ANALYSIS OF COMMUNICATION TOOLS EFFECT IN GREEN MARKETING USING STRUCTURAL EQUATION MODELING AND SYSTEM DYNAMICS APPROACH

(STUDY CASE: REI PROPERTY)

THESIS

Submitted to International Program Industrial Engineering Department in Partial

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For the sake of Allah SWT, I confess this work is my own work except for the experts and the summaries that each of their sources has already been cited and mentioned. If in the future my confession were proved wrong and the dishonest given result of the violence of the legal regulation of the papers and the intellectual property rights, then I would have the honor to return my degree to be drawn back to Universitas Islam Indonesia.
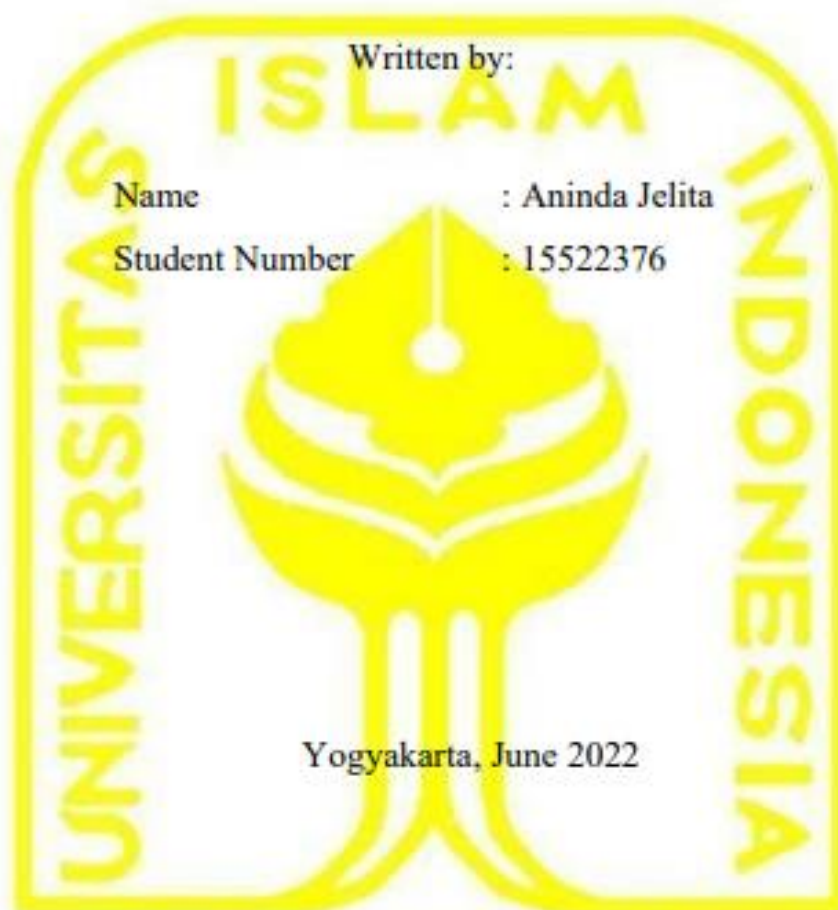
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ANALYSIS OF COMMUNICATION TOOLS EFFECT IN GREEN MARKETING USING STRUCTURAL EQUATION MODELING AND SYSTEM DYNAMICS APPROACH

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DEDICATION PAGE

Alhamdulillahirabbil'alamin

To my graceful parents, **Mr. Ir. Dony Yudha Satria** and **Mrs. Ir. Wina Antari**

Thankful for everything in life

To my one and only sibling, **Pangeran Nandivo Satria**

Thankful for every support and prayer you have given

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Thankful for sharing your knowledge and lesson of life

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MOTIVATION PAGE

"So verily, with the hardship, there is relief. Verily, with the hardship, there is relief"

(QS. Al-Insyirah 94:5-6)

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Upon finishing the thesis, the author realizes that there are still deficiencies in this undergraduate thesis. However, with encouragement, support, and guidance from various parties, the author can complete the report. Therefore, the author expects criticism and constructive suggestions for the perfection of this thesis. The Author hopes that this report will be useful for the Author herself and for all readers.

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Yogyakarta, June 2022

(Aninda Jelita)

15522376

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ABSTRACT

Changing climates and environmental issues have been more serious than in past times, including people who have mostly been exposed frequently. Specifically at the present time, consumers are considering pursuing greener options to be implemented in their behavior that can do well for the environment and life itself. In order to respond to the consumer's environmental needs, companies should develop new corporate strategies that focus on green alternatives, one of the ways to do that is by using green marketing methods in products and services. Green marketing requires new management and market strategies to address the challenges associated with developing for ecological products. One of the functions of green marketing is communication that needs to be maintained from supplier to the consumers, in order to have a reliable relationship. This research aims to determine whether communication tools are influenced by various type of communication tools in green marketing. For this research, conceptual models have been proposed using survey methods for data collection. The sample for this research is from consumers who have experienced and acknowledged green property products, specifically D.I Yogyakarta city. This study uses structural equation modeling (SEM) to verify the proposed hypothesis and is processed by AMOS 23 Graphics Software. There are 6 variables which are advertising, sales promotion, public relation, direct marketing, personal selling and interactive marketing as an exogenous variable. As for the endogenous variable is the communication tool. Each variable consisting a few indicators. After the proposed model is acceptable, the next phase is doing a model simulation using Powersim 9 Software to examine the impact value of the communication tool every year. The result of this research shows that all six variables. Advertising, Sales Promotion, Interactive Marketing and Personal Selling have significant impact on communication tools of green marketing.

Keywords: Green Marketing, Communication Tools, Industry Property, Structural Equation Model (SEM), Simulation

CHAPTER I

INTRODUCTION

1.1   Background

Increasing competition and growing customer expectations encourage companies to focus more on efforts to retain existing customers. Maintaining existing markets through developing customer loyalty is the company's strategic goal to maintain its business and profits (Aminee, 1998). Through quality products and services, such as better service and a high empathy for consumers to participate in the competition. Consumer needs is an important thing to be considered and satisfied by the producers of the products offered. The supplier of products must pay attention to changes in consumer needs or broaden the consumer needs. Product suppliers require an appropriate business strategy in order to win the competition from other competitors.

To improve the business strategy in a company, marketing is one of the important aspects that need to be paid attention to. American Marketing Association - AMA (2004) stated that marketing is an organizational function and a set of processes for creating, communicating and delivering value to customers and also for managing customer relationships in ways that benefit the organization and the stakeholder. In addition, marketing reveals a clear relationship between the business world and society and the impacts of marketing activities.

At the present time, being exposed to the environmental problems that affect the world, customers consider green options to be integrated with their behavior that can do good for the environment. As the awareness of environmental problems rises, consumers prefer to choose environmentally friendly products or services in order to decrease damage to the environment. Not only products and services, the property industry has also developed green practices for buildings and their construction. People demanded more sustainable buildings. At the same time, the accelerating physical

consequences of a changing climate are becoming more pronounced as communities face storms, floods, fires, extreme heat, and other risks.

These changes have brought a sense of urgency to the critical role of real-estate leaders in the climate transition, the period until 2050 during which the world will feel both the physical effects of climate change and the economic, social, and regulatory changes necessary to decarbonizes. The climate transition not only creates new responsibilities for real estate players to both revalue and future-proof their portfolios but also brings opportunities to create fresh sources of value. They have also shown a better propensity to pay a quality price to firm their implementation of green practices. Green practices can provide emotional benefits for customers who appreciate green practices (Leakey & Van Damme, 2014). In order to respond to these environmental demands, companies should develop new corporate strategies then can guarantee fulfillment with these green alternatives, such as green marketing. Green marketing requires new management and market strategies to address the challenges associated with the development of ecological products.

Polonsky (2011) stated the concept of "Green Marketing" comes into focus from a major societal concern of environmental degradation. Nowadays, green products, eco-friendly products or green marketing has become an emerging topic of marketing research. People are concentrated on environmental protection from the negative effects of product consumption, manufacturing, and increasing waste byproducts. According to studies on consumers' perceptions of green practices, businesses are not sufficiently communicate the activities which are perceived to be important to consumers (Chhay et al, 2015). The combination of this economic transition and the physical risks of climate change have created a significant risk of mispricing real estate across markets and asset classes. In another way, green practices on building properties have way more advantages that can be suitable for communities. Other than the environmental benefits of green housing, cost advantages are rapidly becoming apparent to builders, who pass on cost savings to consumers in a positive cycle of affordability that reduces electricity bills and water consumption while offering higher asset appreciation. Green housing controls water conservation measures by rainwater harvesting, as well as using sustainable materials like low carbon and ethical raw materials and renewable power to lower dependency on fossil fuels. Based on the benefits of green practices in the

property industry, the company needs to communicate the values through suitable approaches to the people, such as green marketing.

This research could identify whether the way of industry property company communicates their products using variables of communication tools to consumers are likely to affect the scope of communication tools. The communication tools have variables and each variable has an indicator. Therefore, this research will examine how to recognize the relationship of the six variables to brand trust with the attributes or indicators that follow them. The six variables are included in exogenous variables and communication tools as endogenous variables. Such situation leads to a problem, how far is the relationship between the variables affect communication tools followed by the indicators. The next issue is to find out how much effect those variables toward communication tools model. The conceptual model design needs to clarify the direction of the relationship between exogenous and endogenous variables. After processing the data and identifying which variables have positive significance toward the endogenous variable, the next phase is to do a model simulation to identify the value of how much the impact will be over a certain period toward communication tools.

Therefore, based on the identification of the problem there were several way to solve this problem by defining the variable and the indicator of communication tools to build a model and then test the hypotheses on variable relationships and gain new insights from the data. This research is conducted by using Structural Equation Modeling (SEM) using AMOS software, Structural equation modeling as a method for multivariate statistical analysis technique that used to analyze structural relationships among variables. As for the simulation, the researcher will use system dynamic software, Powersim 9. Using dynamic system study, the researcher will make a Causal Loop Diagram (CLD) based on the conceptual model and followed by that can make the flow diagram for the simulation.

1.2   Research Question

1. What is the model of conceptual design for variables of communication tools?

2.   What is the relationship between variables and indicators of communication tools in the conceptual model?

3.   How to build up a model simulation to identify the value of the impact of communication tools every year?

1.3   Research Objective

1.   Designing the model of the conceptual design of communication tools towards brand trust.

2.   Determining the relationship between variables of communication tools based on the conceptual model.

3.   Develop a model simulation to identify the value of communication tools' impact in years.

1.4   Research Limitation

1.   The study is focused on green marketing in the discussion of communication tools.

2.   Research is carried out based on the conceptual model that has been built.

3.   The object of the research was carried out on consumers of real estate property company in Yogyakarta.

1.5   Research Benefit

The research can provide the development of scientific knowledge, especially in the field of green marketing technology and structural equation modeling which focus on communication tools for brand trust. In addition, this research can recommend for companies that apply green marketing to increase consumer awareness of the environment through communication tools.

1.6   Systematical Writing

The systematical writing in this research are as follows:

CHAPTER II   **LITERATURE REVIEW**

This chapter is the focus on determining the current study of the previous related research. The chapter contains information about the result of previous related research and supporting literature underlying the research.

CHAPTER III   **RESEARCH METHODOLOGY**

This chapter consists of the research methodology. This chapter will be described the detailed series of research objects, system development, research design, research procedure, and data collecting, processing, and analyzing method.

CHAPTER IV   **DATA COLLECTING AND PROCESSING**

This chapter describes the data collection and processing, analysis and results, including images and graphics obtained. This chapter is a reference for the discussion of the results that will be written in Chapter V.

CHAPTER V   **DISCUSSION**

This chapter discusses the result of the previous chapter. It will be the core discussion in order to get a comprehensive understanding of the whole research.

CHAPTER VI   **CONCLUSION AND SUGGESTION**

This chapter provides short and precise statements described in the previous chapter. A suggestion related to the current study in for the purpose of advancement in future research is given based on the limitations of the current research.

REFERENCES

APPENDIX

CHAPTER II

LITERATURE REVIEW

In this chapter, the researcher will explain the literature studies that are divided into two parts, which are inductive study and deductive study. An inductive study is a study to collect observations and theories that are proposed towards the end of the research process because of the observation's result. The study constructs or evaluates general propositions derived from previous research, as have been summarized in the Systematic Literature Review (SLR) table below. As for the deductive study, it will explain the basic theory that is obtained from books or international journals that relates to the research.

2.1 Inductive Study

The results of inductive literature studies that have been summarized using Systematic Literature Review (SLR) method can be seen in the table below.

Table 2. 1 Systematic Literature Review Source Table

No	Publisher	Total	Indexed Paper	Percentage
1	Elsevier	15	12	
2	Emerald Insight	10	8	
3	Others	12	9	
4	Books	3	-	
	TOTAL	40	29	

Based on the literature studies that have been obtained, the researcher continues to construct a K-Chart. K-Chart is a *Research Planning Tool* that was found by Prof. Khasanah. A method in the form of a flow chart to determine the general topic, issues, methodology, and parameters that will be used in this research. The K-Chart can be seen in Figure 2.1 below.
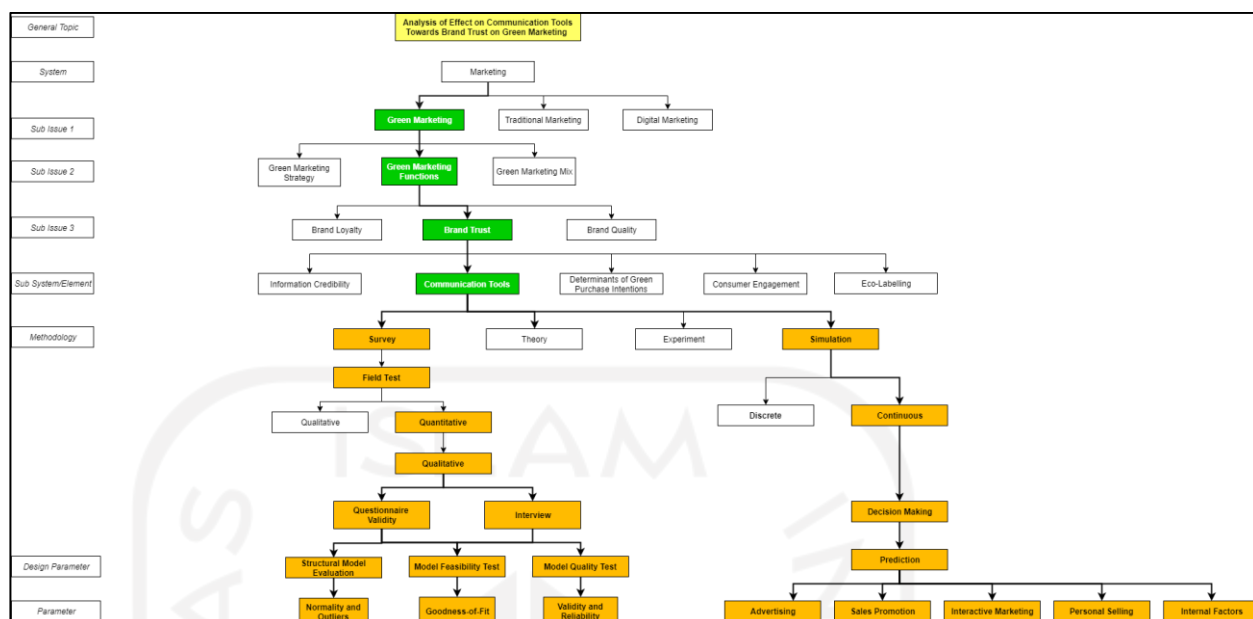
Figure 2. 1 CK-Chart of Green Marketing Communication Tools

The table below is the list of journals that help the researcher to construct the CK-Chart of Green Marketing Communication Tools:

Table 2. 2 Table of CK-Chart Journal References

No. of Journal	Sub Issue and Sub-System	Reference(s)
1	Marketing, Green Marketing	(Salman et al, 2017)
2	Marketing	(Londhe, 2014)
3	Green Marketing	(Kumar, 2016)
4	Green Marketing	(Dangelico & Vocalecci, 2017)
5	Marketing; Communication Tools	(Sadek & Tantawi, 2016)
6	Communication Tools	(Sadek et al, 2015)
7	Brand Communication; Advertisement	(Sainy & Attri, 2017)
8	Survey, Simulation	(Ariyani, 2010)
9	Green Marketing	(Murin et al, 2015)
10	Simulation, System Dynamic	(Koentjoro et al, 2015)

11	Modeling	(Carlucci & Cira, 2009)
12	Green Marketing Tools	(Shrestha, 2016)
13	System Dynamic	(Capelo, Dias, & Pereira, 2018)
14	Simulation Tools	(Sotaquira-Gutierrez et al, 2016)
15	SEM	(Babin, Hair, & Boles, 2008)
16	Simulation Model	(Chaker, El Manouar, & Idrissi, 2015)

Several previous researches related to the topics contained in the CK-Chart, there are green marketing and green communication. The first research is from Murin Markova, Zeleny & Jad'ud'ova (2015). This research objective is offers an overview of forms and strategies of marketing communication in consumers´ environment, the use of marketing communication with environmental elements and its research under Slovak conditions. Methods of mapping marketing tools in the environmental management of companies and evaluating their effectiveness have been becoming actual management tools. Strategies of sustainability and environmental ethics are a common and acceptable marketing advantage on the market at present. Gender, education level, monthly income and the product price was the main indicator for quantitative and marginally qualitative research data. Regional diversity is still evident in green marketing mainly in gender preference.

Chang (2015) has done research on the influence of green viral communication on green purchase intentions; the research objective is to incorporate the diffusion of innovation theory and conformity theory to explain consumers' green purchase intentions. As the end result, a conceptual model has been proposed and subjected to empirical verification with the use of a survey method. Using a sample of Taiwanese consumers who had the actual purchase experience of green detergents, this study engaged Structural Equation Modeling SEM for short to verify the hypothesis proposed processed by Mplus. The empirical results suggested that green viral communication is positively related to normative interpersonal influence, informational interpersonal influence and green purchase intention. Informational interpersonal influence also had a positive impact on

green purchase intention. However, the relationship between consumers' normative interpersonal influence and green purchase intention was not supported. Therefore, this study concludes that green marketers must strengthen their green viral communications skills to enhance consumers' purchase intentions. Additionally, this study also contributes to the literature by stating that consumers' susceptibility to informational interpersonal relationships is an important mediator in the green viral communication and green purchase intentions relationship. This study discusses the implications of the findings and research limitations at the end of the paper.

Mantiaha (2016) conducted research on how green marketing influence will affect consumer buying behavior. The attention to environmental issues can be seen in the increasing of environmentally awareness markets. Many companies are choosing green marketing strategy company that has a great opportunity to increase sales. With Green Marketing, companies have to compete and prove that their products are produced after going through the stages of environmental management efforts and are safe to use. The researcher used a questionnaire as the data collection method. Multiple regression analysis was used to test the stated hypothesis and to find out the influence of dependent variable on independent variables. The respondents of this research are 40 respondents. Green marketing in this research is represented by green product and green promotion. The result shows that the two variables of green marketing have a significant positive influence on consumer buying behavior simultaneously. Moderately, the green product has no significant influence on consumer buying behavior. While, the green promotion has a significant on consumer buying behavior.

The environmental issue is a sizzling topic nowadays as almost every country's government and society has started to be more aware of these issues. This leads to a trend of green marketing used by the firm as one of the strategies in order to gain profit and protect the environment. The paper aims to discuss green marketing and its sustainability, the tools and green marketing mix also about green consumers and its branding. Green marketing is a strategy which benefits the environment and the firms. Not only benefits the company but also acts as an important strategy for preserving the environment. Therefore, each company, regardless of its industry, should consider integrating sustainability into its marketing strategy. Companies engaged in green

marketing should structure their effort to minimize green washing risks. As there are few strategies that can be use to apply green marketing. The companies adopt the marketing mix concept in green marketing. This enables the companies to manage the 4Ps appropriately (FuiYeng & Yazdanifard, 2015).

Suki (2014) has conducted a research that has several focuses. The objectives are to assess the impact of green brand positioning, consumers' attitude toward green brands, and green brand knowledge on green product purchase intention; to investigate the influence of green brand knowledge on consumers' attitude toward green brands; and to examine the moderating effect of green brand knowledge on the relationship between green brand positioning and green product purchase intention. By using a questionnaire as the data collection method, the purposive sampling technique was used, involving respondents who practice a green lifestyle and have had a green product purchasing experience. The partial least squares (PLS) method, which is a variance-based technique for the analysis of structural equation modeling, was used to analyze the data with the assistance of the SmartPLS computer program version 2.0. The end result that was based on the standardized path coefficients of the structural model from the PLS results, green brand knowledge was found to be the most significant determinant of green product purchase intention. Knowledge of green brands has caused consumers to develop positive green marketing awareness and has bolstered their interest in fortifying the environment whilst preventing its degradation. Furthermore, green brand knowledge also impacted consumers' attitude toward green brands. However, this factor was an insignificant moderator of the impact between green brand positioning and green product purchase intention.

Another previous research is by Jirangkul (2017), that conducted research of best practices based on a high-performance organizational model with six causal factors. By employing a quantitative methodology, this study constructed a structural equation model based on a sample of 477 people working in two public organizations in Thailand. In order to analyze the data, structural equation modeling was performed using the LISREL software. The research findings discovered a good fit of the empirical data to the theoretical model. Culture and engagement had indirect effects on people and change management, resulting in strong organizations. Employee and design

management indirectly affected high-performance organizations (HPOs). Thus, employee management, which was a crucial mediator variable in the full excellent organizational model, must be approached and established for successful management according to this study.

Next previous research was conducted by Meilinda (2018). The research aims to determine whether brand trust has an impact on the type of communication tools for green marketing. For this purpose, conceptual models have been proposed using survey methods for data collection. By using a sample of consumers who have experience in purchasing Starbucks products, this study uses structural equation modeling (SEM) to verify the proposed hypothesis and is processed by AMOS Software. There are 5 variables which are advertising, sales promotion, public relation, direct marketing, and interactive marketing classified as an exogenous variable and brand trust as an endogenous variable, in which each variables has indicator. The result of this research shows that advertising and public relation has a significant effect on brand trust.

Based on previous research mentioned, then the research that will be conducted is related to the green communication tools toward brand trust. The difference between this research with the previous research is in analyzing the impact of the variables/indicator that will affect green marketing. This research will use AMOS software to determine the relationship between variables. On the next phase a simulation will be carried out based on scenarios to analyze the variables of communication tools towards brand trust. In the meantime, in this study the variable that affected is brand trust. The variables that will be reviewed toward brand trust include green advertising, sales promotion, green public relation /publicity, direct marketing, interactive marketing, selling and personal selling. The data used using survey method with questionnaire.

2.2   Deductive Study

2.2.1   Marketing

Marketing is an organizational function and a set of processes for creating, communicating and delivering value to customers and for managing customer relationships in ways that benefit the organization and its stakeholders. Marketing is the activity, set of institutions, and processes for creating, communicating, delivering, and exchanging offerings that have value for customers, clients, partners, and society. Marketing activities are required to benefit society as a whole. This inclusive definition explicitly recognizes other achievements of the discipline beyond those of instrumental rationality. Marketing is also considered a science, an educational process and a philosophy rather than a mere management system. It allows anyone to market anything to do well or to take society into account (Tellez, 2017).

Marketing can be scientifically defined as a complex function of anthropogenic entities, a function that integrates provisional marketing and operational marketing activities, with an aim to increase the value offered to all stakeholders, to nature, and to sustainable competitiveness of entities with human operators. (Pater & Cristea, 2018). In the natural environment, marketers need to be aware of the public's increased concern about the health of the environment. Many marketers are now embracing sustainability and green marketing programs that provide better environmental solutions as a result.

2.2.2   Green Marketing

The green revolution, environmental protection, sustainable lifestyle, sustainable development and many more have become a major phenomenon nowadays. To facilitate these environmental phenomena, companies should expand new corporate strategies and then they can guarantee fulfillment with green alternatives, such as green marketing. Green marketing which is alternately known as Environmental Marketing and Sustainable Marketing refers to an organization's efforts at designing, promoting,

pricing and distributing products that will not harm the environment or products which are environmentally safe or environmentally beneficial. Green marketing has become one of the most relevant concepts (Bhalerao, 2014).

Green marketing can be defined as all activities designed to generate and facilitate any exchanges intended to satisfy human needs or wants, such that the satisfaction of these needs and wants occurs, with minimal detrimental impact on the natural environment (Mishra & Sharma, 2010). Green marketing incorporates a broad range of activities, including product modification, changes to the production process, packaging changes, as well as modifying advertising. Firms use green marketing in an attempt to address cost or profit-related issues. In implementing green marketing, consumers, corporate and the government play a very important role.

According to Hasan & Ali (2015), green marketing can be applied to much broader concepts; consumer goods, industrial goods and services. The objective of green marketing is to lessen the impact on the natural environment during the process of planning and implementations of products or services, price, place and promotion. In addition, it points out that the goal for green marketing is to create profit and maintain the social responsibility.

Some authors characterized many elements of green marketing and also regarded it as a real and complete strategy. Many factors in green marketing, but Rahmawati, Hadiwidjojo, Noermijati, & Solimun (2014) defined green marketing as green products produced by the green company, and also manipulated elements of the traditional marketing mix (called 4P''s). Implementation of a green marketing strategy requires a fundamental approach, comprehensive and integrated into all functional aspects of marketing, including the marketing mix as a whole, such as product design, pricing, location and promotion. Based on the research conducted by Kumar (2016), stated that green marketing could be classified into 2 elements, there are:

A. Green Marketing Strategy

Marketing strategy entails four different steps: segmentation, targeting, positioning and differentiation. In the following, the characteristics of each of these steps for Green Marketing will be analyzed.

1.) Segmentation and Targeting

Through segmentation and targeting, a company identifies the group or groups of consumers to serve. An analysis of reviewed studies highlighted that, in the Green Marketing domain, there are two main approaches for segmenting consumers: according to consumer's characteristics or according to purchase ones.

2.) Positioning and Differentiation

A green brand can be positioned through various attributes that will contribute to differentiate it from competitors. This positioning can be based on functional or emotional product attributes. A positioning strategy based on the functional characteristics of products can be enhanced by environmental benefits coming from production processes or product usage. The success of a positioning strategy exclusively according to its functional attributes may be limited by the fact that, generally, better product environmental performance does not guarantee individual benefits to the buyer.

B. Green Marketing Functions

According to Bhalerao & Deshmukh (2015), each definition of 4p (product, price, promotion, and place) are:

1.) Products

A green product is defined as a product that was manufactured using toxic-free ingredients and environmentally-friendly measures and which is certified as such by an acknowledged organization. Product is the center of the green marketing mix and the essential part whole green marketing strategy. However, it should be considered that green product is not limited to the last object only but involves all the elements of the product, such as the materials used, the production process, the package of the product, etc. In business, the terms "green product" and "environmental product" are generally used to explain those that effort to protect or boost the natural environment by conserving energy and/or resources and reducing or eliminating the use of noxious agents, pollution, and waste.

2.) Price

Price refers to the amount paid by the customer to purchase a product. The price of a product is influenced by several factors like cost of material, product differentiation, competition, market share and the customer's perceived value of a product. When it comes to pricing the question arises as to how firms ensure green marketing while pricing their products. In this discussion it would be quite convincing that green products are relatively costlier than non-green products. The cost of absorbing environmental concerns is relatively high compared to conventional ones. It can be argued that green marketing pricing should be affordable to a common customer. Rather green pricing differs from industry to industry. So when customers have the option to purchase a green product, its price should never be demotivating.

3.) Place

The place is generally referred to as the distribution channel or distribution network. The green place is about managing logistics to cut down on transportation emissions, thereby in effect aiming at reducing the carbon

footprint. The place can be any physical store as well as virtual stores. The process involved in transferring products from the producer to the consumer is known as physical distribution. Green place in that sense can be anything that minimizes the customers and the manufacturer's effort in acquiring and selling a product respectively. Many firms nowadays have started selling their products online. This really cuts down the customers cost to practically visit a marketplace, select a store and then purchase the product. Firms have come up with their own websites which display the merchandise and the customers have to place the order online and get the delivery of the product within a few days. The challenge in selling a product in a green place would be in terms of sensing the features of a product and experiencing it. The green place should be enough to convince the smart customer about the product features. The green place will definitely influence the scope of distribution partners and will also benefit the end user by making the product available at a relatively lower cost.

4.) Other issues

Firms undertake promotional activities so as to create awareness about the product/services they make. It always has been an expectation from the top management of organizations to have an optimum promotional budget that creates good awareness and influences the target audiences for further purchases. Talking in terms of green promotion would then be meeting this optimum level. The optimum level needs to be taken forward not only in terms of the promotional expenses but also in the different ways in which promotion is being affected.

Green promotion involves configuring the tools of promotion, such as advertising, marketing materials, signage, white papers, websites, public relations, sales promotions, direct marketing and on-site promotions, videos and presentations by keeping people, the planet and profits in mind. Significant promotion tools green advertising as promotional messages that may appeal to the wants and desires of environmentally concerned

consumers. The objective of green advertisements is to influence consumers' purchase behavior by encouraging them to buy products that do not hurt the environment and to direct their interest to the positive consequences of their purchase behavior for themselves as well as the environment. Marketing communication is defined as a cross-functional activity. Green promotion involves communicating information on the environmental commitments and the efforts made by companies to consumers. This element in the green marketing mix includes various activities like paid advertising, public relations, sales promotions, direct marketing and on-site promotions (Mahmoud, 2018).

Marketing promotion represents organizations seeking to build brand knowledge and corporate awareness. Promotion Strategies include advertising, public relations, personal selling, viral advertising and communication between the organization and customers. Companies green their promotion methods by targeting certain customer segments with specific green value propositions (Zhu & Sarkis, 2016). It is worth exploring how taking into account the new media and integrated marketing strategies cater to new and constantly changing consumer needs and how adopting distinct approaches allow green marketing managers to improve communication with consumers in a personalized and interactive manner. Related to the green promotion that cares for the environment, in building communication between consumers and companies using green communication also, for example reduces paper use. Based on the research conducted by Kumar (2015) there are five issues of green promotion related to green communication:

a. Eco-labeling

Eco-labels are tools to indicate and communicate the environmental performance of a product with the aim of supporting consumer decision-making for environmentally friendly products by providing transparency and enhancing loyalty in the environmental identities of products. Eco-labeling has become crucially important for informing consumers about the environmental background of products or services to make them

aware of environmentally harmful products and change their preferences in favor of environmentally friendly products. According to Gocer and Oflac (2017), through eco-labeling, consumers can understand the environmental impact of their purchase decisions while producers can inform the market about their green initiatives.

b. Information Credibility

Information credibility is generally the extent to which individuals believe in the postings they read (Yin, Sun, Fang, & Lim, 2018).

c. Communication tool

Communication tools will describe all types of different tools to deliver planned messages via different media to audiences in order to build a brand. Communication is an approach to ensure that brand personality, messages and position are derived from a unique strategy and are delivered to the customer with synergy among all communication elements (Ekhlassi, Maghsoodi, & Mehrmane, 2012).

d. Consumer engagement

Consumer engagement is an important strategic challenge for firms when they are managing customer relationships to generate profit. Consumer engagement is the consumer's intensity, participation, connection, and investment in an organization's brand, offerings, or activities–which is a vital element of firm performance (Heinonen, 2017).

e. Determinants of green purchase intentions

Green purchase intention has a significant relationship between environmental knowledge, attitudes, environmental concern and social influence and green purchase intention. Mahmoud (2018) stated that purchase intention could be defined as the possibility; a consumer will purchase a product or service in the future. A positive purchase intention drives the consumer to actual purchase action or a negative purchase intention restrain to the consumer not to purchase that. \

2.2.3   Communication Tools

A green company could be defined as a company whose purpose, activities and its own material existence are in full harmony with the natural and cultural environment and whose employees strictly follow ethical rules in relation and communication among themselves and with the company's stakeholders. Therefore, to be recognized in the market as a green company, the company needs to build a strong reputation. Building a reputation is a lengthy process that needs to be carefully planned and controlled. It is, therefore necessary to understand and know the factors that build the reputation of a "green" company in society. How to communicate with the public can affect corporate identity: these factors form corporate identity and directly influence the formation of the corporate image of an organization. The communication of the company with the public plays the key since corporate communication is so important for the development of a "green" reputation (Biloslavo & Trnavcevic, 2009).

The reputation of a "green" company is achieved when the majority of stakeholders (both internal and external) consider a company to be truly committed to nothing less than a long-term, ideal goal of "zero": zero emissions, zero waste, and zero environmental impact. In building communication between consumers and companies related to the green communication tools, for example not using brochure or pamphlets to promote the product but can use other tools such as social media, website where there is no negative impact on the environment.

2.2.4   SEM (Structural Equation Modelling)

SEM can be used in handling research problems to treat unobservable and difficult measure variables (Wong, 2013). Most of the success of SEM can be attributed to the ability of methods to evaluate the measurement of non-measurable variables while also examining the relationship between these variables (Babin, Hair, & Boles, 2008).

In using SEM there are several assumptions. SEM assumptions are:

1. Sample size

   The minimum recommended sample size in the use of SEM is as much as 100 or using a comparison of 5-10 times the number of observations for each estimated parameter or indicator used. The estimation technique used is the maximum likelihood in accordance with the provisions of the sample tested is 100 to 200.

2. Normality

   Normality and linearity Data distribution must be analyzed to see whether normality assumptions are met. Normality can be tested through image histogram data. Linearity test can be done through scatter plots from the data that is by selecting the data pair and seeing the pattern of its spread to predict whether there is linearity.

3. Outliers

   Outliers are observations with extreme values both univariate and multivariate arise because of the combination of unique characteristics that they have and look very much different from other observations.

A. Data Analysis using SEM Method

Based on Hair, Black, Babin, & Anderson (2014) there are the key terms to develop an understanding of the concepts and terminology used in structural equation modeling:

1. SEM variable

   The variables in each SEM affect each other. Variables contained in SEM include:

   a. Latent variable

      In SEM the variables of concern are latent variables. A latent variable or the latent construct is a variable that is not directly measured. There are two types of latent variables, namely:

      1) Exogenous

         The exogenous latent variable is denoted ξ "ksi". The independent variable (independent latent variable) in all equations that exist in SEM, with a circle symbol with arrows going out.

      2) Endogenous

The endogenous latent variable is denoted η "eta". The dependent variable (latent dependent variable) is at least one equal in the model, with a circle symbol with arrows going out and in.
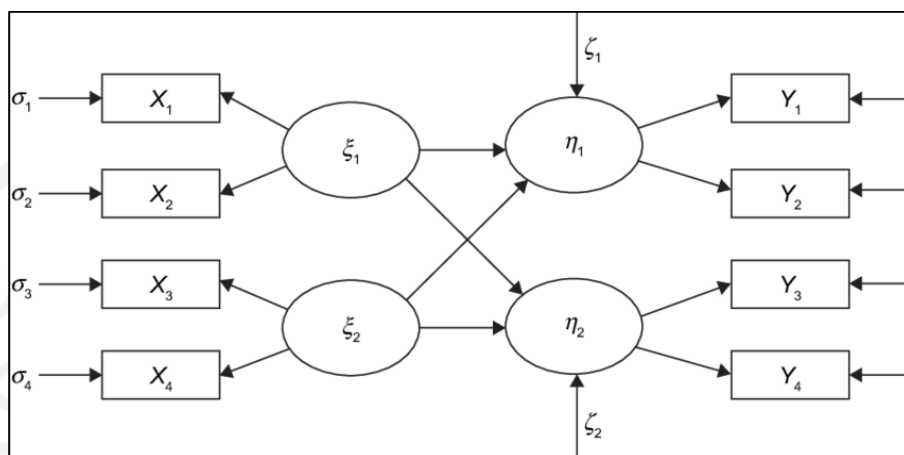
Figure 2. 3 Exogenous and Endogenous Latent Variables

b. Measured/Manifest variable

Observed variables are variables that can be observed or can be measured empirically and referred to as indicators. Observed variables are effects or measures of latent variables. Observed variables related to exogenous variables are given mathematical notation with label X, while those related to endogenous latent variables are labeled Y.

2. SEM model

The models contained in SEM include:

a. Structural model

Set of one or more dependence relationships linking the hypothesized model's constructs. The structural model is most useful in representing the interrelationships of variables between constructs. Parameters that show the exogenous latent variable regression is labeled with γ "gamma", whereas for endogenous latent variable regression is labeled with β "beta", and the covariance matrix of exogenous latent variables is labeled with Φ "Phi". An example of the structural model can be shown in Figure 2.3.
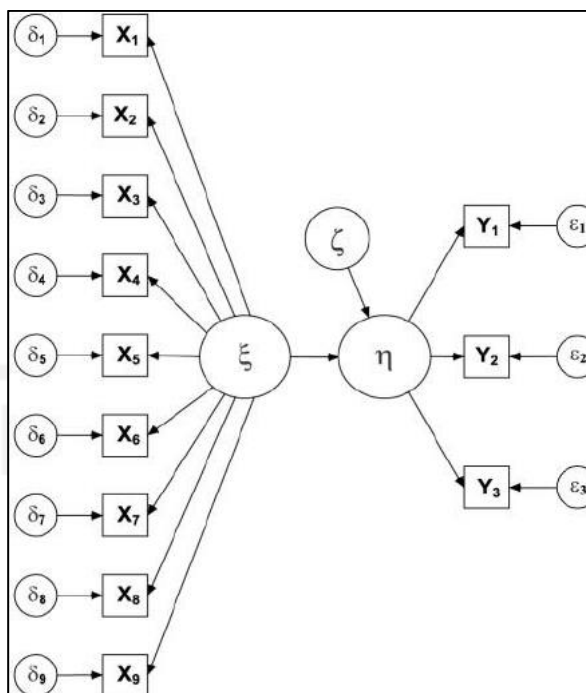
Figure 2. 4 Example of Structural Model

b. Measurement model

SEM model that (1) specifies the indicators for each construct and (2) enables an assessment of construct validity. The first two major steps in complete structural model analysis. The load factors or factor loadings that connect latent variables to observed variables are symbolized by λ ("lambda").

3. Error

Errors in SEM include:

a. Structural error

Symbolized by ζ "zeta" to obtain a consistent parameter estimate, a structural error is assumed not to correlate with the exogenous variables of the model. However, structural errors can be modeled correlating with other structural errors.

b. Measurement error

The observed variable X is represented by δ "delta" and the observed variable Y is symbolized by ε "epsilon". The degree to which the variables can be measured, do not perfectly describe the latent construct(s) of interest.

Sources of measurement error can range from simple data entry errors to the definition of constructs (e.g., abstract concepts such as patriotism or loyalty that mean many things to different people) that are not perfectly defined by any set of measured variables. For all practical purposes, all constructs have some measurement error, even with the best indicator variables. However, the researcher's objective is to minimize the amount of measurement error. SEM can take measurement error into account in order to provide more accurate estimates of the relationships between constructs.

2.2.5 Simulation

Simulation is a duplication or abstraction of a problem in real life into a mathematical model (Subagyo et al, 1995). Problem-solving with simulation models is usually settled by using a computer since many things or calculations that are too complicated to be calculated by hand. However, a very simple problem can be solved without a computer.

As with most things, simulation also has its advantages and disadvantages to be deal with:

a) Advantages of using simulation
   1. Simulation models are more realistic to real systems because they require fewer assumptions. For example, the grace period in the inventory model does not need to be deterministic.
   2. In many cases, simulations are cheaper than the experiments themselves.
   3. Simulation can provide a solution if the analytic model fails to do it.
   4. For a number of dimensional processes, the simulation provides a direct and detailed investigation within a specific period.
b) Disadvantages of using simulation
   1. A good and effective simulation model is very expensive and takes a lot of time compared to analytic models.
   2. Simulation is not precise nor is it an optimization process. The simulation does not produce a solution, but produces a way to assess solutions including optimal solutions.

3. Not all situations can be assessed through simulations except situations that contain uncertainty.

2.2.6 System Thinking

System Thinking is a concept of an understanding complex issues and changes within those issues. According to Wirjatmi (2008), there are key points that can be summarized from various definitions of system thinking:

1. System thinking is a discipline for seeing the interrelationships and patterns rather than a momentary portrait.
2. System thinking contains a set of principles, tools and techniques that enable us to understand system problems well.
3. System thinking is a framework for seeing interrelationships and patterns rather than momentary portraits.
4. System thinking can be a new perspective used to help people see and understand the complexity of current reality.

System thinking has three dimensions namely paradigm, language and methodology. Any event, both physical and non-physical, is seen as a form of work or can be related to the overall interaction between elements within a certain environmental boundary (Forrester, 1961).

2.2.7 System Dynamics

System Dynamics Modeling brings the advantage of modeling this complexity by combining the technical grounding from mathematics and engineering with the nonlinearities of social sciences, organizational behavior, and psychology. As such, models are constructs by incorporating various elements that could affect the system either from the inside or outside, including those variables that could wrongly be disregarded because no historical data is available, for example. Indeed, omitting such variables is equivalent to saying they have zero effect, which is probably the only value that is known to be wrong (Chaker, El Manouar, & Idrissi, 2015).

System dynamics modeling is based on the concept of Causal Loop Diagrams (CLD). A CLD is a graphic representation of the relationships and feedback loops among the elements of a system. In a feedback loop, a component may impact another one and cause it to change. The impact is transferred to other components along the loop, causing the change to occur back into the originating component. According to Sterman (2000), CLD highlights the polarity of the impact created. Positive (+) or negative (-) signs are placed next to each arrow indicating the type of impact. A positive link indicates that "if the cause increases, the effect increases above what it would otherwise have been". As well, a negative link indicates that "if the cause increases, the effect decreases below what it would otherwise have been". By modeling the feedback loops on simulation software using appropriate variables and equations, it is possible to view the results of the intricate links created in the system and simulate the future behavior of each component of the model.

2.2.7.1 Causal Loop Diagram

Causal loop diagrams (CLDs) are used to help modelers understand the system by providing a general overview of the causal relationships in the system (conceptualized system). Using CLD can help the researcher construct a model based on assumptions that will be used. There are 2 significant points that needs to be considerd:

1. Variable
   The variable affects the system and is considered to be the object of the experiment.
2. Interaction/Relationship
   The hallmark of a dynamic system is that there is a causal relationship from one variable to another, which is represented by an arrow. Relationships that occur can be plus (+) or minus (-). A positive relationship occurs if one variable gives the same effect as another variable, while a negative relationship is an opposite.
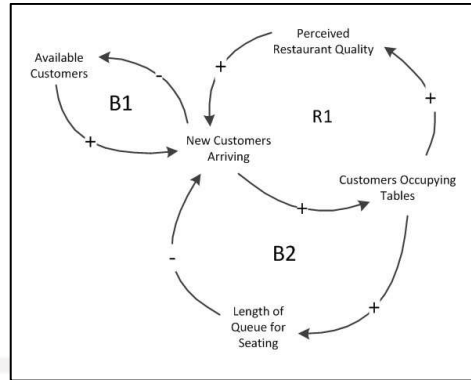
Figure 2. 5. Causal Loop Diagram

Source: (Nozdryn-Plotnicki, 2013)

2.2.7.2 Flow Diagram

The flow diagram is an advanced description of CLD, which in this model already contains formulas and numbers needed in a simulation. In simpler terms, the difference between CLD and flow diagrams is that causal loop diagrams only provide a qualitative relationship by providing various cause and effect perspectives to produce a conceptual model. As for flow diagrams, provide quantitative solutions so that they can provide real solutions in accordance with the wishes of the modeler.

The flow diagram shows the types of variables and the types of relationships between variables in the system. The main purpose of flow diagrams is to represent the flow and structure of the system in detail in order to facilitate mathematical modeling.

The variables in the flow diagram can be classified as follows:

1. Stock (Level)

   Level stated the condition of a system. In engineering, the level of a system is popularly known as the state variable system. The level is an accumulation in a system.

2. Flow (Rate)

   The rate can be defined as a subtle structure that explains why and how a decision is made based on the provided information within a system. Rate is the only variable in a model that affects level (stock).

3. Auxiliary

Auxiliary is the type of variable that contain basic calculations for other variable. In this variable, a mathematical calculation has a value that cannot be changed.

4. Constant

Constant variables contain a constant value that will be used in the calculation of auxiliary or flow variables.

5. Link

Link is a tool that connects between one variable to another variable in the system. It can be differentiate to link and delayed link.

The example of figure for flow diagram can be seen below:
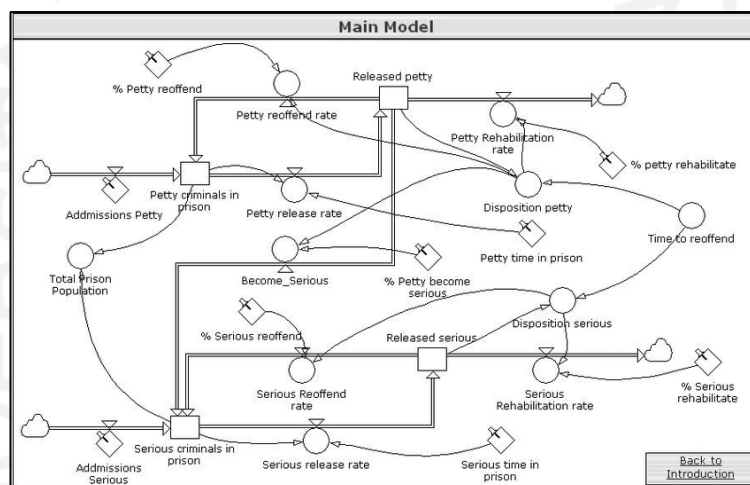
Figure 2. 6. Flow Diagram

Source: (Tako, 2008)

2.3 Conceptual Model (Framework)

Based on various studies that have been conducted, the concept of a research model will be made to facilitate the research. The conceptual model that will be made is about green communication tools that affect brand loyalty. Several variables will be used as a consideration to determine the effect on brand trust.

a. Advertising

Advertising makes marketing claims that a product is made of environmentally sound materials or is contained in an environmentally sound package. With a higher consumer awareness of environmental issues, firms

obviously adopt 'green' strategies and start making environmental claims in their advertising campaigns with the desire of gaining an edge over their competitors (Khandelwal & Bajpai, 2011). Environmental (or green) advertisements refer to all appeals that include ecological, environmental sustainability, or nature-friendly communication that target the needs and desires of customers and stakeholders.

b. Sales Promotion

The intention of sales promotion is to give the product greater appeal and value. Although a lot of sales promotion alternatives exist, traditionally the most widely used is immediate price reduction. The implementation of an adequate sales promotion may guarantee an increase in sales in a short period. This has allowed sales promotion to acquire a greater prominence (Alvarez & Casielles, 2005). In green advertising, sales promotions can be conducted to communicate cost reduction to consumers in exchange for involvement in pro-social-environmental behavior or at least, the intention to act pro-environmentally.

c. Public Relation / Publicity

Public relation in industry, as has been shown, does not hesitate to remind the public of it contribution to progress via material goods and the economic turmoil that would result if this progress were hampered with environmental concerns. Green public relation is a response to specific events, such as contributing to environmental care activities, carried out environmental care activities (Nakajima, 2001).

d. Direct Marketing

Direct marketing includes responses to the client's ability to move are obtained by the effect of direct marketing. Direct marketing is used through the agency of advertisement media. This point allows an organization to reach a client outside of the sales environment, and therefore, information and communication technologies are required. The last point is that response and action toward direct marketing attempts are measured. Direct marketing is one of the methods

whereby a product is made available to the target mass and the message is presented to him/her in a proper way (Hasiloglu & Cinar, 2008).

e. Interactive Marketing

Interactive marketing is one of the most important concepts for every organization to survive in the marketplace. Thus, it is putting the customer first and anticipating needs (Dushyenthan, 2012). Interactive marketing is a combination of conventional marketing's planning and methods of handling relations with consumers and technologies, which enables the establishment of interactive mutual relations and attraction of new consumers.

f. Personal Selling

According to The Economic Times (2019), personal selling is known as face-to-face selling in which one person who is the salesperson tries to convince the customer to buy a product. This is a promotional method where the salesperson uses his or her skills and abilities in an attempt to make a sale.

The following hypotheses have been formulated to test the relationship between variables toward communication tools.

(H1) Advertising has a positive and significant relationship toward communication tools.

(H2) Sales Promotion has a positive and significant relationship toward communication tools.

(H3) Public relation has a positive and significant relationship toward communication tools.

(H4) Direct marketing has a positive and significant relationship toward communication tools.

(H5) Interactive marketing has a positive and significant relationship toward communication tools.

(H6) Personal selling has a positive and significant relationship toward communication tools.

Based on the description above, the framework will provide the basis for developing the research findings and recommendations for the study. The framework explains the key communication tools as independent variables that influence the dependent variable of brand trust. The conceptual model will be shown in Figure 2.6 below.
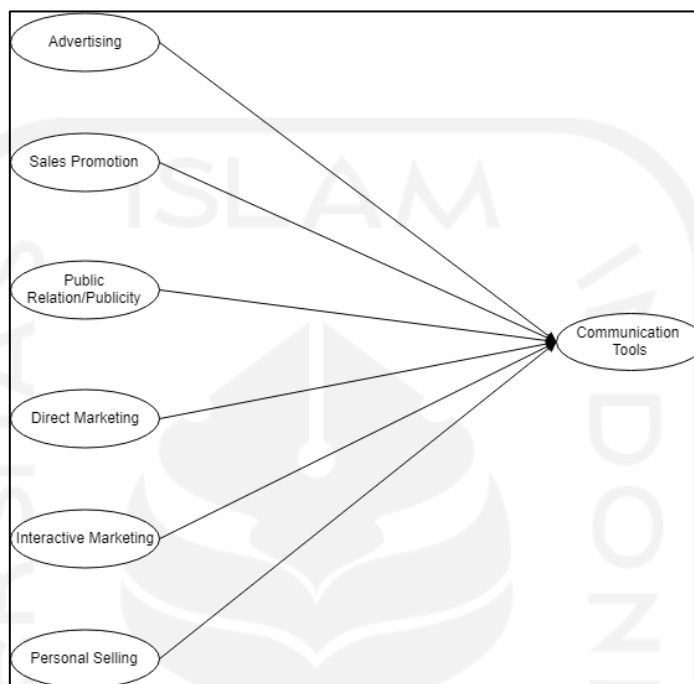
Figure 2. 7. Conceptual Model of Communication Tools

In order to complete the data, each of the variables above has its own indicators. There are several indicator of the conceptual models that have been prepared which will explain the related variables and attributes in this study.
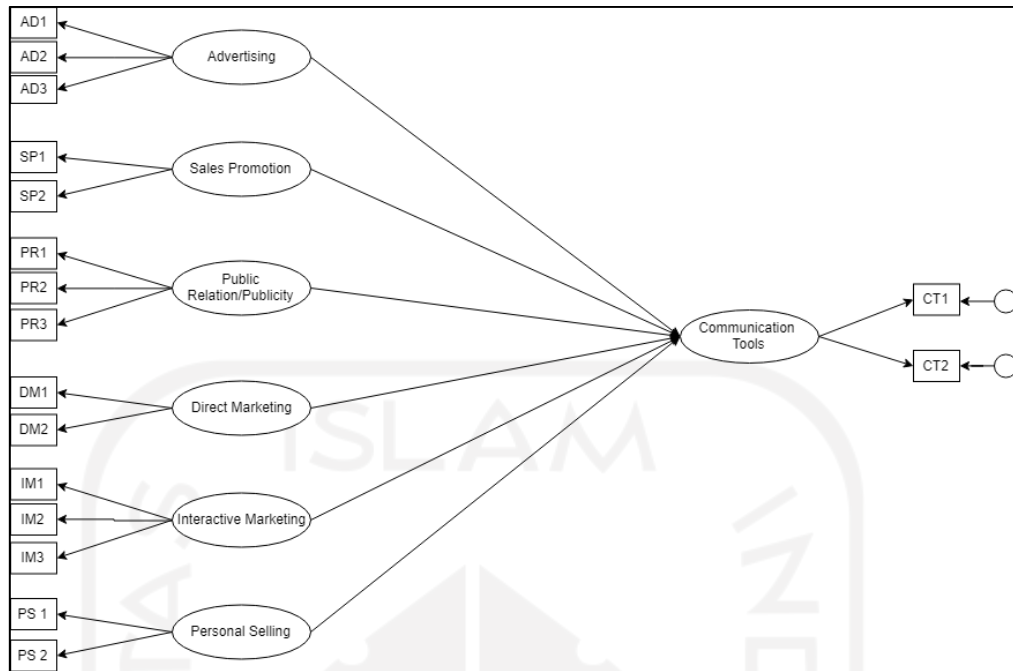
Figure 2. 8. Conceptual Model of Green Marketing Communication Tools

CHAPTER III

RESEARCH METHODOLOGY

This chapter will explain the methodology that will be used in this research. This chapter will consist of several sub-chapters including research object, research place, source of research data, data collection method and analysis method.

3.1 Research Object

The research will took place at one of the companies/organizations called Real Estate Indonesia – Yogyakarta branch. The selected location is based on the category of company that supports environmental real estate, such as a green house or *Smart House*. The data were obtained from the respondents who have experienced in buying real estate products from one of the companies under REI Yogyakarta or are familiar with the green real estate.

The focus of this study is related to green promotion, which refers to communication tools that are used by companies. In this study, several variables will be used and analyzed for the relationship between each variable toward brand trust. After the relationships have been known, the model will be simulated using system dynamics software, Powersim.

3.2 Types of Data

The kinds of data used in this study consist of primary data and secondary data.

a) Primary Data

Primary data is data obtained directly from the object of research. The primary data of this study were obtained from questionnaires filled out by respondents,

including identity and respondent's responses according to the results of filling out the questionnaire.

b) Secondary Data

Secondary data is data is obtained indirectly or through other parties. Secondary data for this study is obtained from literature studies, journals, and textbook. The secondary data is used to gather the information related to the topic discussed in this study to complete the research.

3.3   Use of Tools

This research use numerous tools to help the researcher processing data, include:

a. Google Form

The tool will be employed to gather questions and distribute questionnaires to the respondents.

b. Microsoft Excel

Excel program will be used to help compile the data from the questionnaire's results and supporting data.

c. SPSS Software

d. AMOS Software

This tool will be used to process the Excel data for constructing the conceptual model, then calculate for SEM calculation of the model.

e. Powersim Software

3.4   Data Collection Method

Data retrieval in this research will be carried out using a survey method with the questionnaire and expert judgments. Glasow (2005) defined a survey as a means for gathering information about the characteristics, actions, or opinions of a large group of people. Surveys can also be used to assess needs, evaluate demand, and examine the impact. The term survey instrument is often used to distinguish the survey tool from the survey research that it is designed to support.

A. **Questionnaire**

A questionnaire is a compilation of questions given to respondents. There are 2 types of questionnaires, namely a questionnaire that is directly filled with the physical form and an online questionnaire. In this research, the data collected will be using an online questionnaire.

The questionnaire consists of a number of answer choices in the form of a Likert scale. The Likert scale is a method that can be used to measure perceptions of a person, including opinions and attitudes concerning the occurred event. Likert scale is offered, by giving a statement to the respondent and asking for an answer with a score of 1 to 5.The value of 1 represent "Strongly Disagree" and the number 5 represents "Strongly Agree".

Table 3. 1 Likert Scale

No	Information	Likert Scale
1	Strongly Disagree	1
2	Disagree	2
3	Neutral	3
4	Agree	4
5	Strongly Agree	5

The questionnaire used has been tested with 17 questions in total according to the number of indicators. The questionnaire has a list of questions related to the research.

Table 3. 2 Question List on the Questionnaire

No	Variable(s)	Attributes
1	Advertising	The customer easily find the information about the property through environmentally friendly advertising.
		The customer knows the purpose of promoting the green

No	Variable(s)	Attributes
		property through media is caring for the environment.
		The customer is interested in buying the green property because of the unique design; also to support the environment-friendly act.
2	Sales Promotion	The customer knows about the discount promo that offered by the property company that aims to care about the environment.
		The customer is interested in the discount promo because it has a positive impact on the environment.
3	Public Relation	The customer knows that the activities carried out by the property industry have a positive impact on the environment.
		The customer likes the activities carried out by the property industry that aims to care for the environment.
		The customer desires to participate in the environmental activities are carried out by the property industry.

No	Variable(s)	Attributes
		The customer loves the property industry in promoting the product live through social media with a message to care for the environment.
4	Direct Marketing	The customer loves the property industry for sending messages about promo/coupons live through social media that were done routinely.
5	Interactive Marketing	The customer acknowledges that the property industry carried out an activity/online campaign that gives a positive impact on the environment.
		The customer loves the online campaign activity about caring the environment provide by the property industry; that aims to give positive impact and interesting messages.
		The customer desires to participate in the online campaign because of the clear information.
6	Personal Selling	The customer acknowledges the property industry has good knowledge about the product that aims to develop better environmental/green products.

No	Variable(s)	Attributes
7	Communication Tools	The customer is interested in the face-to-face promotion of the green product.
		The customer believes that the property industry is a company that cares for the environment.
		The customer recommends the industry property to other people.

B. **Expert Judgments**

The research is required to have three expert judgments in order to do data validation. Once the data have been collected from the questionnaire, the result is converted as the input for GEOMEAN calculation using Microsoft Excel.

3.5 Data Processing

The research is conducted by structural equation modeling or SEM using AMOS software. Hence, using the data from the questionnaire's results, it will help the researcher to construct the model. The purpose of AMOS software is to calculate factor loading values for each variable and its indicators. Then, the researcher can construct the model to identify the significant relationship between the variables of communication tools towards brand trust.

Before running the software, the first thing that needs to be done is to build a questionnaire based on the variables and indicators that have been designed using Google Form and afterward distribute the questionnaire directly to the customers of property industry of REI Yogyakarta branch for further analysis.
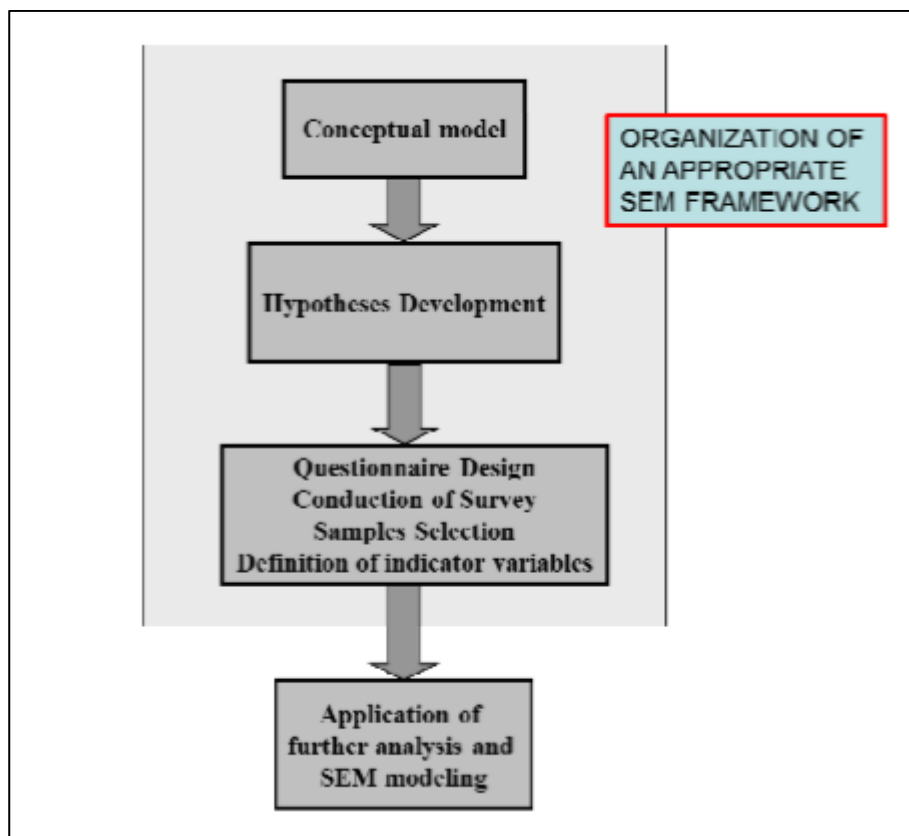
Figure 3. 1 Basic Step of SEM Framework

(Dragan & Topolsek, 2014)

As it can be seen from Figure 3.1, the conceptual framework for building the structural equation modeling (SEM) framework model must be defined first. The latter must include all of the connections, which represent the possible interrelations and causal relations between the variables (an indicator of variables and constructs). The hypotheses must be defined precisely, which describe the possible positive or negative effects and interrelations between the latent factors. Afterward, the indicator variables have to be clearly defined and execute for the further analysis and conduction of SEM modeling.

3.5.1   System Dynamics Model

Following the data that has been collected before, the researcher can start to build the conceptual model using the AMOS software. After the data have been processed and the result came out, a fixed variable that is acquired by the SEM result will then be processed using Powersim software.

First, the researcher has to build the model in the form of a causal loop diagram. The causal loop diagram aims to determine the positive and negative relationship between the variable. The purpose of the Powersim application is to identify the factor that affected the corresponding variable that is communication tools value. Last, the Powersim result was use to observe the pattern in terms of effect in REI Yogyakarta to increase the communication tools value.

3.6   Result Analysis

The result analysis within the research is to design the model of the conceptual design of communication tools value and to identify the relationship between variables of communication tools and their values.

3.7   Conclusion and Recommendation

The last phase of the research is the conclusion to answer the problem formulation that has been formulated in this research. Furthermore, the researcher provides recommendations for further research and suggestion for the company to implement the proposed model in the research.

CHAPTER IV

DATA COLLECTION AND DATA PROCESSING

This chapter will explain the process of collecting and processing data is used in this research. This step commences with a questionnaire validation test and reliability test. Furthermore, data collection and analysis of the models will be constructed.

4.1. Data Collecting

4.1.1 Questionnaire Results

The data collecting is conducted by filling out the online questionnaire using Google form. The target respondents of the questionnaire are industry property consumers, and the questionnaire that distributed to consumers consist of 17 statements. The number of respondents in this questionnaire totaled 400 respondents who had already bought or knew about the green product of property industry in Yogyakarta. The characteristics and responses of respondents who have filled out the questionnaire can be seen in the Table 4.1 and Table 4.2 below.

Table 4. 1 Characteristics Result Table

Characteristics	Total	Percentage
Gender		
Male	235	58,75%
Female	165	41,25%
Age		
< 20	-	-
20 - 25	1	0,25%
26 - 30	97	24,25%
31 - 35	157	39,5%
>35	145	31,25%
Occupation		
Businessman	128	32%
Private Employee	85	21,25%
Civil Employee	163	40,75%

Characteristics	Total	Percentage
Labor	24	6%

Based on the table above it is identified out of 400 respondents, most respondents are women with the highest age of 31 - 35 years old and most of them are the civil servants.

Table 4. 3. Questionnaire Result

No	AD1	AD2	AD3	SP1	SP2	PR1	PR2	PR3	DM1	DM2	IM1	IM2	IM3	PS1	PS2	CT1	CT2
1	4	5	5	5	4	4	4	3	4	4	4	4	4	3	4	5	5
2	5	5	4	4	5	4	4	5	4	5	4	4	5	5	4	3	3
3	5	4	5	5	5	5	5	5	5	4	4	3	4	3	3	4	4
4	4	4	4	4	3	5	5	5	5	4	4	4	4	3	4	4	4
5	4	4	3	4	4	3	4	3	4	3	3	3	3	2	3	3	4
6	4	3	3	3	3	3	3	2	3	2	3	3	3	3	3	3	4
7	3	4	4	5	4	3	3	4	3	4	5	4	4	4	3	4	4
8	4	3	3	2	3	3	3	4	5	4	3	3	4	5	5	3	3
9	3	4	3	3	3	4	4	4	4	4	4	4	3	4	4	4	4
10	4	3	4	4	4	5	5	4	3	4	4	4	4	4	4	4	4
11	3	4	4	4	4	3	4	4	4	3	3	3	4	3	3	4	4
12	4	4	4	4	4	4	3	4	5	4	5	4	4	5	5	4	4
13	4	5	4	4	5	4	3	5	5	5	5	4	4	4	4	5	5
14	5	3	3	3	3	3	3	4	3	3	3	3	3	3	3	3	3
15	3	4	3	3	3	4	4	3	4	3	3	4	3	3	4	3	3
16	4	3	3	3	3	3	3	3	4	3	3	4	3	4	3	3	3
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25	4	5	5	5	5	4	5	4	4	5	4	5	4	4	5	5	5
26	5	4	4	5	4	4	4	5	2	2	3	3	3	3	3	3	4
27	4	5	5	4	5	4	4	4	3	4	5	5	5	4	4	4	5
28	5	5	5	5	5	5	5	4	4	4	4	5	4	4	4	4	4
29	4	5	5	5	4	4	4	3	4	4	4	3	3	3	4	5	5
30	5	5	4	4	5	4	4	5	4	5	4	4	4	3	4	3	3
31	5	5	5	5	5	5	5	5	5	5	4	4	4	3	3	4	4
32	5	5	4	4	3	5	5	5	5	4	4	4	4	3	4	4	4

33	4	4	3	4	4	3	4	3	4	4	3	3	3	2	2	3	4
34	3	3	3	4	3	3	3	4	3	3	2	3	2	3	3	3	4
35	4	4	4	5	4	3	3	4	3	4	4	4	4	4	3	4	4
36	3	3	3	3	3	3	3	4	3	4	3	3	4	3	2	3	3
37	4	4	3	3	4	4	4	4	4	4	4	4	4	4	4	4	4
38	3	3	4	4	4	5	5	4	3	4	4	4	4	4	4	4	4
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4.2. Data Processing

4.2.1 Development of Theoretical Model

Table 4. 4. Definition of Variable Dimensions

Variable	Definition of Variable Dimensions
Advertising	Advertising is one of the marketing communication tools that occupy an open sponsor, non-personal message to promote or sell a product/service.
Sales Promotion	The process of persuading a potential customer to buy a product. It is designed to be used as a short-term tactic to boost sales.
Public Relation	Public relation is a strategic communication process that builds mutually beneficial relationships between organizations and the public.

	Direct Marketing	Direct marketing is a type of advertising tool that seeks to bring an action in a selected group of consumers in response to a communication by the marketer.
	Interactive Marketing	Interactive marketing is online activities and programs that aim to bind potential customers and customers, improve brand awareness, and increase sales of products and services.
	Personal Selling	Personal selling is a face-to-face selling technique by which a salesperson uses his or her interpersonal skills to persuade a customer to buy a particular product.

Based on the table above, 6 variable constructs can be formed, and each construct has numerous indicators. A detail explanation will be presented in Table 4.4 below.

Table 4. 5 Indicator of Variables

No	Construct		Indicator	Variable	Instrument Number
		a.	Easy to find suitable information about green products and eco-friendly advertising media.	X1	AD1
1	Advertising	b.	The advertising media that is offered is aimed at environmental concern.	X2	AD2
		c.	Attractive product design	X3	AD3

No	Construct	Indicator		Variable	Instrument Number
2	Sales Promotion	a.	The good promotion gave a positive impact on the environment	X4	SP1
		b.	Public interest for the offered promotion by the property industry.	X5	SP2
3	Public Relation	a.	The events or activities are concerned with the environment	X6	PR1
		b.	Interested in the events or activities held by the promoter that mainly concern the environment	X7	PR2
		c.	Plan to participate in the events held by the promoter	X8	PR3
4	Direct Marketing	a.	Direct marketing routine interaction by implying message about environmental care	X9	DM1
		b.	Routine interaction via social media / online media to send the environmental message	X10	DM2

No	Construct	Indicator		Variable	Instrument Number
5	Interactive Marketing	a.	Conducting an online campaign about the activities that aim for a positive impact on the environment	X11	IM1
		b.	Interested in the online campaign about the activities that aim for a positive impact on the environment	X12	IM2
		c.	Plan to participate in the positive activities to make the environment better	X13	IM3
6	Personal Selling	a.	Acknowledge the salesperson have good knowledge about the product that aims to develop a better environment/green product	X14	PS1
		b.	Interested in the face-to-face promotion of the green product	X15	PS2

4.2.2 Development of Path Diagram

Based on the theories that have been built, and then a path diagram of causality relationships between factors will be made. In path diagrams usually consist of two

important elements, namely the construct and the relationship between them. Each construct represents a variable and is usually described as an oval and the observed variables are represented as rectangles or squares. Meanwhile, the relationship between constructs usually represented by arrow. The path diagram of this research can be shown in Figure 4.1.
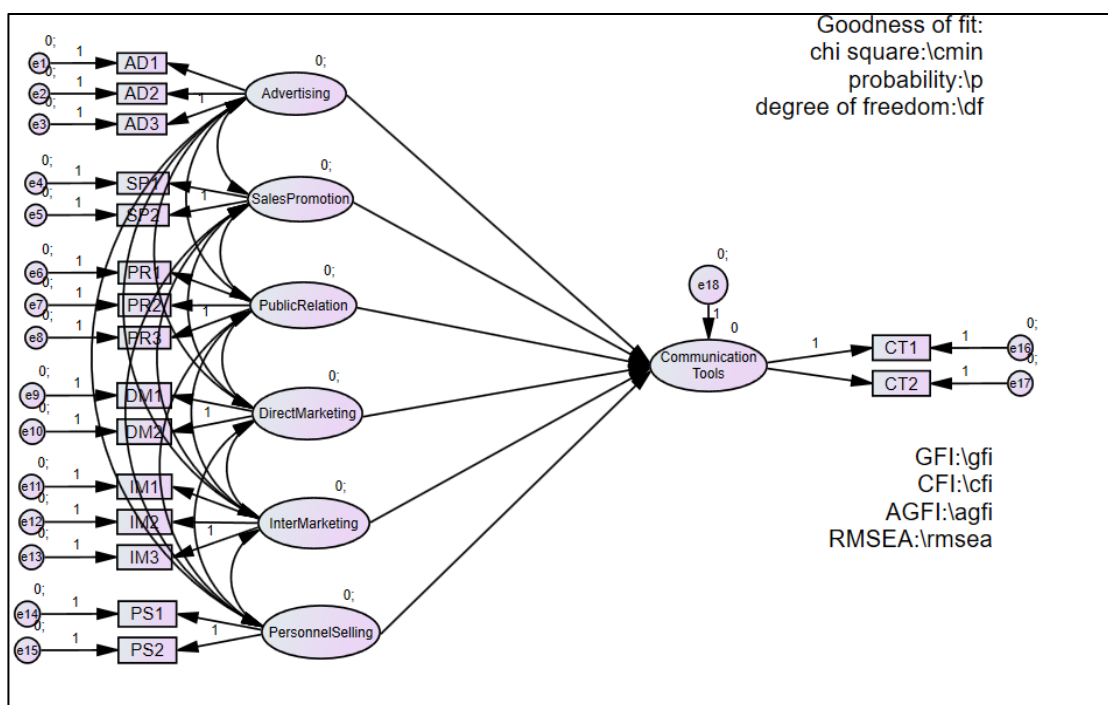
Figure 4.1 Path Diagram

4.2.3 Conversion of Path Diagram Into the Equation

The path diagram that has been created will then be translated into equations for the structural model and measurement model.

    a. Structural Equation Model

    This equation is to express the causality relationship between various constructs.
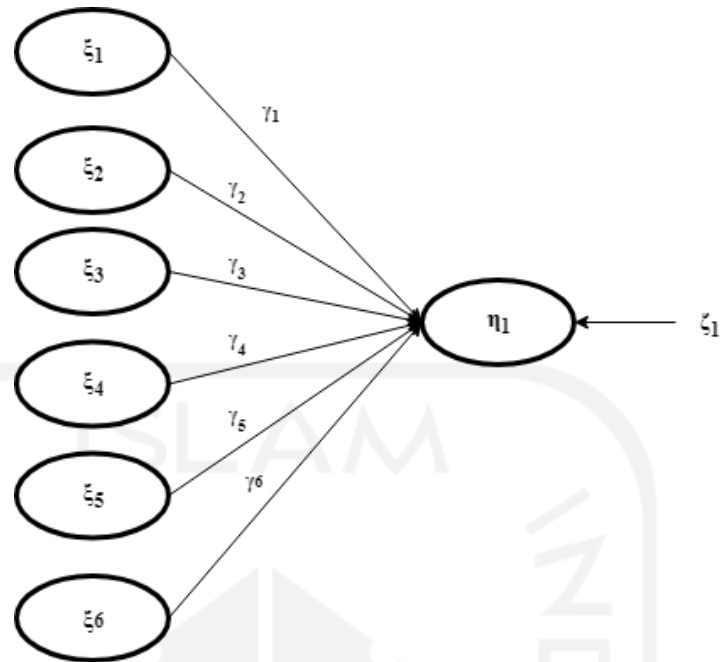
Figure 4.2 Structural Equation Model

The equation of the structural model above can be written as follows:

$$\eta 1 = \gamma 1\ \xi 1 + \gamma 2\ \xi 2 + \gamma 3\ \xi 3 + \gamma 4\ \xi 4 + \gamma 5\ \xi 5 + \gamma 6\ \xi 6 + \zeta 1$$

Information:

$\eta 1$ = Communication Tools

$\xi 1$ = Advertising

$\xi 2$ = Sales Promotion

$\xi 3$ = Public Relation

$\xi 4$ = Direct Marketing

$\xi 5$ = Interactive Marketing

$\xi 6$ = Personal Selling

$\zeta 1$ = Structural error in Communication Tools

b. Measurement Equation Model

The measurement model is the equation designated to complete the whole model, including the relationship between the variable and latent. The measurement equation model can be divided into 2 types, endogenous variable and exogenous variable.

1. Measurement Equation model for endogenous variable

   The measurement equation model for endogenous variable is written as follows:

   $Y_1 = \lambda_{11} \eta_1 + \varepsilon_1$

   $Y_2 = \lambda_{21} \eta_1 + \varepsilon_2$

2. Measurement Equation model for exogenous variable

   The Measurement equation model for an exogenous variable is written as follows:

   $X_1 = \lambda_{11} \xi_1 + \delta_1$

   $X_2 = \lambda_{21} \xi_1 + \delta_2$

   $X_3 = \lambda_{31} \xi_1 + \delta_3$

   $X_4 = \lambda_{42} \xi_2 + \delta_4$

   $X_5 = \lambda_{52} \xi_2 + \delta_5$

   $X_6 = \lambda_{63} \xi_3 + \delta_6$

   $X_7 = \lambda_{73} \xi_3 + \delta_7$

   $X_8 = \lambda_{83} \xi_3 + \delta_8$

   $X_9 = \lambda_{94} \xi_4 + \delta_9$

   $X_{10} = \lambda_{104} \xi_4 + \delta_{10}$

4.2.4 Model Input and Estimation

The appropriate sample size ranges from 100 to 200 respondents for the technique of maximum likelihood estimation, while the minimum sample size is 5 respondents per parameter estimate.

For this research the amount of data used is 400 sample sizes, which means that it has exceeded the minimum size of 100 sample sizes. The number of indicators in this study is 17 indicators. If per parameter requires a bminimum 5 respondents then it is estimated that the data need only 98 sample sizes. Therefore sample size that has been collected has qualified.

4.2.5 Identification

Computation of degrees of freedom (Default model)	
Number of distinct sample moments:	170
Number of distinct parameters to be estimated:	72
Degrees of freedom (170 - 72):	98

Figure 4. 3. Computation of Degrees of Freedom

Based on the output of data analysis in the Figure 4.3 above, the results come to the conclusion that the model built is over-identified. With the number of samples n = 400, the total number of distinct samples is 170 while the number of parameters to be estimated is 72. From these results, the degree of freedom produced is 170-72 = 98, which means 98 > 0 that the model is over identified, so that the model can be estimated.

4.2.6 Model Evaluation

In this step the accuracy of the model has been evaluated whether the model meets the criteria of goodness of fit. An evaluation of the model's accuracy is basically done when AMOS estimates the model. The feasibility test of the model is reviewed from two sides, namely the feasibility test of the measurement model and the feasibility test of the structural model.

a. Feasibility test of the measurement model

It is also known for confirmatory factor analysis (CFA). The measurement model is an examination of reliability and validity with the purpose of deliberating the consistency and accuracy of the data collected from the make use of of indicators. Feasibility tests

on the measurement model function to see whether a variable has been correctly measured by each indicator. A variable can be said to be measured by each indicator if it has a variance-extorted value of $(AVE) \geq 0.5$ and construct reliability $(CR) \geq 0.7$. The table below is the output analysis of SEM for the data quality test.

Table 4. 6. SEM Output

			Estimate
AD3	<---	Advertising	0.734
AD2	<---	Advertising	0.773
AD1	<---	Advertising	0.790
SP2	<---	SalesPromotion	0.947
SP1	<---	SalesPromotion	0.679
PR3	<---	PublicRelation	0.742
PR2	<---	PublicRelation	0.944
PR1	<---	PublicRelation	0.819
DM2	<---	DirectMarketing	0.925
DM1	<---	DirectMarketing	0.678
IM3	<---	InterMarketing	0.752
IM2	<---	InterMarketing	0.789
IM1	<---	InterMarketing	0.847
PS2	<---	PersonalSelling	0.858
PS1	<---	PersonalSelling	0.614
CT2	<---	Communication_Tools	0.894
CT1	<---	Communication-Tools	0.656

Based on the value of standardized regression weights on the results of AMOS output, the next phase is to calculate the Average Variance Exctracted (AVE) and Construct Reliability (CR). The result of the calculation will be shown in Table 4.6.

Table 4. 7. Validity and Reliability Result

No	Variable	Indicator	Std. Loading	Std. Loading^2	Measurement Error	CR	AVE
1	Advertising	A1	0.79	0.624	0.376	0,6	0,6
		A2	0.773	0.6	0.4		
		A3	0.734	0.54	0.46		
		∑	2.297	1.760	1.24		
		∑^{2}	5.276				
2	Sales Promotion	SP1	0.679	0.46	0.54	0,7	0.67
		SP2	0.947	0.896	0.103		
		∑	1,626	1,358	0,642		
		∑^{2}	2,644				
3	Public Relation	PR1	0.819	0.671	0.329	0,7	0.7
		PR2	0.944	0.891	0.109		
		PR3	0.742	0.55	0.45		
		∑	2,505	2,112	0,887539		
		∑^{2}	6,275				
4	Direct Marketing	DM1	0.678	0.46	0,54	0,7	0.66
		DM2	0.925	0.86	0,14		
		∑	1,603	1,315	0,68		

No	Variable	Indicator	Std. Loading	Std. Loading^2	Measurement Error	CR	AVE
		$\sum{}^2$	2,569				
5	Interactive Marketing	IM1	0.847	0.717	0.283	0,6	0.63
		IM2	0.789	0.623	0.377		
		IM3	0.752	0.566	0.434		
		$\sum$	2,388	1,906	1,094		
		$\sum{}^2$	5,7025				
6	Personal Selling	PS1	0.614	0.377	0.623	0.6	0.6
		PS2	0.858	0.736	0.264		
		$\sum$	1,472	1,113	0,887		
		$\sum{}^2$	2,167				

From the table above, it can be seen the result calculation of both composite reliability (CR) and Average Variance Extracted (AVE) from 6 variables. Three variables shows that the CR value is greater or equal to the cut-off value of 0.7, and the indicators have good internal consistency. Then for AVE values it will be smaller than the value of construct reliability. As the six variables obtain values of more than 0.5 shows that the number of variances of the indicators extracted by latent variables is more than the error variances.

b.   Test model assumptions

Before testing the structural model there are several assumption test with normality and outlier assumption.

1) Normality assumption

Normality tests can be done using AMOS. The result can be seen from the value of skewness and kurtosis. Normality test has 2 types, which are univariate and multivariate normality. Data are assumed to be normally distributed if it has a value of CR (skewness and kurtosis) in the range of ± 2.58 at the significance level of 0.01, for both univariate and multivariate. The result of the normality test can be seen in Table 4.7 below.

Table 4.8 Normality Test Output

Descriptive			Statistic	Std. Error
AD1	Mean		3,7550	0,04519
	95% Confidence Interval for Mean	Lower Bound	3,6662	
		Upper Bound	3,8438	
	5% Trimmed Mean		3,7889	
	Median		4,0000	
	Variance		0,817	
	Std. Deviation		0,90389	
	Minimum		1,00	
	Maximum		5,00	
	Range		4,00	
	Interquartile Range		1,00	
	Skewness		-0,356	0,122
	Kurtosis		-0,428	0,243
AD2	Mean		3,9575	0,04309
	95% Confidence Interval for Mean	Lower Bound	3,8728	
		Upper Bound	4,0422	
	5% Trimmed Mean		3,9972	
	Median		4,0000	
	Variance		0,743	
	Std. Deviation		0,86171	
	Minimum		1,00	
	Maximum		5,00	
	Range		4,00	
	Interquartile Range		2,00	
	Skewness		-0,343	0,122
	Kurtosis		-0,628	0,243
AD3	Mean		3,8475	0,05029
	95% Confidence Interval for Mean	Lower Bound	3,7486	
		Upper Bound	3,9464	
	5% Trimmed Mean		3,9139	
	Median		4,0000	
	Variance		1,012	

Descriptive			Statistic	Std. Error
	Std. Deviation		1,00587	
	Minimum		1,00	
	Maximum		5,00	
	Range		4,00	
	Interquartile Range		2,00	
	Skewness		-0,581	3,9139
	Kurtosis		-0,107	4,0000
SP1	Mean		3,9700	0,04376
	95% Confidence Interval for Mean	Lower Bound	3,8840	
		Upper Bound	4,0560	
	5% Trimmed Mean		4,0250	
	Median		4,0000	
	Variance		0,766	
	Std. Deviation		0,87522	
	Minimum		1,00	
	Maximum		5,00	
	Range		4,00	
	Interquartile Range		2,00	
	Skewness		-0,483	0,122
	Kurtosis		-0,417	0,243
SP2	Mean		3,9000	0,04683
	95% Confidence Interval for Mean	Lower Bound	3,8079	
		Upper Bound	3,9921	
	5% Trimmed Mean		3,9556	
	Median		4,0000	
	Variance		0,877	
	Std. Deviation		0,93659	
	Minimum		1,00	
	Maximum		5,00	
	Range		4,00	
	Interquartile Range		2,00	
	Skewness		-0,425	0,122
	Kurtosis		-0,359	0,243
PR1	Mean		3,7950	0,04182
	95% Confidence Interval for Mean	Lower Bound	3,7128	
		Upper Bound	3,8772	
	5% Trimmed Mean		3,8306	
	Median		4,0000	
	Variance		0,700	
	Std. Deviation		0,83650	
	Minimum		1,00	
	Maximum		5,00	
	Range		4,00	
	Interquartile Range		1,00	
	Skewness		-0,400	0,122
	Kurtosis		-0,192	0,243
PR2	Mean		3,9875	0,04567

Descriptive			Statistic	Std. Error
	95% Confidence Interval for Mean	Lower Bound	3,8977	
		Upper Bound	4,0773	
	5% Trimmed Mean		4,0583	
	Median		4,0000	
	Variance		0,834	
	Std. Deviation		0,91347	
	Minimum		1,00	
	Maximum		5,00	
	Range		4,00	
	Interquartile Range		1,00	
	Skewness		<mark>-0,868</mark>	0,122
	Kurtosis		0,644	0,243
PR3	Mean		3,7125	0,04749
	95% Confidence Interval for Mean	Lower Bound	3,6191	
		Upper Bound	3,8059	
	5% Trimmed Mean		3,7500	
	Median		4,0000	
	Variance		0,902	
	Std. Deviation		0,94979	
	Minimum		1,00	
	Maximum		5,00	
	Range		4,00	
	Interquartile Range		1,00	
	Skewness		<mark>-0,332</mark>	0,122
	Kurtosis		-0,404	0,243
DM1	Mean		3,8725	0,04537
	95% Confidence Interval for Mean	Lower Bound	3,7833	
		Upper Bound	3,9617	
	5% Trimmed Mean		3,9389	
	Median		4,0000	
	Variance		0,823	
	Std. Deviation		0,90736	
	Minimum		1,00	
	Maximum		5,00	
	Range		4,00	
	Interquartile Range		0,00	
	Skewness		<mark>-1,000</mark>	0,122
	Kurtosis		1,150	0,243
DM2	Mean		3,7875	0,05244
	95% Confidence Interval for Mean	Lower Bound	3,6844	
		Upper Bound	3,8906	
	5% Trimmed Mean		3,8639	
	Median		4,0000	
	Variance		1,100	
	Std. Deviation		1,04885	
	Minimum		1,00	

Descriptive			Statistic	Std. Error
	Maximum		5,00	
	Range		4,00	
	Interquartile Range		2,00	
	Skewness		-0,667	0,122
	Kurtosis		0,067	0,243
IM1	Mean		3,8700	0,04046
	95% Confidence Interval for Mean	Lower Bound	3,7905	
		Upper Bound	3,9495	
	5% Trimmed Mean		3,8583	
	Median		4,0000	
	Variance		0,655	
	Std. Deviation		0,80916	
	Minimum		2,00	
	Maximum		5,00	
	Range		3,00	
	Interquartile Range		2,00	
	Skewness		0,213	0,122
	Kurtosis		-1,381	0,243
IM2	Mean		3,8875	0,04188
	95% Confidence Interval for Mean	Lower Bound	3,8052	
		Upper Bound	3,9698	
	5% Trimmed Mean		3,9500	
	Median		4,0000	
	Variance		0,702	
	Std. Deviation		0,83761	
	Minimum		1,00	
	Maximum		5,00	
	Range		4,00	
	Interquartile Range		1,00	
	Skewness		-0,840	0,122
	Kurtosis		1,296	0,243
IM3	Mean		3,8675	0,03696
	95% Confidence Interval for Mean	Lower Bound	3,7948	
		Upper Bound	3,9402	
	5% Trimmed Mean		3,8806	
	Median		4,0000	
	Variance		0,546	
	Std. Deviation		0,73913	
	Minimum		1,00	
	Maximum		5,00	
	Range		4,00	
	Interquartile Range		1,00	
	Skewness		-0,308	0,122
	Kurtosis		0,317	0,243
PS1	Mean		3,7400	0,04090
		Lower Bound	3,6596	

Descriptive			Statistic	Std. Error
	95% Confidence Interval for Mean	Upper Bound	3,8204	
	5% Trimmed Mean		3,7722	
	Median		4,0000	
	Variance		0,669	
	Std. Deviation		0,81797	
	Minimum		1,00	
	Maximum		5,00	
	Range		4,00	
	Interquartile Range		1,00	
	Skewness		<mark>-0,482</mark>	0,122
	Kurtosis		0,813	0,243
PS2	Mean		3,7750	0,04305
	95% Confidence Interval for Mean	Lower Bound	3,6904	
		Upper Bound	3,8596	
	5% Trimmed Mean		3,8250	
	Median		4,0000	
	Variance		0,741	
	Std. Deviation		0,86095	
	Minimum		1,00	
	Maximum		5,00	
	Range		4,00	
	Interquartile Range		1,00	
	Skewness		<mark>-0,568</mark>	0,122
	Kurtosis		0,699	0,243
CT1	Mean		3,9000	0,04128
	95% Confidence Interval for Mean	Lower Bound	3,8188	
		Upper Bound	3,9812	
	5% Trimmed Mean		3,9278	
	Median		4,0000	
	Variance		0,682	
	Std. Deviation		0,82565	
	Minimum		1,00	
	Maximum		5,00	
	Range		4,00	
	Interquartile Range		2,00	
	Skewness		<mark>-0,242</mark>	0,122
	Kurtosis		-0,537	0,243
CT2	Mean		4,0050	0,03926
	95% Confidence Interval for Mean	Lower Bound	3,9278	
		Upper Bound	4,0822	
	5% Trimmed Mean		4,0361	
	Median		4,0000	
	Variance		0,617	
	Std. Deviation		0,78519	
	Minimum		1,00	

Descriptive		Statistic	Std. Error
	Maximum	5,00	
	Range	4,00	
	Interquartile Range	1,00	
	Skewness	-0,415	0,122
	Kurtosis	-0,161	0,243

Based on the table above, it can be concluded that some indicators for testing normality univariate and multivariate are generally normally distributed because the value of the critical ratio (c.r) for kurtosis and skewness is within ± 2.58. In this data set, all variables are normally distributed.

2) Outlier Assumption

Outliers are the data that has a value far from the general value or can be said as an extreme value. It appears in the form of extreme values for a single variable (univariate outliers) or a combination variable (multivariate outliers). Outliers can influence the conclusion of research from statistical test results. In this research, outliers can be observed using SPSS 23 program. The output result of the outlier test can be seen in the figures below.
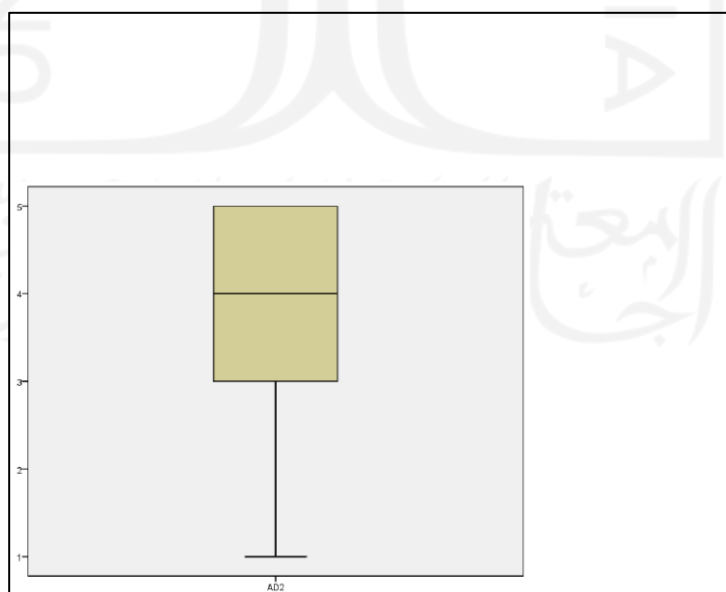
Figure 4.4 AD2 Outlier Boxplot
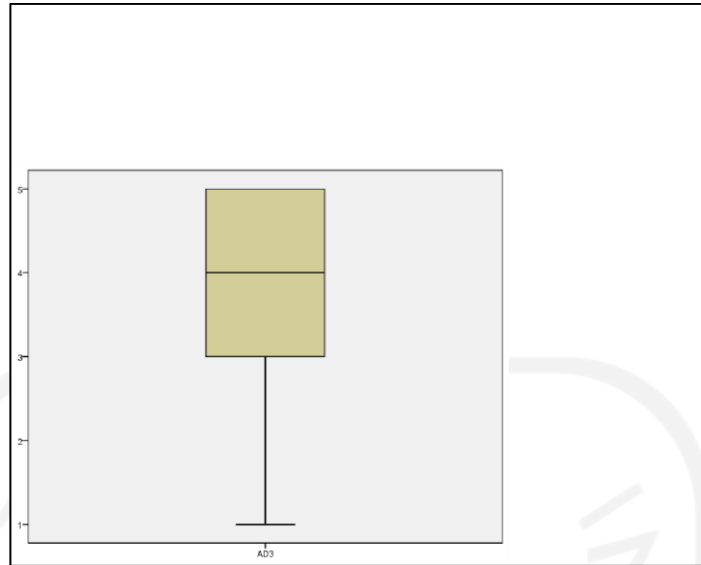
Figure 4.5 AD3 Outlier Boxplot
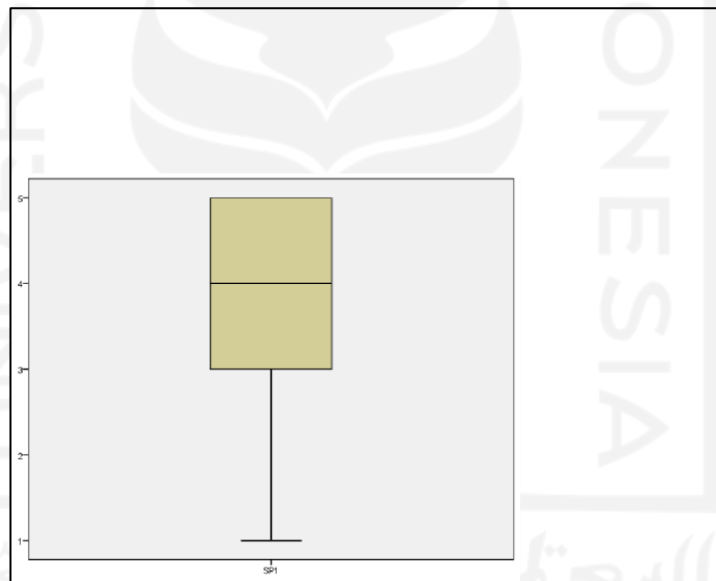
Figure 4.6 SP1 Outlier Boxplot
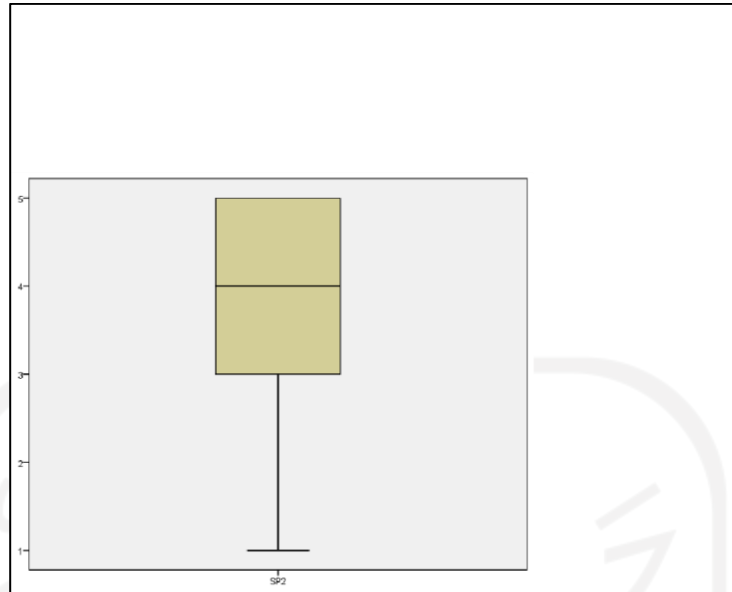
Figure 4.7 SP2 Outlier Boxplot
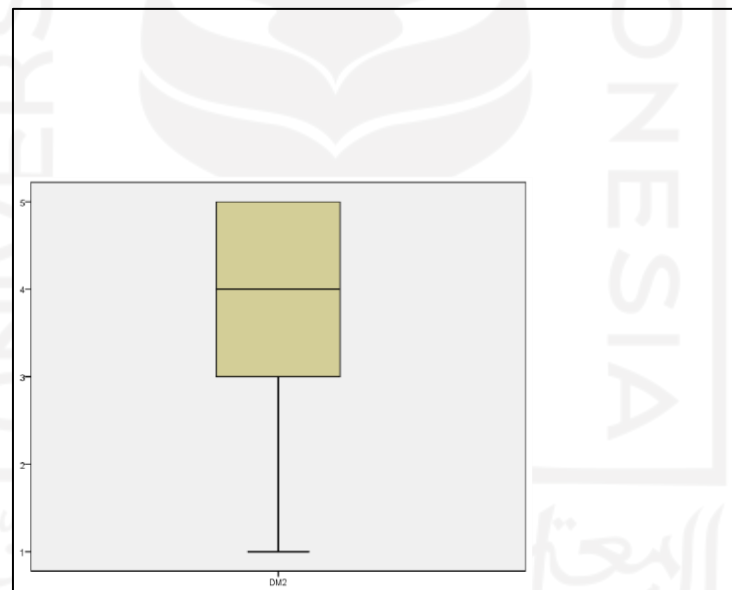
Figure 4.8 DM2 Outlier Boxplot
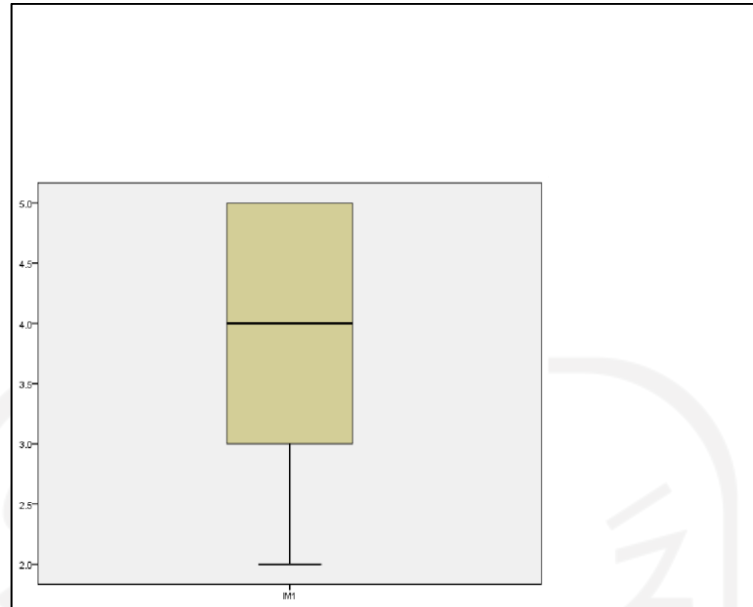
Figure 4.9 IM1 Outlier Boxplot
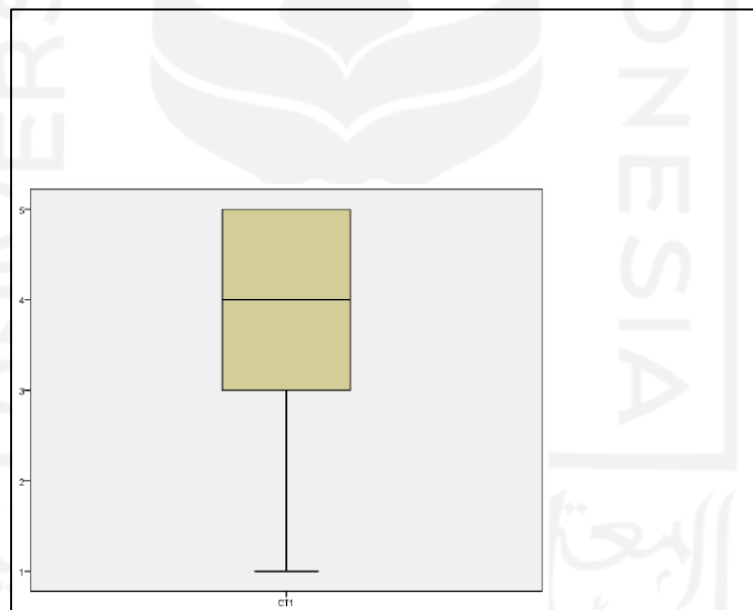
Figure 4.10 CT1 Outlier Boxplot

Based on the figures above, 17 indicators were tested for each of the outlier data. As a result, seven out of 17 indicators are proving to have an outlier in their data. The seven indicators are AD2, AD3, SP1, SP2, DM2, IM1 and CT1. It can be seen from the seven figures that each indicators boxplot shows that there are no values shown within the upper and lower limits, thus it is categorized as an outlier.

c.   Feasibility test of structural model

The structural feasibility test model is expected to see the relationship between variables that have been defined in the construction of the model, whether the relationship between variables has a significant effect, and how much value of the relationship between these variables. A structural model test is often referred to as a hypothesis test. To assess the significance of a relationship between variables, the researcher can see the p-value from the calculation of the regression value of the relationship. The structural model of this research can be seen in Figure 4.4 below.
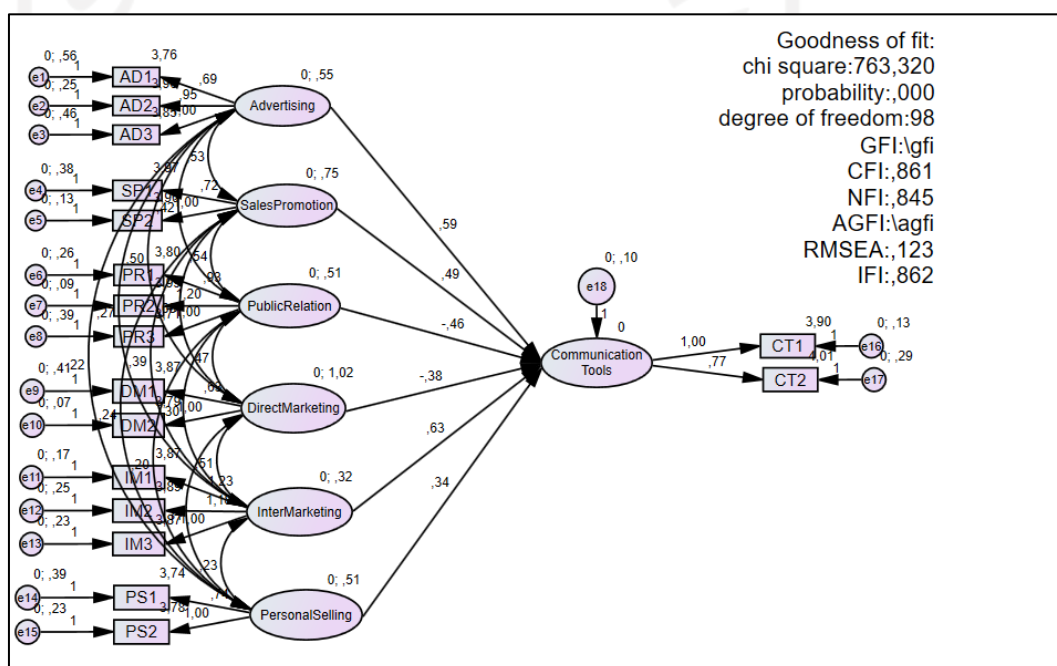
Figure 4.11 Structural Model

After the SEM assumptions have been made, the next step is testing by using several conformity indices to measure the proposed model. A few of these indices can be shown in Table 4.9.

Table 4.9 Goodness of Fit Indices

No	Type of Goodness of Fit indices	The Goodness of Fit Indices	Cut-off Values	Model Result	Category
1	Absolute Fit Indices	Probability	≥ 0.05	,000	
2		Cmin / df	≤ 2.0	-	
3		Chi-Square	small	763,320	

No	Type of Goodness of Fit indices	The Goodness of Fit Indices	Cut-off Values	Model Result	Category
4		GFI	≥ 0.90	-	
5		RMSEA	< 0.1	,123	
6		RMR	≤ 0.05	-	
7		IFI	≥ 0.90	,862	
8	Incremental Fit Indices	CFI	≥ 0.90	-	
9		NFI	≥ 0.90	-	
10		IFI	≥ 0.90	-	

Based on the explanation in the table above, from the seven criteria there are only four values that match the criteria, which are RMR and RMSEA from absolute fit indices, IFI and CFI from incremental fit indices. Some others are in the marginal fit category whose results are close to the predetermined conditions. According to Haryono (2017) stated that the use of 4 to 5 criteria for the goodness of fit analysis is considered to be sufficient to assess the feasibility of a model, provided that each group of the goodness of fit is an absolute fit indices and incremental fit indices are represented. From the statement above it can be concluded that the overall model can be accepted.

4.2.7 Model Interpretation

If the model is good enough, then the next step in modeling structural equations is to interpret, and vice versa. If it is not good then it is necessary to modify the model. The main purpose of modifying the model is to improve the fit of a model and done by removing or adding relationships in the model. To give an interpretation of whether the theory-based model tested can be accepted directly or need modification, the researcher must direct his attention to the predictive power of the model by observing the number of residuals produced. Suppose the standardized residual covariance matrix has a value outside the ring $-2.58 \leq$ standardized residual ≤ 2.58, then the estimated model needs to be modified. The result of the standardized residual covariance matrix can be seen in Table 4.10 below.

Table 4. 10. Standardized Residual Covariance

	CT2	CT1	PS1	PS2	IM1	IM2	IM3	DM1	DM2	PR1	PR2	PR3	SP1	SP2	AD1	AD2	AD3
CT2	0,573																
CT1	0,37	0,694															
PS1	0,174	0,26	0,673														
PS2	0,257	0,385	0,376	0,755													
IM1	0,223	0,334	0,189	0,279	0,608												
IM2	0,215	0,322	0,182	0,269	0,42	0,649											
IM3	0,185	0,278	0,157	0,232	0,362	0,349	0,533										
DM1	0,17	0,254	0,11	0,162	0,36	0,346	0,299	0,79									
DM2	0,269	0,404	0,174	0,257	0,571	0,549	0,474	0,576	1,069								
PR1	0,246	0,369	0,148	0,219	0,341	0,328	0,283	0,284	0,451	0,724							
PR2	0,325	0,487	0,195	0,288	0,449	0,433	0,373	0,374	0,594	0,64	0,947						
PR3	0,252	0,378	0,151	0,224	0,349	0,336	0,29	0,291	0,462	0,498	0,656	0,927					
SP1	0,206	0,309	0,11	0,163	0,31	0,298	0,258	0,292	0,464	0,364	0,479	0,373	0,766				
SP2	0,315	0,471	0,168	0,249	0,473	0,455	0,393	0,446	0,708	0,555	0,731	0,568	0,539	0,916			
AD1	0,256	0,383	0,118	0,174	0,296	0,285	0,246	0,307	0,488	0,383	0,505	0,393	0,337	0,515	0,753		
AD2	0,243	0,365	0,112	0,166	0,282	0,271	0,234	0,292	0,464	0,365	0,481	0,373	0,321	0,49	0,447	0,71	
AD3	0,28	0,419	0,129	0,191	0,324	0,312	0,269	0,336	0,533	0,419	0,553	0,43	0,369	0,563	0,514	0,489	1,044

Based on the table above it shows that there is no standard covariance residual matrix that has a value outside the range of -2.58 ≤ standard residual ≤ 2.58, so the model that estimates does not need to be modified. And the model has been accepted through the feasibility test of the goodness of fit, but the modification of the model will not be carried out. Then, it will be continued in the next analysis.

4.3. Hypothesis testing

The next step is hypothesis testing. Data analysis in the hypothesis can be adopted from the regression weight value based on the value of the critical ratio of more than 1.96 and the value of the probability is less than 0.05. If the hypothesis results meet with required conditions, assumed that the hypothesis is accepted or has a significant effect. The estimation results for each exogenous variable with endogenous variables will be disclosed in Table 4.10 below.

Table 4.11 Estimation Result

		Estimate	S.E	C.R	P	Label
Communication_Tools Advertising	<---	.588	.164	3,575	***	par_26
Communication_Tools SalesPromotion	<---	.490	.190	2,579	.010	par_27

Communication_Tools PublicRelation	<---	-.463	.202	-2,290	.022	par_28
Communication_Tools<--- DirectMarketing		-.404	.245	-2,172	.030	par_29
Communication_Tools InterMarketing	<---	.688	.483	1,960	.056	par_30
Communication_Tools PersonalSelling	<---	.394	.090	3,977	***	par_31

Based on the results of the regression weight analysis above, it showed that advertising, sales promotion, interactive marketing and personal selling have a significant effect on communication tools because their critical ratio is more than 1.96 and the probability less than 0.05. As for the rest of variable left, public relation and direct marketing have no significant effect on communication tools of green marketing.

4.4. Simulation

4.4.1 Causal Loop Diagram

CLD or Causal Loop Diagram is the cause-and-effect diagram that can be defined by model formulation and equation. Often used as an analytical tool in system dynamics, to analyze and develop an understanding of a complex systems. The CLD consist of the interconnected relationship between variables and construct loops to determine the exact internal relationship. The input for building a causal loop diagram is from the variables of the SEM result consisting of seven variables.
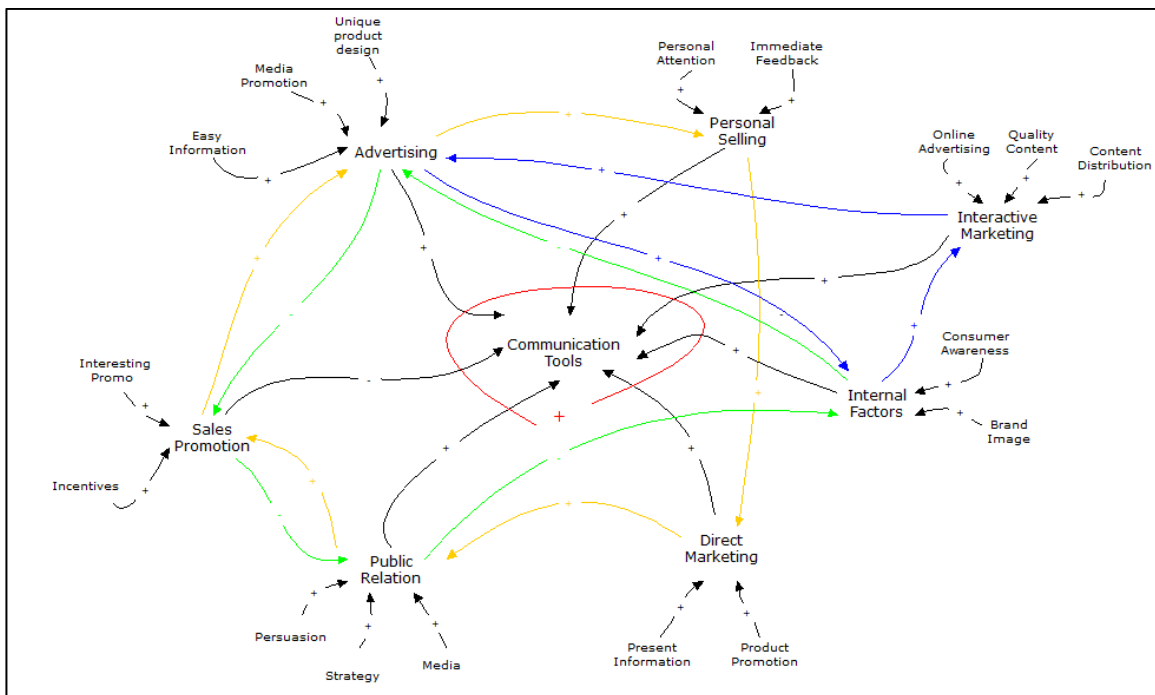
Figure 4. 12 Causal Loop Diagram (CLD) of Communication Tools

Based on the causal loop diagram above, there is one endogenous variable in this research, which is the communication tool. The endogenous variable will be the internal factor. The researcher has constructed a model within the communication tools as the internal factor to make it simple in determining the model formulation. As for the exogenous variables in the constructed model, are also included in the diagram. The six exogenous variables are Advertising, Sales Promotion, Public Relation, Direct Marketing, Interactive Marketing, and Personal Selling.

In Causal Loop Diagram, each variable is connected with other variables and then linked by a loop. One variable can link to more than one connecting loop. In the figure above, the diagram consists of three connected loops; two positive loops and one negative loop.

4.4.2 Flow Diagram

In the next phase after constructing a CLD using Powersim Studio 9 software, the researcher can build a flow diagram. The flow diagram is a diagram that uses notations to describe the flow of data or explain the work processes of a system. It aims to create an understanding of the system clearly and structured. In this research, the researcher uses the variables of the SEM result and CLD to constructs a flow diagram. The diagram can be seen in the Figure 4.13 below.
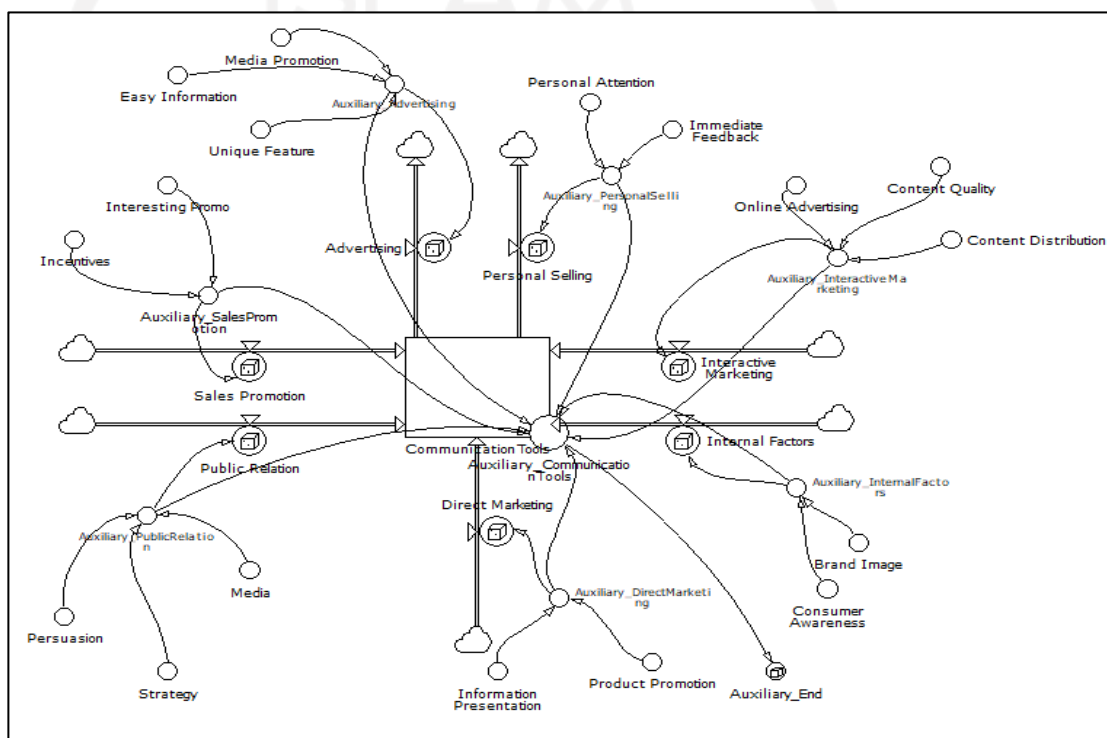
Figure 4. 13 Flow Diagram of Communication Tools

4.4.3 Flow Diagram Modeling

A. Data Input

The data input for the research was obtained from the interview result from the experts in the Real Estate Indonesia (REI) Yogyakarta branch and questionnaire result from respondents. The data will be the same as the SEM model, with six variables and 17 indicators. To calculate the data for the flow diagram computation is using the Likert scale. The Likert scale ranges from 1 to 5, with the expert judgment opinion towards

the research. The data obtained from expert judgments are processed using GEOMEAN function in Microsoft Excel The table below will show the input data with its own values of the variables and indicators.

Table 4. 12 Data Input

No	Variable	E1	E2	E3	Geomean	Round up/down
1	**Advertising**	3	2	2	2,28942849	2
2	Media Promotion	2	3	3	2,62074139	3
3	Easy Information	3	2	3	2,62074139	3
4	Unique Feature	2	2	2	2	2
5	**Sales Promotion**	3	2	2	2,28942849	2
6	Interesting Promo	2	3	1	1,81712059	2
7	Incentives	2	1	2	1,58740105	2
8	**Public Relation**	2	2	2	2	2
9	Persuasion	3	2	2	2,28942849	2
10	Media	1	2	3	1,81712059	2
11	Strategy	3	2	2	2,28942849	2
12	**Direct Marketing**	2	3	3	2,62074139	3
13	Information Presentation	3	3	2	2,62074139	3
14	Product Promotion	2	3	2	2,28942849	2
15	**Interactive Marketing**	3	2	3	2,62074139	3
16	Online Advertising	3	3	2	2,62074139	3
17	Content Quality	2	3	3	2,62074139	3
18	Content Distribution	2	2	2	2	2
19	**Personal Selling**	3	3	2	2,62074139	3
20	Immediate Feedback	3	3	3	3	3
21	Personal Attention	3	3	2	2,62074139	3
22	**Internal Factors**	3	2	3	2,62074139	3
23	Brand Image	3	3	3	3	3
24	Consumer Awareness	2	3	2	2,28942849	2
25	**Communication Tools**	3	3	3	3	3

B. Model Formulation

The model formulation uses the data imputation that resultted from the expert judgments. For the first step, to do a model formulation the researcher needs to define the unit for each variable consisting in the model. The definition that will be used to define the unit is "values" as in the qualitative model.

With the research considered qualitative that has no units, thus "values" is defined as the units for this model with the number generated by expert judgments. In the simulation process using the Powersim application, each variable will have the same units. The figures below will explain the simulation model formulation that is added to the definition box of each variable.
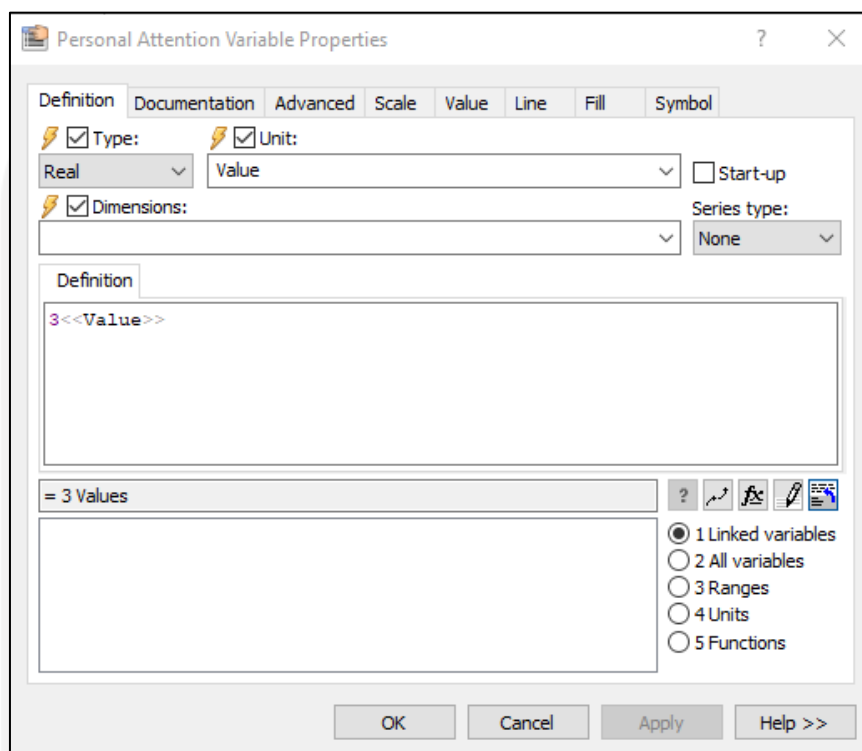
Figure 4. 14 Definition Box of Auxiliary - Units

The variables (indicators) that have already been defined then connected with the supplementary auxiliary. The definition used in the supplementary auxiliary is IF function. In this model simulation, the researcher also used the RANDOM function. Yet, both functions of IF and RANDOM cannot be shared in one definition box. Then, it is required to make other auxiliaries that contain one of the functions.
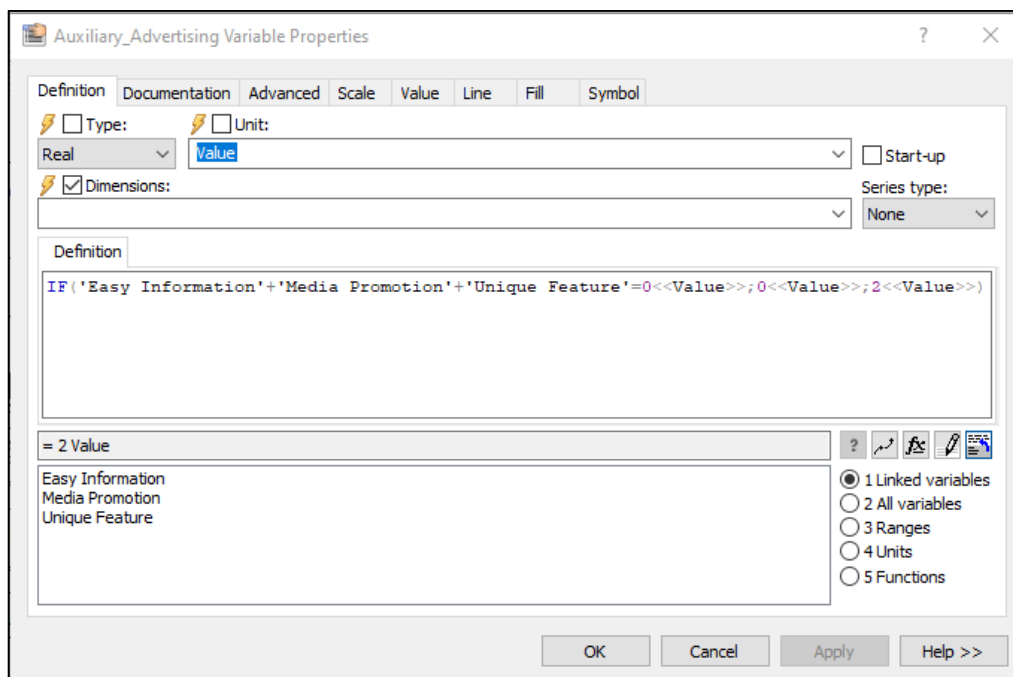
Figure 4. 15 Definition Box of Auxiliary – IF Function

In the figure above, the auxiliary contains the IF function. The definition of IF function is:

(connected_variables=0<<values>>;0<<values>>;1<<values>>)

The definition explains that if the connected variables have zero (0) value, thus the value becomes 0. Otherwise, the value will be based on the GEOMEAN value for each variable.

The auxiliary of the IF function will connect to other auxiliaries with RANDOM and ROUND functions. The function of RANDOM and ROUND is seek to find out the value of the variables in the simulation that can be changed based on the limitation of the definition box. In this research, the random number will range from 1 to 5 which was based on the Likert scale. The definition of the auxiliary with RANDOM and ROUND function will be shown in the figure below.
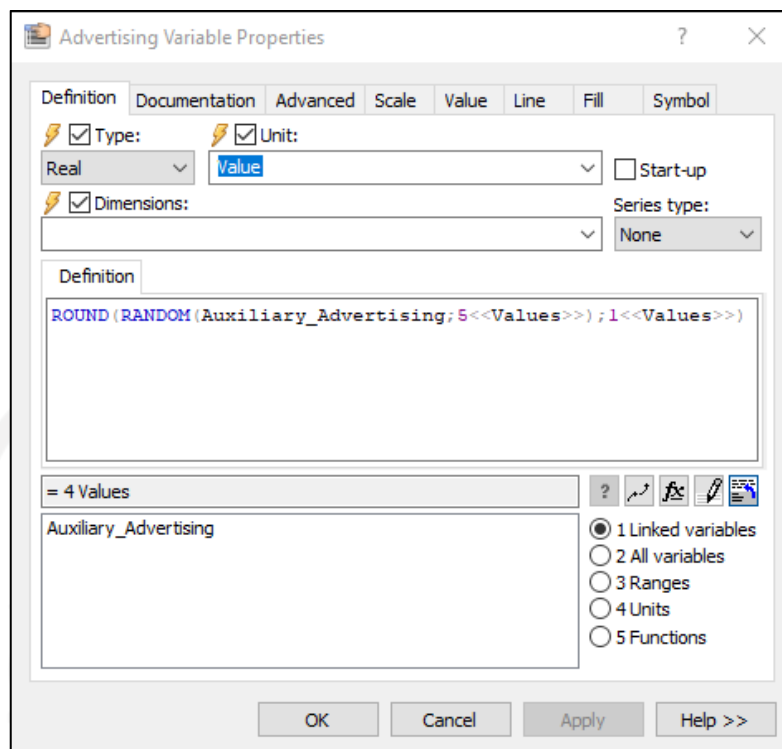
Figure 4. 16 Definition Box of Auxiliary – RANDOM and ROUND function

The final flow connection for the auxiliary is the auxiliary for the customer engagement, which can be seen in Figure 4.13. The last auxiliary is needed as the final result of the model simulation. As the Communication Tools cannot be defined in this level, then an extra auxiliary will be processed in simulation to determine whether the model can be used to increase the value of Communication Tools through simulation model using Powersim Studio software.

C. Simulation Result

The final step of this research is to do the model simulation using Powersim Studio software. The time span will be for 10 years ahead. Thus, the model result will be until the year of 2029. After running the flow diagram model, a statistic graph will be seen as the simulation result that can be seen below:
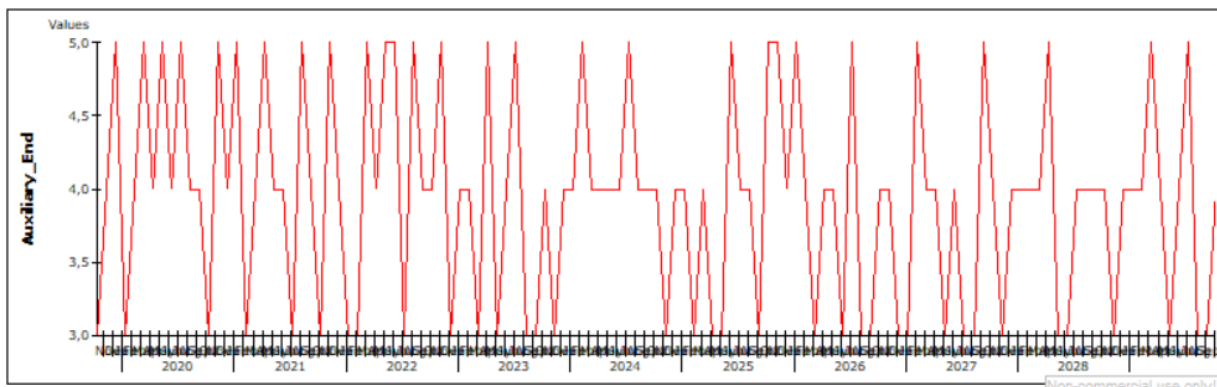
Figure 4. 17 Simulation Result Graph of Communication Tools Model

The resulting graph based on the figure above shows the impact result of communication tools in 10 years span. In the graph, it can be seen that the values throughout each year are increasing and decreasing. The pattern of the graph does transform in variative result, with the minimum value for communication tools is three and maximum value for communication tools is five. Every six variables in the simulation model also have its own each values result. If the communication tools value compared to the variables that influence the values, it can be see that those variables are really matters to the communication tools value. Whereas, the communication tools value will decrease if the variables have a small value The simulation result table will be attached in the appendix section. The following figures shown above are the simulation results for the communication tools.

A. **Simulation Graph Result of Communication Tools - Year 1**

CT Values (Year 1)

— Oct
— Nov
— Dec
— Jan
— Feb
— Mar
— Apr
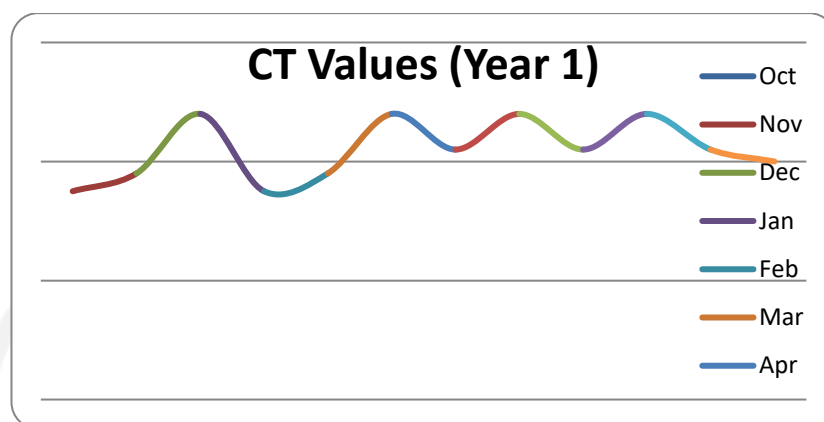
Graph 4. 1 Simulation Result of Communication Tools (Year 1)

Based on the Graph 4.1, it is shown that throughout the years that the communication tools value is either increasing and decreasing. The bottom of the decreasing CT value happens to be in the February 2020 and July 2020, while most of the values from the beginning of the period are increasing each month The communication tools value recorded as three as the minimum value and five as the maximum value.
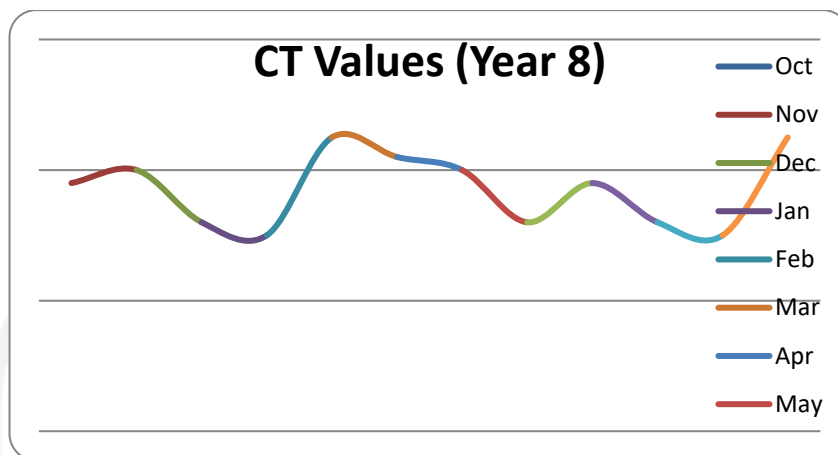
B.   Simulation Graph Result of Communication Tools - Year 2
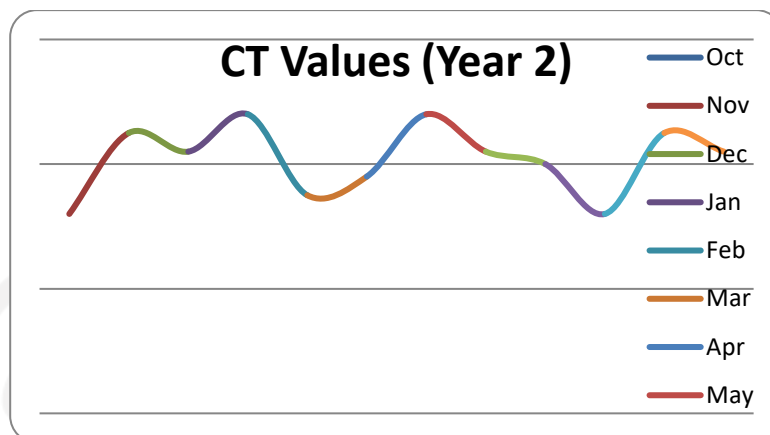
Graph 4. 2 Simulation Result of Communication Tools (Year 2)

Based on the Graph 4.2, it is shown that throughout the second period, the communication tools value is increasing and decreasing. From the beginning of the period, the communication tools value has increased by the end of September 2021. Though, the phenomenon of increase and decrease values still happened throughout the whole period 2.

C.   Simulation Graph Result of Communication Tools - Year 3
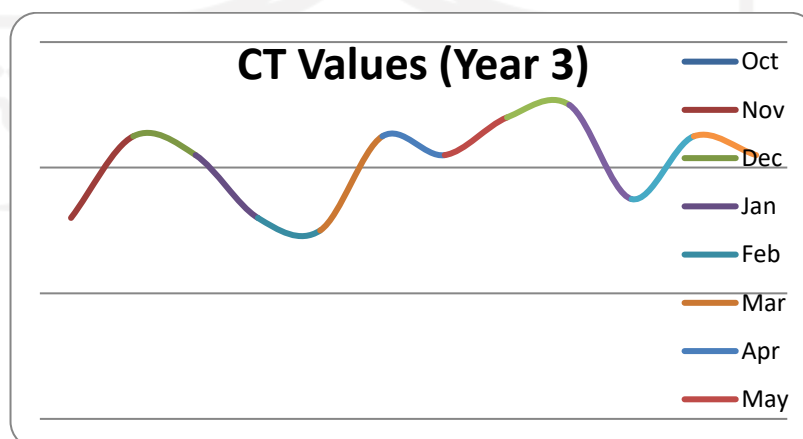
Graph 4. 3 Simulation Result of Communication Tools (Year 3)

Graph 4.3 shows that throughout the third period, the value of communication tools is increasing and decreasing. Starting from December 2021 until February 2022, CT values decreased to the minimum value of three. Then, in July 2022 the CT value decreased after 4 months to have a stable and increased value. Meanwhile, other than the decreasing values, the results of CT values at the end of Year 3 have increased from the beginning.

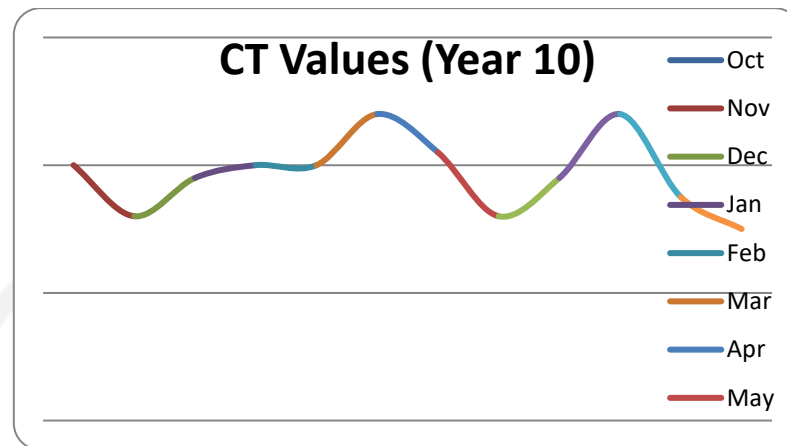**D. Simulation Graph Result of Communication Tools - Year 4**
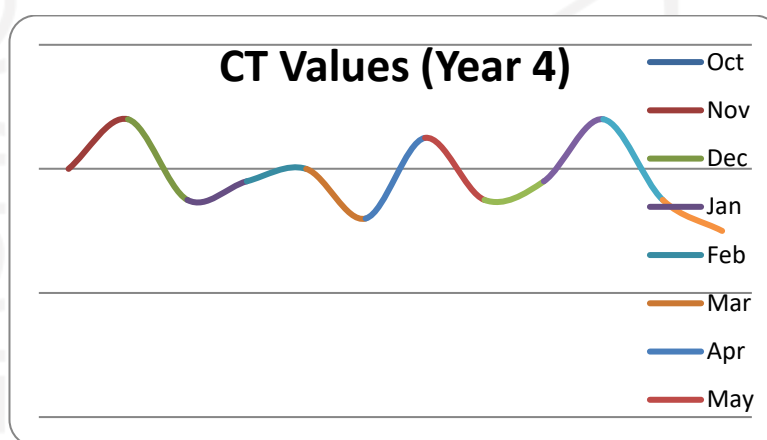
Graph 4. 4 Simulation Result of Communication Tools (Year 4)

On Graph 4.1, it is shown that throughout the years that the communication tools value is either increasing or decreasing. The bottom of the decreasing CT value happens to be in February 2022 and July 2022, while most of the values from the beginning of the period are increasing each month The communication tools value has three as the minimum value and five as the maximum value.

E.   Simulation Graph Result of Communication Tools - Year 5
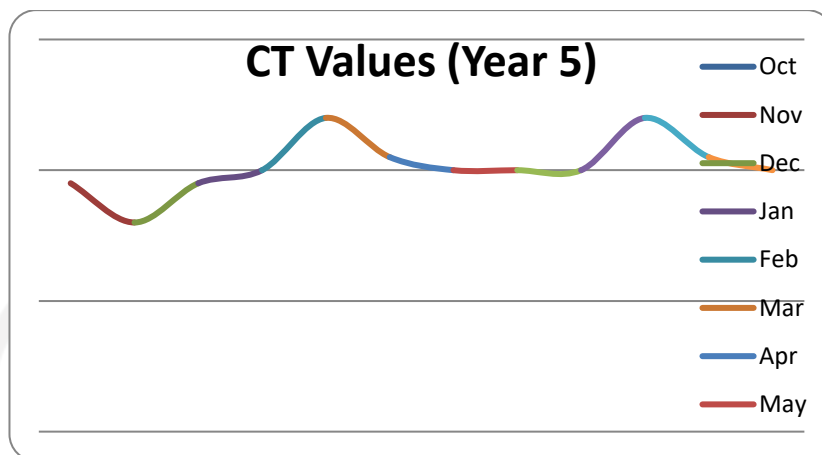
Graph 4. 5 Simulation Result of Communication Tools (Year 5)

Based on the graph above, the communication tools value does have a constant period, from March 2023 and lasts until June 2023. As same as its predecessor, Graph 4.5 also shows that the CT value does increase by a bit or equal with the beginning period until the end of period 5.

F.   Simulation Graph Result of Communication Tools - Year 6
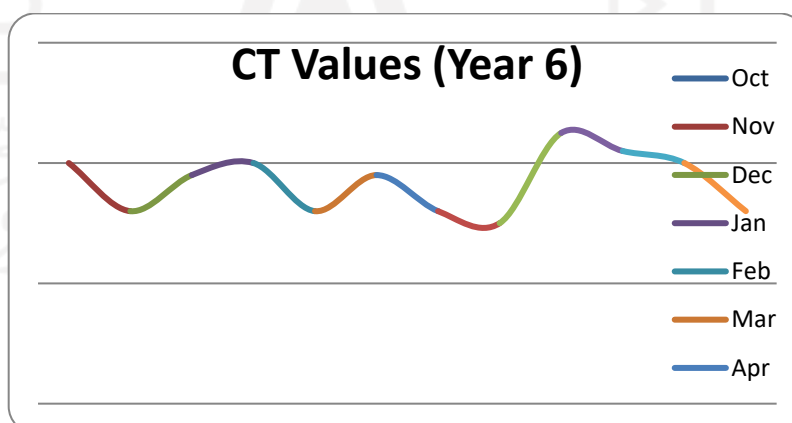
Graph 4. 6 Simulation Result of Communication Tools (Year 6)

Graph 4.6 above shows the result of Period 6 (October 2023 – September 2024) for communication tools values simulation. Different from the previous periods, the communication tools value at the end of the period has decreased from the initial value

at the beginning of period 6. Also, this period do has the most decreasing times of CT values are decreasing but at one point it will be increased by a bit.

G.   Simulation Graph of Communication Tools - Year 7
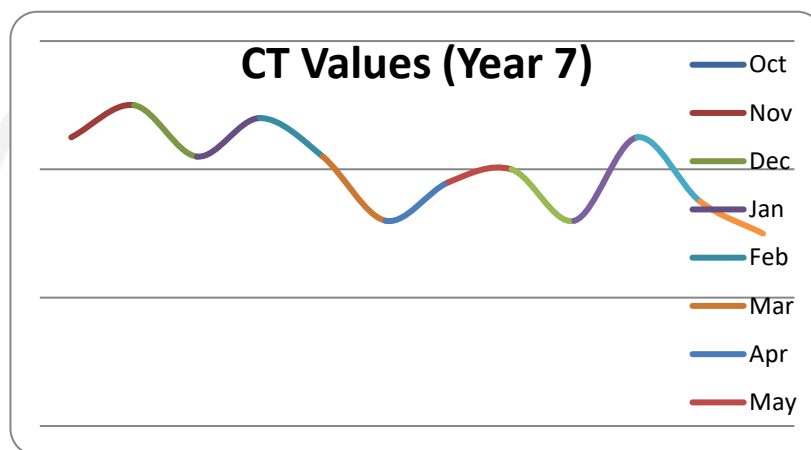
Graph 4.7 Simulation Result of Communication Tools (Year 7)

Based on the period 7 graph result, it can be concluded that the CT values have much more decreasing time rather than increasing value. Same as period 6, the initial CT value from the beginning of the period have decreased throughout the year. With the initial CT value towards five, however at the end of the period it decrease to the minimum value of three.

H. Simulation Graph of Communication Tools - Year 8

Graph 4. 8 Simulation Result of Communication Tools (Year 8)

Graph 4.8 shows the result of Period 8 for communication tools values simulation. Period 8 has returned to the increasing value of communication tools from the beginning until the end of period 8. However, in this period there are few decreasing times when the CT values hit the minimum value of three. From December 2025 and January 2026, it will happened in May 2026, July 2026 and ends of August 2026.

I. Simulation Graph of Communication Tools - Year 9
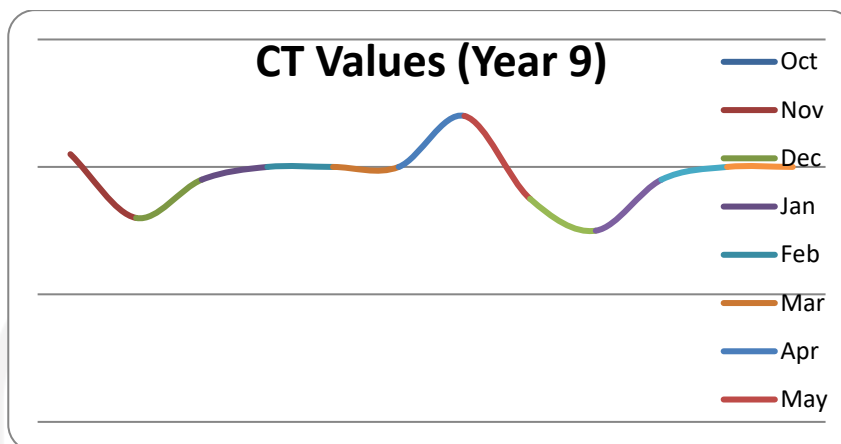
Graph 4. 9 Simulation Result of Communication Tools (Year 9)

Based on Graph 4.9, it is shown that Period 9 has a constant value from December 2026-March 2027 and lasts from August-September 2027 as the end of period 9 closing. Although there are a few times, such as November 2026 and May – June 2027 the CT values are decreasing.

J. Simulation Graph Result of Communication Tools – Year 10

Graph 4. 10 Simulation Result of Communication Tools (Year 10)

This period can be specified as the graph with a significant change. It is because the graph only has one constant CT value and short time spent which is one month (January – February). The last result of the simulation is a value of 3, which is the minimum value of the simulation of communication tools value.

CHAPTER V

DISCUSSION

In this chapter, the researcher will discuss the whole research process, starting from the beginning until the result of the research. This research is a continuation of other researches. The research objectives lead to build a model based on theory. In the early process of this research, a conceptual model was built that consisted of both exogenous and endogenous variables of communication tools. The difference from other research, this research has additional indicators and variables, consisting of one endogenous variable, six exogenous variables and seventeen indicators. The endogenous variable is communication tools. As for the exogenous variables includes; Advertising, Sales Promotion, Public Relation, Direct Marketing, Interactive Marketing and Personal Selling. The variables and indicators will be processed using Structural Equation Modeling (SEM) within the AMOS 23® Software as the statistical tool to calculate the SEM calculation and provide the result.

5.1   The Effect of Advertising Towards Communication Tools

Advertising variables consist of three indicators, which are AD1, AD2 and AD3. The indicators are tested for validity and reliability. The test result came out as the C.R (construct reliability) value is 0.6, which is lower than 0.7 and AVE (variance-extracted value) is 0.6, which is more than 0.5. This result verified that the indicators are not reliable however it is proven valid. As for the hypothesis testing result, advertising has the C.R (critical ratio) of 3,575, which is more than the consistent value (1.96) and p value *** is less than 0.05. It shows that advertising has a significant effect on communication tools (**H1**).

5.2   The Effect of Sales Promotion Towards Communication Tools

The three indicators of Sales Promotion consisting of SP1 and SP2, have been tested for their validity and reliability. The result shows that for C.R (construct reliability) and

AVE (variance-extracted value) both reach each reputable value, 0.7 is equal to C.R value (0.7) and 0.67 is exceeding the AVE value (0.5). This result shows that the variables and indicators are both reliable and valid. For the hypothesis test result, sales promotion has the critical ratio (C.R) of 2,579 which exceed 1,96 with p-value that is lower than 0.05. This hypothesis result proves that Sales Promotion does have a significant/positive effect towards communication tools (**H2**).

5.3 The Effect of Public Relation Towards Communication Tools

PR1 and PR2 as the indicators of Public Relation have been tested. The result came out as both reliability and validity are proven to be correct. The value of each reliability and validity are 0.7 equal with defined C.R (construct reliability) value and for validity is $0.7 > 0.5$. The next phase is addressed for the hypotheses test and the result comes up with critical ratio (C.R) value which is lower than 1,96, but the p-value is shown to be lower than 0.05.

5.4 The Effect of Direct Marketing Towards Communication Tools

The direct Marketing variable has three indicators, which are called DM1, DM2 and DM3. The first test is addressed for the validity and reliability. It is proven to be both exceed each of the defined values. The construct reliability (C.R) value is 0.7 which is equal with 0.7 and the variance-extracted value (AVE) is $0.66 > 0.5$. It shows that the variable has good internal consistency by being reliable and valid. For estimation result, it is shown that critical ratio (C.R) value is -2,172 which is lower than 1,96, but the p-value is $0.30 < 0.05$.

5.5 The Effect of Interactive Marketing Towards Communication Tools

The Interactive Marketing variable, which consists of three indicators that are IM1, IM2 and IM3 have been tested and observed by the researcher. The indicators were tested for their reliability and validity, and the outcome result shows that the value of the indicators are valid yet unreliable. The C.R (construct reliability) value is below the

defined value of 0.7 and AVE (variance-extracted value) is more than 0.5. After the hypotheses are tested, the result comes out with a critical ratio (C.R) equal to 1.96 and p-value is equal to the defined value which is 0.05. Thus, based on the outcome result it can be verified that Interactive Marketing has a significant/positive impact towards communication tools (**H5**).

5.6   The Effect of Personal Selling Towards Communication Tools

The personal Selling variable consists of two indicators, which are PS1and PS2. The indicators are tested for validity and reliability. The test result came out as the C.R (construct reliability) value is 0.6, which is lower than 0.7 and AVE (variance-extracted value) is 0.6, which is more than 0.5. This result verified that the indicators are not reliable however it is proven valid. As for the hypothesis testing result, advertising has the C.R (critical ratio) of 3,977, which is more than the consistent value (1.96) and p-value *** is less than 0.05. It shows that personal selling has a significant/positive effect towards communication tools (**H6**).

Thus, based on the hypothesis testing, all six exogenous variables correlate well to communication tools. The conceptual model is accepted based on H1, H2, H3, H4, H5, and H6 considering the result of the critical ratio value (> 1.96) and its probability (< 0.05). The model that will be continued in simulation process contains six variable such as **Advertising**, **Sales Promotion**, **Public Relation**, **Direct Marketing**, **Interactive Marketing**, and **Personal Selling**.

Hence, it can be concluded that the relation/correlation between an exogenous variable with the corresponding hypotheses; SEM only provides correlation between variables in the conceptual modeling of communication tools. The limitation of SEM cannot provide when the use of achievement strategy for communication tools can reach a suitable/good brand trust. Thus, the researcher makes an effort to determine the time strategy for communication tools using simulation.

5.7   Simulation Result

The next stage to continue the study is to simulate the model from the SEM result analysis.

In this study, the researcher used system dynamics simulation needs to build a Causal Loop Diagram (CLD) for the model. CLD is built to define the relationship in each variable. Seven variables are included in the CLD diagram. There are Advertising, Sales Promotion, Public Relations, Direct Marketing, Interactive Marketing, and Personal Selling as the accepted exogenous variables and internal factor as the additional variable. The relationship between variables is defined by the direct interview with the expert on this field study case, and then the expert judgment result can be obtained.

For the CLD, the diagram contains two types of relationship; positive and negative relationship. In this research, the model has three loop correlations within two positive loops and one negative loop. After the CLD has already been identified and accepted, then the flow diagram can be built. On the flow diagram, it is required to input the data on the definition box on all of the variables and indicators. The data are derived from three expert judgments. The expert in this study is the finance manager, marketing manager and product engineer in REI Yogyakarta.

The result of qualitative result is represented as the Likert scale that ranges from 1 to 5. The data input from the expert judgment is calculated using Microsoft Excel and the function to help generate the data is GEOMEAN. After the data have been generated, it can be continued to do the simulation. While the data being inputted and given by the formulation, the model can now be simulated.

The research simulation simulates the time range for calculating the communication tools for 10 years. Based on from the simulation result, the researcher can be concluded that the communication tools value is not always increased and decreased. The calculation result has a minimal value of three and a maximum value of five. For ten years of simulation, the data shows that the Communication Tools (CT)

value is always changing. While there are a few circumstances where at least one month and a maximum of four months the value has a steady result, which can be called as the constant value. This result can be advantageous for the property industry to construct a decision to make the communication tools value still persistently elevated.

Following the simulation result that provided by the Powersim 9 Software, the researcher could now construct the scenario design. Scenario design aims to create a decision for solving the situation. The communication tools value will decrease if the input variables also have a small value. Based on the overall result, the decision maker can make a vast decision by observing the graphic changes through the years. Hence, this discussion will help to build the scenario design. The scenario design can be the suggestion act for the company to keep the communication tools value frequently becomes good.

For future research the quantitative method can be employed in simulating the variables of communication tools. More research can be carried out using various reliable sources. In order to find a suitable systemic solution, the researcher has conducted the simulation proposed model using the historical data. The result may have been insufficient because this method is the first trial simulation that have been conducted using consumers data from this company. Thus, there is a limitation to achieving the complete solution.

CHAPTER VI

CONCLUSION AND RECOMMENDATION

6.1   Conclusion

Based on the result analysis and discussion in previous chapters, a conclusion can be drawn to answer the problem identification below:

1. The conceptual model design is built based on the hypothesis testing for all six variables. The model consists of two types of variables; six variables are considered as the exogenous variable which are Advertising, Sales Promotion, Public Relations, Direct Marketing, Interactive Marketing and Personal Selling; whereas the endogenous variable is communication tools.

2. The relationship between exogenous variable, endogenous variable and their indicators can be identified through a significant hypothesis test. In this research, the result of the test shows that H1, H2, H3, H4, H5, and H6 are accepted. The six variables are Advertising, Sales Promotion, Public Relations, Direct Marketing, Interactive Marketing and Personal Selling.

3. After the data of this research have been tested, the accepted variables will be put into the simulation model. The researcher then constructs the model using system dynamics theory with the help of Powersim 9 software. The simulation will run for 10 years range of time. The simulation result came out as line graphs that the values can be obtained according to the effect of communication tools values, which can be the reference for the decision maker to build appropriate decision-making.

6.2 Recommendation

As for the recommendation for further research, the future researcher can find and identify other exogenous variables and calculate the data along with the proposed model for the simulation process. Thus, the research on this topic can produce a significant result towards communication tools in managing the consumer's environmental needs.

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