




## Model for Strengthening MSMEs in the Cultural Heritage of Borobudur Temple Based on the Green Industry Concept: A Mixed-Method Analysis



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### ABSTRACT

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*size, profitability, management ownership, leverage, green industry*

This research aims to provide an index model for strengthening MSMEs based on factors that influence the implementation of the green industry, namely size, profitability, management ownership, and profitability. This research used a sequential explanatory mixed-methods design to explain and interpret quantitative results by collecting and analyzing follow-up qualitative data. The population used in this research is all MSMEs in the Borobudur area. The cluster random sampling technique was used to determine the final sample of 70 observations based on the type of MSME business. Based on the results, the size and profitability of MSMEs have a positive effect on the implementation of the green industry in MSMEs, while management ownership and leverage have no effect on the implementation of the green industry in MSMEs.

## 1. INTRODUCTION

Sustainable Development Goals (SDGs) are the ultimate goals of all countries in the world [1]. The countries are implementing SDGs to achieve economic, social, and environmental balance [2]. One of the applications is the concept of green industry, which aims to achieve sustainable economic balance by paying attention to social and environmental conditions. This is by SDG criterion number 12, namely ensuring sustainable consumption and production patterns. [3], stated that the green industry will impact increasing employment and the country's gross domestic product. This is because workers in green industries have higher incomes than those who work in non-green industries [4]. Apart from that, workers' commitment to implementing green concept-based industries is also needed.

One of the industrial sector that is concern in implementing the green industry concept is the MSME sector. MSMEs are industry that is considered a booster of development. This means that MSMEs have the potential to influence the country's economy. This influence is in the form of a positive influence if it can improve the economy and a negative influence if it reduces the country's economy. One of the causes of the economy's decline is a lack of awareness of the impact of operations on social and the environment [5]. Previous research found that sustainable MSMEs must pay attention to triple bottom-line performance, namely achieving balanced performance in the economic, environmental, and social sectors [6]. Sustainable MSMEs minimize consumption of natural resources, production of hazardous materials, and exploitation of living things in all their forms. To make a business sustainable, all business functions, such as

operations, marketing, and strategy, must be sustainable.

MSMEs that have the potential to lack management of the green industry concept are MSMEs around tourism locations. During the COVID-19 pandemic, the tourism sector could not operate due to the restrictions imposed [7]. This certainly has an impact on the MSME industry around tourism locations. MSMEs need innovation and creativity in their businesses to continue operating [8]. Post-pandemic, MSMEs around tourism are required to implement the green industry concept as part of a business strategy to adapt to the situation and reduce the spread of COVID-19 [9].

One of the tourist attractions that has industrial potential is the cultural heritage of Borobudur Temple. As one of the wonders of the world, the cultural heritage of Borobudur Temple is attractive as a religious heritage and because of the beauty of the natural resources. This causes a large number of MSMEs around tourist attractions. Currently, the number of MSMEs in the cultural heritage of Borobudur Temple reaches 106,000 business units, consisting of various types of crafts, culinary, and other sectors. Apart from that, the cultural heritage of Borobudur Temple is visited by many visitors, both local and international. However, the problem is that most MSMEs are still untouched by the creative and innovation processes. Even MSMEs around tourism are relatively primitive. The quality of human resources needs to be improved by paying attention to the concepts of green industry and green tourism, thereby improving community welfare.

Borobudur Temple stands as Indonesia's most frequently visited heritage site, drawing tourists from far and wide. Its renown has fostered the growth of MSMEs in the surrounding area. The tangible impact is evident in the many MSMEs profiting from tourist visits. As a region bustling with visitors,

Borobudur area is hoped to set an example for MSMEs elsewhere regarding the concept of green industry. Green industry will influence tourists' behaviors to consistently uphold sustainability.

The factors causing the strength of MSMEs based on the green industry concept need to be reviewed. This factor is the size of the MSMEs. The size of the MSMEs will have an impact on the MSMEs' ability to implement the green industry concept [10]. The company's financial condition is also a factor that determines the ability of MSMEs to implement green industries. This financial condition is in the form of a profitability ratio to measure the ability of MSMEs to generate profits and a leverage ratio to measure the ability of MSMEs to fulfill their obligations [11]. MSMEs currently have various forms of ownership. Managerial ownership wants a return on capital, so it is a causal factor in implementing the green industry to achieve its goals [12].

This research aims to provide an index model for strengthening MSMEs based on factors that influence the implementation of the green industry, namely size, profitability, management ownership, and profitability. The research results provide contributions to academics and practitioners. For academics, this research can provide and develop knowledge about the model for strengthening MSMEs in the cultural heritage of Borobudur Temple based on the green industry concept, answering study questions about how to model indexes in the context of strengthening MSMEs based on the concept and factors that influence the implementation of the green industry, becomes a reference for academics, and strengthens the results of previous research regarding index models in the context of strengthening MSMEs based on the implementation design and factors that influence the green industry. For MSMEs, this research is a guide to carrying out activities based on the green industry concept.

## **2. LITERATURE STUDY**

### **2.1 Tourist**

Tourism is an activity that provides facilities and services to local communities, fellow tourists, the government, local governments, and entrepreneurs. The role of tourism is one sector that can support the progress of a region, especially with the existence of regulations regarding regional autonomy. This policy is implemented based on regional communities having capital that can be relied on for regional progress. Garanti [13] provided a critical literature review of the concept of a smart tourism ecosystem and its implementation at the destination level. Smart tourism provides numerous benefits to stakeholders; however, the value is co-created among stakeholders. The synergies within the ecosystem create sustainable economic, social and environmental benefits for all [14].

### **2.2 Green industry**

Green industry is an industry in which every production process prioritizes aspects of the efficiency and effectiveness of sustainable natural energy sources. Environmentally friendly industry is an industry that is committed to industrial development balanced with preserving the surrounding environment. The implementation of environmentally friendly

industry is carried out by applying low-carbon technology to every production process and environmentally friendly waste. Apart from that, implementing green industry is very important in facing global climate problems, considering that many conventional industries ignore the preservation of the surrounding environment. Green growth policies are likely to reduce the demand for polluting final and intermediate production goods and by extension, labour demand in the brown sectors [15]. Micro, small and medium enterprises (MSMEs) can implement this environmentally friendly industry by prioritizing natural sustainability in every operational process, such as implementing the 4R principles, namely reduction, reuse, recycling and recovery [16].

### **2.3 Sustainable Development Goals (SDGs)**

Sustainable Development Goals (SDGs) aim to plan global actions agreed upon by world leaders that seek to end poverty, reduce inequality, and protect the environment (un.org). The principle of "no" one left behind in the SDGs (Sustainable Development Goals) is defined as a journey with several countries (no one left behind) to continue the global development program that was previously initiated in the MDGs. Seventeen Sustainable Development Goals will guide policy and funding for the next 15 years [17]. The most important goal we want to achieve is point 12: "Ensure sustainable consumption and production patterns," often called "responsible consumption and production." The targets that must be achieved include: 1) implementing a 10-year framework for sustainable consumption and production programs; 2) achieving sustainable management and efficient use of natural resources; 3) halving the amount of global food waste per capita based on retail level; 4) achieving environmentally friendly management of chemicals and other waste throughout their life cycle; 5) substantially reducing production waste through prevention, reduction, recycling, and reuse; 6) encouraging companies, especially large-scale and transnational companies, to adopt sustainable practices and incorporate sustainable information into their reporting cycles; 7) supporting sustainable public procurement practices through national policies and priorities; 8) it ensures that everyone everywhere has relevant information and is aware of sustainable development and a lifestyle in harmony with nature [18].

### **2.4 Micro, Small and Medium Enterprises (MSMEs)**

The difficulties and priorities of MSMEs are very different from those of large multinational companies [19]. In contrast to multinational companies, MSMEs in developing countries are barely aware of the global shift towards investing in sustainability and taking advantage of the opportunities and challenges that come with it. In addition, MSMEs, especially in developing countries, have limited resources, skills and information, so they cannot afford to make mistakes [20]. The obstacles faced by MSMEs in developing countries make industrial buyers biased towards sustainable products [21]. In cases like this, green industry and its effectiveness are also limited. The categorization of MSMEs is broad and encompasses all industries beyond large-scale enterprises. In most parts of the world micro and small-scale industries are not differentiated and are considered to be the same [22]. In around Borobudur, a business is categorized as a microbusiness, small business, and medium business. The

broad categorization of MSMEs in various sectors encourages economic actors to take advantage of technological advances to increase convenience in the fields of marketing, finance, management, and access to information as a form of support for entering the business world in the era of green industrial technology [23].

### 3. RESEARCH METHOD

This study used a sequential explanatory mixed-methods strategy to determine the significant variables that influence the implementation of the green industry in the cultural heritage of Borobudur Temple. Mixed methods were used because they involve integrating quantitative and qualitative data collection and analysis in one study. It has proven useful in providing confirmation of findings, more comprehensive data, increasing validity, and increasing understanding of the phenomenon under study [24]. The sequential explanation strategy is characterized by collecting and analyzing quantitative data in the first stage of research (i.e., the influence of size, profitability, leverage, and managerial ownership) followed by collecting and analyzing qualitative data in the second stage (i.e., in-depth interviews by asking participants' level of agreement and disagreement with validating important variables such as the green industry index) built on initial quantitative results. Then compare the results of quantitative and individual in-depth interviews to find out the significant variables that cause strengthening of MSMEs based on green industry in the cultural heritage of Borobudur Temple.

The green industry index in this research is an index for implementing environmental sustainability regarding tourism activities related to the role and activities of MSMEs. In this case, researchers formulate standards to measure the level of green industry implementation. The green industry index is formulated through several stages: (1) collecting definitions of the green industry in MSME activities from previous research; (2) identifying and analyzing each definition element that corresponds to an item in the sustainability reporting guidelines (e.g., Global Reporting Initiative, applicable laws, and regulations, government programs, etc.); (3) deleting some similar items; (4) developing a modified index by adding ideal indicators; (5) testing the validity of indicators through Focus Group Discussions (FGD) with academics and experienced industry practitioners, especially those related to tourism activities and MSMEs.

The dependent variable of this research is the application of the green industry index, so that we know the determining factors for the application of green industry and the level of application of green industry. Green industry adoption was measured using a weighted index, based on current guidelines and previous research. In this study, we used a dichotomous score to measure green industrial adoption (1 if successful and 0 if not). The application of the green industry was developed to gain insight into the importance of everything that needs to be implemented in MSME activities from academics and practitioners. The index weight for each question is calculated based on the average score for each question given by academics and practitioners. The independent variables in this research are MSME management ownership, MSME size, leverage, and MSME profitability.

This green industry index obtained by analyzing items related to the green industry from several previous studies and

from the GRI Sustainability Reporting Standards (GRI Standards), which are adapted to the conditions of MSMEs in Borobudur. Furthermore, this index was determined as a green industry standard through FGD activities with MSME leaders in the Borobudur area. The green industry standards as in Table 1 used as a reference in this research include:

**Table 1.** Green industry index

No	Index
1.	Use of materials to produce and package the organization's key products and services, based on: <ul style="list-style-type: none"> <li>✓ non-renewable materials.</li> <li>✓ renewable materials.</li> </ul>
2.	Input materials are recycled materials that are used to produce an organization's primary products and services.
3.	An organization's total fuel consumption comes from non-renewable resources and includes the type of fuel used.
4.	An organization's total fuel consumption comes from renewable resources and includes the type of fuel used. <p>In watt hours or multiples, use:</p> <ul style="list-style-type: none"> <li>✓ electricity consumption.</li> <li>✓ heating consumption.</li> <li>✓ cooling consumption.</li> <li>✓ steam consumption.</li> </ul>
5.	Total energy consumption in the organization.
7.	The way an organization interacts with water, including how and where it is collected, consumed, and disposed of, is related to the organization's activities, products, or services.
8.	How water-related impacts are caused or contributed to by, or directly related to, the organization's activities, products, or services (e.g., impacts caused by water runoff).
9.	The approach used to identify water-related impacts includes the scope of the assessment, timeframe, and tools or methodologies used.
10.	How to address water-related impacts, including how the organization works with stakeholders to manage water as a shared resource and how the organization works with suppliers or customers who have significant water-related impacts.
11.	The process of establishing water-related goals and targets that are part of an organization's management approach and how these goals and targets relate to public policy and the local context in each region experiencing water shortages. Discharge of water over the entire area in cubic meters and breakdown of totals based on the following discharge purposes, if necessary: <ul style="list-style-type: none"> <li>✓ surface water.</li> <li>✓ groundwater.</li> <li>✓ sea water.</li> </ul>
12.	<ul style="list-style-type: none"> <li>✓ Third-party water and the volume of the total amount of third-party water sent to other organizations for use.</li> </ul> <p>Explanation of:</p>
13.	<ul style="list-style-type: none"> <li>✓ inputs, activities, and outputs that can cause these impacts.</li> <li>✓ whether the impact is related to waste arising in the organization's activities or waste arising upstream or downstream of its value chain.</li> </ul>
14.	Actions taken, including a circular approach, to prevent waste generation in the organization's activities and to manage the significant impacts of waste generation.
15.	If waste arising from the organization's activities is managed by a third party, what processes are used to determine whether the third party is managing the waste in accordance with contractual or regulatory obligations.
16.	Processes used to collect and monitor waste-related data.
17.	Type and scope of programs implemented and assistance provided to improve employee skills.

18.	Transition assistance programs are provided to facilitate continuity of employment and management of end-of-career outcomes resulting from retirement or layoff.
19.	Future policy programs or innovations related to environmental utilization.
20.	Future policy programs related to environmental maintenance and environmental impact management.

This research uses primary data from questionnaires sent to MSMEs in the cultural heritage of Borobudur Temple area. This research uses hypothesis testing to examine the influence of ownership structure and business characteristics on the implementation of the green industry. The following regression model is:

$$GTI = \alpha + \beta_1 MO + \beta_2 SIZE + \beta_3 LEV + \beta_4 PRF + \varepsilon \quad (1)$$

where:

GTI = Green industry index (Index implementation green industry)

MO = Management ownership (management ownership)

SIZE = Size of MSME

LEV = Total debt

PRF = Profitability

The model is expected to be able to answer the research hypothesis as follows:

H1: Management ownership has a positive effect on the implementation of the green industry index

H2: The size of MSMEs has a positive effect on the implementation of the green industry index

H3: The amount of debt has a negative effect on the implementation of the green industry index

H4: Profitability has a positive effect on the application of the industrial green index

#### 4. RESEARCH RESULT

The population in this research is all MSMEs in the Borobudur area, totaling approximately 500 MSMEs. This research sample used cluster random sampling, namely samples from clusters based on the type of MSME business, and obtained 70 samples. The types of businesses in question include food and beverage businesses, handicraft business service businesses, and other types of businesses. Based on the 70 MSMEs, 11 of them have an operational period of 1-2 years, 29 of them have operated for 3-5 years, 22 of them have operated for 5-10 years, and 8 of them have operated for more than 10 years. The highest level of education in MSME management is 4% only at SD/MI/Package A level, 17% with a final education of SMP/MTS/Package B, 69% with a final education of SMA/MA/Package C, and 4% with a final education of a bachelor's degree. The remaining 6% have other recent education, such as a diploma or even a postgraduate degree. Below is descriptive statistical data from the sample in this research.

Table 2 shows that MSMEs in the Borobudur area have an average management ownership of 8.5 million, with the lowest ownership being 200 thousand and the highest being 50 million. The average assets owned by MSMEs are 11 million, with the lowest amount being 600 thousand and the highest being 75 million. The average debt owned by MSMEs is 8.8 million, with the lowest amount being 500 thousand and the highest being 50 million. The average profitability achieved by MSMEs was 0.29, with the lowest being 0.01 and the

highest being 5.0. In general, it is seen that MSMEs in the Borobudur area run businesses with limited capital.

**Table 2.** Research sample descriptive statistics

	X1	X2	X3	X4
Average	8,535,384	11,070,769	8,861,538	0.2
Standard Error	1,530,955	1,518,275	1,399,283	0.0
Median	3,500,000	10,000,000	5,000,000	0.1
Standard Deviation	12,342,956	12,240,729	11,281,382	0.7
Minimum	2000	600,000	500,000	0.0
Maximum	50,000,000	75,000,000	50,000,000	5.0

#### 4.1 Hypothesis testing

The following are the results of hypothesis testing on the data processed in this research:

**Table 3.** Linear regression test

R	R Square	Adjusted R Square	Std. Error of the Estimate	Durbin-Watson
.731 <sup>a</sup>	.534	.506	.14608	1.639

Source: Data processed by 2022 researchers

Table 3 shows the Adjusted R Square value of 0.506, which means that the variables used in this research include management ownership, MSME size, debt, and profitability, which affect the implementation of the green industry by 50.6%. Thus, it can be said that these variables deserve attention in increasing the implementation of the green industry in the future. Next, the results of the F test are presented to find out whether the model used in this research is fit or not, as follows:

**Table 4.** F test

Sum of Squares	Df	Mean Square	F	Sig.
1,592	4	.398	18650	.000 <sup>b</sup>
1,387	65	.021		
2,979	69			

Source: Data processed by 2022 researchers

Table 4 shows a significance value of 0.000 which means that the model used in this study is fit to assess the application of the green industry. Thus, it said this model is suitable for considering how to implement the green industry in MSMEs. Next, the results of the t-test are to determine whether each variable used in this research has a significant influence on the implementation of the MSME green industry, as follows:

**Table 5.** t test

Model	Unstandardized Coefficients		Standardized Coefficients	t	Sig.
	B	Std. Error	Beta		
(Const)	-.20	.43		-.47	.63
MO	.00	.01	.00	.00	.99
Size	.04	.02	.28	2.3	.02
LEV	-.02	.02	-.08	-9.6	.33
PRF	.09	.01	.53	5.3	.00

Source: Data processed by 2022 researchers

Table 5 shows the significance value of each variable that will be used to determine whether or not the variable has an effect on the implementation of green industry in MSMEs, which will be compared with a tolerance value of 5%. The significance value of the management ownership variable is 0.994, indicating that this variable has no effect on the implementation of green industry in MSMEs. The significance value of the MSME Size variable is 0.021, indicating that this variable has a positive effect on the implementation of green industry in MSMEs. The significance value of the leverage variable is 0.339, indicating that this variable has no effect on the implementation of green industry in MSMEs. While the significance value of the Profitability variable of 0.000 indicates that this variable has a positive effect on the implementation of green industry in MSMEs.

## 5. DISCUSSION

### 5.1 Mix method analysis results

The existence of MSMEs in the Borobudur area has advantages, including being supported by the existence of the Borobudur Temple, which already has fame both at national and international levels. Apart from that, the abundant natural beauty in the Borobudur area is also a tourist attraction. This can be a driving reason for MSMEs in the Borobudur area to continue to exist and even develop because of the existence of Borobudur Temple. Currently, the distance between MSMEs and Borobudur Temple varies, from 1 to 5 km up to 32 km. Most MSME sales places are 1-5 km from Borobudur Temple, namely 1 km, 2 km, and 5 km.

In testing the quantitative approach, regression analysis was conducted. The results indicated that profitability has a positive impact on the implementation of the green industry. Therefore, increasing profitability should be a concern for various stakeholders in the future. However, these findings differ from other hypotheses, where management ownership, leverage, and size showed results that do not influence the implementation of the green industry. When profitability increases for MSMEs, so does their implementation of green industry practices. Profitability is a measure that shows the financial condition of MSMEs during the current period [25]. This means that MSMEs in the Borobudur Temple cultural heritage are able to utilize the resources they have to generate profits or achieve their goals. Maximum utilization of resources causes MSMEs to increasingly implement green industries. On the other hand, the high profitability of MSMEs will make it easier for MSMEs to implement the green industry concept. The reason is that the financial condition of MSMEs is in good condition, so there is no problem in implementing the green industry concept. As one of MSMEs owners, Mr. Nursalim also confirmed this,

"... Our main hope is to be able to utilize resources optimally to gain profits, so that we can implement the green industry concept optimally."

Most of the non-renewable materials used by MSMEs are plastic. There are also those who use used bottles, soap, cloth, pens, stoves, frying pans, and batik canting, as well as cooking utensils such as frying pans and woks. Meanwhile, the renewable materials used by MSMEs are mostly various food raw materials such as wheat flour, eggs, granulated sugar, sausages, chicken, sauces, soy sauce, nuts, chocolate, cheese, and others. There are also those who use renewable materials

in the form of fabric, wax, and fabric dye. Input materials in the form of recycled materials used to produce the main products and services for MSMEs on average per month include candles, bath and facial soap, giri, cloves, husks, soil, and plastic bottles. MSMEs are aware that new, renewable energy is very important for the environment, as stated by Mr. Suyono, one of managers in village-owned enterprise

"... Sustainable tourism should encourage the use of renewable energy."

The types of fuel used on average per month from non-renewable resources are mostly LPG gas and electricity. There are also those who use fuel in the form of kerosene and gasoline. The types of fuel used on average per month from renewable sources are mostly firewood and electric grinders. Based on the research results, the size of MSMEs as measured through MSME assets has a positive influence on the implementation of green industry. In the future, increasing the existence and ownership of assets by MSMEs can become a concern for various related parties. Because the larger the size (assets) of MSMEs, the higher the implementation of green industry by MSMEs. With the perception that the higher and more complex the assets used by MSMEs, the greater the number of green industry implementation activities.

Most MSMEs use water taken from wells, then the water that has been used for the production process is discharged into waste disposal wells or into septic tanks. There are also MSMEs that use PDAM water for consumption and production without processing. Most MSMEs produce small amounts of waste so they do not have a big impact on the environment. There are also water channels that are safe and remain environmentally friendly. Most MSMEs conduct surveys of local community opinions as an approach to identifying water-related impacts. There are also those who carry out manual identification and make water filters so that the waste is not thrown directly into the sewer.

In terms of addressing water-related impacts, including how the organization collaborates with stakeholders to manage water as a shared resource, and how the organization collaborates with suppliers or customers who have significant water-related impacts, MSME owners/management feel that currently there are still several things that need to be done. there are no adverse impacts related to water (the water conditions are clean and safe) so no special treatment is required.

MSMEs set various goals and targets related to water, including processing water carefully so that it is environmentally friendly, water efficiency, carrying out infiltration, and carrying out environmental management so that pollution does not occur and does not have a negative impact on the environment. The total surface water discharge across the region is 0.25 cubic meters, 0.6 cubic meters, up to 1 cubic meter, with the most widely quoted figure being 0.25 cubic meters. MSMEs want to get access to water sources:

"... Sustainable tourism must develop policies and practices to protect water resources and protect ecosystems."

To improve employee skills, most MSMEs implement self-taught learning programs by creating and practicing them themselves. In addition, employees are also encouraged to take part in training when available. For batik UKMs, the type of program implemented is natural dyeing, while for coffee UKMs, they take part in barista and coffee processing classes. Most MSMEs do not yet have a transition assistance program provided to facilitate work continuity and the management of career endings due to retirement or layoffs. Meanwhile, others

provide assistance in the form of savings and severance pay.

Most MSMEs have future policy or innovation programs related to environmental use in the form of planting or reforestation. Another way is to preserve national culture and use natural dyes, such as local leaves. There are also those who maintain traditional food, use environmentally friendly packaging, manage rubbish and waste, and use waste as animal feed and fermentation. UKM Coffee has a future policy program related to environmental maintenance and managing environmental impacts in the form of planting coffee plants to reduce the risk of landslides. Several other MSMEs carry out greening, waste management, and cleanliness in their operations. Apart from that, several MSMEs have built water reservoirs, sorted waste, and built organic waste disposal sites.

There are also those who state that the production material (in the form of cloves) does not cause environmental waste because the waste can be burned. Based on the research results, management ownership, which is closely related to various policies implemented by MSMEs, has no effect on the implementation of the green industry. Therefore, it is necessary to pay attention to related parties to determine whether the policies taken by MSME management are on target or not. Therefore, in the future, there is a need for an MSME management approach and training related to the implementation of green industry in MSMEs.

MSMEs have a variety of capital resources to manage their operations. This capital can be in the form of owner's capital, financier's capital, or debt. Based on the research results, leverage has no effect on the implementation of green industries. This research provides evidence for MSMEs in the Borobudur Temple cultural heritage that the higher the level of company leverage, the less or greater the implementation of green industry. Leverage is a measure that shows the ability of a company's debt to obtain returns. Then, debt can show positive returns in the form of assets or investments. In reality, MSME debt has not been able to have an impact on the management of the MSME green industry.

## 6. CONCLUSIONS

This research concludes that the size and profitability of MSMEs have a positive effect on the implementation of green industry. So that in the future increasing asset ownership and profitability of MSMEs can become the concern of various related parties. The higher the size and profitability of MSMEs will encourage increased implementation of green industry by MSMEs. Considering that management ownership and leverage of MSMEs do not influence the implementation of green industry, it is necessary to pay attention to whether MSME management policies have not touched the implementation of green industry in MSMEs. The results of this research are expected to contribute to knowledge and development of knowledge regarding the SME strengthening model and become a reference for strengthening SMEs based on green industrial design. Apart from that, it can also be used as input in implementing MSME activities so that it leads to the sustainability of MSMEs based on the green industry concept.

The findings of this study are consistent with previous research indicating that higher company profitability correlates with increased awareness of the importance of green industry practices. Established companies will continue to strive for green innovations to ensure the sustainability of their

businesses [26]. Business sustainability yields long-term benefits for both the company and its surrounding environment.

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