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The Role of Internal Drivers Toward Eco-Innovation Adoption and Its Consequences on Sustainable Performance in the Small Manufacturing Firms

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Abstract- This study aims to identify the role of internal drivers consisting of organizational capabilities, efficiency, and environmental managerial concern as factors that are thought to increase eco-innovation adoption and its impact on sustainable performance in small manufacturing firms. This study took a sample of manufacturing SMEs consisting of five main industrial categories, namely the textile industry, the handicraft industry, the shoe & bag industry, the food & beverage industry, and various industries. Sampling was conducted on 75 owners or managers of manufacturing SMEs in the Bandung and surrounding areas because the area is one of the centers for manufacturing SMEs in West Java Province. The data analysis in this study used a structural equation model based on partial least square (SEM-PLS). The test results of the research hypothesis show that internal drivers have a positive and significant effect on eco-innovation adoption, and eco-innovation adoption also has a positive and significant effect on sustainable performance. This study has implications for policymakers for small manufacturing firms in increasing eco-innovation adoption in developing countries. Furthermore, it is hoped that the company can reflect on the results of business research decision making and to improve its sustainability performance.

Keywords: *Internal Drivers, Eco-innovation Adoption, Sustainable Performance.*

INTRODUCTION

Environmental issues and global warming have increased recently because of air pollution, water, soil, and exploitation of natural resources, and dangerous materials and products have become the main problems in almost every country, including Indonesia. In addition, the attention of domestic and international communities towards environmental sustainability encourages every firm, whether small, medium, or large, to create environmentally friendly innovations. Within this new period of environmentalism, eco-innovation (reuse, recycle, and reduction) have surfaced as unavoidable activities that positively lead to avoid environmental damage (Aboelmaged & Hashem, 2019). Firms to consider environmental rules. Although recently, both in educational and practical controversy problem such as innovation and sustainability are hot topics, what companies are doing and exactly how they may develop those ideas to their actions and strategies is not yet determined (Bossle et al., 2016). The problem is what drivers that are determining eco-innovation in a firm (Cai & Zhou, 2014). Therefore, researchers need to analyze driver factors that can determine the adoption of eco-innovation in the firm.

Research on the adoption of eco-innovation towards sustainable performance, especially in an emerging market is still less attention. In addition, the driving factors that affect eco-innovation are also rarely studied, such as organizational capabilities, efficiency, environmental managerial concerns, green consumer needs, competitive pressure, and environmental regulation. Although there are differences in the drivers of eco-innovation and most researchers in studies outside of Indonesia such as Kiefer, et al. who examines the resource, competence, and dynamic capability as an eco-innovation driver (Kiefer et al., 2018), or Chai & Zhou (2014) who researched eco-innovation and integrative capability internal drivers and external drivers in 1266 companies in China, then Jové-Llopis and Segarra-Blasco (2018) who examined the technology push, market-pull and public policy as eco-innovation drivers in large companies in Spain.

Eco-innovation can be explained as the production, utility, or search of goods, service, production method, business or managerial framework or approach to business new to the organization or to the consumer (Pacheco et al., 2017). The required results are decreased environmental threats, less air pollution, and less harmful effects of the use of resources in comparison with the related alternative options. There are three factors that become drivers of eco-innovation adoption, namely organizational capabilities, efficiency, and environmental managerial concern (Bossle et al., 2016; Cai & Zhou, 2014).

Eco-innovation is a firm strategy for offering consumer and industry values that lead to sustainable growth and reduces environmental expenses and effects (Kiefer et al., 2018). Based on the results of the elaboration of the previous study, the authors concluded that there were three for eco-innovation adoption, which are organizational capabilities, efficiency, and environmental managerial concern. Although some research has been analyzed, many questions stay unanswered. For instance, it is the element of whether these drivers result from the firm's eco-innovation and sustainable performance (Cai & Zhou, 2014), especially in developing countries such as Indonesia.

The capability to create eco-innovation depends upon internal drivers. It encourages environmental innovation and business advancement. Internal drivers will cause the business to assess expenses, gains, and risks involved in the adoption of eco-innovations. Basically, firms find to become more efficient leading to fewer environmental effects, by organizational capabilities, efficiency, and environmental managerial concern (Bossle et al., 2016; Cai & Zhou, 2014).

Internal factors are the driving force for firms to create eco-innovation that relies on internal drives. That encourage environmental innovation and business progress. Internal drivers will cause businesses to assess the costs, benefits, and risks involved in environmental innovation adoption. Firms become more efficient which leads to fewer negative effects on the environment, with organizational capabilities, efficiency, and environmental managerial concern (Bossle et al., 2016). Environmental management practices facilitate firms to create organizational and implementation capabilities such as reducing resources, recycling use, protecting against pollution, and designing environmentally friendly products designed to encourage eco-innovation adoption towards improved environmental quality combined with reduced costs (Cai & Zhou, 2014). Efficiency, like cost savings, was identified as the most important driver for better organizational capabilities (Bossle et al., 2016).

The study aims to analyze whether the role of internal drivers (organizational capabilities, efficiency, and environmental managerial concern) can have a positive effect on eco-innovation adoption and whether eco-innovation adoption can have a positive impact on sustainable performance in small manufacturing firms.

LITERATURE REVIEW

Internal Drivers

The internal characteristics of a firm are an essential factor for the adoption of eco-innovation (Fagerberg & Mowery, 2005) that encourages a firm's success. The ability to take advantage of eco-innovation adoption depends on internal factors, including organizational capabilities, efficiency, and environmental managerial concern. In general, resource capabilities play an essential role in producing innovation (Baumol, 2002).

That capability consists of the knowledge capital and physical capacity to develop new products and processes. In building this capital, a firm must increase investment in developing or continuing training for members of the organization. Firms that have the capacity for innovation can achieve sustainable innovation in the future. Environmental managerial concern for organizations can be meaning as environmental organizational capabilities, which are essential for triggering product innovation and process (Blind, 2012).
The application of internal drivers helps companies to build organizational capabilities and practices such as pollution prevention, recycling, source reduction, recycling, and environmentally friendly product design. It is intended to encourage process innovation towards better environmental quality in pairing with reduced costs. They can also assist in product and service innovation in the field of eco-efficiency (Cai & Zhou, 2014).
Demirel & Kesidou (2011) confirmed the positive influence of internal drivers for the environment on eco-innovation adoption. Greening efficiency has a positive impact on eco-innovation through the adoption process. The explanation in the literature shows that the environmental managerial concern construct is a strong factor in the environmental innovation approach (Chang, 2011). Environmental managerial concerns are identified to be related to sustainable performance for firms through the adoption of eco-innovation (Bossle et al., 2016). Thus:
H1: Internal drivers have a positive impact on eco-innovation adoption

Eco-Innovation Adoption

Eco-innovation is an improvement that decreases the environmental effects of usage and production activities, would perform a truly relevant role in the search for more affordable, eco-friendly, and sustainable societies (Kiefer et al., 2018). Creating value by determining innovations that can handle bringing in green profits in the market, minimizing environmental effects when creating value for the firms. It entails the creation of new areas on the market, goods, and services or procedures added by concerns of the environmental, social, or sustainability nature (Foxon & Andersen, 2009). Eco-innovation creates new advancement lease by discovering new eco-technologies and providing new green solutions to the marketplace (Andersen, 2010). Alternatively, eco-innovation assists a green-oriented firm to obtain advantages by exploiting efficient usages of resources and powers to minimize the unfavorable effect on the ecosystem. The ambidextrous orientation of eco-innovation offers a system to control and balance business-related and environmental-related activities that react to and from environmental opportunities (Zhang & Walton, 2017). Eco-innovation enables green-oriented firms to require higher synergies and relationships of different resources and capabilities (Ghisetti et al., 2015). These synergies imply that eco-innovation can significantly lead to green-oriented firms’ sustainable performance (Zhang & Walton, 2017). Thus:
H2: Eco-innovation adoption has a positive impact on sustainable performance

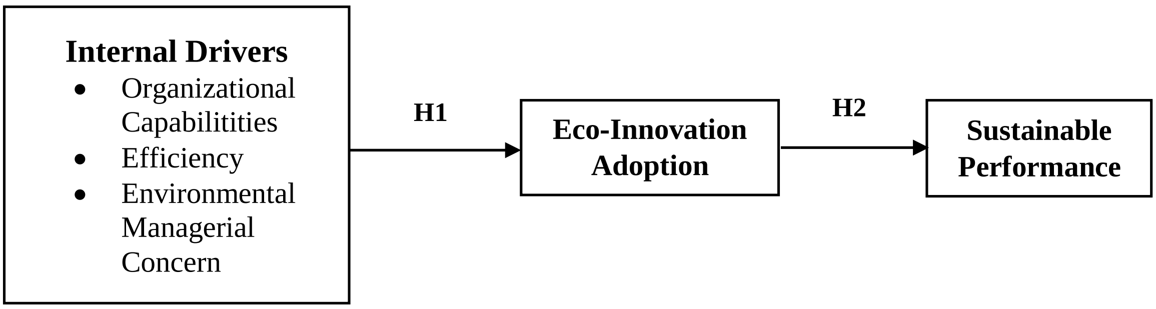

Figure 1. Research Model

METHODOLOGY

This research was conducted using primary data obtained from respondents by asking them to answer several questions contained in the research instrument. Then, the data source is the owner or manager of small manufacturing firms, which consist of food & beverage, shoes & bags, handicrafts, and various sectors. Then the target population area is Bandung and its surroundings because the area is a center for small manufacturing firms in West Java. The sample size refers to Ghozali (2011) which states that the number of samples can be calculated from the number of parameters multiplied by 5 to 10. Because this study uses one exogenous variable and two endogenous variables with a total of 13 parameters, so the sample needed in this study minimal. 13 x 5 = 65 samples. However, to further strengthen the results, this study used a sample of 75 respondents.

This data analysis used structural equation modeling based on partial least square by SmartPLS 3.0. The research instrument consisted of a four-part questionnaire tailored from various sources to collect demographic information and business characteristics of the respondent's biodata filling instrument. Then filled in questions about variables of external drivers, internal drivers, adoption of eco-innovation, and sustainable performance. contained in the instrument. A five-point Likert scale, indicated by strongly disagree to strongly agree (1 = strongly disagree, 5 = strongly agree), was used to measure the study construction. The construction of sustainable performance items was also evaluated using a five-point Likert scale (1 = significantly decreased; 5 = significantly higher). Furthermore, testing the validity and reliability using factor loading, average variance extracted or AVE, discriminant validity, and composite reliability. The factor assignment is intended to ensure that each question item is classified on each variable.

RESULTS AND DISCUSSION

Descriptive Analysis

Furthermore, Table 2 shows a descriptive analysis of the research variables showing that the owners or managers of manufacturing SMEs give high scores for the internal drivers, eco-innovation adoption, and sustainable performance with each of 4.75, 3.93, and 4.05. That explains that the application of internal drivers, eco-innovation adoption and sustainable performance in manufacturing SMEs is high, meaning that the owners or managers of manufacturing SMEs can properly implement these factors.

Table 2. Descriptive Analysis of Research Variables

Variables	Average Score
Internal Drivers	4.75
Eco-Innovation Adoption	3.93
Sustainable performance	4.05

Source: Data Processing, 2020

Validity Test

Validity test measuring whether the data is valid or not. This test was performed using the SmartPLS 3.0 application program revealing convergent validity (See Table 4). The variables adopted in this study consisted of internal drivers as independent variables; while the dependent variable is the eco-innovation adoption and sustainable performance. Each variable must be greater than 0.5. Based on the results of the validity test, all indicators of internal drivers, eco-innovation adoption, and sustainable performance have a factor containing an estimated value greater than 0.5. That can be indicated by the mean value of extracted variance (AVE) for all variable constructs greater than 0.5. That means that all variables are valid and can be continued for further processing.

Table 3. Test of Validity

Variables	AVE	Description
Internal Drivers	0.522	Valid
Eco-Innovation Adoption	0.654	Valid
Sustainable performance	0.579	Valid

Source: Data Processing, 2020

Table 4 shows the model for measuring discriminant validity through the Fornell-Larcker Criteria approach. Based on Table 4, it can be seen that the constructs of internal drivers, eco-innovation adoption, and sustainable performance each have a greater discriminant value than the other construct values. That means testing the validity of using process creations in the next process.

Table 4. Discriminant Validity Using Fornell-Larcker Criteria

Constructs	Eco-Innovation Adoption	Internal Drivers	Sustainable performance
Eco-Innovation Adoption	0.809		
Internal Drivers	0.475	0.722	
Sustainable performance	0.325	0.062	0.761

Source: Data Processing, 2020

After that, we verify the discriminant validity of the measurement model through the Fornell-Larcker Criteria approach (Table 4). Since the ratio for almost all constructs is a smaller value compared to the respective validity's value of the construct. Consequently, all construct can further be processed to the next stage.

Reliability Test

Table 5 shows the reliability test to check the consistency of each variable. With a minimum value above 0.4, it can be explained that all constructs can pass the reliability test. That is acceptable if the composite reliability value is between 0.6 to 0.7, then for higher levels, the assessment results between 0.7 to 0.9 can be more satisfying (Hair et al., 2014). The results can be seen in Table 5. Reliability testing shows that each composite reliability of all variables is above 0.7. That means that all variables in the research are reliable and can be continued for further processing.

Table 5. Test of Reliability

Variables	Composite Reliability	Description
Internal Drivers	0.881	Reliable
Eco-Innovation Adoption	0.791	Reliable
Sustainable Performance	0.845	Reliable

Source: Data Processing, 2020

Structural Model Testing

The structural model test shows that the correlation value between variables, significance, and R-square value on the relationship between constructs. The PLS research model starts by understanding the R-square value of all dependent variables. This worth is to look for the effect of exogenous latent variables on latent variables. A higher value indicates a more significant effect on endogenous variables. Based on Table 6, the estimated R-square value using PLS shows the value of eco-innovation adoption of 0.225 and sustainable performance of 0.105. This means that the internal drive is able to explain the adoption of eco-innovation by 22.5% and other variables outside that variable by 78.5%. Furthermore, the adoption of eco-innovation can explain the sustainable performance of 10.5% and other variables outside this research model of 89.5%.

Table 6. R-Square

Variables	R-Square
Eco-Innovation Adoption	0.225
Sustainable Performance	0.105

Source: Data Processing, 2020

The results of data testing using SmartPLS reveal that the structural equation model explains the correlation between constructs using bootstrapping. The results show an empirical research model of internal drivers, eco-innovation adoption, and sustainable performance (see Figure 2).

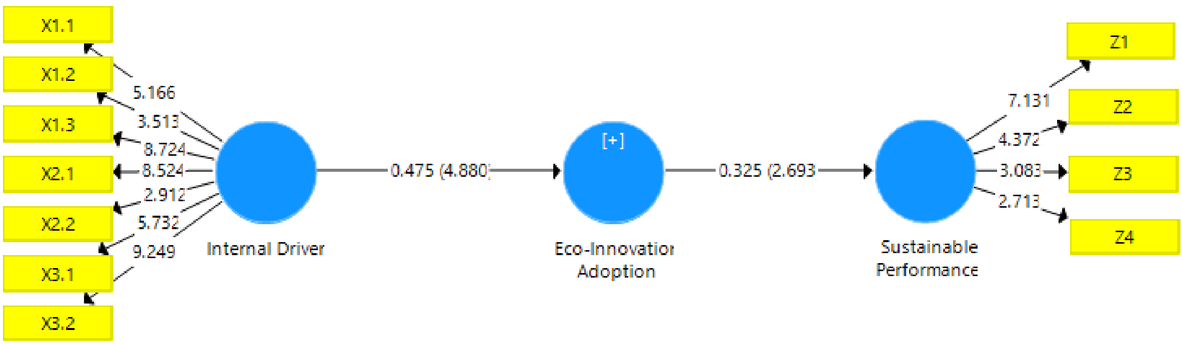

Figure 2. Structural Model Test

Hypothesis Testing

Table 7 presents the measurement results of hypothesis testing for all variables in the research model. The table below shows that the influence of internal drivers on eco-innovation adoption is positive (0.475) and the significance is at *p* <0.01 with a statistical value of 4.880 (greater than t-table 1.97), so hypothesis 1 can be accepted. Furthermore, the eco-innovation variable adoption of sustainable performance has a positive effect (0.325) and is significant at *p* <0.01 with a statistical value of 2.693 (greater than t-table 1.97), so hypothesis 2 can also be accepted.

Table 7. Hypothesis Testing Result

Hypothesis	Construct Coefficient	Standard Deviation	t-statistic (t-table=1.97)	Description

H1: Internal Drivers → Eco-Innovation Adoption	0.475	0.097	4.880	Supported**
H2: Eco-Innovation Adoption → Sustainable Performance	0.325	0.120	2.693	Supported**

Notes: **Sig. < 0.01

Internal Drivers on Eco-Innovation Adoption

The analysis results from the path analysis estimate of 0.475, and the coefficient value is positive. That shows when the implementation of internal drivers increases, the adoption of eco-innovation will also increase. That can be proven by the results of testing the hypothesis sig. <0.01 (t-statistic 4,880). Therefore, it can be concluded that there is a significant and positive influence of internal drivers toward eco-innovation adoption. This finding is supported by Cai and Zou (2014) that emphasizes the importance of internal drivers in increasing eco-innovation adoption. That is because internal drivers will encourage companies to generate benefits, reduce risks, and reduce costs associated with eco-innovation adoption (Bossle et al., 2016).

According to Paraschiv et al. (2012) stated that human resources are an essential driver for eco-innovation adoption. Developing internal drivers by building networks, utilizing educational programs, and spending more training for employees can be essential factors for the success of eco-innovation adoption (Arnold & Hockerts, 2011; Cainelli et al., 2012). In short, internal factors related to organizational capability, the efficiency with cost reduction, and environmental managerial concerns consisting of quality of human resource, training, environmental leadership, and participation in sustainability programs can affect eco-innovation adoption (Bossle et al., 2016). In the application of internal drivers, managers can interpret the environment that allows them to pay more attention to problems, identify business opportunities, and respond more quickly and proactively to environmental problems that associate with their allocation of attention for eco-innovation adoption (Peng & Liu, 2016).

Eco-Innovation Adoption on Sustainable Performance

The table shows that eco-innovation adoption positively affects sustainable performance with a t-statistic value of 2.693 and sig. < 0.01. The path analysis of the sample estimate is 0.325. It means that better implementation of eco-innovation adoption will improve sustainable performance. Therefore, it can be concluded that there is a positive and significant effect of eco-innovation adoption toward sustainable performance. This finding is consistent with Sezen and Çankaya (2013) state that eco-innovation adoption can affect sustainable performance. That because firms that implementing eco-innovation can reduce energy consumption costs, cut processing and waste disposal costs, also avoid fines if there is a loss to the environment (Sezen & Çankaya, 2013).

In addition, Lee and Min (2015) argue that the results of implementing eco-innovation result in an increase in a firm's sustainable performance. That because a company involved in eco-innovation adoption will make fundamental efforts to reduce the negative impact of activities on the environment, starting from the aspects of production, processes, and product development. Then, to improve sustainable performance by implementing eco-innovation adoption, firms need to invest in environmental resources and technologies to reduce such as pollution, carbon emissions, and other pollution. Green innovation can help identify waste in existing environmental production and technology, to increase efficiency and at the same time lead to increased performance (Lee & Min, 2015).

CONCLUSION

This study aims to analyze the role of internal drivers in eco-innovation adoption and their impact on sustainable performance in small manufacturing firms. Based on the test results that the authors have done, it can be concluded that the internal drivers variable consisting of organizational capabilities, efficiency, and environmental managerial concern have a positive and significant effect on eco-innovation adoption; then the eco-innovation adoption variable has a positive and significant effect on sustainable performance. In addition, the internal drivers' variable has a greater influence on eco-innovation adoption when compared to the eco-innovation adoption variable on sustainable performance.

The findings of this study have implications for managerial practice in small manufacturing firms. First, small manufacturing companies should develop internal drivers by increasing organizational capabilities that focus on improving human resources and technology. This is because of the need for the organization's unique resources and capabilities to support a proactive environmental strategy. The resources and capabilities of these companies, in turn, contribute to their advantage. Second, companies should increase efficiency in cost savings that lead to a green environment such as cutting production costs, reducing pollution, emissions, and production waste in order to support eco-innovation adoption activities. Third, company management allocates more time, energy, thoughts, and costs in an effort to pay attention to the environment that supports eco-innovation adoption activities. That is essential for firms because the role of internal drivers can support eco-innovation adoption of innovation and also indirectly have an impact on sustainable performance in small manufacturing firms.

The limitations of this study are the limited population coverage in Bandung and its surroundings as well as the industry category for small manufacturing firms. Suggestions for future studies to look at a wider population with different industry categories. In addition, this research variable can be developed by adding independent or moderating variables such as external drivers, absorptive capabilities, and knowledge transfer on eco-innovation adoption and sustainable performance.

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