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THE INFLUENCE OF ENVIRONMENTAL AWARENESS AND BUSINESS INNOVATION ON THE IMPLEMENTATION OF THE GREEN ECONOMY IN MSMES IN PUYUDAN DUNGDANG VILLAGE

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ABSTRACT

This research focuses on exploring how innovation in business activities and awareness of environmental issues affect the application of green economy principles in MSMEs. This study employs a survey method based on a quantitative approach, with data collected from 100 MSME actors through a questionnaire instrument. Data analysis was conducted using multiple linear regression with the assistance of SPSS software. Findings reveal that environmental awareness has a significant and positive role (p = 0.020) on its own. In addition, business innovation produces a stronger and more dominant effect (p = 0.000). When combined, these two factors significantly shape the adoption of green economy practices. The R^2 value of 0.859 shows that 85.9% of the changes in green economy implementation are explained by both variables. Promoting sustainability in MSMEs depends on strengthening environmental consciousness alongside continuous innovation in business practices. This study integrates environmental awareness and business innovation into a single model to explain the implementation of the green economy in MSMEs. This study presents a new context in rural MSMEs that has rarely been explored. The findings indicate that business innovation is more dominant than environmental awareness in driving the green economy

Keywords: *Environmental Awareness; Business Innovation; Green Economy MSMEs.*

ABSTRAK

Fokus riset ini adalah untuk membedah dampak dari inovasi bisnis serta kesadaran terhadap lingkungan dalam penerapan ekonomi hijau di kalangan UMKM di desa puyudan dungdang kacamatan guluk-guluk kabupaten sumenep. Penelitian ini menggunakan metode survei berbasis pendekatan kuantitatif, data dihimpun dari 100 pelaku UMKM melalui instrumen kuesioner. Analisis data dilaksanakan menggunakan metode regresi linier berganda dengan bantuan perangkat lunak SPSS. Hasil penelitian menunjukkan bahwa kesadaran lingkungan memberikan pengaruh positif dan signifikan secara parsial (p = 0,020). Selain itu, inovasi usaha juga terbukti berpengaruh signifikan (p = 0,000) serta menjadi variabel yang paling dominan. Secara bersama-sama, kedua unsur tersebut berpengaruh kuat terhadap praktik *green economy*. Adapun angka koefisien determinasi (R^2) mencapai 0,859, yang berarti variabel kesadaran dan

inovasi mampu menjelaskan 85,9% fenomena implementasi ekonomi hijau. Penguatan ekonomi berkelanjutan pada sektor UMKM dapat dicapai dengan mengintegrasikan kepedulian lingkungan dan kreativitas inovasi secara beriringan. Penelitian ini mengintegrasikan kesadaran lingkungan dan inovasi usaha dalam satu model untuk menjelaskan implementasi *green economy* pada UMKM. Studi ini menghadirkan konteks baru pada UMKM pedesaan yang masih jarang diteliti. Temuan menunjukkan bahwa inovasi usaha lebih dominan dibandingkan kesadaran lingkungan dalam mendorong ekonomi hijau.

Kata Kunci: *Kesadaran Lingkungan; Inovasi Usaha; Green Economy UMKM*

INTRUDUCTION

In recent decades, MSMEs have experienced rapid development and play an important role in the economy, both globally and nationally, as they are capable of creating employment opportunities and reducing social inequality. However, increasing environmental problems such as climate change, natural resource degradation, and pollution have led economic development to shift toward the concept of a green economy, which emphasizes the balance between economic growth, environmental sustainability, and social justice. According to the United Nations Environment Programme (UNEP), the green economy aims to improve human well-being in a sustainable manner while maintaining environmental quality for future generations (Kristianto, 2020).

In Indonesia, this effort has been strengthened through policies such as Presidential Regulation Number 98 of 2021 and green MSME programs; however, its implementation still faces challenges because around 87% of MSMEs have not fully adopted environmentally friendly practices due to limitations in knowledge, technology, and innovation (Farhani et al., 2025). Technological advances have a very large impact on global life (Kurniadi, 2025). On the other hand, MSMEs make a significant contribution with more than 65 million business units, absorbing around 97% of the workforce and contributing more than 60% of GDP (Bappenas, 2022). However, this also has environmental impacts due to weak waste management practices, particularly in the food and craft sectors (Sari et al., 2023). as well as the low adoption of environmentally friendly technologies caused by limited financing and environmental literacy among business actors (Putri & Rahman, 2022).

These problems are also evident in Payudan Dundang Village, Guluk-Guluk District, Sumenep Regency, where some MSME actors have begun to adopt environmentally friendly practices, but these are still not comprehensive or fully integrated. In fact, they are often perceived as a cost burden rather than a long-term investment (Parmariza & Juniarti, 2024). Theoretically, this is influenced by the level of environmental awareness among business actors, which affects their attitudes and behaviors. As a result, differences in knowledge and concern lead to unequal readiness among MSMEs in implementing the green economy (Habibie, 2020). In fact, the concept of a green economy does not only focus on environmental preservation, but

also on the efficient and sustainable use of resources, such as carbon emission reduction, energy efficiency, and circular economy-based waste management (Aisah et al., 2023). and it can promote inclusive economic growth while enhancing MSME competitiveness in the long term (Programme, 2022).

Environmental awareness is related to the willingness of business actors to make more responsible economic decisions, particularly in resource and waste management (Zhao et al., 2023). This level of understanding also influences the implementation of sustainable business practices such as green accounting (Indraswari et al., 2024). In addition, business innovation is also an important factor in implementing the green economy, as it can improve efficiency, reduce waste, and add product value (Rudiningtyas & Wardana, 2024). Schumpeter's perspective, innovation is a process of creating new combinations in economic activities to support business sustainability (Schumpeter, 2020). This is supported by research showing that innovation has a significant effect on MSME performance, particularly through the use of environmentally friendly materials and production process efficiency (Sukriani, 2022).

Several studies show that environmental awareness and innovation have a positive effect on the implementation of the green economy and MSME sustainability (Wijaya et al., 2022). However, most studies still use a quantitative approach, so they have not deeply explained the processes and experiences of MSME actors in implementing the green economy, especially in the socio cultural context of rural areas (Hastin, 2024). Therefore, there is a research gap, namely the lack of qualitative studies exploring how environmental awareness and business innovation are understood, interpreted, and applied by MSME actors in daily life. Thus, a qualitative approach is important to understand the social dynamics, values, and real experiences of business actors in facing the demands of the green economy.

Based on these conditions, this study aims to comprehensively examine the influence of environmental awareness and business innovation on the implementation of the green economy in MSMEs in Payudan Dundang Village. This study not only examines the relationships between variables but also explores the processes, obstacles, and strategies carried out by business actors in implementing the green economy. Theoretically, this research is expected to contribute to the study of sustainable economy based on MSMEs in rural areas, while practically, the results of this study are expected to serve as a reference for village authorities and policymakers in designing more appropriate and sustainable green economy programs.

METHOD

This study uses a survey method with a quantitative approach to obtain accurate data and examine the relationship between environmental awareness and business innovation on the implementation of the green economy among MSME actors. Data were collected through a structured questionnaire in a systematic manner to ensure objective results, and were then analyzed using statistical methods to test the hypotheses. The study was conducted among MSME actors in Payudan Dundang Village, Guluk-Guluk District, Sumenep Regency, which was selected because MSME

activities are relatively developed, but the implementation of the green economy is still not optimal. The research timeline was adjusted to the field data collection schedule.

This study uses a population consisting of all active MSME actors in Payudan Dundang Village. Since the entire population could not be reached, a non-probability sampling technique with a purposive sampling approach was used, meaning respondents were selected based on specific criteria such as actively running a business and willingness to participate in the study. The sample size was calculated using the Lemeshow formula with a 95% confidence level (z = 1.96), a proportion of 0.5, and a margin of error (MoE) of 10%, resulting in 97 respondents, which was then rounded up to 100 respondents to ensure more representative data. The data used in this study are primary data collected through a questionnaire distributed via Google Forms using a 1–5 Likert scale to measure respondents' level of agreement from strongly disagree to strongly agree.

This study consists of two independent variables, namely environmental awareness (X1) and business innovation (X2), and one dependent variable, namely the implementation of the green economy (Y). Environmental awareness is measured through knowledge, attitudes, and actions toward the environment. Business innovation is measured through invention, development, duplication, and synthesis, while the green economy is measured through indicators of low carbon, resource efficiency, and social inclusiveness.

The feasibility of the research instrument was tested through validity and reliability tests. The validity test was conducted by comparing the calculated r-value (r-count) and the critical r-value (r-table), where the instrument is considered valid if the r-count is greater than the r-table. Meanwhile, reliability testing used Cronbach's Alpha, where the instrument is considered reliable if the value is above 0.60, indicating consistency in respondents' answers.

Data analysis was conducted through several stages, namely classical assumption tests, multiple linear regression, and hypothesis testing. Classical assumption tests included the normality test using Kolmogorov–Smirnov, multicollinearity test using tolerance and VIF values, autocorrelation test using Durbin–Watson, and heteroscedasticity test using a scatterplot. Furthermore, multiple linear regression was used to determine the effect of independent variables on the dependent variable using the equation $Y = a + b1X1 + b2X2 + e$. Hypothesis testing was conducted using the t-test to examine the partial effect of each variable and the F-test to examine the simultaneous effect, while the coefficient of determination (R^2) was used to measure how well the model explains the dependent variable.

RESULT AND DISCUSSION

Result

1. Validity Test Results

Instrument validity was tested to ensure the accuracy of the statement items in measuring research variables. This test refers to the comparison between r-count and r-table, which is 0.196. If the calculated value shows r-count > 0.196, the item is declared statistically valid at a 5% significance level.

Table 1. Validity Test Results

ITEM	R-COUNT	R TABLE	DESCRIPTION
X1.1	0,797	0,196	Valid
X1.2	0,733	0,196	Valid
X1.3	0,840	0,196	Valid
X1.4	0,752	0,196	Valid
X1.5	0,722	0,196	Valid
X1.6	0,702	0,196	Valid
X2.1	0,776	0,196	Valid
X2.2	0,778	0,196	Valid
X2.3	0,778	0,196	Valid
X2.4	0,850	0,196	Valid
X2.5	0,769	0,196	Valid
X2.6	0,828	0,196	Valid
X2.7	0,781	0,196	Valid
X2.8	0,842	0,196	Valid
Y1	0,688	0,196	Valid
Y2	0,696	0,196	Valid
Y3	0,705	0,196	Valid
Y4	0,794	0,196	Valid
Y5	0,705	0,196	Valid

The validity test results indicate that each item in the environmental awareness variable (X1), business innovation (X2), and green economy (Y) has a correlation coefficient (r-count) greater than the r-table value of 0.196 at a significance level of 0.05. The r-count values for X1 range from 0.520–0.840, for X2 from 0.719–0.850, and for Y from 0.592–0.794. All significance values are 0.000 < 0.05; therefore, it can be concluded that all questionnaire items are valid and suitable for use in this study.

2. Reliability Test Results

The reliability test was conducted to determine the level of consistency of the research instrument using Cronbach's Alpha.

Table 2. Reliability Test

Variable	*Cronbach's Alpha*	*Description*
X1	0,920	Reliabel
X2	0,966	Reliabel
Y	0,904	Reliabel

The reliability test results show that each variable has a Cronbach's Alpha value above 0.60, namely 0.920 (X1), 0.966 (X2), and 0.904 (Y). This indicates that the research instrument is highly consistent and can be trusted to measure the research variables.

3. Classical Assumption Tests

a. Normality Test

The normality test was used to determine whether the residual data are normally distributed using the Kolmogorov Smirnov test.

Table 3. Normality Test Results

One-Sample Kolmogorov-Smirnov Test

		Unstandardized Residual
N		100
Normal Parameters[a,b]	Mean	.0000000
	Std. Deviation	1.24700653
Most Extreme Differences	Absolute	.250
	Positive	.127
	Negative	-.250
Test Statistic		.250
Asymp. Sig. (2-tailed)		.000[c]

As shown in Table 3, the significance value is < 0.05, indicating that the data are not normally distributed. However, in social research with a large sample size, this condition is still tolerable and does not significantly affect the analysis results.

b. Multicollinearity Test

The multicollinearity test was conducted to determine the relationship between independent variables.

Table 4. Multicollinearity Test

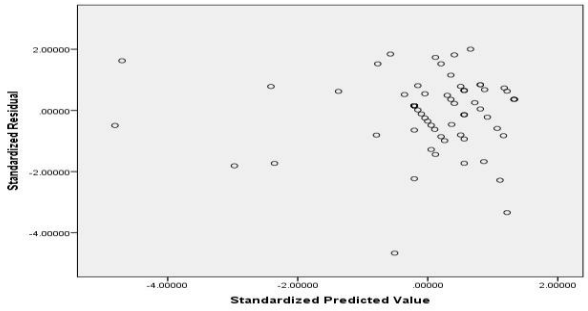
Variable	Tolerance	Vif	Description
X1	0,203	4,921	No multicollinearity
X2	0,203	4,921	No multicollinearity

The analysis shows that the tolerance value is above 0.10 and the VIF value is below 10. Therefore, the regression model does not experience multicollinearity problems. This indicates that each independent variable contributes independently to explaining the dependent variable.

c. Heteroscedasticity Test

The heteroscedasticity test was conducted using a scatterplot graph.

Image 1. Scatterplot Uji Heteroskedastisitas



The scatterplot shows that data points are randomly distributed around zero on the Y-axis and do not form a specific pattern. This indicates that there is no heteroscedasticity problem, meaning the residual variance is constant. Therefore, the regression model is suitable for further analysis.

d. Autocorrelation Test

In the context of classical assumption testing, the researcher employed an autocorrelation test to determine whether there is a relationship between the current residuals and the residuals from the previous period. This test was still conducted on cross-sectional data, even though this phenomenon is more commonly found in time series data, in order to ensure that each residual in the model is independent of one another. A good regression model must be free from autocorrelation to avoid biased and inefficient parameter estimates. In this study, the Durbin Watson (DW) method was applied using SPSS software to verify this condition.

The decision criteria for the Durbin Watson test are as follows:

1) DW < 1.5 indicates positive autocorrelation
2) DW between 1.5 – 2.5 indicates no autocorrelation
3) DW > 2.5 indicates negative autocorrelation

Table 5. Autocorrelation Test Results

Model	*R*	*R Square*	*Adjusted R Square*	*Std. Error*	*Durbin-Watson*
1	0,927	0,859	0,856	1,260	2,157

The Durbin Watson result of 2.157 indicates that the research model does not experience autocorrelation problems because it falls within the interval of 1.5 < DW < 2.5. This condition shows that the residuals of one observation are not influenced by other observations, thereby fulfilling the independence assumption in classical assumptions. With this result, the regression model is considered stable and suitable for hypothesis testing without the risk of biased estimation.

4. Multiple Linear Regression Analysis

The purpose of this analysis is to determine the extent to which the independent variables influence the dependent variable.

Table 6. Multiple Linear Regression Results

Constant	*Coefficient*	*T-Value*	*Sig*
	0,888	*1,076*	*0,284*
X1	*0,167*	*2,356*	*0,020*
X2	*0,466*	*8,820*	*0,000*

Y=0,888+0,167X1+0,466X2

Based on the multiple linear regression analysis, the equation Y = 0.888 + 0.167X1 + 0.466X2 is obtained. The constant value of 0.888 indicates that if environmental awareness (X1) and business innovation (X2) are assumed to be constant or zero, then the green economy (Y) equals 0.888. The regression coefficient of environmental awareness (X1) of 0.167 shows that every one-unit increase in environmental awareness will have a positive effect on the green economy by 0.167, assuming other variables remain constant. The business innovation variable (X2) contributes 0.466 to the increase in the green economy for every one unit increase (assuming other variables remain constant). The positive coefficients of all variables indicate that the relationship is linear and in the same direction. Therefore, if environmental awareness and business innovation are optimized, the achievement of the green economy in the research subjects will also increase linearly.

5. Hypothesis Testing

The validity of the preliminary assumptions formulated through the literature review and previous studies was tested through hypothesis testing, which is a fundamental part of quantitative research methods. Hypothesis testing was conducted to determine whether the independent variables, namely environmental awareness (X1) and business innovation (X2), influence the dependent variable, namely the implementation of the green economy (Y), both partially and simultaneously. In this study, hypothesis testing was carried out using multiple linear regression analysis with SPSS. The calculations were performed through three main approaches: partial test (t-test), simultaneous test (F-test), and coefficient of determination (R^2).

The decision criteria for hypothesis testing are:

1. If Sig. < 0.05, then the alternative hypothesis (Ha) is accepted and the null hypothesis (H0) is rejected.
2. If Sig. > 0.05, then the alternative hypothesis (Ha) is rejected and the null hypothesis (H0) is accepted.

a. Partial Test (t-test)

The t-test is used to examine the effect of each independent variable on the dependent variable individually. This step aims to determine the extent of the contribution of environmental awareness and business innovation in influencing the implementation of the green economy separately (Waluyo, 2024).

Table 7. t-test Results

Variable	T-value	Sig	Description
X1 (Environmental Awareness)	2,356	0,020	Significant
X2 (Business Innovation)	8.820	0.000	Significant

Based on the t-test results, environmental awareness (X1) has a significance value of 0.020 (< 0.05). This indicates that environmental awareness has a significant effect on the implementation of the green economy. Therefore, the hypothesis stating that environmental awareness affects the green economy is accepted. Furthermore, business innovation (X2) has a significance value of 0.000, which is also less than 0.05. This finding confirms that business innovation plays an important role in encouraging the implementation of the green economy. Thus, the hypothesis stating that business innovation affects the green economy is accepted. In comparison, the t-value of business innovation is much higher than that of environmental awareness, indicating that business innovation has a more dominant influence in improving the implementation of the green economy.

b. Simultaneous Test (F-test)

The F-test is used to determine whether the independent variables simultaneously affect the dependent variable. This test is important to assess whether the regression model is overall feasible and significant in explaining the relationship between variables.

Table 8. F-test Results

Model	F-Value	Sig	Description
Regression	296,393	0,000	Significant

Based on the F-test results, the F-value is 296.393 with a significance value of 0.000. Since it is below 0.05, it can be concluded that environmental awareness and business innovation simultaneously have a significant effect on the implementation of the green economy. Thus, the hypothesis stating that environmental awareness and business innovation together affect the green economy is accepted. This result shows that both independent variables strongly represent changes in the dependent variable.

c. Coefficient of Determination (R^2)

The coefficient of determination (R^2) test is used to determine how well the independent variables explain the variation of the dependent variable in the research model. The R^2 value ranges from 0 to 1, and a value closer to 1 indicates stronger explanatory power.

Table 9. Coefficient of Determination

Model	R	R-Squere	Adjusted R Square
1	0,927	0,859	0,856

The R Square value of 0.859 indicates that 85.9% of the variation in the green economy (Y) is explained by environmental awareness (X1) and business innovation (X2) simultaneously. The remaining 14.1% is influenced by other variables not included in this study. His high coefficient of determination indicates that the regression model has very strong explanatory power in describing the relationship between independent and dependent variables. Therefore, environmental awareness and business innovation are dominant factors influencing the green economy.

Discussion

Effect of Environmental Awareness on the Implementation of the Green Economy

Based on the partial test (t-test) results presented in Table 7, the environmental awareness variable (X1) shows a t-value of 2.356 with a significance level of 0.020. Considering that the significance value is below the 0.05 threshold, it can be concluded that environmental awareness has a positive and significant effect on the implementation of the green economy in MSMEs in Payudan Dundang Village. This condition confirms that the first hypothesis of this study is empirically accepted.

Further analysis using the regression model in Table 6 strengthens this finding, with a regression coefficient of 0.167. This value represents a positive relationship, meaning that each one-unit increase in environmental awareness is predicted to increase the effectiveness of green economy implementation by 0.167 points. This estimation applies under the assumption that other independent variables in the model remain constant (ceteris paribus).

Substantively, this study confirms that the level of knowledge, mindset, and concern of MSME actors toward environmental sustainability is a key driving factor in the adoption of environmentally friendly business practices. These findings indicate that the deeper the understanding of business actors regarding environmental issues, the greater their tendency to transform their business operations toward sustainable green economy principles. Therefore, strengthening environmental literacy becomes a crucial instrument for the success of economic development programs at the village level.

These findings are consistent with pro-environmental behavior theory, which positions environmental awareness as a key cognitive factor in shaping sustainable behavior. This awareness influences individual actions through values, norms, and attitudes toward the environment, which in the MSME context are reflected in practices such as waste management, energy efficiency, and the use of environmentally friendly materials (Steg & Vlek, 2021). Selain itu, kesadaran lingkungan juga terbukti memiliki hubungan signifikan n addition, environmental awareness has also been shown to have a significant relationship with sustainable economic behavior in the small business sector, making it an important foundation in the implementation of the green economy (Nabila & Zulkarnain, 2025).

However, in this study, the effect of environmental awareness is still lower than business innovation. This indicates that although business actors have awareness, practical implementation still requires technical and innovative capabilities to translate awareness into concrete actions.

Effect of Business Innovation on the Implementation of the Green Economy

Referring to the partial t-test results in Table 7, the business innovation variable (X2) obtained a t-value of 8.820 with a significance value of 0.000. This value is lower than 0.05, indicating that business innovation has a positive and significant effect on

the implementation of the green economy. Furthermore, business innovation is the most dominant factor in driving green economy implementation, as it has the largest regression coefficient value of 0.466 based on the multiple linear regression results in Table 6.

The positive coefficient indicates that if business innovation increases by one unit, the green economy implementation will also increase by 0.466 units. This value is far higher than that of environmental awareness, indicating that business innovation has a stronger This study confirms that business innovation is not only positively and significantly influential but also a key determinant in the implementation of the green economy. The ability of MSME actors to generate creative ideas, improve products, and update business strategies is a crucial factor in achieving green economic practices. This is in line with eco-innovation theory, which positions innovation as an important instrument for aligning economic growth with environmental sustainability, as well as a pillar in optimizing resources and reducing environmental impacts of economic activities (Development, 2021). In addition, business innovation has also been proven to significantly affect environmental performance and business sustainability, which in the MSME context can be realized through the use of environmentally friendly raw materials, green product development, and production efficiency (Dangelico & Pujari, 2020).

However, several studies show that innovation does not always have a significant impact, especially in MSMEs with limited resources. These differences may be caused by factors such as access to technology, the education level of business actors, and varying government policy support. In this study, the dominant influence of innovation indicates that MSME actors have begun to adapt to changes and market demands toward sustainability.

Simultaneous Effect of Environmental Awareness and Business Innovation on the Implementation of the Green Economy

The F-test results in Table 8 show an F-value of 296.393 with a significance of 0.000. Since this value is below 0.05, it can be concluded that environmental awareness and business innovation simultaneously have a significant effect on the implementation of the green economy. Furthermore, based on the coefficient of determination (R^2) results in Table 9, the R Square value is 0.859. This indicates that 85.9% of the variation in green economy implementation can be explained by environmental awareness and business innovation, while the remaining 14.1% is influenced by other variables outside this study. The high coefficient of determination reflects the strong capability of the research model in explaining the relationship between independent and dependent variables. This confirms that the integration of environmental awareness and business innovation is a key determinant driving the implementation of the green economy among MSME actors.

These findings are consistent with the green economy concept presented by the United Nations Environment Programme, which emphasizes the integration of economic growth and environmental sustainability through resource efficiency and innovation (UNEP, 2022). In addition, sustainable economic implementation is also

influenced by the combination of awareness and innovation, where awareness serves as the foundation for behavior formation, while innovation acts as a means to realize tangible changes in economic activities (Geissdoerfer et al., 2020). Thus, this study demonstrates that the success of green economy implementation in MSMEs cannot be separated from the synergy between environmental awareness and business innovation. Both variables complement each other in encouraging sustainable business practices.

CONCLUSION

Based on the results of the research and discussion, it can be concluded that the implementation of the green economy in MSMEs is significantly influenced by environmental awareness and business innovation. Partially, environmental awareness has a positive and significant effect, meaning that the higher the knowledge, attitudes, and concern of business actors toward the environment, the better the implementation of sustainable business practices, although its influence is not as strong as business innovation. Meanwhile, business innovation has a more dominant effect, indicating that the ability of MSME actors to create and develop new ideas is very important in supporting environmentally friendly economic practices. Simultaneously, environmental awareness and business innovation together have a strong influence on the green economy, with an R Square value of 85.9%. Therefore, it can be concluded that both factors are the main determinants of green economy implementation in MSMEs, and they need to be improved simultaneously in order to create sustainable businesses.

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