



Strategy to Increase Interest in Purchasing Refill Machine Products as an Implementation of Pro-environmental Behavior

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Keywords

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Abstract

Along with the increasing volume of national waste had been getting higher since 2019-2022, it increased by 37.3% in national waste was almost 14% of the total of the world. Through the Ministry of Environment and Forestry (MEF), the Indonesian government made policies concerning the movement of waste free Indonesia implemented through the 3R (Reduce, Reuse, Recycle) which began in 2018. In this regard, companies offer to purchase products without packaging where the buyers were required to bring their own packaging. This study aim to determine public interest in the use of refill machines by analyzing economic aspects, knowledge, facility support, attitude, and pro-environmental behavior. The research used descriptive quantitative method with 155 respondents and the analytical method was Structural Equation Model (SEM) with Smart-PLS software. The results show that there was positive significant effect between knowledge, facility support, and attitude towards pro-environmental behavior. Whereas, the economic aspect had no significant effect on pro-environmental behavior. Researchers suggested business organizations to provide refill machine at affordable prices, and government to provide adequate waste treatment facilities that could be reached easily by the public.

1. Introduction

Indonesia is a the fourth highest population country in the world and the second largest contributor of plastic waste in the world. In 2019, the amount of plastic waste in Indonesia is estimated at 9.52 million tons or nearly 14% of the total of the world. Indonesia produced 67.8 million tons of waste in 2020, which has increased by 37.3% compared to 2019. This is worrying that plastic waste is an emerging contaminant that does not decompose easily but persists in the aquatic environment for a long time. Plastic is also one of the main toxic pollutants which consists of toxic chemicals and most importantly non-biodegradable substances, polluting the earth and causing air pollution and water pollution (McCarthy & Richter, 2020). Recently, most of the plastic waste found in the environment is bags or packaging materials. In most countries, plastic bags are widely used to package food, water, medicines, and almost any product that requires to be transported from one place to another.

The Ministry of Environment and Forestry (MEF) declared the policy of the Waste Free Indonesia movement which has been implemented since 2020, is a waste reduction policy, which consists of 3R as Reduce, Reuse and Recycle (Isabella, 2020). In this case, the government hopes for participation of people, which is through refill machine products, which are currently receiving the attention of many parties. Considering this waste problem has become a national problem which certainly requires integrated and comprehensive management can be started from the smallest unit, for example by managing waste of household in the 3R way (Reduce, Reuse, Recycle) Waste management with 3R is important to overcome the increasing volume of waste every day. Recycle can reduce

significant CO₂ emissions in the atmosphere because using recycled plastic can avoid emissions equivalent to those produced during the production of raw plastic (RENI, 2016) (Istiqomah, Mafruhah, & Gravitiani, 2019).

The refill machine provides a number of products from household needs to staples for consumption, from soap, detergent, soy sauce, to shampoo (Afroz, Rahman, Masud, & Akhtar, 2017). This refill machine product uses the concept of purchasing products without packaging which requires buyers to bring their own places to be used in order to reduce the use of single-use plastics, and also encourage people to recycle the plastic they produce (d'Ambrières, 2019).

Based on this phenomenon, the authors feel the need to do research on what things can make someone interested in implementing environmentally friendly behavior for the sake of environmental sustainability in the future. This environmentally friendly behavior is often referred to as pro environmental behavior (PEB). Where pro environmental behavior is an individual effort to reduce the negative impact of damage to nature by improving and preserving the environment, Pro environmental behavior (PEB) is behavior that seeks to reduce negative impacts on the environment which can be in the form of reducing resource and energy consumption, using non-toxic materials, and reducing waste production. There are several factors underlying pro-environmental behavior, those are person's environmental knowledge, also subjective norms and attitudes, as well as perceived behavioral control, and environmental beliefs, and other factors that influence a person's environmentally friendly behavior buying green products. In addition, supporting facilities are also able to influence how a person's behavior towards their environment.

Based on the description above, this study aims to find out how people's interest in using green products from refill machine products, in terms of several aspects of factors that are considered to influence, such as economic aspects, knowledge, facility support, attitude, and environmental belief.

Theoretical Review

Consumer behavior

Consumer behavior is all forms of psychological actions and processes that control a person before making a purchase, using a product, and evaluating the product.

Theory of Planned Behavior

The main components of the Theory of Planned Behavior are behavioral intentions which are influenced by attitudes about the possibility that the behavior will have the expected results and subjective evaluation of the risks and benefits of the results of the behavior. Through the theory of planned behavior, a person's behavioral intention determines a person's pro-environmental behavior (Žak, 2015).

Triple Bottom Line

The triple bottom line is the idea that all of company performance must be measured based on its combined contribution to economic prosperity, environmental quality, social capital which is long-term and sustainable.

Pro Environmental Behavior

Pro-environmental behavior is attitude in avoiding activities that can damage the environment, one of which is by paying attention to every product that will be used by buying environmentally friendly products.

Economic Aspect

Financial capacity plays a direct role because pro-environmental behavior is perceived as costly, as for example, having more money can facilitate individuals to access green products.

Environmental knowledge

Environmental knowledge is a perception of how far he knows about environmental issues in general and considers that environmental knowledge has a positive and significant effect on green purchase intention.

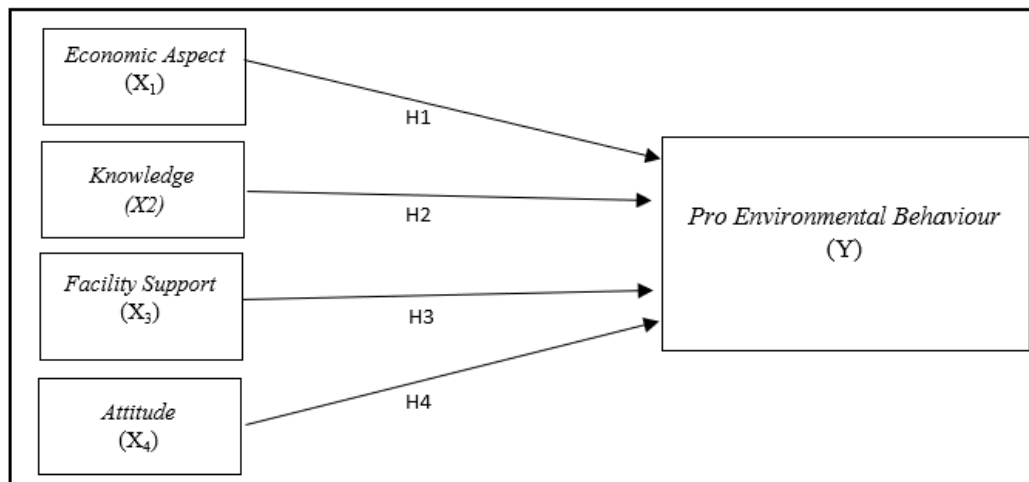
Support facility

The availability of facilities and infrastructure is part of the success of waste management program through the application of reducing or reusing. Facility support here has a significant impact on pro-environmental behavior, which in this case relates to recycling and re-managing plastic waste.

Attitude

Attitude is the center of pro-environmental behavior. Attitude also has a positive and significant effect on the pro environmental attitude which is implemented through recycle behavior.

Framework



In accordance with the formulation of the problem, theoretical review, and framework, the hypotheses proposed in this study are:

H₁ = *economic aspect* (X₁) has a positive and significant effect on pro-environmental behavior (Y).

H₂ = *knowledge* (X₂) has a positive and significant effect on pro-environmental behavior (Y).

H₃ = *facility support* (X₃) has a positive and significant effect on *pro environmental behaviour* (Y).

H₄ = *Attitude* (X₄) has a positive and significant effect on *pro environmental behaviour* (Y).

2. Materials and Methods

The research design is a causal associative research, namely to determine the relationship between two or more variables. Causal associative research is research that aims to determine the relationship between two or more variables, where this theory can be functions to explain, predict and control a phenomenon.

Operational Variable			
No	Variable	Indicator	Scale
1	Pro Environmental Behavior (Y)	1. Environmental aspects are the main factor in choosing a product 2. Recommend the use of sustainable products 3. Avoid using single-use plastic packaging	Likert
2	Economic Aspect (x)	1. The price of sustainable products is more expensive 2. Packaging and plastic bags are cheaper and more efficient 3. It takes a lot of money to manage plastic	Likert

		waste.	
3	Knowledge (x)	<ol style="list-style-type: none"> 1. To know about the dangers of overusing plastic 2. To know about climate change due to environmental pollution 3. To know how to deal with environmental pollution 	Likert
4	Support Facility (x)	<ol style="list-style-type: none"> 1. Availability of separate bins for organic and inorganic 2. Availability of good waste processing facilities 3. Availability of rules related to the environment including waste management 	Likert
5	Attitude (x)	<ol style="list-style-type: none"> 1. Separate any recyclable waste such as paper and bottles 2. Support the love of the environment program by participating as a volunteer 3. Making green products a living culture 	Likert

The data collection method used was to collect primary data through distributing questionnaires that understand the concept of refill machines but not limited to whether they have or never purchased these refill machine products. This study uses a Likert scale, which is a psychometric scale that is commonly used in questionnaires and is most widely used in survey research. The Likert scale is a scale designed to examine how strongly the subject agrees with a statement on a five-point scale with the following guide points: 1 = Strongly Disagree, 2 = Disagree, 3 Neutral, 4 = Agree, 5 = Strongly Agree.

In this study, the population used is all people in Indonesia who know and understand the concept of refill machines. The questionnaire was distributed in June 2022 with the required number of respondents being at least 150 respondents, but the researchers decided to increase the number of respondents to 155 as anticipation if there were respondents' answers that were invalid and could not be used. The sampling method in this study used a non-probability sampling method, namely purposive sampling.

Examination of the hypothesis research was carried out using the Partial Least Square (PLS) based Structural Equation Model (SEM) approach which aims to examine the relationship between variables in a model, whether between indicators and constructs, or relationships between constructs. The examination of hypothesis in this study uses analysis techniques from the path coefficient and t statistics. The value of the path coefficient is declared acceptable if the range of values is between > 0.000 and the t statistic > 1.96 . From these two numbers it can be seen whether the research hypothesis can be accepted or rejected.

3. Result and Discussion

In this study, data was obtained by distributing questionnaires to 155 respondents who know and understand the concept of refill machines to obtain research data related to economic aspects, knowledge, facility support, attitude, and pro-environmental behavior. It is known that out of 155 respondents, 95 people (61.29%) and 60 men (38.71%). From the age of the respondents, 22 people (14.19%) respondents aged between 17-25 years, 124 people (80.00%) respondents aged between 26-45 years, and 9 people (5.81%) respondents aged over 45 year.

Descriptive Analysis of the result of Questionnaire answers

Economic Aspect

The average result of the algorithm in the economic aspect variable (X1) is 3.41, which means that in the interpretation interval it falls into the "Agree" category. The EA1 indicator has the highest average of 3.92 from the economic aspect variable which states that "Eco-friendly products are more expensive". While the EA3 indicator, "It costs a lot to manage plastic waste" is an indicator that has the lowest average of 2.55 from the economic aspect variable according to consumer perceptions.

Knowledge

The average result of statements in the knowledge variable (X2) is 3.78, which means that in the interval interpretation it is included in the "Strongly Agree" category. The KNW1 and KNW2 indicators have the highest average of 4.34 from the knowledge variable which states that "Knowing the dangers of excessive use of plastic" and "Knowing the impact of environmental pollution on the climate". While the KNW3 indicator, "Knowing how to deal with environmental damage" is an indicator that has the lowest average of 3.95 from the knowledge variable according to consumer perceptions.

Support Facility

The average result of statements in the facility support variable (X3) is 3.16, which means that in the interval interpretation it falls into the "Neutral" category. The FS3 indicator has the highest average of 3.92 from the facility support variable which states that "There are rules related to the environment". While the FS2 indicator, "Available good waste processing facilities" is an indicator that has the lowest average of 3.66 from the variable facility support according to consumer perceptions.

Attitude

The average result of the statement in the attitude variable (X4) is 4.01, which means that in the interval interpretation it is included in the "Agree" category. The AT1 indicator has the highest average of 4.28 from the attitude variable which states that "Separate any waste that can be reprocessed such as paper and bottles". While the AT2 indicator, "Supporting the love of the environment program by participating as a volunteer" is an indicator that has the lowest average of 3.80 from the attitude variable according to consumer perceptions.

Pro environmental behavior

The average result of statements in the pro-environmental behavior (Y) variable is 4.10, which means that in the interval interpretation it falls into the "Agree" category. The PEB1 indicator has the highest average of 4.27 from the pro-environmental behavior variable which states that "Environmentally friendly products are more expensive. Environmental aspects are the main factor in selecting products". Meanwhile, the PEB3 indicator, "Avoiding the use of single-use plastic packaging" is an indicator that has the lowest average of 3.76 from the pro-environmental behavior variable according to consumer perceptions.

A. Outer Model Test

Convergent validity

Convergent validity rule of thumb used in the convergent validity test is that the loading factor value is greater than 0.7, but a loading of 0.50 to 0.60 is still acceptable.

In the study, there was one invalid indicator with a value below 0.7, namely the EA3 indicator worth -0.233. Furthermore, the EA3 indicator was removed in the next model. Where for the attitude variable, AT1 is 0.714, AT2 is 0.802, and AT3 is 0.896. For the economic aspect variable, AE 1 is worth 0.913 and EA2 is worth 0.868. While the variable facility support, FS1 is worth 0.884, FS2 is worth 0.924, and FS3 is worth 0.827. The knowledge variable, where KNW1 is worth 0.863, KNW2 is worth 0.894, and KNW3 is worth 0.775. As well as pro-environmental behavior variables, PEB1 is worth 0.834, PEB2 is worth 0.807, and PEB3 is worth 0.766.

Discriminant Validity

The Cross Loading value of all variables in this research model has a value above 0.7. So the researchers concluded that Discriminant Validity had met the requirements.

AVE Test Results

All variables in the study are valid, because the AVE value is above the requirement of 0.50. Where attitude has a value of 0.652, economic aspect of 0.793, facility support of 0.773, knowledge of 0.715, and pro-environmental behavior of 0.644.

The Fornell-Lacker Criterion

The Fornell-Lacker Criterion in this study shows that all the roots of the AVE (Fornell-Larcker Criterion) for each construct are greater than their correlation with other variables. For example, for AT, the root value of AVE is 0.807. The value of 0.807 is greater than the correlation with other constructs, namely with EA of 0.303, with FS of 0.282, with KNW of 0.358, and with PEB of 0.427.

Cronbach Alpha and Composite Reliability Test Results

It can be concluded that Cronbach's Alpha has fulfilled the requirements where the five variables above have values above the threshold and enter the range of values from 0.7 to 1.0 with a reliability level of "Reliable" and "Very Reliable". Where the attitude variable has a cronbach's alpha value of 0.732 and composite reliability has a value of 0.848, the economic aspect variable has a cronbach's alpha value of 0.741 and composite reliability has a value of 0.885, the facility support variable has a cronbach's alpha value of 0.853 and composite reliability has a value of 0.911, knowledge has a cronbach's alpha value 0.798 and composite reliability has a value of 0.882, and the pro-environmental behavior variable has a Cronbach's alpha value of 0.723 and composite reliability has a value of 0.844.

B. Inner Model Test

R-Square values of 0.75, 0.50 and 0.25 can be concluded that the model is strong, moderate and weak. An R² value of 0.540 is obtained which is in the range 0.5 – 0.75 so that it is included in the strong category. From the r-square value, it can also be concluded that the exogenous variables (economic aspect, knowledge, facility support, and attitude) that influence pro-environmental behavior in the tested model represent 54.0% of the variance of the pro-environmental behavior value.

F-Square (Effect Size)

It is known that only the FS variable has a strong influence on PEB with a value of 0.134, the KNW variable has a medium effect on PEB with a value of 0.153, while the other variables have a weak influence on PEB, namely the AT variable with a value of 0.047 and EA with a value of 0.026.

Q-Square (Predictive relevance)

Based on predictive relevance calculations, the value of Q² (=1-SSE/SSO) is 0.334 (greater than zero), so it can be concluded that the model meets the relevant predictive value.

Hypothesis test

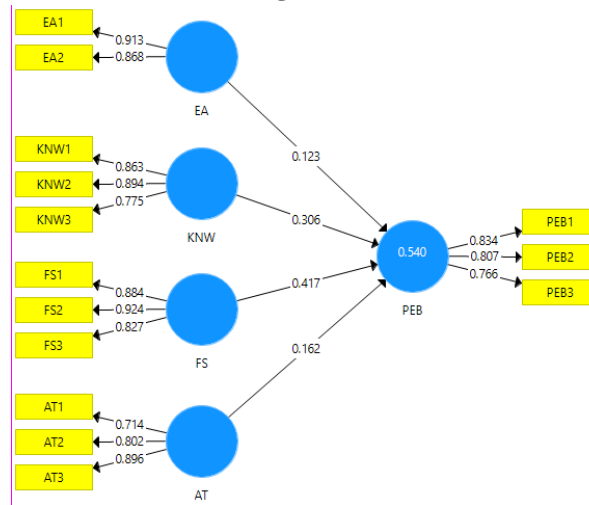
Path Coefficient (β) and Structural Model Equations

The higher the value of path coefficient is the stronger the effect. According to (Eriksen et al., 2014), the value of the path coefficient (β) is standardized in the range of values -1 to +1. Coefficients closer to +1 indicate a strong and positive relationship. While the coefficient is close to -1, it shows a strong negative relationship.

Path Coefficient Value

The results of calculating the path coefficients in the research model in the table show that all latent variables have a coefficient value of 0.123 for the economic aspect variable, 0.306 for the knowledge variable, 0.417 for the facility support variable, and 0.162 for the attitude variable, which shows a positive relationship.

Results of the PLS Algorithm on the Path Model



The hypothesis accepted or not, in addition to the path coefficient value, the t-statistic value must also be tested. The hypothesis is accepted if t-statistics > t table value

Hypothesis test

	Original Sample (O)	Sample Mean (M)	Standard Deviation (STDEV)	T Statistics ((O/STDEV)	P Values	Information
<i>Economics Aspect -> Pro Environmental Behaviour</i>	0.123	0.124	0.069	1.788	0.075	Insignificant
<i>Knowledge -> Pro Environmental Behaviour</i>	0.306	0.304	0.063	4.889	0.000	Significant
<i>Facility Support -> Pro Environmental Behaviour</i>	0.417	0.412	0.058	7.143	0.000	Significant
<i>Attitude -> Pro Environmental Behaviour</i>	0.162	0.164	0.069	2.352	0.019	Significant

Based on the table above, it is known that Economics Aspect has no significant effect on Pro Environmental Behavior. This is shown by the test results between the two variables which show an original sample value of 0.123 which is close to 1 and has a T-Statistic value of 1.788 (<1.96).

Based on the table above, it is known that Knowledge has an effect on Pro Environmental Behavior. This is shown by the test results between the two variables which show an original sample value of 0.306 which is close to 1 and has a T-Statistic value of 4.889 (> 1.96).

Based on the table above, it is known that Facility Support influences Pro Environmental Behavior. This is shown by the test results between the two variables which show an original sample value of 0.417 which is close to 1 and has a T-Statistic value of 7.143 (> 1.96).

Based on the table above, it is known that Attitude influences Pro Environmental Behavior. This is shown by the test results between the two variables which show an original sample value of 0.162 which is close to 1 and has a T-Statistic value of 2.352 (> 1.96).

1. The Effect of Economic Aspect on Pro Environmental Behaviour

Based on the results, it is known that the economic aspect variable has a p-value of $0.0745 > 0.05$. Thus the H1 hypothesis in this study which states that "the economic aspect (X1) has a positive and significant effect on pro-environmental behavior (Y)" is rejected So that the economic aspect does not affect pro-environmental behavior.

This research contradicts the results of research conducted by (Fairhurst & Nam, 2019) which states that there is a positive and significant influence between financial constraints as an economic aspect on pro-environmental behavior. (Hasebrook et al., 2022) also contradicts the results of this study, where the results of the study suggest that financial benefits affect sustainable behavior or pro-environmental behavior.

2. The Effect of Knowledge (X₂) on Pro Environmental Behaviour

Based on the results, it is known that the path coefficient value of the knowledge variable is 0.3056, meaning that knowledge has a positive effect on pro-environmental behavior by 30.56%. It is also known that the knowledge variable has a p-value of $0.0000 < 0.05$. Thus the H2 hypothesis in this study which states that "knowledge (X2) has a positive and significant effect on pro-environmental behavior (Y)" is accepted.

This result is in line with research conducted by (Lee, 2017) which states that there is a positive and significant influence between environmental knowledge and pro-environmental behavior. However, contrary to the results of research by (Indriani, Rahayu, & Hadiwidjojo, 2019), it contradicts the results of this study by stating that there is no significant influence between environmental knowledge and green purchase intention which is part of pro-environmental behavior.

3. The Effect of Support Facility on Pro Environmental Behaviour

Based on the results, it is known that the path coefficient value of the facility support variable is 0.4169, meaning that facility support has a positive effect on pro-environmental behavior of 41.69%. It is also known that the facility support variable has a p-value of $0.0000 < 0.05$. Thus the H3 hypothesis in this study which states that "facility support (X3) has a positive and significant effect on pro environmental behavior (Y)" is accepted.

This is in line with the research results of (Zamroni, Prahara, Kartiko, Purnawati, & Kusuma, 2020), which also stated that there is a positive and significant influence between facility support and pro-environmental behavior.

4. The Effect of Attitude on Pro Environmental Behaviour

Based on the results, it is known that the path coefficient value of the attitude variable is 0.1624, meaning that attitude has a positive effect on pro-environmental behavior by 16.24%. It is also known that the attitude variable has a p-value of $0.0191 < 0.05$. Thus the H4 hypothesis in this study which states that "attitude (X4) has a positive and significant effect on pro-environmental behavior (Y)" is accepted.

In line with the results of research conducted by (Roan, 2017) which states that there is a significant positive effect on attitude towards pro-environmental behavior. As well as the results of the same research by (Arisyi & Engriani, 2019), also states that there is a positive and significant relationship between attitude and pro-environmental behavior that is implemented with green consumer behavior.

4 Conclusion

Based on the results of the study, the conclusion that can be presented in this study is that there is no influence between the economic aspect variables on Pro Environmental Behavior. There is a positive and significant effect of the knowledge variable on Pro Environmental Behavior. There is a positive and significant influence between Facility Support on Pro Environmental Behavior. There is a positive and significant influence between attitude towards pro environmental behavior.

Suggestion

The researcher suggests the Indonesian government to add adequate waste processing facilities such as refill machines that can help encourage buying interest in these refill machine products, also suggest business organizations to be able to innovate to increase interest in using refill machine products by making female customers the target. it is easier to be persuaded considering that women understand the concept of refill machines better and are more likely to buy refill machine products.

In addition, it is suggested for business organizations to pay attention to green product prices in order to increase public buying interest to make it more affordable. Another suggestion for companies is being able to reduce the use of single-use plastic because it refers to the triple bottom line, companies are responsible for paying attention to environmental sustainability, not just focusing on company profitability.

As well as suggesting that in future research it is still necessary to carry out the latest research on variables with negative results because these variables can still be developed at a later date such as social influence, subjective norms, perceived behavioral control, and others.

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