

# **Green Product Innovation, Green Process Innovation, and its Impact on Green Performance of Batik SMEs**

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*Abstract : This study aims to analyze the effect of green product innovation and green process innovation on the green performance of SMEs. The data of this study were collected from Batik SMEs in Yogyakarta Regency, Indonesia, with 204 Batik SMEs' owners. This research used purposive sampling methods for the data process collecting. The result of this study uncovered that green product innovation had a significant positive effect on the green performance of SMEs. Green process innovation had a positive effect on the performance of SMEs.*

*Keywords: green product innovation, green process innovation, green performance of SMEs.*

*Abstrak : Studi ini bertujuan untuk menganalisis pengaruh inovasi produk hijau dan inovasi proses hijau pada kinerja hijau UKM. Data penelitian ini dikumpulkan dari UKM Batik di Yogyakarta, Indonesia, dengan 204 sampel UKM Batik. Penelitian ini menggunakan metode purposive sampling dalam proses pengumpulan sampel. Hasil penelitian ini menemukan bahwa inovasi produk hijau berpengaruh positif signifikan terhadap kinerja hijau UKM. Inovasi proses hijau berpengaruh positif terhadap kinerja hijau UKM.*

*Kata Kunci: inovasi produk hijau, inovasi proses hijau, kinerja hijau UKM..*

## **Introduction**

The development of technology and information influences the company's strategy in allocating internal resources in achieving superior performance through access to market information (Nuryakin et al. 2021). The organization's internal resources are a source that can achieve a degree of competitive advantage so that it can create uniqueness for the company compared to its competitors. In this case, companies that adapt and are oriented towards market and innovation have an advantage in performance (Pekovic et al. 2016).

Companies also need to maintain the sustainability of their business by paying attention to environmental aspects amidst the issue of environmental change (Pan et al. 2021). In the customer aspect, they currently have a behavioral tendency in choosing products made from environmentally friendly (green) materials, thus impacting customer satisfaction. Here, the role of company owners and managers becomes interesting when they strive to create distinctive products that can adapt to customer desires by utilizing green technology-based production materials (Sun et al. 2021).

Several studies have been conducted to discuss the issue of green innovation, among others, finding that green innovation influenced the performance and resilience of companies in maintaining long-term sustainability (Nuryakin and Maryati 2020). Even more, it is explained that, currently, the focus of research on green innovation in reaching customers is not only carried out at the organizational level but also the customer level. Another study also found that organizations that adapt to care about environmental aspects can achieve competitive advantage (Wang 2019). Other researchers have also revealed a strong relationship between innovation and environmental issues (Zhang et al. 2020) and economic activities and the long-term sustainability of business organizations and their environment (Soewarno et al. 2019).

Therefore, this study aims to empirically examine the effect of green product innovation and green process innovation in improving the green performance of SMEs. Green product innovation and green process innovation in this study are independent constructs in determining the green performance of SMEs.

### **Theoretical Review and Hypotheses Development**

#### **The Relationship between Green Product Innovation and Green Performance of SMEs**

Research conducted by Huang et al. (2016) explained that green innovation products developed by companies are the determinants of green capabilities. Here, a

deep understanding of the internal factors is needed in developing green product innovation. It is also crucial for organizations to build green product innovations and green process innovations in achieving excellence and success for their products in market competition (Kam and Wong 2012). In their study, Khin et al. (2010) said that innovation is an organizational strategy utilizing their internal resources.

In addition, Yu et al. (2018) found that operational capabilities and organizational productivity are vital in achieving performance. Business organizations also need to focus on their organizational culture in achieving green innovation and green performance processes (Wang 2019). It is even explained that the process of forming a green organizational culture makes a major contribution to achieving green performance.

Based on the previous studies, the researchers proposed the hypothesized model in this study:

*H1: Green product innovation has a positive effect on the green performance of SMEs.*

#### **The Relationship between Green Process Innovation and Green Performance of SMEs**

Product performance in gaining market share is influenced by the success of product innovation (Ledwith and O'Dwyer 2008). Even more, product success is said to be one of the hallmarks of product excellence developed by the company when carrying out the innovation process. The success of new products or

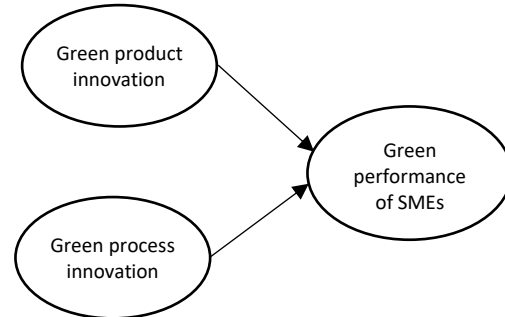
services has become an important concern for organizations since the company carries out innovation activities. It has a significant effect in encouraging organizations to adapt to changes in the market, technology, and competition, including creating green products. It is significant in helping organizations to adapt to changes in markets, technology, and competition (Simpson 2004). Meanwhile, in his study, Nuryakin (2018) found that product innovation makes an important contribution to companies in achieving a degree of competitive advantage.

Moreover, this study examines the important role of green product innovation in SMEs. SMEs have great potential to develop products that adapt to market potential by building product differentiation through market resource allocation strategies by looking at the potential for product creation for customers (Bradley and Sean 2001). In addition, Zhang and Zheng (2018) study focuses on green innovation activities consisting of input processes in product creation activities with proportional materials in terms of easily biodegradable materials, and a small material fraction benefits the business.

Based on the previous studies, the researchers put forward the hypothesized model in this study:

*H2: Green process innovation has a positive effect on the green performance of SMEs.*

Based on the previous studies, the researchers formularized the hypothesized model in this study:



**Figure 1. Research Method**

## Research Methods

### Research Design

This study used a quantitative approach by conducting a survey. This study empirically proved two research hypotheses. This study was also conducted by distributing questionnaires to Batik SMEs in Yogyakarta. The survey approach was carried out using a questionnaire to explore information related to the research sample. Meanwhile, a quantitative approach was conducted in this study by testing the research hypotheses.

### Sample and Data Collection

The samples used in this study were Batik SMEs, where Batik has natural ingredients, and Batik SMEs developed a production system using environmentally friendly (green) materials in Yogyakarta, Indonesia. The samples studied were 200

respondents, consisting of the Batik SMEs owners in Yogyakarta, Indonesia.

**Measurement of Construct**

This research used a quantitative design to analyze the two hypotheses and the empirical research model. The research method was to analyze the effect of green product innovation and green process innovation on SMEs' green performance in this study. A literature review study was conducted to identify the validity and reliability of the data and measure the three-related constructs, such as green product innovation, green process innovation, and green performance of SMEs, as described below with SME samples. The three constructs were then measured with a seven-point Likert scale (1 strongly disagree – 7 strongly agree).

**Validity and Reliability Tests**

This study employed a confirmatory factor analysis test to examine the instrument's validity and reliability. The calculation results of construct validity, extract variance, and discriminant validity showed the conclusion that the constructs of green product innovation, green process innovation, and green performance of SMEs met the required criteria: the value of construct reliability of more than 0.7, the average variance extract value of more than 0.5, and each value of discriminant validity of more than 0.7. Thus, it can be concluded that the instrument was declared valid and reliable.

**Results**

**Hypotheses Tests**

This research utilized Structural Equation Modeling to analyze the research design and test the hypotheses using AMOS software. Table 1 indicates the structural model test results in this research. Overall, the model fit measurement with structural equation modeling indicates that the model fit values were good (GFI = 0.890, AGFI = 0.848, RMSEA = 0.069, CFI = 0.945, TLI = 0.933). Overall, the paths estimated test also reveals that all the hypotheses significantly showed results supporting the hypotheses test. The full model test results in this research are shown in Figure 1. The three hypotheses developed in this research, after the test, showed positive and significant results that green product innovation positively and significantly influenced the green performance of SMEs, and green process innovation positively and significantly influenced the green performance of SMEs. The results of each hypothesis test are presented in the table below.

**Table 1. The testing of Hypothesis Model**

Hypothesis	Proposed effect	Path coefficient	Sig	Result
H1	Positive	3.680**	0.000	H1 is supported.
H2	Positive	2.362*	0.018	H2 is supported.

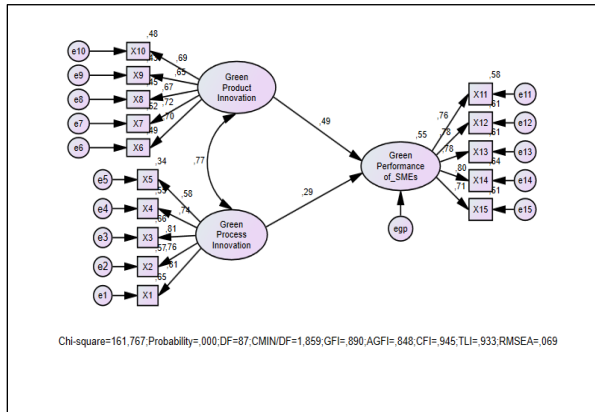
\*p <0.05, \*\*p<0.01.

Table 1 explains the standardized path coefficient value in the test of each exogenous construct with the endogenous

construct. The test results empirically prove the two hypotheses.

The statistic test for H1 found the path coefficient value of 3.680 and significance value of 0.000, showing that green product innovation positively and significantly influenced the green performance of SMEs. Then, the statistic test for H2 uncovered the path coefficient value of 2.362 and significance value of 0.018, indicating that green process innovation positively and significantly influenced the green performance of SMEs. The results of each hypothesis model test are given in Figure 1 below.

**Figure 1. Full Model**



**Discussion, Implication, and Limitation**

This study is interesting in testing this empirical research model because the two hypotheses tested were proven significantly in statistical testing with the AMOS program. The results of this study also indicate that empirically, the results of this study answered the findings of studies conducted by previous researchers.

Testing on the first hypothesis found that green product innovation had a positive

and significant positive effect on SMEs' green performance. The results of this study align with previous studies conducted by Huang et al. (2016), who found that green product innovation is an important part of the company's strategy. The results of this study are also consistent with previous studies, stating that the advantages of green innovation can be created through green innovation. Within the scope of SMEs, excellence is also determined by product launches (Ledwith and O'Dwyer 2008). In addition, this study explains that green innovation is also an important strategy when companies develop new product innovations and through the production process and as an effort to maintain competitive advantage and environmental sustainability (Li et al. 2018; Pujari 2006; Ar 2012). As a strategy that can increase the reputation and access of customers and wider new markets, green innovation is developed in the company's strategy, especially by adopting environmentally-friendly (green) technologies and resources (Low and Shang Gao 2015).

The results of testing the second hypothesis revealed that green process innovation had a positive and significant positive effect on SMEs' green performance. The findings in this research corroborate with the results of a study, finding that green product innovation and green process innovations are important in achieving excellence and success for their products in market competition (Kam and Wong 2012). In addition, the findings of this study also support the results of this previous study (Bradley and Sean 2001). Also, this study is in line with research by Zhang and Zheng (2018), which found that

green innovation activities consist of input processes in product creation activities. The empirical evidence in this study then makes an important contribution to the body of knowledge on how SMEs can optimize their strategies, especially related to environmental sustainability issues.

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