stability and growth. Conversely, the factors of financial literacy ($\beta = 1.025$, $p > 0.1$), networks and partnerships ($\beta = 1.005$, $p > 0.1$), and infrastructure and technology ($\beta = 1.087$, $p > 0.1$) do not exhibit statistical significance in the model. This suggests that, within the Labuhanbatu MSME context, these aspects have yet to emerge as key determinants of success.

A comparison between models shows that factors affecting the operational (SOP) and environmental (ENVP) aspects of MSMEs are more limited and focus on education, locus of control, and policy support, while the economic aspect (ECP) is influenced by a broader spectrum of variables, including financial literacy and partnership networks. This indicates the different roles and interactions of variables in each dimension of MSMEs, which need to be considered in designing more focused and effective policies and interventions.

The findings of this research show that MSME actors show high levels of healthy and independent MSME development, with an average score of 4.30. However, partnership and networking scored the lowest average score and did not significantly influence healthy and independent MSMEs in Labuhanbatu. This implies that partnership and networking are not very prominent, where, in advancing their business, MSME players do not depend on partners and relationships, but require the opening of a wider market to market their products. This is contrary to the research results, which suggest that partnership and networking have a potential influence on the development and independence of MSMEs. Consistent with prior research, the findings show that education and skills positively and significantly impact healthy and independent MSMEs [21], which stated that having skills will encourage MSMEs to improve their business productivity in a sustainable manner. The next results show that financial literacy does not significantly influence healthy and independent MSMEs. The outcome of this research goes against what most researchers have found [22]. The importance of financial literacy for MSMEs includes empowering them to control their financial business, prepare business development plans, and face pressure from their own finances.

The study found that access to capital and financial resources has a significant influence on healthy and independent MSMEs, a result that is consistent with other research [23], which state that ease in accessing sources of capital will make it easier for business actors to increase their business scale, both in management and development. Undoubtedly, access to capital and other financial resources will be a driving force in enabling the development of healthy and independent small and medium-sized businesses. Establishing these businesses requires easier access to capital from the government, financial

institutions, and the private sector.

Infrastructure and technology did not show a significant influence on healthy and independent MSMEs in this research. This is because infrastructure and technology are not obstructive factors for the progress of MSME businesses. These results are similar to the results of previous research [24]. Social Media and E-Commerce at the Global Level: Do ICT Access and ICT Skills Matter?, which also did not find a significant influence of progress and technology on the development of MSMEs. Several things strengthen this, including even when infrastructure and technology are available, SMIEs might still not have competent human resources or be ready to fully use technology. For example, a lack of digital skills limits the beneficial use of technology. The technology may be available, but access to it may be costly for the SMIEs in terms of costs, knowledge, and supporting infrastructure availability, such as stable internet access. MSMEs in the traditional sectors of rural areas might pay more attention to community relations and conventional operations, which are not so dependent on high technology. Most probably, applied technologies do not fit MSME-specific needs or are not fully utilized; therefore do not provide an impressive effect for the independence or health of UMKM.

The findings suggest that a person's locus of control or their belief in their ability to shape their own destiny is a major factor in the health and independence of their small business. This aligns with prior research that demonstrated a strong link between locus of control and the financial behaviors of entrepreneurs [25], [26]. Locus of control is a psychological construct that gauges the degree to which a person perceives they have agency over the circumstances of their life and business. MSME owners who possess an internal locus of control believe they are primarily responsible for their business's success or failure. This perspective drives them to be more active, confident, and motivated, as they concentrate on the results they can personally create.

Government backing and policies have a notable effect on the health and independence of micro and small enterprises. This echoes previous research [27] that found government support significantly impacts MSME entrepreneurship. One study even specifically noted the crucial role of government support for Malaysian manufacturing MSMEs [28]. Several aspects that play an important role include government support and its policies, including traffic, a) financing policies, b) legal protection, c) education and training, d) access to markets, e) infrastructure and technology.

The study's findings reveal that all the independent variables presented in Figure 1 are significantly related to the health and independence of MSMEs, both individually and collectively. Specifically, the findings show that Access to capital and financial resources, Infrastructure, and technology are the most influential factors in MSME development, followed by government support and policies. These results are in line with the findings of previous research. These conclusions are consistent with the research from study [29,30], who believe that the regulatory framework alone is not enough for managing MSMEs towards healthy and independent MSMEs and recommend that it must be supported by the provision of broader marketing and market facilities and by structured institutions.

4. **Conclusion**

This study's findings indicate that several variables significantly influence the development of healthy and independent MSMEs in the Labuhanbatu area. The most impactful factors are education and skills, locus of control, access to capital and financial resources, and government support and policies. Conversely, the research suggests that financial literacy, partnership networks, and technological infrastructure do not contribute significantly to this development. These findings confirm the importance of strengthening human resource capacity and access to finance as the main pillars of MSME development, as well as the need for an active role of the government in providing policies that support and encourage the use of digital technology for marketing and distribution of MSME products.

As a practical recommendation, the government is expected to increase structured digital-based training and mentoring, simplify the business legality licensing process, and develop a special e-market platform to expand market access for MSMEs in Labuhanbatu. Consistent institutional and policy support is also needed to strengthen MSME competitiveness in a sustainable manner. This study has limitations because it only involves MSMEs in the Labuhanbatu region, so the results cannot be widely

generalized. Therefore, further studies involving various regions with a multidisciplinary approach are highly recommended to validate and expand the findings and support the development of MSMEs nationally.

Credit Authorship Contribution Statement

Mulkan Ritonga: Conceptualization, Data curation, Formal analysis, Funding acquisition, Investigation, Methodology, Writing – original draft. Ade Parlaungan Nasution: Conceptualization, Supervision, Writing – review & editing. Rahma Muti'ah: Conceptualization, Supervision, Writing – review & editing.

Declaration of competing interests

All authors declare that they have no conflicts of interest.

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