

HYBRID STRUCTURAL EQUATION MODEL AND DINAMYC SIMULATION OF ECO LABEL TOWARDS GREEN MARKETING

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Abstract:

This study explored the pattern of green marketing concepts available that are offered by property industry, some of which are sustainable development and eco-labeled building. Eco-labeling is one of the crucial aspects in green marketing. Eco-labeling able to encourage the consumer preferences regarding green products or services. Examined how to develop eco-label model, to identify significance relationship of eco-label exogenous and endogenous variables and to predict eco-label value through simulation.

The data was collected through survey method on 400 sample sizes, whereas the collected data was processed and analyzed using Structural Equation Modeling method. Result suggested showing 4 variables that significantly related to eco-label: eco-label awareness, eco-label knowledge, brand feedback and green perceived quality. Results are discussed in terms of implications the value of eco-label is fluctuative in 10 years

Keywords: Green Marketing, Property Industry, Eco-label, Structural Equation Modeling, Powersim, Simulation

INTRODUCTION

Conducting marketing activities is a crucial aspect to a company or organization. It is indeed being said as the key of a high-profit organization, well of course each organization has its strategy or technique of promoting which makes it diverse from its competitors. According to Grönroos (1989), marketing is a planning and executing process of conception, pricing, promotion and distribution of ideas, goods and services to be able to exchange and to comply individual and organizational goals. Mentioned exchange means exchange process between producer and consumer, in which the producer is in charged to fulfill the needs of consumer. Brunswick (2014) also stated that an effective marketing includes consumer-oriented business activities and adopted by marketer to ease the exchange of goods that will profit both parties.

Green marketing function could be a crucial portion of a company, particularly for a company that applies the green concept. It could be a part that a company to distinguish and source possibly fruitful products for their market put, which afterward will be advanced by the company in a way to distinguish the products from other comparative products. Green marketing addresses issues related to products, promotion, retailing and distribution, branding, positioning and internal marketing (Kumar, 2016). For company in the retail environment, the green marketing functions of the company's image include social responsibility, product image and company reputation (Mallek & Alipour, 2016).

Brand trust is really communicated by six essential and collectively adequate conditions that incorporate in this one sentence, which is "brand trust is the biased, behavioral response expressed over time by some decision-making unit with respect to one or more alternative brands out of a set such

brands, and is a function of psychological (decision-making, evaluative) processes (Jacoby, 1971). According to Kumar (2016), brand trust is categorized in other functions in green marketing functions, it is the same level as other green marketing functions such as product, promotion and retailing and distribution.

Eco label is a prominent aspect for brand trust, since it underpins in picking up consumer trust within the advertisement aspect, thus it is additionally unmistakable for brand trust. Eco label creates a way for advertisers to attempt in providing informations that are relevant, precise and valuable to allow customers to include human health and environmental considerations as part of their purchasing decision routinity (Atkinson & Rosenthal, 2013).

The issue raised is developing a conceptual model of eco label model. The reason of this research is to analyze the eco label factors toward eco label. The relationship investigation of eco label factors toward eco label will be performed. The relationship analysis of eco label variables toward eco label will be performed. Additionally, eco label has seven variables that will be analyzed to find out whether they are truly related to eco label or not. This particular situation arised issue of how exogenous variables (eco label variables) affect endogenous variable (eco label). Moreover, second problem that arised is, how is the significance of relationship between eco label variables from model that have been developed.

METHOD RESEARCH OBJECT

The research has limitation that only focused on green marketing function issue with discussion on ecolabel brand trust. The research was carried out based on the conceptual model that had been built about the effect of ecolabel toward ecolabel. The

object of the research was conducted in a property organization called Real Estate Indonesia (REI). Analysis tools used by SPSS and SEM AMOS.

DATA COLLECTING METHOD

In this study, the method used in data retrieval is using survey method supported by a questionnaire. The questionnaire that used has a list of statements related to the research. The questionnaire that prepared has a choice of answers in the form of Likert scale. The questionnaire that distributed consists of various statements relating to research variables and indicators. The method of measurement in this questionnaire is to give a statement to the respondent and then asked to give an answer. The scale used in this study is using level 1 until 5.

DATA PROCESSING METHOD

The data that have been collected will be processed using SPSS and AMOS software. Tests carried out include measurement model tests, structural test models, and model modifications.

RESEARCH MODEL

The concept of the research model is made to facilitate research, and to find out what will be studied. Conceptual research models are obtained based on various studies that have been conducted. The conceptual model that will be made is about the influence of ecolabel variables toward ecolabel. In Ecolabel, there are several factors or variables that consumers can consider influential.

Environmental knowledge is defined as general knowledge about the facts, relationships concerning the surrounding environment and its ecosystems (Paço & Lavrador, 2017). Environmental knowledge is also believe to include several terms such as awareness of eco-friendly products while combining other specific terms related to recycling issues. Based on the elucidation, it can be proposed that environmental knowledge has an influence towards eco label (H1).

Eco-label awareness general term would be the condition where customers are buying the products based on their eco-labels. According to Rashid (2009), consumers that have high awaranses of eco-label tend to show willingness to purchase eco-friendly products with features corresponding eco-labels. Based on the elucidation, it can be proposed that eco-label awareness has an influence towards eco label (H2).

“Eco label knowledge is meant to measure consumers’ familiarity with the functional aspects of eco-labels and the meaning of different terms used in eco-labels” (Taufique, Siwar, Chamhuri& Sarah, 2015). Based on the elucidation, it can be proposed that eco-label knowledge has an influence towards eco label (H3). According to Tan and Lau (2011) green product purchasing belief refers to consumers belief of purchasing and consuming products that are eco-friendly

would cause minimal impacts on the environment or make a difference in saving environment. Based on the elucidation, it can be proposed that green product purchasing belief has an influence towards eco label (H4). Negative brand feedback represents negative things such as los trust that are coming from negative eWOM that are undertake by the brand in order to strengthen the validity of the brand pledge. Based on the elucidation, it can be proposed that negative brand feedback has negative influence towards eco label (H5). Chen, Lin and Weng (2015) explains thatsatisfaction is a widely known aspect to assess relationship between consumers and businesses, with higher satisfaction, it is believed that there is also a higher chance that customers will repurchase a product, hence generally, satisfaction explains the emotional impact of customers when they have purchased then evaluated the product, by this, satisfaction of green product (green satisfaction) will likely positively influence its green trust. Based on the elucidation, it can be proposed that green satisfaction has an influence towards eco label (H6). Green perceived quality is simply said as the assessment green product or service superiority by the user, which has five measurements such as ease of use, functionality, performance, service capability and reputation (Chen, Lin & Weng, 2015). Based on the elucidation, it can be proposed that green perceived quality has an influence towards eco label (H7).

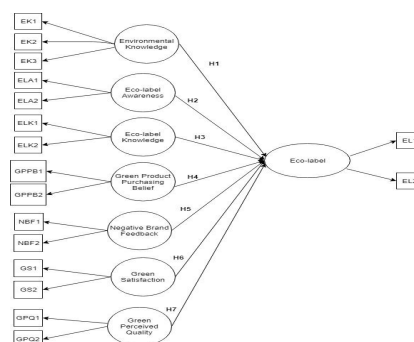


Figure 1. Conceptual Model

RESULTS AND DISCUSSIONS

RESULTS MEASUREMENT MODEL

In the measurement model test, the Chi-square results obtained were 247,897, degrees of freedom were 91 and Probability level was 000. The results of the measurement test can be seen in Figure 2.

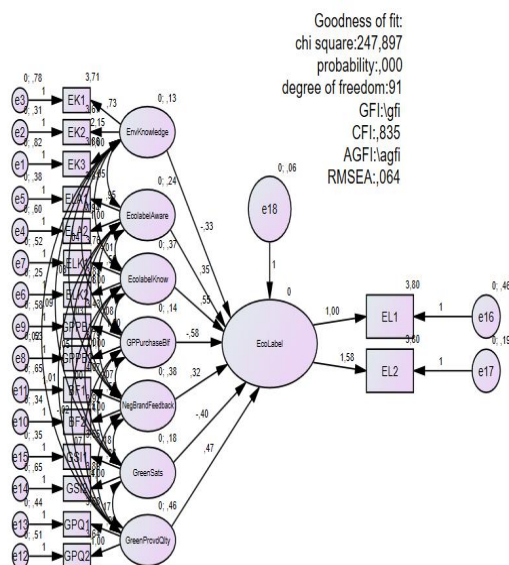


Figure 2. Measurement Model

Model hypothesis testing aims to determine whether the proposed model is in accordance with the data used. Although the Chi-Square value is quite large at 247,897, the Chi-Square value is affected by the degree of freedom. In this research the degree of freedom is 91. If the degree of freedom is smaller, the Chi-Square value will decrease.

HYPOTHESIS ANALYSIS OF MODIFICATION MODEL

Criteria for goodness of fit structural models estimated can be fulfilled, then the next step is an analysis of the structural model relationships (hypothesis testing) as shown in Figure 3 earlier. The significance relationship between constructs in hypotheses is shown by regression weights values Hair et al, (1998). To analyze more clearly about the Ecolabel variables significance, which are Environmental Knowledge, Ecolabel Awareness, Ecolabel Knowledge, Green Product Purchasing Belief, Negative Brand Feedback, Green Satisfaction and Green Perceived Quality can be seen in Table 1.

Table 1: Regression Weight

		Estimate	Standard Error	Critical Value	P-value	Label	
Eco	<	EnvKnowledge	-.2	-.1	par		
Lab	--	dge	.32	2	1, 5	1	
el	-		6	8	43	2	
Eco	<	EcolabelAware	.35	.1	2,	.0	par
Lab	--	are	5	5	36	1	1
el	-			0	0	8	1
Eco	<	EcolabelKnow	.55	.1	3,	.0	par
Lab	--	ow	4	7	23	0	1
el	-			1	6	1	2
Eco	<	GPPurchaseBlf	-.58	.3	-.1	par	
Lab	--	eBlf	.58	9	1,	4	1
el	-		0	6	46	3	3
Eco	<	NeagativeBrandFeedback	.32	.1	2,	.0	par
Lab	--	andFeedba	2	5	03	4	1
el	-	ck		8	1	2	4
Eco	<	GreenSats	-.4	-.3	par		
Lab	--		.39	4	.8	7	1
el	-		6	6	88	4	5

Eco	<	GreenPrvd	.47	.1	3,	**	par
Lab	--	Qty	2	4	37	*	1
el	-			0	2		6

- The Effect of Environmental Knowledge toward Ecolabel
From the result of this research the CR value between environmental knowledge and ecolabel is 1.431 ($p = 0.152 \geq 0.05$). It shows the hypothesis is rejected, there is no influence of environmental knowledge toward ecolabel. H1 hypothesis, environmental knowledge is not influencing ecolabel.
- The Effect of Ecolabel Awareness toward Ecolabel
From the result of this research the CR value between environmental knowledge and ecolabel is 2.360 ($p = 0.018 \leq 0.05$). It shows the hypothesis is accepted, meaning there is an influence of ecolabel awareness toward ecolabel. H2 hypothesis, ecolabel awareness influencing ecolabel.
- The Effect of Ecolabel Knowledge toward Ecolabel
From the result of this research the CR value between environmental knowledge and ecolabel is 3.236 ($p = 0.001 \leq 0.05$). It shows the hypothesis is accepted, meaning there is an influence of ecolabel knowledge toward ecolabel. H3 hypothesis, ecolabel knowledge influencing ecolabel.
- The Effect of Green Product Purchasing Belief toward Ecolabel
From the result of this research the CR value between green product purchasing belief and ecolabel is 1.465 ($p = 0.143 \geq 0.05$). It shows the hypothesis is rejected, meaning there is no influence of green product purchasing belief toward ecolabel. H4 hypothesis, green product purchasing belief is not influencing ecolabel.
- The Effect of Negative Brand Feedback toward Ecolabel
From the result of this research the CR value between negative brand feedback and ecolabel is 2.031 ($p = 0.042 \leq 0.05$). It shows the hypothesis is accepted, meaning there is an influence of negative brand feedback toward ecolabel. H5 hypothesis, negative brand feedback influencing ecolabel.
- The Effect of Green Satisfaction toward Ecolabel
From the result of this research the CR value between green satisfaction and ecolabel is 0.888 ($p = 0.374 \geq 0.05$). It shows the hypothesis is rejected, meaning there is no influence of green satisfaction toward ecolabel. H6 hypothesis, green satisfaction is not influencing ecolabel.
- The Effect of Green Perceived Quality toward Ecolabel
From the result of this research the CR value between green perceived quality and ecolabel is 3.372 ($p = *** \leq 0.05$). It shows the hypothesis is accepted, meaning there is an influence of green perceived quality toward ecolabel. H7 hypothesis, green perceived quality influencing ecolabel.

CAUSAL LOOP DIAGRAM (CLD)

Causal loop diagram (CLD) is also called as influence diagram, used to give more insights to researchers to help them understand the system by giving general decription about cause and effect within the system. CLD depicts how a system works and behaves. CLD should be made, because CLD will help the researcher to understand more about cause and effect happens within the system, specifically within Real Estate Indonesia (REI) system. The CLD for this research is shown in figure 3below

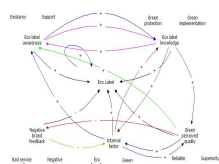


Figure 3. Causal Loop Diagram

SIMULATION

After conducting interviews with the experts whose judgements are being used in this research, a scenario for doing the simulation was suggested. The main focus of the scenario is about eco-label value prediction for the next 10 years. The value of variables that will be changed here are the auxiliaries of eco-label awareness, eco-label knowledge, negative brand feedback, green perceived quality and internal factors (eco-label). The value will be filled with random numbers using powersim random formula in the range of 1 to 5, because the scale used to collect the data was 1 to 5 scale. A model of flow diagram for Eco label has already been developed for this research.

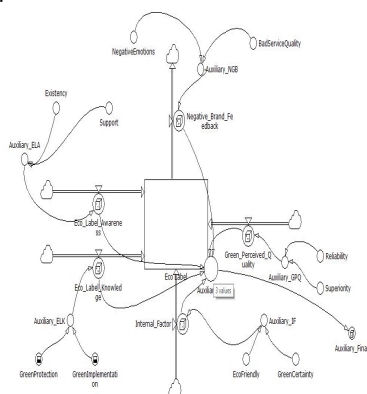


Figure 4. Flow Diagram

After conducting the simulation in powersim, data is obtained. The data resulted from the simulation contains data of 10 years prediction of eco label value, starts from year 2020 to 2029.

Table 2. Simulation Result

Year / Mo	Eco-Label Value											
	Jan	Feb	Mar	Apr	May	June	July	Aug	Sept	Oct	Nov	Dec
2020	4	5	4	5	4	5	5	3	4	5	3	5
2021	5	5	3	4	4	5	5	4	4	4	4	5
2022	5	4	3	4	5	4	5	5	5	3	4	3
2023	4	4	4	5	3	5	5	5	4	4	3	5
2024	3	5	3	4	5	4	3	3	4	4	4	4
2025	4	4	4	4	4	3	3	5	4	4	4	3
2026	5	3	4	4	5	4	4	4	3	5	3	3
2027	3	3	4	5	5	5	4	5	3	5	5	3
2028	4	3	4	3	3	4	5	3	5	4	3	4
2029	3	4	4	4	3	3	3	4	4	3	4	5

Year / Mo	Jan	Feb	Mar	Apr	May	June	July	Aug	Sept	Oct	Nov	Dec
2020	4	5	4	5	4	5	5	3	4	5	3	5
2021	5	5	3	4	4	5	5	4	4	4	4	5
2022	5	4	3	4	5	4	5	5	5	3	4	3
2023	4	4	4	5	3	5	5	5	4	4	3	5
2024	3	5	3	4	5	4	3	3	4	4	4	4
2025	4	4	4	4	4	3	3	5	4	4	4	3
2026	5	3	4	4	5	4	4	4	3	5	3	3
2027	3	3	4	5	5	5	4	5	3	5	5	3
2028	4	3	4	3	3	4	5	3	5	4	3	4
2029	3	4	4	4	3	3	3	4	4	3	4	5

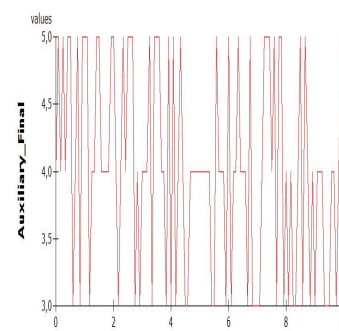


Figure 5. Graph Shows The Ecolabel Value That Was Predicted For 10 Years, Started From Year 2020 To 2029.

DISCUSSION

After conducting a literature review, a conceptual research model can be proposed. This study uses a survey method with a questionnaire. Before being distributed to respondents, the questionnaire items were tested. Question item questionnaire aims to determine the suitability of the indicator with the questions that will be used in data retrieval. The number of questions to be tested are 17 items. Based on the literature review, the data needed in the minimum item test amounted to 71 respondents.

However, to avoid bias in the data, on this item test using the odd number of respondents is 400. Test items are processed with SPSS software. The results obtained are that R count > R table. From the results that have been tested, it can be concluded, all question items are declared valid. So, the questionnaire can be distributed for research data collection.

The results of distributing questionnaires to 400 respondents, then continue to measurement model testing, structural model testing, and modification model testing. (1) Measurement model testing is done to know the chi-square, probability and degrees of freedom of the model. Model hypothesis testing aims to determine whether the proposed model is in accordance with the data used. Even though the Chi-Square value is quite large at 247,897, the Chi-Square value is influenced by the level of freedom. In this study the level of freedom is 91. If the level of freedom is smaller, the value of Chi-Square will decrease.

(2) Structural testing of this model includes Normality Testing, Outlier Evaluation, and Goodness of fit model. The value of the structural model is good, but it still requires a little change in the goodness of fit to make the better result in Goodness of Fit and the significances. According to that in this study will be done the modification model testing that recommended by AMOS.

(3) In the model modification testing, the results of goodness of fit that obtained are better from structural models with a chi-square value of 247.897. CMIN/DF=2.7. RMSEA=0.06. CFI=0.8. GFI=0.9 AGFI=0.8 Probability=0.00 and NFI=0.9. Hypothesis testing found that 4 of the 7 variables used in this study had an influence on purchasing decisions, they are: the CR value between ecolabel awareness and ecolabel is 2.360 ($p = 0.018 \leq 0.05$). It means the hypothesis accepted, it means that there is a positive effect between ecolabel awareness and ecolabel. H2 hypothesis, ecolabel awareness influencing ecolabel. The next results of the study the CR value between ecolabel knowledge and ecolabel is 3.236 ($p = 0.001 \leq 0.05$). It means the hypothesis accepted, it means that there is a positive effect between ecolabel knowledge and ecolabel. H3 hypothesis, ecolabel knowledge influencing ecolabel. The next results of the study the CR value between negative brand feedback and ecolabel is 2.031 ($p = 0.042 \leq 0.05$). It means the hypothesis rejected, meaning that there is no influence between ecolabel knowledge and ecolabel. H5 hypothesis, negative brand feedback does influence ecolabel. The next results of the study the CR value between green perceived quality and ecolabel is 3.372 ($p = *** \leq 0.05$). It means the hypothesis accepted, it means that there is a positive effect between belief in green perceived quality and ecolabel. H7 hypothesis, belief in green perceived quality influencing ecolabel.

The hypothesis that shows results does not significantly influence ecolabel does not mean that the research that already done was failed. The hypothesis proposed failed is possible because the indicators used in the study are not in accordance with the current reality. With these results, it is necessary to have further research to perfect the research.

From each year eco label value simulation, there are several patterns that were found by the researcher while doing the result data analysis. The simulation graphs show that the interval for average increase of eco label value is 4 times

in a year, meanwhile its interval for average decrease is 3 times in a year. For the eco-label value itself, the value with most appears in each year is 4 within the range of 3 to 5. Last is about the drop point (for the first time) of eco-label in each year, the graph shows that the highest chance of eco-label value drops for the first time is in between the second and third month (February and April) of each year. However, there is also moderate chance of eco-label value to drop in the seventh month of each year (July).

CONCLUSION AND SUGGESTIONS

The results of the research that have been conducted produce conclusions and suggestions that must be given for the continuation of future research. Based on the research that has been done to produce conclusions that answer the research objectives. Then it can be concluded that: (1) The conceptual design of the model consists of seven eco-label variables that ought to influence eco-label, which consist of 17 indicators. These variables are environmental knowledge which includes three indicators, eco-label awareness which includes two indicators, eco-label knowledge which includes two indicators, green product purchasing belief which includes two indicators, negative brand feedback which includes two indicators, green satisfaction which includes two indicators, green perceived quality which includes two indicators and eco-label which includes two indicators. (2) Variables that influence eco-label or significantly affect eco-label are eco-label awareness, eco-label knowledge, negative brand feedback and green perceived quality because their construct values (C.R) are higher than defined construct value (1.96), and their significant values (p value) are lower than 0.05. In this study there are some hypothesis that has no significant influence. To perfect the conceptual model that has been made, further research is needed. Focus on further research is to deal with hypotheses that have no significant relationship or no effect toward ecolabel.

The simulation result graphs show that the interval for average increase of eco label value is 4 times in a year, meanwhile its interval for average decrease is 3 times in a year. The eco-label value with most appears in each year is 4 within the range of 3 to 5. Meanwhile for the drop point (for the first time) of eco-label in each year, the highest chance of eco-label value drops for the first time is in between the second and third month (February and April) of each year. However, there is also moderate chance of eco-label value to drop in the seventh month of each year (July).

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