Jurnal Apesiasi Ekonomi Volume 13, Nomor 3, September 2025 : 774-784 ISSN Cetak : 2337-3997
ISSN Online : 2613-9774

OPTIMIZING THE ROLE OF COLLABORATION IN MAINTAINING MSME SUSTAINABILITY

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ABSTRACT

Product and service innovation collaboration, marketing collaboration, and supply chain collaboration are strategies that can be done to improve the performance and sustainability of MSMEs in the current industrial revolution 4.0 era. The purpose of this study is to analyze and explain the optimization of the role of collaboration in maintaining the sustainability of MSMEs. The study's data, which consists of MSMEs in Sukabumi City, has a population of 31,926. Web.raosoft.com sample size was used, with an error rate of 5%, to ensure that a sample of 380 respondents was obtained. This study employed a quantitative, descriptive methodology. Respondents to a Google form including questions are given questionnaires as part of the data gathering process for this project. In this study, the analysis method employed was multiple linear regression analysis. The study's results explained that product and service innovation collaboration, marketing collaboration, and supply chain collaboration had a positive and significant effect on maintaining the sustainability of MSMEs and its influence was 64.4% while 35.6% was influenced by other variables that were not studied.

Keywords: Product and service innovation collaboration, Marketing collaboration, Supply chain collaboration, MSME sustainability, Sukabumi City

INTRODUCTION

In the era of the Industrial Revolution 4.0 which makes the joints of life more complex, collaboration is the key to achieving optimal results. This collaboration involves active cooperation between different individuals, organizations, or sectors to achieve a common goal that is greater than can be achieved individually (Hsieh et al., 2018). In the business context, collaboration has proven to be an important factor in achieving business success and sustainability (Lauritzen, 2017). Collaboration between companies, nonprofits, governments, and communities can provide significant benefits in increasing efficiency, innovation, and positive impact (Hewitt-Dundas et al., 2019). Optimization of collaboration is becoming increasingly important due to the complex challenges faced by today's world. Challenges such as climate change, poverty, social inequality, and technological change require a holistic and collaborative approach to achieving sustainable solutions.

One of the key benefits of collaboration is the exchange of knowledge, resources, and expertise between the parties involved (Smirnova et al., 2018). Through collaboration, organizations can learn from each other's experiences and expertise, thus creating synergies and improving the quality of work (Audretsch et al., 2023). In addition, collaboration can also increase innovation. By combining multiple perspectives and expertise, collaboration fosters the creation of new ideas, creative approaches, and better solutions (Belitski & Mariani, 2023). Collaboration also allows for risk sharing, thus expanding the potential to take greater risks to achieve better results (Hidayanti & Alhadar, 2021; Li & Chen, 2019). Collaborations can include partnerships between companies for new product development, sharing resources and costs in the supply chain, or collaboration with research institutions to develop new technologies (Marion & Fixson, 2021). More broadly, collaboration can also involve the involvement of governments, non-profit organizations, and communities to create positive social impact, such as corporate social responsibility programs or sustainable development projects. In addition, collaboration between MSMEs is a trending issue that is always echoed by the government through the Ministry of Cooperatives and SMEs, amid the onslaught of foreign products entering Indonesia.

In the era of globalization and rapid advances in information technology, the role of micro, small, and medium enterprises (MSMEs) is becoming increasingly important in maintaining the economic sustainability of a country (Duc Tai, 2022). MSMEs not only act as providers of employment, but also as drivers of innovation, creativity, and economic growth. However, MSMEs often face various challenges that can hinder their development and sustainability. Some of the main challenges faced by MSMEs include limited access to capital, lack of managerial skills,

limited market access, and lack of access to technology and information (Shin et al., 2023). In facing this challenge, collaboration is one of the strategies that can help MSMEs to improve their business sustainability. This collaboration between MSMEs is about product and service innovation collaboration, marketing collaboration, digital technology collaboration, and supply chain collaboration (Anwer & Ahmed Siddiqui, 2019). In addition to collaboration between MSMEs, of course, collaboration with financial institutions or investors to gain access to the funding sources needed to increase production (Lu & Yu, 2020). This collaboration can certainly help MSMEs in overcoming capital limitations.

Collaboration can not only increase the amount of production but can also improve the managerial skills and knowledge of MSMEs. Through training, mentoring, or educational programs organized by educational institutions or the private sector, MSMEs can develop the managerial skills needed to manage their businesses more effectively. Knowledge of marketing strategies, financial management, and the use of technology can help MSMEs increase their competitiveness in the market. Collaboration can help MSMEs in expanding market access (Zhang, 2018). Through partnerships with large companies or e-commerce platforms, MSMEs can market their products to a wider range of customers. In the digital era, information technology plays a very important role to develop and expand a business that is useful for maintaining business continuity (Tseng et al., 2019). Optimizing the role of collaboration to maintain the sustainability of MSMEs, is very important in facing the economic challenges faced by business people. This optimal collaboration can certainly help business actors overcome capital limitations, improve managerial skills, expand market access, and get access to the latest technology and information (Prasanna et al., 2019). Through effective collaboration, MSMEs can play an optimal role in maintaining economic sustainability and encouraging inclusive growth.

The optimization of the role of this collaboration is about product and service innovation collaboration, marketing collaboration, digital technology collaboration, and supply chain collaboration, where digital technology and supply chain collaboration are a novelty in this study. Research on optimizing the role of collaboration in maintaining the sustainability of MSMEs has been carried out by previous researchers. Where each researcher has different results (research gap). Research from (Taib et al., 2015) stated that collaboration has a significant impact on the sustainability of MSMEs. While research from (Guimarães et al., 2021) states that collaboration has no impact on the sustainability of MSMEs. From the description above and the gap in results between researchers, this study aims to analyze and explain the optimization of the role of collaboration in maintaining the sustainability of MSMEs. The contribution of this research is to provide an overview to business actors, on how important collaboration is to strengthen business sustainability. In addition, this research helps the government in determining policy directions, if you want MSMEs to continue their business, it is better to collaborate.

LITERATURE REVIEW AND HYPOTHESIS DEVELOPMENT

Product and Service Innovation Collaboration

Product and service innovation collaboration is an approach in which various parties or entities work together to create or improve innovative products and services (Miozzo et al., 2016). This kind of collaboration involves a combination of expertise, resources, and different perspectives to come up with better solutions and meet the needs of a growing market (Açikgöz, 2017). Product and service innovation collaboration can be a very useful strategy for Micro, Small, and Medium Enterprises. MSMEs often have limited resources and access to knowledge, technology, and a wider range of markets (Hsieh et al., 2018). Through collaboration, MSMEs can leverage advantages together with business partners or other organizations to create more innovative and competitive products and services. The benefits of product and service innovation collaboration for MSMEs are being able to access additional knowledge and expertise possessed by collaboration partners, helping MSMEs solve complex problems, having a wider network and market access, reducing risks associated with developing new products or services, increasing their competitiveness in competitive markets, and can increase access to greater resources, such as capital, infrastructure, technology, or business connections (Marion & Fixson, 2021).

Marketing Collaboration

Marketing collaboration refers to a cooperative effort between two or more business entities to promote their products or services together (Gaczek et al., 2023). In marketing collaborations, these business entities work together to combine their resources, expertise, and reach to achieve mutually beneficial marketing goals. The main goal of marketing collaboration is to increase brand visibility, reach a wider range of

consumers, and generate mutual benefits (Hidayanti & Alhadar, 2021). Marketing collaborations include joint marketing campaigns, shared product or service offerings, and shared content creation. This marketing collaboration, can increase brand visibility, and marketing cost efficiency, optimize the use of resources, increase brand awareness and consumer trust, and increase added value for customers (Smirnova et al., 2018).

Supply Chain Collaboration

Supply chain collaboration refers to collaborative efforts between various entities in the supply chain to improve the efficiency, coordination, and overall performance of the supply chain (Priyadi & Prasetio, 2018). Supply chains involve a series of steps in moving products or services from suppliers to end customers, and effective collaboration within the supply chain can help address challenges such as inventory imbalances, long delivery times, or lack of visibility (Anwer & Ahmed Siddiqui, 2019). Supply chain collaboration involves various parties involved in the supply chain, including suppliers, manufacturers, distributors, retailers, and even customers (Liu et al., 2023). The goal is to create mutually beneficial relationships that focus on sharing information, improving coordination, and organizing activities together. This collaboration in the supply chain works together to increase efficiency, improve quality, reduce costs, and provide added value to customers (Rodriguez-Aguilar et al., 2019). This collaboration involves sharing information, resources, and responsibilities between business partners in the supply chain.

Business Sustainability

Business sustainability refers to the ability of a business to survive and continue to operate in the long term, taking into account economic, social, and environmental aspects (Coşkun & Akgül, 2022). Business sustainability involves prudent management of resources, responsible business practices, and adaptation to changing business environments and society (Utaminingsih et al., 2020). Factors that contribute to business sustainability are financial health, operational efficiency, compliance with regulations and standards, social and environmental responsibility, and the ability to adapt to uncertain economic conditions (Duc Tai, 2022).

Research Hypothesis

Collaboration of Product and Service Innovation on MSME Sustainability

Collaboration of product and service innovations can help MSMEs increase added value to the products and services offered (Maier et al., 2019). Through collaboration with other parties, MSMEs can combine their knowledge and expertise with external resources, such as research institutions, industry experts, or business partners (Tolstykh et al., 2022). This allows MSMEs to produce more innovative, high-quality products and services and better meet market needs. This increase in added value can increase the competitiveness of MSMEs and overall improve the sustainability of their business (Greco et al., 2021). Increased market access can help MSMEs reduce dependence on local markets that may be vulnerable to economic fluctuations or tougher competition. By having a wider market share, MSMEs have a greater opportunity to survive and grow in the long term. Collaboration in product and service innovation can also help MSMEs improve their operational efficiency so that the profitability obtained increases and reduces the risk of impact on the wider environment (Martínez-Sánchez et al., 2009). Collaboration in product and service innovation can also encourage MSMEs to continue to innovate sustainably. Through collaboration with external parties, MSMEs can continue to learn and adapt to market and technological changes. Product and service innovation collaboration has a positive impact on MSME sustainability through increased added value, market expansion, operational efficiency, and continuous innovation (Zelenika & Pearce, 2014).

H_1: There is a positive influence of product and service innovation collaboration on the sustainability of MSMEs

Marketing Collaboration on MSME Sustainability

Marketing collaboration can help MSMEs increase their visibility and brand awareness (Srinivasan & Lohith, 2017). By collaborating with business partners who have a larger market share or strong distribution channels, MSMEs can expand their marketing reach (Ujano, 2024). Such collaborations can include joint promotional activities, the use of shared distribution channels, or the use of broader digital marketing platforms (Kusumastuti et al., 2021). With increased visibility and brand awareness, MSMEs have a better chance of attracting new customers, retaining existing customers, and expanding their market share. Marketing collaboration can also help MSMEs gain access to new customers. Through collaboration with partners who have different customer bases or different distribution channels, MSMEs can expand their reach and reach market segments that were previously difficult to reach (Ramli et al., 2022). Marketing collaboration can help MSMEs in conducting more effective market research. Marketing collaboration can also help MSMEs share resources and reduce

marketing costs. In collaboration, MSMEs can share promotional costs, advertising costs, or marketing campaign development costs with business partners. By sharing resources and costs, MSMEs can access marketing resources that were previously difficult to reach or expensive, thereby increasing their marketing efficiency and effectiveness (Hariyono & Narsa, 2024). With this marketing collaboration between business actors, it will have an impact on the sustainability of their business (Kadarisman, 2019).

H_2: There is a positive influence of marketing collaboration on the sustainability of MSMEs

Supply Chain Collaboration on MSME Sustainability

Supply chain collaboration can help MSMEs gain better access to the resources and raw materials needed for their production (Ning & Yao, 2023). Through partnerships with larger suppliers or distributors, MSMEs can gain access to a wider supply network (Wiedmer et al., 2020). This can help MSMEs secure stable supply, reduce the risk of raw material shortages, and increase production efficiency. Supply chain collaboration can also help MSMEs improve operational efficiency. In partnership with supply chain partners, MSMEs can share information, knowledge, and best practices in operational management (Sarkum et al., 2020). By improving operational efficiency, MSMEs can reduce lead times, production costs, and error rates. Supply chain collaboration can help MSMEs mitigate risks associated with supply uncertainty, price fluctuations, or policy changes (Thi Mai Anh et al., 2019). By reducing risk and increasing resilience, MSMEs can achieve better business sustainability in the long term (Sudusinghe & Seuring, 2022).

H_3: There is a positive influence of supply chain collaboration on the sustainability of MSMEs

RESEARCH METHODS

Types and Objects of Research

This study uses quantitative methods with the type of causality associative relationship, which is research that aims to reveal problems that are causal relationships between two or more variables (Sugiyono, 2019). The type of research used is descriptive, which is research that aims to decrypt or explain something as it is or a picture of a situation (Arikunto, 2013). The object of this research is product and service innovation collaboration (X1), marketing collaboration (X2), supply chain collaboration (X3), and MSME sustainability (Y). The location of this research is MSMEs in Sukabumi City.

Data Types and Sources

This study makes use of primary data, which comes from distributing surveys or inquiries about to product and service innovation collaboration, marketing collaboration, digital technology collaboration, supply chain collaboration, and MSME sustainability. MSMEs in the Sukabumi City Area were the respondents to whom the study's primary data was submitted.

Population and Sample

The population of this study is MSMEs in Sukabumi City, with a total population of 31,926 business actors obtained from the West Java open data web. Using a sample size calculator on the internet at raosoft.com, samples were collected with a 5% margin of error and a 95% data accuracy rate. So respondents were obtained who could be sampled as many as 380 people.

$$x = Z(^{c}/_{100})^{2} r(100\text{-}r)$$

$$n = {}^{N\,x}/_{((N\text{-}1)E^{2} + x)}$$

$$E = \mathrm{Sqrt}[{}^{(N\,-\,n)x}/_{n(N\text{-}1)}]$$

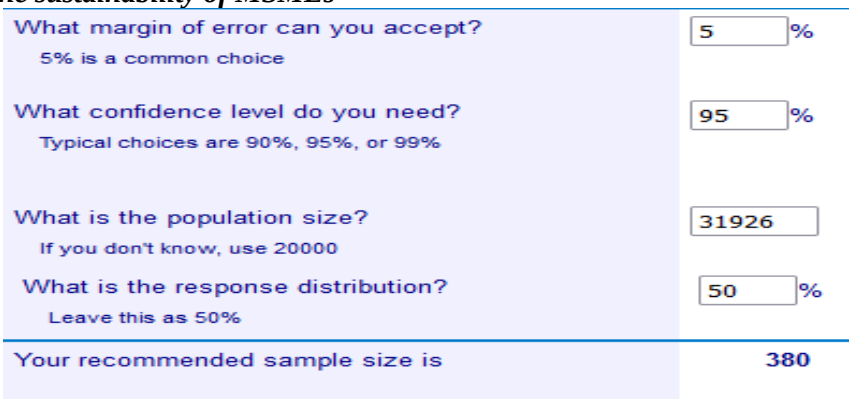

Figure 1. Research Sample

Data Analysis Techniques

Statistical data analysis is carried out in stages, namely first carried out data feasibility tests (validity and reliability tests), then classical assumption tests are carried out, namely normality tests, heteroskedasticity tests, and multicollinearity tests. While the analysis technique used is multiple linear regression, determination coefficient test,

then partial and simultaneous hypothesis tests are carried out. For multiple linear regression, it can be formulated as follows:

$$Y = \alpha + b_1X_1 + b_2X_2 + b_3X_3 + e$$

RESULTS AND DISCUSSION

Characteristics Respondent

The total number of participants in this study was 380 MSME actors in Sukabumi City. These respondents' traits are determined by their gender, education level, and MSME characteristics based on product:

Table 1. Characteristics Respondent

No	Information	Frequency	Percentage
1.	**Gender**		
	Man	170	44,7%
	Woman	210	55,3%
2.	**Education Level**		
	Junior high school	30	7,9%
	Senior high school	160	42,1%
	Diploma III	40	10,5%
	S1	110	28,9%
	S2	40	10,5%
3.	**Types of MSMEs Based on Product**		
	Accessories	1	0,26%
	Batik	1	0,26%
	Embroidery	1	0,26%
	Craft	32	8,44%
	Fashion	31	8,16%
	Convection	19	5,00%
	Culinary	133	35,0%
	Food	100	26,31%
	Drink	19	5,00%
	Services/Others	43	11,31%
	Sum	380	100%

Source: Data processed (Researcher, 2024)

Data Feasibility Test

Test Validity and Reliability

Validity testing is a process to determine how well the instruments of each variable in the study. Validity is very important in research because it confirms whether the results obtained from the instrument are relevant and accurate or not. The validity test carried out is by testing all variable instruments of product and service innovation collaboration, marketing collaboration, supply chain collaboration, and MSME sustainability. An instrument's validity can be determined by comparison r calculate with r critical. Where if r counts > r critical (0.3) then it is declared valid, and if r counts < r critical then it is declared invalid (Sugiyono, 2019).

Reliability is a measure of how consistent and stable an instrument is in delivering results. Reliability testing is a process for evaluating how well an instrument can reliably measure constructs. The Cronbach alpha formula approach is used to conduct reliability tests, and a test is deemed reliable if its Cronbach alpha value is more than 0.600. According to the study's reliability test results, every variable was deemed reliable (>0.600). It is shown in the following table:

Table 2. Research Validity and Reliability Test Result

Variable	*Indicators*	*r Count*	*r Critical*	*Critical Point*	*Cronbach's Alpha*	*Result*
Product and Service Innovation Collaboration	X_1.1	0,574	0,3	0,600	0,679	**Valid & Reliable**
	X_1.2	0,621	0,3			
	X_1.3	0,606	0,3			
	X_1.4	0,590	0,3			
	X_1.5	0,657	0,3			
	X_1.6	0,687	0,3			
Marketing Collaboration	X_2.1	0,913	0,3	0,600	0,835	**Valid & Reliable**
	X_2.2	0,833	0,3			
	X_2.3	0,813	0,3			
	X_2.4	0,784	0,3			
	X_2.5	0,374	0,3			
	X_2.6	0,807	0,3			
Supply Chain Collaboration	X_3.1	0,514	0,3	0,600	0,708	**Valid & Reliable**
	X_3.2	0,627	0,3			
	X_3.3	0,632	0,3			
	X_3.4	0,635	0,3			
	X_3.5	0,570	0,3			
	X_3.6	0,626	0,3			
	X_3.7	0,689	0,3			
Business Sustainability	Y1	0,754	0,3	0,600	0,858	**Valid & Reliable**
	Y2	0.772	0,3			
	Y3	0,680	0,3			
	Y4	0,703	0,3			
	Y5	0,699	0,3			
	Y6	0,772	0,3			
	Y7	0,634	0,3			
	Y8	0,699	0,3			

Source: processed data (Researcher, 2024)

Classical Assumption Test

Normality Test

The normality test is used to evaluate whether the data is normally distributed or not. A normal distribution is where data tends to be gathered around a middle value with symmetry and balance on both sides. The residual values' distributional properties are ascertained by the normalcy test. Regression analysis with regularly distributed residual values works well (Ghozali, 2016). The Kolgomorov-Smirnov one-sample normality test yields a p-value of 0.200 > 0.05, indicating a normal distribution of the data. As seen below in Table 3:

Table 3. One Sample Kolgomorov-Smirnov Test

	Unstandardized Residual
N	380
Asymp. Sig. (2-tailed)	,200c,d

Multicollinearity Test

The multicollinearity test is used to evaluate whether there is a strong correlation between independent variables in a regression analysis model. The high correlation between two or more independent variables is known as multicollinearity, and it can lead to issues with regression model estimation and interpretation. The method used to detect multicollinearity is to look at VIF and *tolerance* with test criteria if VIF < 10 with *a tolerance number* of > 0.1, then multicollinearity does not occur (Ghozali, 2016). It can be seen in table 4 below:

Table 4. Multicollinearity Test

Variable	Tollerance	VIF	Information
Product and Service Innovation Collaboration (X1)	0,582	1,719	Not Multicollinearity
Marketing Collaboration (X2)	0,871	1,418	
Supply Chain Collaboration (X3)	0,610	1,638	

Source: processed data (Researcher, 2024)

Heteroskedasticity Test

The goal of the heteroscedasticity test is to determine if there is variance inequality between the residuals of different observations in the regression model. It is referred to as homoscedasticity if the variance between the residuals of one observation and another is fixed, and heteroscedasticity if it differs. A regression model that does not exhibit homoscedasticity or heteroscedasticity is considered good (Ghozali, 2016). If heteroscedasticity exists between independent variables, it can be ascertained using the plot graph that connects the projected value of the dependent variable with its residual. The scatterplot below, which is derived from Figure 2, displays an irregularly patterned spreading point, indicating the absence of a heteroscedasticity issue.

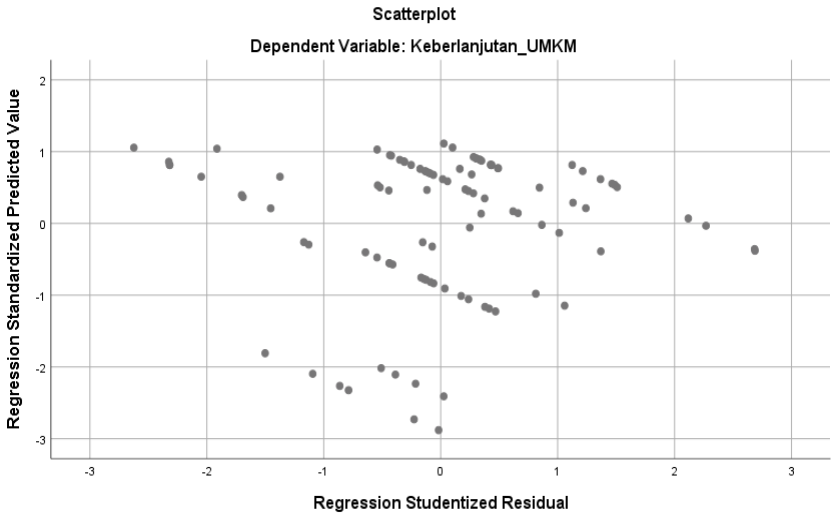

Figure 2. Scatterplot Heteroskedasticity Test

Hypothesis Test Results

Multiple Linear Regression Analysis Results

The following equation represents the multiple regression test findings that were created for this study:

Y = 5,561 - 0,285 X1 + 1,174 X2 + 0,129 X3 + *e*

The variables of product and service innovation collaboration and marketing collaboration have a significant influence on the sustainability of MSMEs. With *a p-value of* product and service innovation collaboration of 0.015 < 0.05, and *a p-value of* marketing collaboration of 0.000 < 0.05. Meanwhile, the supply chain collaboration variable does not have a significant effect on the sustainability of MSMEs, where the p-value is 0.236 > 0.05. Test F significance value. 0.000 < 0.05, indicating that the independent and dependent variables together have a substantial impact on the former. The result of the R Square test was 0.644, which indicates that variations in independent variables can explain the sustainability of MSMEs by 64.4%, while 35.6% are influenced by other variables that are not studied.

Table 5. Multiple Linear Regression Test Results

Research Variables	B	Beta	t	Sig.
Product and Service Innovation Collaboration (X1)	-0,285	-0,198	-2,472	0,015
Marketing Collaboration (X2)	1,174	0,831	12,725	0,000
Supply Chain Collaboration (X3)	0,129	0,093	1,193	0,236
R Square = 0,644	Fcount = 57,785			
Adjusted R^2 = 0,632	Probabilitas = 0,000			

Source: processed data (Researcher, 2024)

Discussion

Collaboration of Product and Service Innovation on MSME Sustainability

The results of the statistical test explain that there is a significant influence of product and service innovation collaboration on the sustainability of MSMEs in Sukabumi City, where the p-value is 0.015 < 0.05, and the calculated t-coefficient value is -2.472 < 1.966 from the t table. This means that the significant influence of product and service innovation collaboration is negative, explaining that when innovation and service collaboration are improved, it will disrupt the sustainability of MSMEs. This is because each MSME that collaborates does not understand the concept of product and service innovation that can be mutually beneficial.

Marketing Collaboration on MSME Sustainability

It is clarified that there is a substantial influence of statistical test findings on marketing collaboration on the sustainability of MSMEs in Sukabumi City, where the t coefficient is computed at 12.275 > 1.966 using the t table, and the p-value is 0.000 < 0.05. The findings of this investigation are consistent with studies carried out by (Agung Mas Andriani & Agung Istri Ngurah, 2021), which states that marketing collaborations have a positive and significant influence.

Marketing collaboration is one strategy that can be applied in the digital era, which can help business actors in marketing their products with a wider market reach. Increasing marketing collaboration between MSMEs will be able to help the sustainability of MSME businesses in Sukabumi City.

Supply Chain Collaboration on MSME Sustainability

The results of the statistical test stated that there was no effect of supply chain collaboration on the sustainability of MSMEs in Sukabumi City, where the p-value was 0.236 > 0.05 and the coefficient value t was calculated at 1.193 < 1.966 from the t table. The results of this study are not in line with research from (Sudusinghe & Seuring, 2022) which states that supply chain collaboration has a significant influence on the sustainability of MSMEs.

The lack of maximum supply chain collaboration will have an impact on the sustainability of MSMEs in Sukabumi City. The opportunity for supply chain collaboration between MSMEs, of course, can improve the performance of MSMEs and will certainly affect the sustainability of MSMEs in Sukabumi City.

CONCLUSION

The statistical test analysis's findings demonstrate that the variables of product and service innovation collaboration (X1) and marketing collaboration (X2) have a significant influence on the sustainability of MSMEs, while the variable of supply chain collaboration has no significant influence on the sustainability of MSMEs. The effect of product and service innovation collaboration, marketing collaboration, and supply chain collaboration is 64.4% on the sustainability of MSMEs, while 35.6% is impacted by additional factors that have not been researched. The Sukabumi City administration, academic institutions, and corporate actors that serve as study sites and may aid in the addition and expansion of information for researchers are anticipated to benefit from the research's findings. Furthermore, this study can aid in the advancement of science, especially operations and supply chain management. Furthermore, it is envisaged that this study will have an effect on the field of education, and the Office of Cooperatives, Micro Enterprises, Industry and Trade of Sukabumi City as recommendations in making policies and decisions to maintain the sustainability of MSMEs. This research is expected to be a reference for other researchers who conduct research related to product and service innovation collaboration, marketing collaboration, and supply chain collaboration, on MSME sustainability. As well as suggestions for future research to involve many business actors not only in Sukabumi City but also involving business actors in regencies and cities in West Java, to increase responders, and use other techniques to bolster quantitative data obtained from the distribution of questionnaires.

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