

# GREEN INNOVATION STRATEGY TO ENHANCE COMPETITIVENESS AND PERFORMANCE OF SMEs IN SOUTH SULAWESI

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## Abstract

This research points to analyze the effect of green innovation strategy on competitiveness, the impact of green innovation strategy on performance, the impact of competitiveness on performance, and the impact of green innovation strategy on performance through the mediating role of competitiveness in SMEs in South Sulawesi. The analysis methods used were: (1) Descriptive Analysis, (2) Structural Equation Modelling (SEM). The results showed that green innovation strategy has a positive and significant impact on business competitiveness. Green innovation strategy has a positive but not significant impact on business performance. Competitiveness has a positive and significant impact on business performance. In addition, green innovation strategy has a positive and significant impact on the performance of SMEs in South Sulawesi mediated by competitiveness. The mediating role of competitiveness variable is included in the category of "full mediation". Therefore, business performance is indirectly influenced positively and significantly by green innovation strategy.

**Keywords:** Green Innovation Strategy; Competitiveness; SMEs Performance

**JEL Codes:** P47; O31

## INTRODUCTION

Environmental problems such as global warming have made consumers increasingly concerned about the environment because they believe that products produced from a prepare may contribute to natural harm damage. One solution is environmentally friendly products that meet consumers' desires for eco-friendly products. The right green innovation activities not only aim to reduce negative environmental impact but also improve competitive advantages (Rennings & Rammer, 2009).

Green innovation strategy is a critical approach to reducing negative environmental impacts (Chang, 2011; Li et al., 2017). Green innovation is another solution to meet environmental requirements and sustainable business growth (Chen et al., 2006; Tseng et al., 2013). Green innovation denotes product, process, or business model innovation that leads to increased environmental sustainability (Triguero et al., 2013). Green innovation includes green product and green process innovation that aims to use sustainable resources, recycle garbage, and reduce energy consumption and pollution (Chen et al., 2006). Eco-friendly item advancement involves creating things or administrations that have no negative affect on the environment, restrain squander, or lessen a company's negative impact on the environment. Green handle

advancement may be a manufacturing process that utilizes ecologically neighboring advances to make merchandise and administrations that have the potential to reduce negative natural results (Wong, 2012).

In the last few decades, several empirical studies have examined the link between sustainable improvement and company achievement (Hall & Wagner, 2012). Several surveys have examined the connection between the green supply chain and performance through different observations, yet there has been no demonstration of the link between supply chain and environmental progress in terms of its impact on performance. Too, they have not clarified the connect between green supply chain, green development, and competitive advantage on execution. A few observational investigate have found an real interface between green development and performance (Cheng et al., 2014; Hojnik & Ruzzier, 2016; Li et al., 2017; Shu et al., 2016). Expressing that the enhancement of Green Innovation prospects of the organization leads to an increment in company execution, and moreover, Charlo showed that socially mindful companies will win higher benefits for the same level of chance (Charlo et al., 2015). In any case, a few ponders have moreover found a negative relationship between green advancement and execution, expressing that the argumentation in green advancement leads to diminished money related execution of the company (Driessen et al., 2013). The study by Haizam et al. showed no relationship between administrative natural concerns for green prepare innovation and economic performance and Green Innovation for the company's economic performance (Haizam et al., 2019). Puryono explained that the application of management of Green Supply Chain can increase the company's financial performance. (Puryono et al., 2017). Heriyanto & Noviardy found that culinary SMEs in Palembang have not optimally implemented a green supply chain (Heriyanto & Noviardy, 2019). Furthermore, Budi & Didi explained that green item innovation does not altogether impact feasible performance, though green prepare advancement essentially impacts economical execution (Tay & Sundiman, 2021).

Competitive advantage is a strategy path for a firm that is not the end aim, but rather a tool for achieving the company's ultimate goal, which is high relative profit performance. The degree of a company's competitive edge heavily influences its capacity to create performance, particularly financial success. The firm's competitive edge must also be sustainable in order for it to exist since, ultimately, the company wants to remain. A company strategy to attain its ultimate aim of high-profit performance is known as sustainable competitive advantage. That is, sustained competitive advantage is a method to attain the company's ultimate aim, which is high performance (Ferdinand, 2003).

The growth of small and medium-sized enterprises (SMEs) in South Sulawesi has shown a consistent upward trend, which was typically observed between 2006 and 2016. This information is derived from data published by the Central Statistics Agency (BPS) of South Sulawesi Province, the SME sector in South Sulawesi grew by 19.75% from 2006 to 2016. In 2006, the total number of SMEs was only 751,362 businesses, while in 2016, it increased to 936,294 businesses, or an increase of 20 thousand SMEs per year. Most of these business units

are classified as micro and small, mainly due to limited financial resources, lower quality of human resources, and limited marketing capabilities experienced by small enterprises.

The phenomenon and empirical facts mentioned above indicate that in-depth research is needed on the influence of green innovation strategy on competitive advantage and its impact on SMEs' performance in South Sulawesi. The research focuses to analyze the impact of green innovation technique on SMEs' competitiveness, the impact of green innovation technique on SMEs' performance, analyze the impact of competitiveness on SMEs' performance, and analyze the impact of green innovation technique on SMEs' performance through intervening competitiveness.

## **LITERATURE REVIEW**

### **Green Innovation**

Green innovation or naturally friendly advancement plays a critical part in moving forward a company's performance. Green innovation, which incorporates specialized headways in vitality reserve funds, contamination shirking, and squander reusing, may be a basic key driver for accomplishing economic improvement (Chang, 2011). Green innovation is additionally characterized as any activity that anybody or any organization can take to advance the advancement and usage of moved forward forms, items, strategies, and administration frameworks that offer assistance to decrease negative natural impacts and accomplish particular environmental objectives. Green innovation suggests that process innovation, product innovation, or business models contribute to increased environmental sustainability for the firm (Triguero et al., 2013). Green innovation comprises of green product advancement and green prepare advancement outlined to diminish vitality utilize and contamination, reuse squander, and utilize maintainable assets (Chen et al., 2006). Green item innovation includes making merchandise or administrations that do not have negative impacts and minimize squander or decrease the company's negative affect on the environment. Green process innovation involves producing goods and services using environmentally friendly technologies to reduce negative impacts on the environment (Wong, 2012).

### **Competitive Advantage**

Heizer and Render explain that competitive advantage is the method of creating a framework that features a special advantage over other competitors that can make esteem for clients in an productive way, through low-cost competition, separation, and speedy reaction (Heizer & Render, 2011). The concept of competitive advantage itself has two distinctive but related implications. The primary meaning emphasizes the advantage or predominance in terms of assets and ability possessed by the company. Companies that have competencies in showcasing, fabricating, and advancement can use them as sources to attain competitive advantage. Companies have the ability to develop protocols that yield appealing products by leveraging these three areas of expertise. The moment meaning emphasizes the advantage in accomplishing execution in this way distant. This concept is related to the company's position compared to its competitors.

Porter explains that competitive strategy is the heart of performance in facing competition (Porter, 1980). A competitive advantage refers to a strategic approach used by companies working together to create stronger advantages over their competitors in the market. This approach needs to be carefully designed to achieve ongoing competitive benefits, allowing the company to excel in both current and emerging markets. Essentially, competitive advantage arises from the value or benefits that a company generates for its customers. Clients by and large lean toward to purchase items that have more esteem than what they anticipate or trust for. In any case, this esteem will too be compared with the cost advertised. Item buys will happen on the off chance that clients consider the item cost to be in line with its esteem.

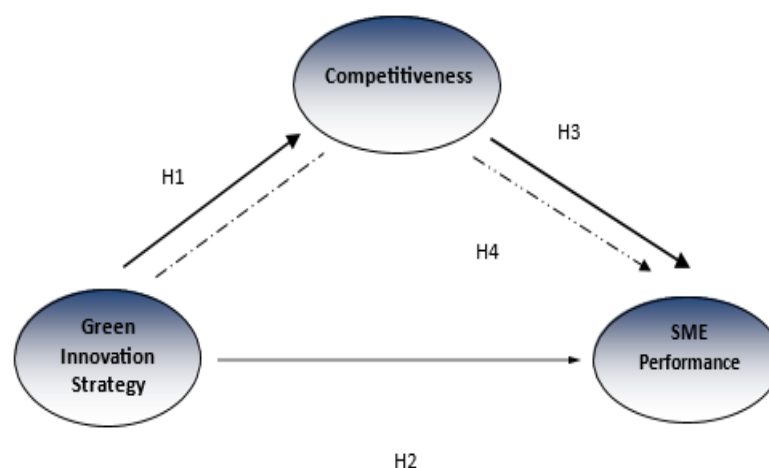
### Business Performance

Business performance is a reflection of whether a company has succeeded or not. Company performance is the real result or gain created by a company which is at that point measured and compared with the anticipated result or gain (Jahanshahi, 2012). Analysts nowadays most regularly utilize budgetary performance, operational performance, and market-based performance measures (Li et al., 2006; Jahanshahi, 2012). Financial performance includes profitability, sales return rate, sales growth, productivity, and cost improvement. Operational performance (non-financial) incorporates showcase share, modern item dispatches, unused product/service quality, promoting viability, and client fulfillment. Market-based measures are utilized by open companies. Subsequently, in such conditions, a combination of monetary and operational execution is adequate to speak to the by and large company execution (Carton & Hofer, 2006).

### Conceptual Mode

The findings of the literature review can be illustrated in the following figure, showcasing the conceptual demonstration of the study. **Figure 1**

**Figure 1: Conceptual Model of the Study**



Given the outcomes of the examination of existing literature and the conceptual framework provided earlier, the subsequent statements articulate the research hypotheses.

- 1) Green innovation technique incorporates a noteworthy impact on SME competitiveness.
- 2) Green innovation technique incorporates a noteworthy impact on SME performance.
- 3) Competitiveness features a noteworthy impact on SME performance.
- 4) Green innovation technique has an effect on SME performance through the interceding part of competitiveness

## **METHOD**

This study was carried out in the province of South Sulawesi, specifically in Makassar City. The population of this study was all small and Medium Enterprises (SMEs) registered in the Cooperative and SME Agency in Makassar City, which amounted to 12,578 units (2021). The minimum test measure was 100 respondents, decided based on the Slovin equation with a 10% blunder rate. Sampling was done purposively based on specific objectives and criteria. The research respondents were micro and small business owners selected to represent their businesses, totaling 105 people. This study used both secondary and primary data. Secondary data was obtained from the Central Statistics Agency and the Cooperative and SME Agency of Makassar City, while primary data was obtained through questionnaires. The variables tested for correlation and influence consisted of: (1) green innovation strategy as an exogenous variable, and (2) competitiveness and SME performance as endogenous variables 1 and 2, respectively.

The validity and reliability of the data collecting instrument were examined using validity and reliability testing, with validity testing done using item analysis utilizing the Pearson Product Moment Correlation approach. An indicator/item is considered valid if it has an  $r$  value  $> 0.30$ , while testing using Cronbach's Alpha coefficient ( $\alpha$ ). An instrument can be considered reliable if the  $\alpha$  value is greater than 0.60 (Hair Jr. et al., 2017; Sugiyono, 2018). Furthermore, the data analysis method used in this study was: (1) Descriptive Analysis, (2) Structural Equation Modeling (SEM) Analysis. The research data were processed using IBM SPSS and AMOS 23 programs.

## **RESEARCH RESULTS**

### **Instrument Testing Results**

An indicator is considered valid if its correlation coefficient value, namely  $r$  value  $> 0.30$ . The results of the validity testing of the questionnaire instrument can be seen in the following table.

**Table 1**

**Table 1: Results of Instrument Validity Test**

| Variable                                    | Indicator | Standard r value | Validity Test Result    |             |
|---|-----------|------------------|-------------------------|-------------|
|   |           |                  | Correlation Coefficient | Description |
| Green innovation strategy (X <sub>1</sub> ) | X1.1      | 0,30             | 0,369                   | Valid       |
|   | X1.2      |                  | 0,671                   | Valid       |
|   | X1.3      |                  | 0,673                   | Valid       |
|   | X1.4      |                  | 0,470                   | Valid       |
| Competitiveness (Y <sub>1</sub> )           | Y1.1      | 0,30             | 0,398                   | Valid       |
|   | Y1.2      |                  | 0,567                   | Valid       |
|   | Y1.3      |                  | 0,618                   | Valid       |
|   | Y1.4      |                  | 0,636                   | Valid       |
|   | Y1.5      |                  | 0,498                   | Valid       |
| SMEs Performance (Y <sub>2</sub> )          | Y2.1      | 0,30             | 0,358                   | Valid       |
|   | Y2.2      |                  | 0,665                   | Valid       |
|   | Y2.3      |                  | 0,759                   | Valid       |
|   | Y2.4      |                  | 0,628                   | Valid       |

Source: Data Processed, 2023.

The results shown in the table above indicate that all 4 indicators of the green innovation strategy variable (X<sub>1</sub>) are valid, as well as 5 indicators of competitiveness (Y<sub>1</sub>), and 4 indicators of SME performance. All indicators used in this study are valid because they have correlation coefficient values that are greater than the required value ( $r > 0.30$ ). Therefore, this research tool can be utilized for field data collection. Furthermore, an instrument can be considered reliable in the event that the  $\alpha$  value is more prominent than 0.60. The comes about of the unwavering quality testing of the survey instrument can be seen within the taking after table. **Table 2**

**Table 2: Results of Questionnaire Reliability Test**

| Research Variable                           | Alpha Standard | Reliability Test Result     |             |
|---|----------------|-----------------------------|-------------|
|   |                | Cronbach Alpha ( $\alpha$ ) | Description |
| Green innovation strategy (X <sub>1</sub> ) | 0,60           | 0,742                       | Reliable    |
| Competitiveness (Y <sub>1</sub> )           | 0,60           | 0,768                       | Reliable    |
| SMEs Performance (Y <sub>2</sub> )          | 0,60           | 0,786                       | Reliable    |

Source: Data Processed, 2023.

Based on the comes about appeared within the table over, it can be seen that the green innovation strategy variable (X<sub>1</sub>) incorporates a value of  $\alpha = 0.742$ ; the competitiveness variable (Y<sub>1</sub>) has a value of  $\alpha = 0.768$ ; and the SME performance variable has a value of  $\alpha = 0.786$ . It can be concluded that the variables and indicators utilized in this ponder are solid since they have Cronbach's Alpha values more prominent than the standard value that has been set ( $\alpha > 0.60$ ). Thus, the research instrument or questionnaire is ready to be used for field data collection.

### Description of Respondent Profile

The comes about of the graphic factual investigation give a total depiction of the respondent information based on sex, age, and instruction level. The depiction of respondent information

based on sex, age, and instruction level can be seen within the table underneath. **Table 3**

**Table 3: Description of Respondents based on Gender, Age, and Education Level**

| No | Description                                    | Number of Respondent | Percentage (%) |
|----|--|----------------------|----------------|
| 1. | Gender:  |                      |                |
|    | a. Male  | 68                   | 64,76          |
|    | b. Female                                      | 37                   | 35,24          |
|    | Total  | 105                  | 100,00         |
| 2. | Age:   |                      |                |
|    | a. 25 - 35 years old                           | 15                   | 14,29          |
|    | b. 36 - 45 years old                           | 60                   | 57,14          |
|    | c. 46 - 60 years old                           | 23                   | 21,90          |
|    | d. > 60 years old                              | 7                    | 6,67           |
|    | Total  | 105                  | 100,00         |
| 3. | Education Level:                               |                      |                |
|    | a. High School/Vocational School/or equivalent | 48                   | 45,71          |
|    | b. Diploma                                     | 17                   | 16,19          |
|    | c. Bachelor's Degree                           | 34                   | 32,38          |
|    | d. Postgraduate                                | 6                    | 5,71           |
|    | Total  | 105                  | 100,00         |

Source: Data Processed, 2023.

The data in the table above shows that out of 105 respondents, males are dominant with a total of 68 people (64.76%) with an age range of 36-45 years, which is a total of 60 people (57.14%) of the total respondents. Based on education level, the most respondents graduated from high school/vocational school or equivalent, with a total of 48 people (45.71%), followed by Bachelor's degree (S1) with 34 people (32.38%) and Diploma with 17 people or 16.19% of the total respondents.

### Description of Research Variables

The research variables are described based on the average implementation value (mean) of each variable in practice. The interval values used as a reference for interpreting the implementation of indicators and variables are: (1) 1.00-1.80 = not good/very low, (2) 1.81-2.60 = less good/low, (3) 2.61-3.40 = sufficiently good/moderate, (4) 3.41-4.20 = good/high, and (5) 4.21-5.00 = very good/very high. The table displays the outcomes of the descriptive analysis conducted for each research variable. **Table 4**



**Table 4: Average Value of Research Variables**

| No | Variable/Indicator             | Mean        | Description |
|----|--------------------------------|-------------|-------------|
| 1. | Green innovation strategy (X1) | 3.95        | Good        |
|    | - X1.1                         | 3.95        | Good        |
|    | - X1.2                         | 3.94        | Good        |
|    | - X1.3                         | 3.91        | Good        |
|    | - X1.4                         | <b>3.99</b> | Good        |
| 2. | Competitiveness (Y1)           | 3.73        | High        |
|    | - Y1.1                         | <b>3.89</b> | High        |
|    | - Y1.2                         | 3.73        | High        |
|    | - Y1.3                         | 3.72        | High        |
|    | - Y1.4                         | 3.71        | High        |
|    | - Y1.5                         | 3.61        | High        |
| 3. | SMEs Performance (Y2)          | 3.91        | High        |
|    | - Y2.1                         | 3.86        | High        |
|    | - Y2.2                         | <b>3.93</b> | High        |
|    | - Y2.3                         | 3.91        | High        |
|    | - Y2.4                         | 3.92        | High        |

Source: Data Processed, 2023.

Based on the table over, it can be seen that concurring to the mean esteem, the level of usage of the green innovation technique variable is within the great category (3.95). This indicates that in general, the green innovation strategy carried out by SMEs, as measured through indicators such as creating products with a good waste recycling system, using safe raw materials, minimum pollution, and environmentally friendly products, is perceived positively by the respondents. With an average score of 3.99, respondents consider the company's strategy as emphasizing the creation of ecologically friendly products as the most favorable sign.

The average value of the competitiveness variable (3.73) is similarly in the top range. This suggests that respondents see SMEs' competitiveness favourably, as evaluated by characteristics such as cost, quality, flexibility, delivery, and product innovation. The indicator that is most perceived positively by respondents is that the company emphasizes creating products with lower costs/ prices compared to competitors with an average value of 3.89.

The SME performance variable also has a mean value in the high category (3.91). This indicates that in general, the performance of SMEs, as measured through pointers such as advertise share development, deals development, benefit development, and return on investment (ROI), is perceived positively by respondents. The indicator that is most perceived positively by respondents is that the company's product sales have increased over the past 3 years with an average value of 3.93.

### **Confirmatory Factor Analysis (CFA)**

The green innovation strategy variable is measured through 4 indicators: creating products with a good waste recycling system, using safe raw materials, production processes with minimum pollution, and environmentally friendly products. The complete findings of the model's suitability test for this particular factor are displayed in the subsequent table. **Table 5**



**Table 5: Model Fit Test for the Green Innovation Strategy Variable**

| Criteria    | Standard Value | Test Result | Description |
|-------------|----------------|-------------|-------------|
| Probability | $\geq 0.05$    | 0.866       | Good        |
| CMIN/DF     | $\leq 2.00$    | 0.144       | Good        |
| GFI         | $\geq 0.90$    | 0.999       | Good        |
| RMSEA       | $\leq 0.08$    | 0.000       | Good        |
| CFI         | $\geq 0.95$    | 1.000       | Good        |
| TLI         | $\geq 0.95$    | 1.025       | Good        |

Source: Data Processed, 2023.

The data in the table above shows that there are six criteria used to evaluate a good model, namely: Probability, CMIN/DF, GFI, RMSEA, CFI, and TLI. A model can be considered good if it has met one or more criteria or standard requirements of a fit model (Hair et al., 2010). The demonstrate fit test comes about appear that the green development methodology variable has met the prerequisites to be considered a great demonstrate. Therefore, the model can be accepted and used for analyzing the research results. The comes about of the corroborative figure examination of the green development technique variable are displayed in full within the taking after table. **Table 6**

**Table 6: Results of Confirmatory Factor Analysis of the Green Innovation Strategy Variable**

| Indicator/Item                                 | Factor Loading | Critical Ratio | Prob. | Description |
|--|----------------|----------------|-------|-------------|
| X1.1   | 0.518          | Fix            |       | Significant |
| X1.2   | 0.838          | 5.456          | 0.000 | Significant |
| X1.3   | 0.931          | 5.604          | 0.000 | Significant |
| X1.4   | 0.784          | 5.295          | 0.000 | Significant |
| T-table Value = 1.980, n= 105, $\alpha = 0.05$ |                |                |       |             |

Source: Data Processed, 2023.

The table data clearly shows that indicators X1.1, X1.2, X1.3, and X1.4 effectively contribute to and explain the variable of green innovation strategy. This conclusion is supported by the probability values (prob.) of each indicator, which are lower than the standard  $\alpha$  value (prob. < 0.05). Furthermore, it can also be seen from the critical ratio or t-value of each indicator which is greater than the t-table value (C.R. > 1.980). The calculate stacking esteem reflects the level of significance of a marker to the variable or inactive develop being shaped. In this manner, it can be concluded that the foremost critical pointer in reflecting the green development procedure variable is X1.3, which is the generation handle with least contamination with a calculate stacking esteem of 0.931.

The competitiveness variable is measured through 5 indicators, namely products with low costs/prices, high-quality products, flexible products according to consumer demand, real-time product delivery to consumers, and sustainable product innovation. The results of the model fit test for this variable are presented in full in the following table. **Table 7**

**Table 7: Model Fit Test for the Competitiveness Variable**

| Criteria    | Standard Value | Test Result | Description |
|-------------|----------------|-------------|-------------|
| Probability | $\geq 0.05$    | 0.222       | Good        |
| CMIN/DF     | $\leq 2.00$    | 1.426       | Good        |
| GFI         | $\geq 0.90$    | 0.978       | Good        |
| RMSEA       | $\leq 0.08$    | 0.064       | Good        |
| CFI         | $\geq 0.95$    | 0.993       | Good        |
| TLI         | $\geq 0.95$    | 0.981       | Good        |

Source: Data Processed, 2023.

The data in the table above shows that there are six criteria used to evaluate a good model, namely: Probability, CMIN/DF, GFI, RMSEA, CFI, and TLI. A model can be considered good if it has met one or more criteria or standard requirements of a fit model (Hair et al., 2010). The model fit test results show that the competitiveness variable has met the requirements to be considered a good model. Therefore, the model can be accepted and used for analyzing the research results. The comes about of the corroborative figure investigation of the competitiveness variable are displayed in full within the taking after table. **Table 8**

**Table 8: Results of Confirmatory Factor Analysis of the Competitiveness Variable**

| Indicator/Item                                 | Factor Loading | Critical Ratio | Prob. | Description |
|--|----------------|----------------|-------|-------------|
| Y1.1   | 0.697          | Fix            |       | Significant |
| Y1.2   | 0.860          | 7.453          | 0.000 | Significant |
| Y1.3   | 0.807          | 7.188          | 0.000 | Significant |
| Y1.4   | 0.627          | 5.668          | 0.000 | Significant |
| Y1.5   | 0.663          | 6.081          | 0.000 | Significant |
| T-table Value = 1.980, n= 105, $\alpha = 0.05$ |                |                |       |             |

Source: Data Processed, 2023.

The information presented in the table indicates that indicators Y1.1, Y1.2, Y1.3, Y1.4, and Y1.5 effectively contribute to and elucidate the company's competitiveness variable. This conclusion is supported by the probability values (prob.) associated with each indicator, all of which are below the standard  $\alpha$  value (prob. < 0.05). Furthermore, it can also be seen from the critical ratio or t-value of each indicator which is greater than the t-table value (C.R. > 1.980). The calculate stacking value reflects the level of significance of a pointer to the variable or idle build being shaped. Therefore, it can be concluded that the most important indicator in reflecting the company's competitiveness variable is Y1.2, which is the company always offering high-quality products to consumers with a factor loading value of 0.860.

The SME performance variable is measured through 4 indicators, namely market share, product sales, profit growth, and investment turnover. The results of the model fit test for this variable are presented in full in the following table. **Table 9**

**Table 9: Model Fit Test for the SME Performance Variable**

| Criteria    | Standard Value | Test Result | Description |
|-------------|----------------|-------------|-------------|
| Probability | $\geq 0.05$    | 0.387       | Good        |
| CMIN/DF     | $\leq 2.00$    | 0.748       | Good        |
| GFI         | $\geq 0.90$    | 0.996       | Good        |
| RMSEA       | $\leq 0.08$    | 0.000       | Good        |
| CFI         | $\geq 0.95$    | 1.000       | Good        |
| TLI         | $\geq 0.95$    | 1.007       | Good        |

Source: Data processed, 2023.

Based on the test results in the table above, it can be seen that there are six criteria used to evaluate a good model, namely: Probability, CMIN/DF, GFI, RMSEA, CFI, and TLI. A model can be considered good if it has met one or more criteria or standard requirements of a fit model (Hair et al., 2010). The model fit test results show that the SME performance variable has met the requirements to be considered a good model. Therefore, the model can be accepted and used for analyzing the research results. The results of the confirmatory factor analysis of the SME performance variable are presented in full in the following table. **Table 10**

**Table 10: Results of Confirmatory Factor Analysis of the SME Performance Variable**

| Indicator/Item                                  | Factor Loading | Critical Ratio | Prob. | Description |
|---|----------------|----------------|-------|-------------|
| Y2.1  | 0.591          | Fix            |       | Significant |
| Y2.2  | 0.800          | 6,886          | 0,000 | Significant |
| Y2.3  | 0.875          | 6,061          | 0,000 | Significant |
| Y2.4  | 0.819          | 5,969          | 0,000 | Significant |
| Nilai t-table = 1,980, n = 105, $\alpha = 0,05$ |                |                |       |             |

Source: Data Processed, 2023.

The table above presents data demonstrating that indicators Y2.1, Y2.2, Y2.3, and Y2.4 effectively contribute to and clarify the SME performance variable. This conclusion is supported by the probability values (prob.) associated with each indicator, all of which are below the standard  $\alpha$  value (prob.  $< 0.05$ ). Additionally, the critical ratio or t-value of each indicator exceeds the corresponding t-table value (C.R.  $> 1.980$ ). The factor loading value indicates the significance of an indicator in relation to the variable or underlying concept being developed. Consequently, it can be deduced that the most crucial indicator for reflecting the SME performance variable is Y2.3, which represents the company's profit growth and possesses a factor loading value of 0.875.

### Structural Equation Modeling (SEM) Analysis

There are 2 (two) stages of Structural equation modeling (SEM) analysis, namely: (1) testing the model fit, and (2) analyzing the relationship between variables. The test of the fit level of the structural equation model is based on standard values (cut-off). The results of the fit level test in this research structural model can be presented in full in the following table. **Table 11**

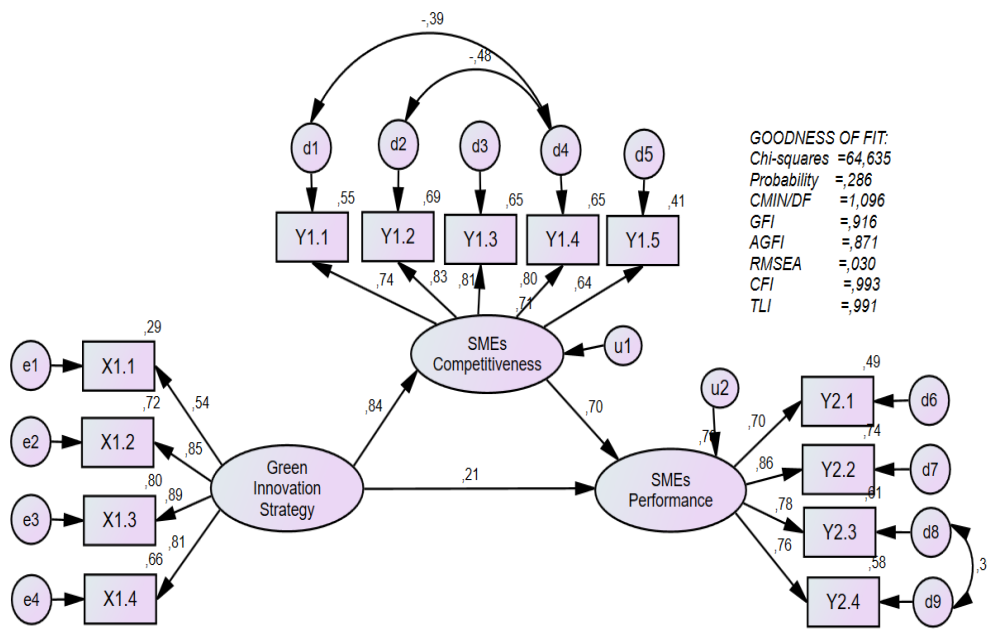
**Table 11: Results of Goodness of Fit Model Test**

| Criteria    | Cut Off Value  | Test Result | Description |
|-------------|----------------|-------------|-------------|
| Chi-Square  | expected small | 64.635      | Marginal    |
| Probability | ≥ 0.05         | 0.286       | Good        |
| CMIN/DF     | ≤ 2.00         | 1.096       | Good        |
| GFI         | ≥ 0.90         | 0.916       | Good        |
| RMSEA       | ≤ 0.08         | 0.030       | Good        |
| CFI         | ≥ 0.95         | 0.993       | Good        |
| TLI         | ≥ 0.95         | 0.991       | Good        |

Source: Data Processed, 2023.

The test results on several criteria of the structural model fit listed in the table above show that 7 (seven) criteria as fit model requirements, namely: Chi-square, probability, CMIN/DF, GFI, RMSEA, CFI, and TLI, have been met well. Therefore, this research show can be utilized to assess and clarify the causal connections in this research demonstrate. Besides, the comes about of the basic demonstrate with respect to the impact of the green advancement procedure variable on SME competitiveness and performance can be displayed within the taking after chart. **Figure 2**

**Figure 2: Results of Empirical Research Model**



\*) Significant at  $\alpha = 5\%$

The above figure illustrates the results of the empirical model on the influence of green innovation strategy on SME competitiveness and performance. Based on the results of this empirical model, the hypothesis test results of this research can be seen in full in the following table. **Table 12**

**Table 12: Results of Research Hypothesis Test**

| Causality Relationship                           | Path Coefficient | Critical Ratio (C.R.) | Prob. | Description                    |
|--|------------------|-----------------------|-------|--------------------------------|
| Direct Effect                                    |                  |                       |       |                                |
| Green Innovation Strategy → SMEs Competitiveness | 0.843            | 5.036                 | 0.000 | Significant (H1, accepted)     |
| Green Innovation Strategy → SMEs Performance     | 0.205            | 1.285                 | 0.199 | Not Significant (H2, rejected) |
| SMEs Competitiveness → SMEs Performance          | 0.701            | 3.860                 | 0.000 | Significant (H2, accepted)     |
| Indirect Effect                                  |                  |                       |       |                                |
| Green Innovation Strategy → SMEs Performance     | 0.590            | (0.843x0.701 = 0.590) |       | Significant (H4, accepted)     |
| T-table value = 1.980, n= 105, α = 0.05          |                  |                       |       |                                |

Source: Data Processed, 2023.

Based on the hypothesis testing results presented in the table above, the following conclusions can be drawn:

- 1) The variable of green innovation technique features a positive and noteworthy impact on SME competitiveness. This could be seen from the basic proportion (C.R.) value which is more noteworthy than the t-table value ( $5.036 > 1.980$ ). Therefore, hypothesis I formulated, namely: green innovation strategy has a significant influence on SME competitiveness in South Sulawesi is supported by field facts (Hypothesis 1, accepted).
- 2) The variable of green innovation strategy has a positive but not significant effect on SME performance. This can be seen from the critical ratio (C.R.) value which is smaller than the t-table value ( $1.285 < 1.980$ ). Therefore, hypothesis II formulated, namely: green innovation strategy has a significant influence on SME performance in South Sulawesi is not supported by field facts (Hypothesis 2, rejected).
- 3) The competitiveness variable has a positive and significant influence on SME performance. This can be seen from the critical ratio (C.R.) value which is greater than the t-table value ( $3.860 > 1.980$ ). Therefore, hypothesis III formulated, namely: competitiveness has a significant influence on SME performance in South Sulawesi is supported by field facts (Hypothesis 3, accepted).
- 4) The variable of green innovation technique features a positive and critical impact on SME performance interceded by competitiveness. This can be seen from the significance value of the  $X1 \diamond Y1$  (significant) and  $Y1 \diamond Y2$  (significant) path coefficients. Then, the indirect effect value is 0.590. Thus, the mediating role of competitiveness variable is "full mediation". Therefore, hypothesis IV formulated, namely: green innovation strategy has a positive and significant influence on SME performance in South Sulawesi mediated by competitiveness is supported by field facts (Hypothesis 4, accepted).

## DISCUSSION

### **The Effect of Green Innovation Strategy on Competitiveness**

The study's findings indicate that the green innovation approach has a good and substantial impact on the competitiveness of South Sulawesi's small and medium-sized businesses (SMEs). The path coefficient value of 0.843 suggests that SMEs firm owners that use green innovation strategies contribute 84.3% to the enhancement of competitiveness value.

An environmentally-based company innovation strategy that can be seen in SME activities by creating products with a good waste recycling system, the use of safe raw materials, a production process with minimal pollution, and environmentally friendly products are important elements that positively affect a company's level of competitiveness. Therefore, a well-implemented environmentally-based innovation strategy will improve a company's competitiveness.

The outcomes of this study support Fitriani's conclusions that green process innovation, as part of a green innovation strategy, has a considerable impact on the competitive advantage of goods in SMEs (Fitriani, 2017). In addition, the findings from this research also support Chen et al.'s conclusions that green process innovation improves competitive advantage. (Chen et al., 2006). Through green process innovation, production waste can be reduced and recycled. The findings of this study also reinforce Kuo's research results, that by implementing green manufacturing, business organizations/companies will achieve better competitiveness through improved quality and efficiency of energy and resource use during production (Kuo, 2007).

### **The Effect of Green Innovation Strategy on Business Performance**

According to the findings of the study, the green innovation approach has a favorable but not statistically significant impact on the performance of SMEs in South Sulawesi. The path coefficient value of 0.205 suggests that SME firm owners that use green innovation strategies contribute 20.5% to the improvement of business performance.

An environmentally-based company innovation strategy that can be seen in SME activities by creating products with a good waste recycling system, the use of safe raw materials, a production process with minimal pollution, and environmentally friendly products are important elements that positively affect business performance. However, its impact is relatively smaller when compared to other variables in the model.

These research findings are consistent with Driessen et al.'s study that found no significant relationship between green innovation and performance (Driessen et al., 2013). In fact, green innovation strategies can lead to a decrease in a company's financial performance. However, several study findings support a link between green innovation and performance (C. C. J. Cheng et al., 2014; Fitriani, 2017; Huang & Li, 2017). Improving organizational prospects through green innovation leads to improved company performance. Socially responsible companies will earn higher profits for the same level of risk (Charlo et al., 2015).



### **The Effect of Competitiveness on Business Performance**

According to the findings of the study, competition has a favorable and considerable impact on the performance of SMEs in South Sulawesi. The path coefficient value of 0.701 suggests that the degree of competitiveness contributes positively to the improvement of company performance by 70.1%.

The level of competitiveness, which can be seen in the ability of SMEs to create products with low cost/prices, high-quality products, flexible products according to consumer demand, real-time product delivery to consumers, and sustainable product innovation, are important elements that positively affect the level of SME business performance. Therefore, business performance will increase further if business owners are able to increase their competitiveness intensively.

These findings are consistent with and validate earlier studies indicating competition has a major impact on business success (Fitriani, 2017). Competitive elements of an organization, including cost, quality, delivery speed, and flexibility, are important elements in improving business performance (Riyadi & Munizu, 2022).

### **The Effect of Green Innovation Strategy on SME Performance through Competitiveness**

The research results show that the green innovation strategy has a positive and significant influence on SME performance mediated by competitiveness. This can be seen from the significance value of the influence path X1 -> Y1 (significant) and Y1 -> Y2 (significant). The indirect influence value is 0.590. Thus, the mediating role of competitiveness is "full mediation". Therefore, SME performance is indirectly, positively and significantly influenced by the green innovation strategy by 59%.

An environmentally-based company innovation strategy that can be seen in SME activities by creating products with a good waste recycling system, the use of safe raw materials, a production process with minimal pollution, and environmentally friendly products are important elements that positively affect the level of competitiveness. Therefore, the path to improving SME performance must begin with improving competitiveness elements because when competitiveness improves, it will directly have a positive effect on business performance. Green innovation procedures can make strides commerce execution through the advancement of competitive components (Chen et al., 2006; C. F. Cheng et al., 2013).

Green innovation includes advancement in items, forms or trade models that lead companies to a higher level of natural maintainability. Green innovation comprises of green item development and green prepare advancement outlined to diminish vitality and contamination utilization, reuse squander, and utilize assets in a maintainable way. In general, companies will incur higher investment costs in creating environmentally-friendly products in the short term, but in the long term, the company will gain a good reputation, and the products produced by the company will receive positive responses from consumers, which will impact the sustainability of the business.



## CONCLUSION AND RECOMMENDATION

Based on the research results and discussions that have been conducted in the previous section, the following conclusions can be formulated:

- 1) The green innovation strategy has a positive and significant influence on business competitiveness. This indicates that the implementation of green innovation strategy through better programs and activities will provide a positive contribution to improving the competitiveness position of SMEs in South Sulawesi.
- 2) The green innovation strategy has a positive but not significant influence on business performance. This indicates that although the implementation of green innovation strategy has provided a positive contribution to the performance of SMEs in South Sulawesi, it is still relatively small compared to other variables in the model.
- 3) Competitiveness has a positive and significant influence on business performance. This indicates that better competitiveness will provide a positive contribution to improving the performance of SMEs in South Sulawesi.
- 4) The green innovation strategy has a positive and significant influence on SME performance in South Sulawesi mediated by competitiveness. The mediating role of competitiveness is included in the category of "full mediation". Therefore, business performance is indirectly, positively, and significantly influenced by the green innovation strategy.

Based on these conclusions, it is recommended that SME business owners in South Sulawesi improve their competitiveness by creating products with low cost/prices, high-quality products, flexible products according to consumer demand, real-time product delivery to consumers, and sustainable product innovation. They should also implement green innovation strategies by creating products with a good waste recycling system, using safe raw materials, a production process with minimal pollution, and environmentally-friendly products. This will lead to a positive impact on business performance and competitiveness. Based on the conclusions that have been formulated, the following recommendations are made from the results of this research:

- 1) SME stakeholders are expected to be more intensive and consistent in implementing environmentally-based innovation strategies. Improvements that are continuously made should focus more on effectively managing the production waste recycling system.
- 2) SME stakeholders are expected to have a better understanding of the elements that form business competitiveness. Decisions in producing low-cost, high-quality, flexible products to meet consumer demand, fast product delivery, and product innovation are important elements that must be well understood. Improvements that are continuously made should focus more on the speed of delivering products to customers.
- 3) SME stakeholders are also expected to have a better understanding of the elements that form business performance, which include market share, sales, profit, and investment turnover. Improvements that are continuously made should focus more on the market share of SMEs.

Therefore, the ability of SME managers is needed not only to serve existing markets but also to create new market opportunities and expand the marketing reach of their products.

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