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***Research paper***

# Green Product: Its Impacts on Environmental Safety and Customer Satisfaction

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**Abstract**

Green marketing has become a phenomenon to protect our earth from environmental destruction. As resulted, many companies from various industries have implemented the green revolution and fulfilled market demands by creating green products. The concern toward environment makes people change their behaviors toward the products they consume in their daily life. Hence, this paper explored the customer behavior towards green products, green customer satisfaction and the impact of green products on customer satisfaction and environmental safety. The data collection techniques used are observation, questionnaire and literature study. This study used Path Analysis for data analysis techniques with three tests, classical assumption test, regression analysis, and correlation analysis. The study result showed Green Product significantly affected Environmental Safety by 59.9% and to Customer Satisfaction by 39.4%. Meanwhile, Environmental Safety did not significantly affect the Customer Satisfaction, which was only 19.2%. The effects of Green Product on Customer Satisfaction through Environmental Friendly simultaneously were 28.2%, the remaining influenced by other factors which cannot be explained in this study.

***Keywords***: *Green Products, Environmental Safety, Green Customer Satisfaction, Customer Behavior*

## 1. Introduction

From Data Indonesia Ministry of Environment in 2006 the total production of waste in Indonesia was 36.06 million tones. Province in Indonesia becoming largest waste producer is West Java, followed by East Java, Central Java, North Sumatra and Jakarta. West Java is the biggest waste producer and Bandung as the capital city of West Java produces waste in the range of 0.61 kilos/person per day [1].

In 2012, Indonesia Ministry of Environment recorded that the average population of Indonesia produced 2 kilograms of waste per person per day. Totally Indonesian people produced 500 thousand tons of waste per day [2].

Every company in terms of environmental management systems are subsequently developed into awarding the ISO 14001 certification, then it has positive impact on the business world. Business in the field of sewage treatment plants, air pollution control equipment, recycling technology, is an opportunity in the transition period of the environmental management strategy of "end-off pipe treatment" to "waste reduction at source" [3].

Green marketing is one of strategies used by companies for the environmental benefits of product to increase sales. Consumers has become aware on environmental issues; as the result, the green products demand grows rapidly as the consumers are willing to pay more for them. By buying eco-friendly products, they contribute to preserve the environment.

Environmentally friendly guarantees or commonly known as eco-label, indicate that these products are assured quality. Other Asian countries, such as China, Japan, Korea, India, Thailand, Malaysia, and Singapore have been more responsive in addressing the issue of environmental pollution. It can be seen from the support and appreciation of government shown to the green marketing action undertaken by companies. One form of supports provided by giving the provision of eco-label for the green products. The eco-label makes green product easily distinguished from other products on the market. Meanwhile, in Indonesia itself, the development of eco-label certification can be categorized late, although it has great potential [4].

Green product is a product designed for environmental protection. Companies creating green product will develop energy efficient operations, better pollution controls, recyclable and biodegradable packaging, amendment the production process to create ecologically safe products. Most customer decisions for using green product are by the green labeling. Based on the research conducted by Yazdanifard and Igbazua (2011), it showed that 70 percent of 2000 people in US, UK, Germany, the Netherlands, Australia and Japan were willing to pay a premium for energy alternatives such as, wind and solar power. The consumers were motivated to buy products from companies offering eco-friendly productions [5]. From the study, it can be concluded that customers nowadays get more realize that green life by using green products is a better and healthier life for future generation, as well as it can protect the environment. In short, green marketing does not only give positive impacts to on environmental safety but also creates customer satisfaction.

There are many challenges faced by the companies implementing green marketing strategy, such as green product requires renewable and recyclable materials which are costly, green product requires a new technology which needs great investment in research and development, also majority of consumers especially in Indonesia are not willing to pay a premium price for green products although they are aware of the environmental hazards.

Lately, in Indonesia environmental issues are being highlighted, especially empowerment of garbage and recyclables. In response to these issues, Unilever Indonesia, having commitment to educate people in preserving the environment, has begun producing the green product in their detergent product, which is Rinso [7]. Currently climate changes in the world accelerating and for many people the lack of water has become a fact of everyday life. Therefore, to motivate their customers, Unilever created the Environmental Protection Program Unilever to promote green and friendly environment [6].

According to data on Indonesia Green Product website, Rinso is included into the category of Type II Environmental product, product type that has the declaration (claim) against environmental aspects [7]. The identification of these products on the market is by the claims of environmental aspects in product, packaging or other media. The target for 2020 is to reduce its environmental impact by half from the use Unilever products. Unilever hopes to achieve this target while developing business with more rapidly. According to Unilever, preserving the environment is the mission of their company inspiring them to change the production methods [6].

### 1.1. Green marketing

According to American Marketing Association (AMA), green marketing is the marketing of products presumed to be environmentally safe [8]. AMA defines green marketing should incorporate several activities, such as product modification, changes to production processes, packaging changes, modifying advertising strategies and also increases awareness on compliance marketing amongst industries [8]. From the definition and activities characteristics explained previously, the main objective of green marketing is to minimize the environmental hazards caused by the industrial manufacturing and to strengthen corporate eco-centric image in the consumers' perception.

### 1.2. Green product

Green Products are characterized as those products saving energy and minimizing pollution throughout their processes of production, use and disposal, are recyclable and reusable, and do not cause harm to the environment after disposal [9], [10].

Meanwhile another definition states that Green product is a product having the ecological objectives to reduce resource consumption and pollution and to increase conservation of scare resources [11].

Green product designed to minimize the use of non-renewable resources, avoid toxic materials, and have renewable resource during its whole life-cycle would be the most effective manner to display green technological development [12].

### 1.3. Environmental safety

The increase of customer awareness on environmental issues is as the result of the rapid publicity on the media on the issues, such as the warring off of the ozone layer and the increased pollution of the environment by industries. Customers have become more concerned about their everyday habits and the impact it has on their environment [5].

There are many laws on environmental safety that have made companies liable to do any wrongdoings. These laws cover areas, such as harmful pollution, hazardous materials management, environmental regulations order, and the emissions gas reduce of greenhouse effect from business. As the result, several hazard control, pollution control and prevention programs are held in different parts of the world on emergency procedures, contingency planning and employee training [5].

### 1.4. Green customer satisfaction

Swenson and Wells states that the basic ways of customer satisfaction can be defined either as an outcome or as a process [13]. As the outcome means the satisfaction of the end state resulting from the consumption experience [14]. Meanwhile as the process itself, it can be defined as the perceptual evaluative and psychological process contributing to satisfaction.

According to Yi, green customer satisfaction can be categorized based on the level of simplicity which includes [15]:

• Product satisfaction

•Satisfaction with the purchase decision experience.

•Satisfaction with the performance attribute

• Satisfaction with the store or institution

• Satisfaction with pre-purchase experience.

## 2. Methods

This aims of this research are to investigate the customer behavior towards green product and its impacts on environmental safety and customer satisfaction. In this research, there are three variables used, Green Product (X) as the exogenous variable; meanwhile, Environmental Safety (Y) and Green Customer Satisfaction (Z) are as endogenous variables.

To analyze the exogenous, Green Product (X), the researchers used the indicators proposed by Chen [12], which are product designed to minimize the use of non-renewable resource, avoiding toxic materials, and renewable resource during its whole life-cycle would be the most effective manner to display green technological development. Meanwhile, to analyze the endogenous variables, Environmental Safety (Y) and Green Customer Satisfaction (Z), the researchers used the indicators for environmental safety modified by Yi [5]. The

indicators for Environmental Safety consist of product not cause pollution, product not contain hazardous materials, product comply with environmental regulations and product gives positive message. Then the indicators for Green Customer Satisfaction (Z) are comprising product satisfaction, such as satisfaction with the purchase experience, performance attribute, store/ institution and pre-purchase experience.

This research is categorized as a descriptive and verifiable research with quantitative data type. Descriptive study is usually structured and are specifically designed to measure the characteristics described in the research question [16].

Quantitative analysis is a systematic scientific research on the parts and phenomena and their relationships [16]. The goal is to develop and to use of mathematical models, theories and hypotheses associated with the phenomenon. Researchers processing quantitative data which will be processed to draw a conclusion.

The population in this study was the Bandung society, especially those living in Bandung, West Java. The sampling technique of this study was a non-probability sampling with purposive sampling taken for sampling method. Purposive sampling technique was conducted with a researcher certain considerations [18]. The consideration of this technique, as the samples in this study were people in Bandung having used Rinso detergent product. The researchers used 100 respondents as the samples of this study. The data collection techniques used are observation, questionnaire and literature study. In addition, the research applied Path Analysis method as the data analysis and hypothesis testing technique.

## 3. Results and Discussion

Figure 1 below is the model of paths analysis the equation this study:

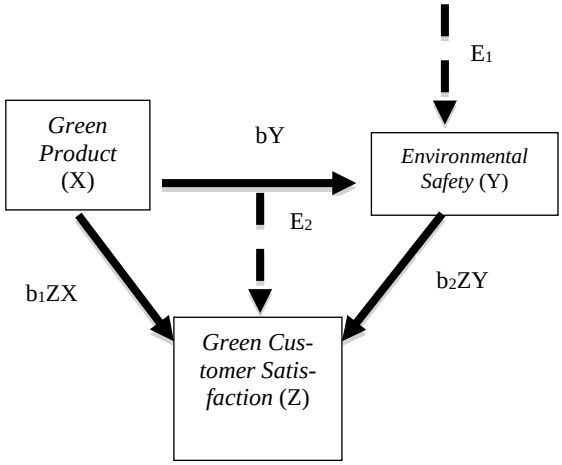


**Fig 1:** Research Framework

From the Figure 1, it shows the structural equation paths analysis which includes X as the independent variable (exogenous); Y and Z as the dependent variable (endogenous variable), with E = Error as follows:

a. First Sub Structure Equation:
$Y = bYX + E_1$

b. Second Sub Structure Equation:
$Z = b_1ZX + b_2ZY + E_2$

### 3.1. First sub structure

Figure 2, it shows as independent variable is Green Product (X); meanwhile, Environmental Safety (Y) is as dependent variable. The following equation model of paths analysis of this study:

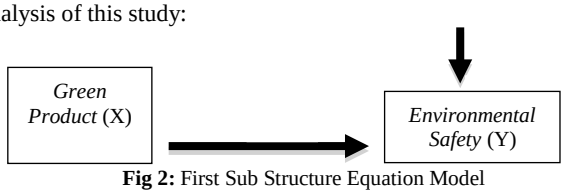


**Fig 2:** First Sub Structure Equation Model

For the equation this paths analysis can be calculated with the following formula:

Y = bYX + E1

To calculate the data, the researchers used IBM SPSS 22. Meanwhile, in testing the paths conducted three tests, such as classical assumption test, regression analysis, and correlation analysis.

**Effect of Green Product (X) To Environmental Safety (Y)**

From Figure 3, it shows that the t ratio is 7.359> t table = +1.9659 or significance value = 0.000 <0.05, then Ho is rejected and Ha accepted. Thus, it can be concluded that the regression coefficient predictor Green Product (X) significantly affect the Environmental Safety (Y). The amount of influence Green Product (X) of the Environmental Safety (Y) is 0.599 or 59.9%.

Meanwhile, the result shows that F count = 54.727> F table = 3.09 and a significance value = 0.000 <0.05, Ho is rejected and Ha accepted. The conclusion is the coefficient predictor X, Y significantly and there is significant influence of variables Green Product (X) of the Environmental Safety (Y).

i. Correlation Green Product (X) and Environmental Safety (Y)

Correlation coefficient obtained simultaneously (R) of 0.599, indicating between variables have a strong relationship. The independent variables were able to explain the relationship occurring with Environmental Safety (Y) or is called coefficient (D) shown by R square of 0.358 or 35.8%. Meanwhile, the remaining 64.2% is influenced by other factors not included in this study.

To determine the significant relationship significant, it can be seen from the amount calculated in table F test ANOVA = 54.727; and the significant value of 0.000. F table = F5%; DF1 (2); DF2 (97) = 3.09. From the data explained, F count = 54.727> F table 3.09 and a significance value is 0.000 <0.05, meaning the relationship between Green Product (X) of the Environmental Safety (Y) is significant.

Thus, the regression paths analysis equation model are as follows:

$$Y = bYX + E1$$
$$Y = 0{,}599X + 64{,}2\%$$

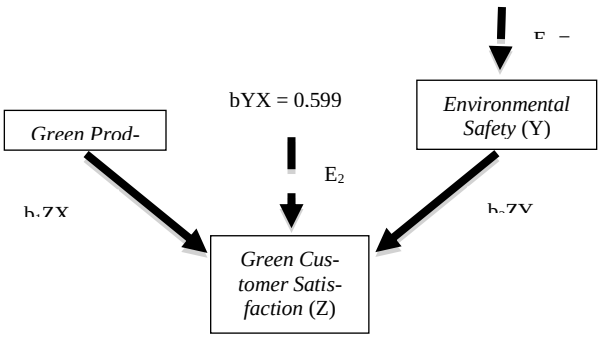


**Fig 3:** Result of Path Analysis First Substructure

## 3.2. Second sub structure

In this model there are two independent variables, namely Green Product (X) and Green Customer Satisfaction (Y), and the dependent variable is the Environmental Safety (Z). The following equation models are the second substructures:

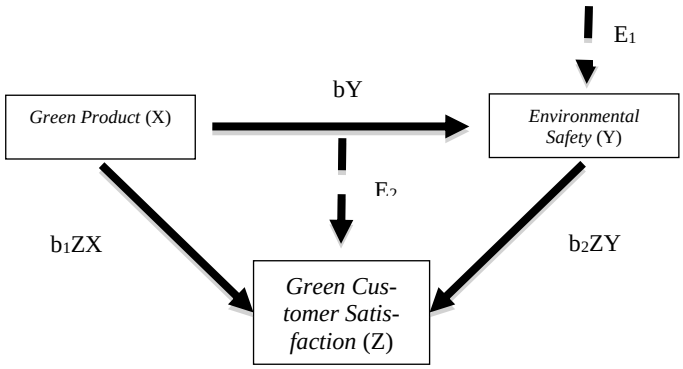


**Fig 4:** Second Sub Structure Equation Model

For an equivalent second sub structure can be calculated by the following formula:

Z = b1ZX + b2ZY + E2

**1. Effect of Green Product (X) and Environmental Safety (Y) Toward Green Customer Satisfaction (Z) Partially**

The T ratio = 3,667> t table = + 1.9659 or significance value = 0.000 <0.05, then Ho is rejected and Ha accepted. Thus, it can be concluded that the regression coefficient predictor Green Product (X) significantly influence the Green Customer Satisfaction (Z). The amount of influence Green Product (X) to Green Customer Satisfaction (Z) is 0.394 or 39.4%.

T table = - 1.98472 <t = 1.789 <t table = + 1.98472 or significance value = 0.077> 0.05, then Ho is accepted and Ha rejected. Thus, it can be concluded that the regression coefficient predictor of Environmental Safety (Y) does not significantly affect Green Customer Satisfaction (Z). The amount of influence Environmental Safety (Y) to Green Customer Satisfaction (Z) is 0.192 or 19.2%.

**2. Effect of Green Product (X) and Environmental Safety (Y) Toward Green Customer Satisfaction (Z) Simultaneously**

F count = 19.093> F table = 2.70 and a significance value = 0.000 <0.05, Ho is rejected and Ha accepted. The conclusion is X1,2 significant predictor coefficient and the significant influence of variables Green Product (X), and Environmental Safety (Y) to Green Customer Satisfaction (Z) simultaneously.

**Output Correlation Analysis Second Substructure Partially**

i. Correlation Green Product (X) and Environmental Safety (Y)

From the results of IBM SPSS output 22, the correlation coefficient obtained was 0.599 and the significance level of 0,000 or 0%. Significance = 0.000 has a value smaller than 0.05. Therefore, the correlation between these two variables is significant. Level relationship of 0.599 or 59.9%, with that value into the strong criteria. The conclusion is the relationship between the two variables is strong and mutually reinforcing.

ii. Correlation Green Product (X) and Green Customer Satisfaction (Z)

From the results of IBM SPSS output 22, the correlation coefficient obtained was 0,509 and 0,000 significance level or 0%. Significance = 0.000 has a value smaller than 0.05. Therefore, the correlation between these two variables is significant. Level conjunction of 0,509 or 50.9%, with that value into the strong criteria. The conclusion is the relationship between the two variables is strong and mutually reinforcing.

iii. Correlation of Environmental Safety (Y) and Green Customer Satisfaction

From the results of IBM SPSS output 22, the correlation coefficient obtained was 0.428 and the significance level of 0,000 or 0%. Significance = 0.000 has a value smaller than 0.05. Therefore, the correlation between these two variables is significant. Level relationship of 0.428 or 42.8%, with the value entered into the criteria fairly. The conclusion is the relationship between two variables quite yet mutually reinforcing.

**Output Correlation Analysis Second Substructure Simultaneously**

Simultaneously correlation coefficient (R) amounted to 0,531, which indicates between variables have a strong relationship. The two independent variables are able to explain the relationship with Green Customer Satisfaction (Z) or the so-called coefficient (D) shown by R square of 0,282 or 28.2%. While the remaining 71.8% is influenced by other factors not known.

To determine the relationship significant or not is to look at the amount calculated in table F test ANOVA = 19.093; and the significant value of 0.000. F table = F5%; DF1 (3); DF2 (96) = 2.70. If you look back at the data, F count = 19.093 > F table 2,70 and significance value is 0.000 < 0.05, meaning the relationship between Green Product (X), and Environmental Safety (Y) to Green Customer Satisfaction (Z) is significant. Thus, the regression analysis equation model paths analysis for the second substructure is as follows:

Z = b1ZX + b2ZY + E2

Z = 0,394X + 0,192Y + 71,8%

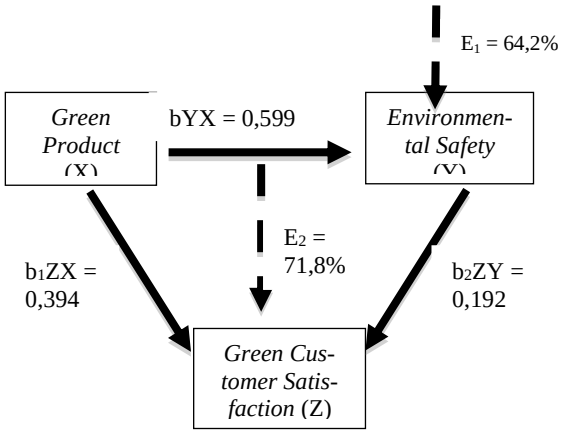


**Fig 5:** Complete Path Analysis Model

## 4. Conclusions

- Green Product (X) significantly affects the Environmental Safety (Y) by 59.9%.

- Green Product (X) significantly influences the Green Customer Satisfaction (Z) by 39.4%.

- The effect of Environmental Safety (Y) to Green Customer Satisfaction (Z), it can be seen that t table = - 1.98472 <t = 1.789 <t table = + 1.98472 or significance value = 0.077> 0.05, then Ho is accepted and Ha rejected. Thus, it can be concluded that the regression coefficient predictor of Environmental Safety (Y) does not significantly affect Green Customer Satisfaction (Z). The amount of influence Environmental Safety (Y) to Green Customer Satisfaction (Z) is 0.192 or 19.2%.

- From this study the correlation between variables are 0.531 which indicates strong relationship. The effect of Green Product on Green Customer Satisfaction through Environmental Friendly simultaneously are 28.2%, the remaining influenced by other factors which cannot be explained in this study.

### Suggestions

- Companies who claims their products are green products have to give a real facts by certification seals, label and ingredient list, and make all green marketing mix strategies to convinces their consumers.

- Marketers have the responsibility to make their consumers understand the benefit of green products as compared to non-green products.

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