

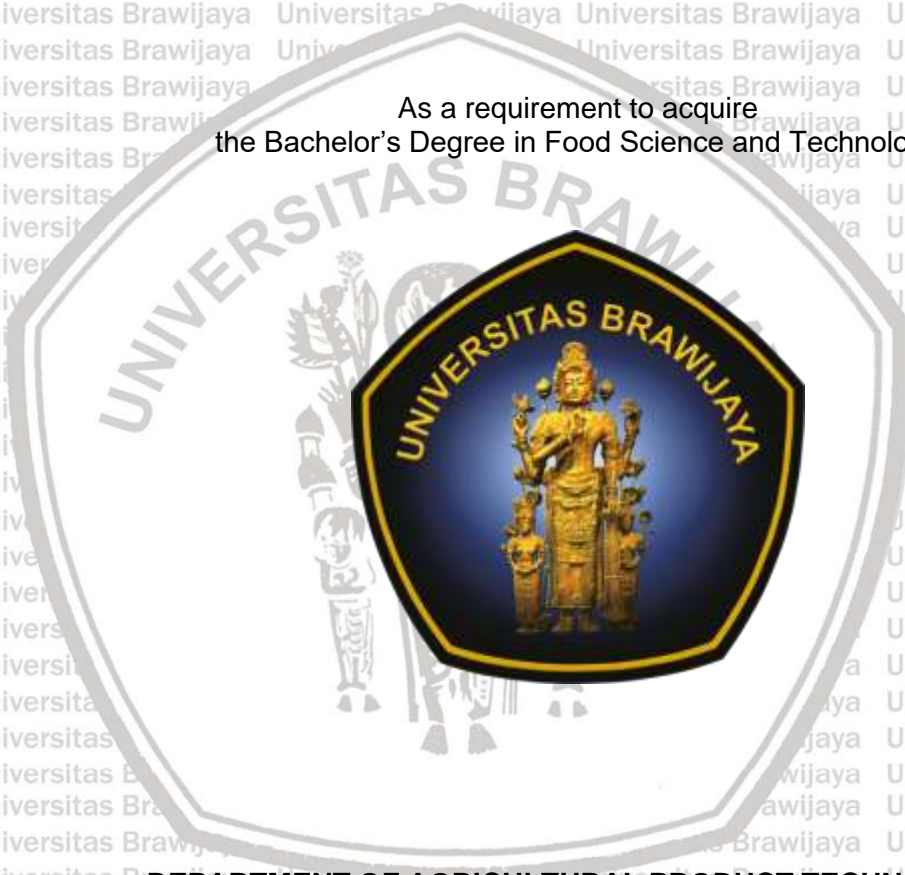
**CONSUMER'S PREFERENCE ANALYSIS TOWARD THE PACKAGING ATTRIBUTES
AND INFLUENCE ON WILLINGNESS TO PAY OF LOCAL CHOCOLATE PRODUCTS**

By:

MIFTAHUS SA'DIYAH

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As a requirement to acquire
the Bachelor's Degree in Food Science and Technology



DEPARTMENT OF AGRICULTURAL PRODUCT TECHNOLOGY

FACULTY OF AGRICULTURE AGRICULTURAL TECHNOLOGY

BRAWIJAYA UNIVERSITY

MALANG

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And Influence On Willingness To Pay Of Local Chocolate Products

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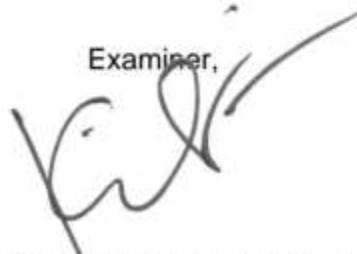
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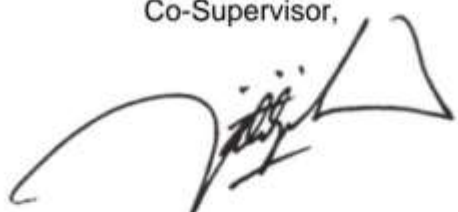
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BIOGRAPHY

Miftahus Sa'diyah, born in Tulngagung on June 22nd, 1998 second children and first daughter of Markadi and Nuning. The author is the second children, with first brother Beny Apriliyanto and little sister Ummi Fadlilah. The author was completed the kindergarten level at RA Al-Hikmah Doroampel in 2005, elementary school at MI Riyadlotul Uqul Doroampel in 2011, junior high school at MTsN 1 Tulungagung in 2014, and senior high school at MAN 2 Tulungagung in 2016. The author was active at academic activity but then that was not a guarantee to be easily pass the college entrance exam. The author was failed on the first trial of college entrance, so the author spent the first year to study English in Pare, Kediri. The second year, the author got accepted as student of Food Science Technology, Department of Agricultural Product Technology, Faculty of Agriculture Technology, in Brawijaya University. During college, the author was active for not only on academic but also in organization. The author was being the participant of short term exchange program in Mae Fah Luang University, Thailand in 2019. Last year of my college will be the most memorable moment on my life since the author started to try finding a job. It was not easy to get a job as we pleased and the author had tried applying to many places until she was got accepted in Gerai Kopi, a coffee shop in Tulungagung. The author got a lot of new amazing experience and support from ther new environment. Since the study was being held by online, the author prepared the Final Project with the title "Consumer's Preference Analysis Toward The Attributes Packaging of Local Chocolate Products And Its Influence to Willingness to Pay Using Discrete Choice Experiment Method" as the requirement in obtaining a Bachelor's degree. The author hopes by finishing the study, the author can bring and give a lot of benefit to her parent, friends, and all people.



This manuscript was dedicated to
All of my family, My dad, My mom, my bro, and my little sist,
My Supervisor and my role model, Ma'am Wenny Sunarharum, S.TP., M.Food., St. Ph.D
And my honorable mentions to NCT 127, NCT Dream, WayV, and Day 6
Big thanks for all of my friends for always supporting me, OPET, TAYO, STAR, KINGKONG,
and Gerai team, all kindness may comes to y'all

MIFTAHUS SA'DIYAH. 175100100111010. Consumer's Preference Analysis Toward The Attributes Packaging of Local Chocolate Products And Its Influence to Willingness to Pay Using Discrete Choice Experiment Method. Supervisor: Wenny Bekti Sunarharum, STP., M.Food.St., Ph.D.

SUMMARY

The packaging is an important attribute of a product, it is used as the communication tool in a marketing activity. There is a lot of components that should be considered to make the packaging. The previous research mentioned that front-of-pack attributes have the potential to affect people's choices. A Discrete Choice Experiment (DCE) was one of the methods that can be used to analyze the consumers' preference towards products. In this research, DCE method will be used with several attributes related to the product packaging such as design and packaging material. This research is conducted to analyze the preference of the consumers toward the design and material of the milk chocolate packaging. The reference sample of this research is an 80 grams milk chocolate bar product. The purpose of this research is to analyze the willingness of the consumers to pay the products that are offered.

The result of this research reported level of attributes (design and packaging material) that preferred by the consumers. It was found that the Design 2 (black) attribute is significantly preferable to the Design 3 (yellow) and the Design 1 (white) designs among the surveyed consumers. Meanwhile, the consumer survey for the packaging material attributes (plastic, paper and aluminum foil) also showed the use of aluminum foil as the packaging material for milk chocolate is notably preferable than the other two materials. Those preferences were also affecting the willingness to pay (WTP) of the consumer towards the product. The consumer willing to pay Rp. 5.037 higher for Design 2 (black) design than the price that given to controlled level (Design 1 (white)) and do not willing to pay Rp. 3.256 higher for Design 3 (yellow) design compared to controlled design. Meanwhile for the material attributes, the analysis predicted the consumers are willing to pay Rp. 14.650 higher for aluminum foil based packaging and Rp. 8.081 higher for paper based packaging compared to the price that given to controlled level (plastic).

Key words: Local Chocolate Product, Packaging, Consumer's Preference, *Willingness to Pay*



FOREWORD

I would like to thank God for all of the mercies and blessings so that I can complete this proposal of the final project that is used for obtaining the Bachelor's Degree in Agriculture technology Faculty. His guidance supports me to fight the obstacles during the process. The title of this manuscript is Consumer's Preference Analysis Toward The Attributes Packaging of Local Chocolate Products And Its Influence on Willingness to Pay Using Discrete Choice Experiment Method.

I would like to thank my parents for their financial and mental supports so that I can be at this stage of my study. Thanks to my sister for always giving me a positive environment and support so I can work peacefully. I would like to thank my supervisor, Mrs. Wenny Bekti Sunarharum, STP., M. Food.St., Ph.D., Dr. Eddie., and Mr. Arif who educate me about all of the materials needed to make this manuscript. Thanks to Mrs. Wenny for always evaluating my work and give a lot of suggestions and support during the process of manuscript making. Thanks to Dr. Eddie for giving me a lot of corrections and suggestions regarding the topic that I use in this manuscript. And Thanks to Mr. Arif who thought me about the methods that I used in this project. Without all of these people, I won't be able to complete this proposal.

I would like to thank all of my friends for always supporting, helping, and dedicating their time and knowledge so we can create a lot of happy memories during our study. Last but not the least, I would thank NCT who always calming my mind and gives a lot of positivity through their music and art due to the manuscript making.

This manuscript is far from perfect but I dedicated my best here. I hope this manuscript can give a lot of benefits information to the readers and all of the people.

Tulungagung, July 7, 2021

Writer,

Miftahus Sa'diyah

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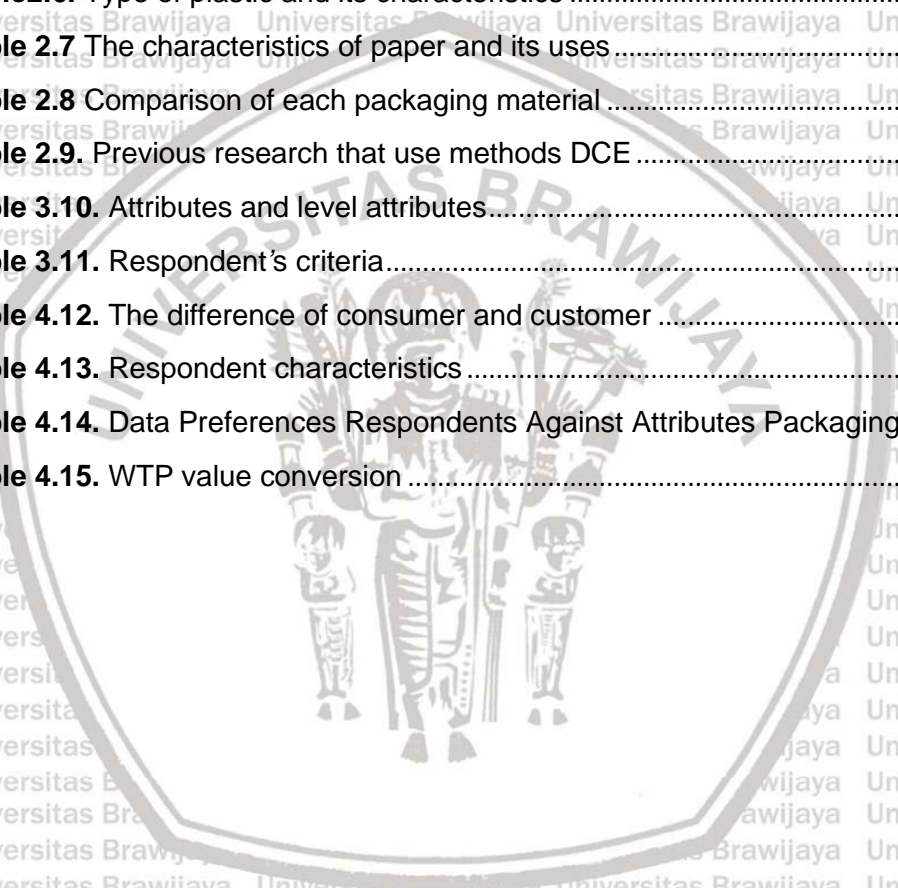
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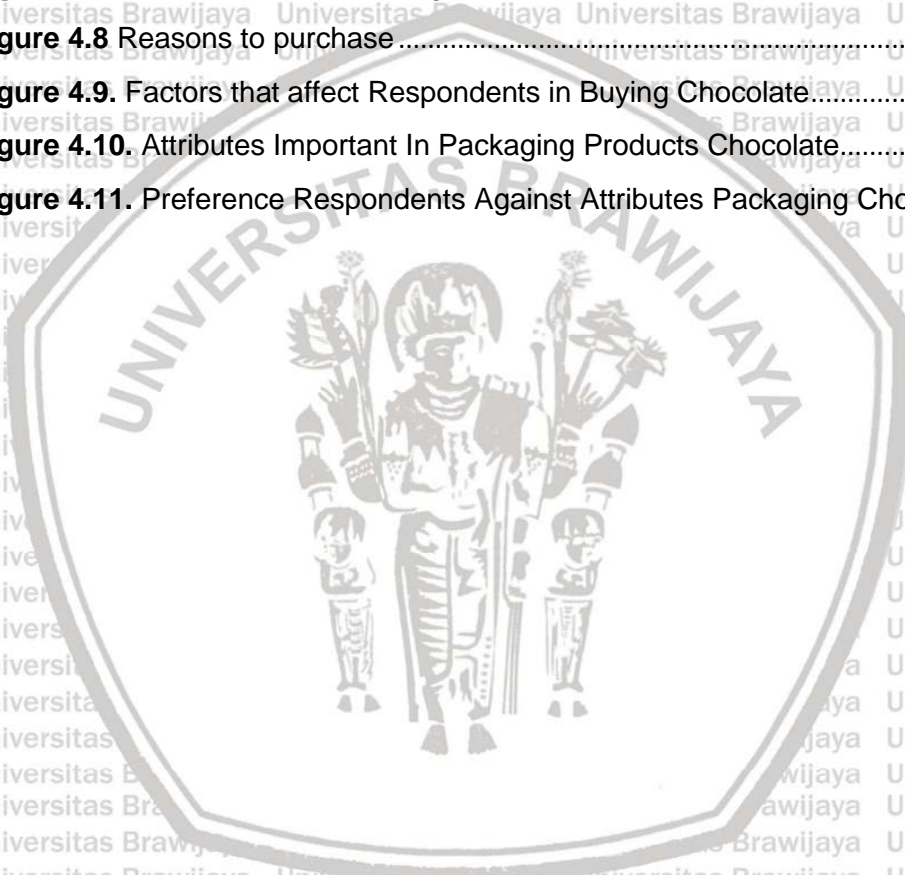
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CHAPTER I. INTRODUCTION

1.1. Background

Packaging is one of the important attributes of the product that is used as a communication tool in marketing (Dung, Anh and Huyen, 2013). The definition of the packaging according to (Aggarwal and H. Langowski, 2020) is a medium that covers the product to prevent contamination. Packaging plays some important roles for the product such as protection, container, convenience, and communication (Aggarwal and H. C. Langowski, 2020). Packaging protects the product from any contamination that can decrease its quality. The product can be damaged by material in the environment such as dirt, chemical, and biological things. Packaging acts as a barrier that can prevent direct contact with the environment so that the hygiene of the product can be maintained (Vardhan and Amulya, 2014).

While in marketing, the packaging is used as communication tools between the producer and the customers. The producer cannot meet a huge of consumers at once and the producer is impossible to tell all of the information directly to the consumer because it will take a lot of cost and time. This problem can be fixed as the role of the packaging is a connector of the producer to the consumers. Packaging will connect them by the information given to the packaging. The information helps the producer deliver the message regarding what product inside of the packaging. (Vardhan and Amulya, 2014).

The relationship between the consumers and the product will involve some sensory activities such as vision or seeing, touching, sensing, smelling, and others. The combination of those activities will create the analytical and judging activity toward the products. The judging process will influence the consumer in considering the willingness to pay (WTP) (Carvajal-larenas *et al.*, 2015). The previous research conducted based on the phycology experiment gives a result that the vision and sense are the major stimuli that dominate the perception forming toward the product (Fenko, Schifferstein and Hekkert, 2010). The previous research that was done by Russell *et.*, *al.* said that the front-of-pack attributes were potentially affected people mostly parents' choices of products. The previous work was focused on nutrition and health information of front-of-pack products affecting people's choices (Georgina Russell *et al.*, 2017).

Indonesia is the third-highest cocoa production country after *Côte d'Ivoire* (Ivory Coast) and Ghana (Andrzejuk, 2014) and has become the highest cocoa-producing country in Asia. Chocolate is one of the favorite and popular food among people all of the ages all around the world (Cevallos-Cevallos *et al.*, 2018). Based on Sabariman's

research, milk chocolate was the most favorite chocolate product (Sabarisman and Purwaditya, 2019). Nowadays, a lot of international chocolate brands entering Indonesia and being popular among Indonesians. It was also mentioned that the cocoa production in Indonesia was tend to be increasing due 1980 – 2016, in contrast the processed product could not fulfill the consumer needs and decreasing the buying interest of chocolate. This phenomenon showed that the chocolate local brands have a high and strong competitor. As mentioned before that packaging plays an important role in marketing and creating the perception toward chocolate that can be affecting the consumer's decision making in the purchasing product. The research about consumer preference towards packaging is important to fulfill consumer satisfaction. The packaging of chocolate helps the product to engage the consumer and make them curious about the product it self, so it is important to analyze the consumer preference towards attribute of the packaging and identified its influence on the willingness to pay.

1.2. Problem Statement

1. What are the preferences of consumers toward the attributes and level of attributes of chocolate packaging?
2. What does the influence of consumer preference on the willingness to pay for chocolate products?

1.3. Purposes

1. Identify the consumers' preference toward attributes and level of attributes of the chocolate packaging
2. Identify the influence of consumers preference to the willingness to pay for chocolate products

1.4. Benefit

This manuscript is expected to be useful for some organization such as:

1. Academic

- a. This manuscript can be one of the literation to develop the next research in the focus of consumer or marketing research
- b. This manuscript can be one of the improvements or further research for completing the previous research on the topic of consumer preference toward chocolate packaging

2. Indonesian Chocolate producers

- a. This research can improve the knowledge of the producers about the consumer preference and the importance of the packaging in the marketing so they can compete with the competitor
- b. This research can be used as their evaluation and suggestion to improve their product

1.5. Limitation of research

This research was for analysing the preference of the consumers towards the attribute of the chocolate packaging. According to the previous survey, Indonesia has a high rate of consuming chocolate. Indonesian people prefer to consume milk chocolate rather than dark chocolate and white chocolate. The dark chocolate has been chosen as the product sample because many of the local chocolate production, such as Pipiltin, Monggo, Krakakoa, Pod, Ndalem, also produced dark chocolate. The dark chocolate is also chosen to give new experience towards chocolate product to the respondent.

There are a lot of important attributes that should be concern in the packaging. According to Gunaratne, the attributes such as design, nutrition information, price, and label generates the expectation of the consumer. Since there are a lot of interesting thing to analyze related to the consumer preference in this research, it is important to decide the limitation of the research in order to get a focus of research.

First, this research was conducted by online survey and focusing on the attributes of design, material, and price. This research only analyzing which level of each attributes that was being chosen by the respondent. This research also analyzed the Willingness to Pay for each level of attributes. The important point is that this research was generated by RStudio software with several packaged used (support.CEs, readxl, and survival) to analyze the data.

Second, this research was targeting the consumer of chocolate product with the minimum age of 18. Under 18 years old respondent were excluded from this research since they were

regarded as underage and predicted incapable of taking good decisions on their own. The consumer chocolate were chosen because the main goal of this research is analyzing the preference of consumer, so in order to be part as the respondent, they should ever bought chocolate product.



CHAPTER II. LITERATURE REVIEW

2.1. Cocoa Plant

Cocoa is a major component of chocolate products. There are a lot of products that can be produced from cocoa such as cocoa powder, chocolate bar, and chocolate paste (Oracz and Nebesny, 2016). The cocoa plant's scientific name belongs to *Theobroma cacao*, this plant mostly grows in tropical areas such as Africa, Asia, and some places in South America. Cocoa tree grows up to 12 meters and lives for 60 years. *Forastero*, *Criollo*, and *Trinitario* are some varieties that are most used in chocolate manufacture. Those varieties are classified by it's characteristic and morphology (Afoakwa *et al.*, 2013). Nair (2010) explained in his book, *The Agronomy and Economy of Important Tree Crops of the Developing World*, the difference between those varieties. The major differences between each variety are explained below:

a. *Criollo*

Criollo is known as cocoa fruit that has reddish-yellow color on its pod. The pod is a whole fruit of the cocoa. The pod has a sharply pointed shape. *Criollo* has a thin fruit wall compare to other varieties with big and round seeds

b. *Forastero*

Forastero has a green color when it's unripe and turns to yellow when it's mature. This variety has a thick fruit wall and flat seeds.

c. *Trinitario*

Trinitario is a hybridation between *Criollo* and *Forastero*. The characteristic of this variety can be specified because they can be similar between both *Criollo* and *Forastero*. (Nair, 2010). The morphology of each variety is shown in **Figure 2.1**.



Forastero



Criollo



Trinitario

Figure 2.1. Cocoa varieties (Afoakwa, 2014)

The different variety gives different characteristics and treatment process. *Criollo* has the best quality compared to others but the plant is not disease-resistant so it's hard to be planted (Pohlan, 2020). *Criollo* is also known as *flavor beans* because it creates a complex flavor. The complex flavor causes a weak cocoa taste when it is used in chocolate

production (Castro-Alayo *et al.*, 2019). Meanwhile, *Forestero* has a bitter taste with moderate acidity. *Forastero* is called *bulk beans* because it is rich in "chocolate" flavor. *Forestero* is more disease-resistant compare to *Criollo* (Zyzelewicz *et al.*, 2014) so it is easier to be planted. Most farmers prefer planting *forastero* because of easy maintenance and have bulk flavor (Pohlan, 2020). The different characteristics of each variety are shown below.

Table 2.1. Characteristics of the different cocoa varieties

Characteristics		Criollo	Forastero	Trinitario
Pod Husk	Texture	Soft, crinkly	Hard, smooth	Mostly hard
	Color	Red occurs	Green	Variable
Beans	Total per pod	20-30	30 or more	30 or more
	Color of cotyledons	White, pale purple	Pale to deep purple	variable
	Quality			
	Fermentation time	1-3 days	5 days	4-5 days
	Flavor	Weak chocolate, mild, nutty	Good chocolate	Good chocolate, full cocoa
	Bean size (g/100 beans)	85	94	91

Source : (Afoakwa, 2014)

The previous research that was conducted by Munoz, Jader, Fabrice, and Sebastian (2020) says that different varieties of cocoa will give different sensory attributes. They also said that the same varieties but different areas of the plantation will give the different characteristics of sensory as well (Muñoz *et al.*, 2020). Some varieties and their characteristics in several areas are shown in the table below.

Table 2.2. Profile of cocoa from different areas

Areas	Cocoa Variety	Flavor Characteristic
Cote d'Ivoire	Forastero	Low bitterness, low acidity, fruity, nutty
Ghana	Hibrida Forastero	Strong basic cocoa, fruity notes
Nigeria	Hibrida Forastero	Medium cocoa, occasional off-notes
Madagascar	Criollo	Winey, citrus
Brazil	Forastero	Bitter, acid, astringent, fruitiness
Colombia	Trinitario dan Criollo	Fruity, bitter

Indonesia	Criollo/hibrida forastero	Acidic, fruity
Sulawesi	Criollo/hibrida forastero	High bitter, low sour
Java	Criollo/hibrida forastero	Mild, acid
Malaysia	Hibrida forastero	Medium to high acidity

Source: (Muñoz *et al.*, 2020)

Chocolate has a specific and unique taste and flavor. Those flavors are created from the chemical compounds inside the cocoa. The compounds are interacting together during the process such as fermentation and roasting to create a complex flavor (Vega and Kwik-Urbe, 2012). The proximate analysis of cocoa is shown in **Table 2.3**.

Table 2.3. Chemical compositions of Cocoa

Compound	Average Concentration (% w/w)	
	Pulp	Seed
Water	80-85	34-45
Lipids	<0.5	45-55
Sugar (sucrose, glucose and fructose)	10-16	0.5-2
Polysaccharide	1.5-3.0	14-20
Pectin	4-7	2.0
Organic Acid	1-3	0.3-0.9
Inorganic Salts	0.5-1.0	0.5-1.0
Polyphenols	<0.1	7-10
Alkaloids (<i>theobromine</i> and <i>caffeine</i>)	<0.1	3.5

Source: (Vega and Kwik-Urbe, 2012).

Indonesia is the third country that has high cocoa production after *Côte d'Ivoire* (Ivory Coast) and Ghana (Andrzejuk, 2014) and is the highest cocoa-producing country in Asia. Indonesia has 1.6 Ha areas that are used as cocoa plantations (Manalu, 2018). Forastero is the major variables that is planted.

Table 2.4. World Cocoa Production in 2014-2015

Region	Area	Production (thousand tons)
Africa	Côte d'Ivoire	1.720
	Ghana	810
	Nigeria	235
	Cameroon	205
	Wilayah lain	91
America	Brazil	215
	Nigeria	230
	Wilayah lain	263
Asia and Oceania	Indonesia	380
	Papua	42
	others	42
Total Production		4.232

Source: (Afoakwa, 2016)

2.2. Cocoa Products

Cocoa beans can be processed to make several products such as cocoa butter, cocoa powder, chocolate bar, chocolate paste, etc. (Beg *et al.*, 2017). Those products are needed in the food and beverages industry as the main ingredient or the flavor compound of the product.

a. *Cocoa Butter*

Cocoa butter is made by grinding the roasted bean. The ground product of cocoa is named *cocoa liquor*. The *cocoa liquor* then will be pressed to separate the solid compound and the liquid. The solid part that is produced after the pressing process is called *cocoa cake* while the liquid is called *cocoa butter* (Naik and Kumar, 2014). The cocoa powder is made from the *cocoa cake* through a drying process (Firmanto, 2018). 100 grams of cocoa contain up to 54% *cocoa butter*. 40 grams of *cocoa butter* and 40 grams of the *cocoa cake* are produced during pressing 100 grams of cocoa (Clercq, no date). *Cocoa butter* composed of lipids in the form of triglycerol that is dominated by *stearic acid* 32.9-37.6%; *oleic acid* 32.7-37.6%; and *palmitic acid* 24.1-27.1% (Barišić *et al.*, 2019).

b. *Cocoa Powder*

As mentioned before that the main ingredient of cocoa powder is a solid phase produced in cocoa pressing. The solid phase or *the cocoa cake* will be processed further

into the milling process to reduce the size of the particle. (Joel *et al.*, 2013). *The cocoa powder* consists of some nutrients such as fat, protein, and fiber. *Cocoa powder* is an essential material in the chocolate-making process because of the aromatic and flavor compound contained in cocoa powder.

Table 2.5. Nutrition Content of Cocoa Powder

Component	Amount (%)
Water	5.10 - 7.10
Fat	10.05 - 12.65
Protein	6.80 - 9.55
Fiber	1.06 - 2.60
Ash	5.30 - 6.40
Carbohydrate	61.00 - 62.40

Source: (Joel *et al.*, 2013).

c. Chocolate Bar

The chocolate bar belongs to the confectionery group. Chocolate is divided into three major groups which are dark chocolate, milk chocolate, and white chocolate. (Toker *et al.*, 2018). Those chocolates have a similar making procedure with the different main ingredients. Chocolate is made by several processes such as *pre-mixing, refining, conching, tempering, and molding* while the ingredients of chocolate are *cocoa butter, cocoa powder* (except white chocolate), sugar, milk (except for dark chocolate).

The pre-mixing process is a process where all of the ingredients are mixed. The ingredients needed to depend on the type of chocolate product that planned to be made. The white chocolate doesn't include cocoa powder in the ingredient. White chocolate uses cocoa butter as the main ingredients so there is no brown color are formed. The white chocolate product has a sweet and milky flavor because milk is added during the process (Toker *et al.*, 2018). While dark chocolate and milk chocolate are used cocoa powder to create brown color and cocoa flavor on the product. Dark chocolate has a higher concentration of cocoa powder compare to milk chocolate. Dark chocolate has a bitter taste and dark brown color. Milk doesn't include in dark chocolate making (Toker *et al.*, 2018).

Refining is a process of reducing the size of the particle. The refining process uses 5 rollers that can reduce the size of the particle up to 30 micrometers. The size of the particle will affect the texture and the sensory of the product there for it needs to be (Afoakwa, 2016). The fine batter of chocolate then will go to the *conching* process. *The conching* process is a chocolate-making process that involving



mechanical movement and heat. This process is needed to form the texture of the chocolate ('Cocoa bean processing and the manufacture of chocolate', 2011).

Tempering is a further process after *conching*. The batter of chocolate that is conched will be hardened by reducing the temperature and continued by re-melting the chocolate. This process helps to create a great crystal structure that can give a pleasant texture of chocolate. After tempering, the chocolate is molded in the molding process ('Cocoa bean processing and the manufacture of chocolate', 2011).

2.3. Packaging

The first impression that consumers have of food products is the packaging. The first impression of the packaging will determine the likelihood of purchasing (Gunaratne *et al.*, 2019). Packaging also plays an important role as a communication tool in marketing (Dung, Anh and Huyen, 2013). The definition of the packaging according to Aggarwal and Langowski (2020) is a medium that covers the product to prevent contamination. Packaging plays some important roles for the product such as protection, container, convenience, and communication (Aggarwal and H. C. Langowski, 2020). As the protection tool, packaging prevents dirt, microbes, and any chemicals to contaminate the product. Dirt, microbes, and chemical can damage the product and reducing the quality of the product, by using the packaging the product will be protected from the environment and prolong the shelf life so the quality can be maintained. Packaging as a container has a similar definition as mentioned before, it protects the product from direct contact with the place where it is put in (Vardhan and Amulya, 2014).

The packaging is also used as a convenience tool by preventing the user from touching the product directly. Some products such as food may contain materials that can contaminate the hygiene of the user. The role of the packaging here is as the barrier that prevents the material (seasoning) from being transferred to the user. As a convenience function, packaging also helps the product easy to be carried everywhere. The next function is for communication tools between the producer and the customers. The producer cannot meet a huge of consumers at once and the producer is impossible to tell all of the information directly to the consumer because it will take a lot of cost and time. To solve this problem, packaging plays a role as a connector of the producer to the consumers. Packaging will connect them by the information given to the packaging. The information helps the producer deliver the message regarding what product inside of the packaging. (Vardhan and Amulya, 2014).

The overall features of the packaging can create a specific and original design. The customer judgments about product quality are largely influenced by product characteristics that are represented by packaging (Silayoi and Speece, 2007). The appearance and design of the packaging influence the willingness to buy of the customer (Dung, Anh and Huyen, 2013). Some attractive and unique designs are needed to attract the consumer and build a positive perception that can influence consumer expectations about the product (Djatna and Dwi, 2015). As a communication tool, the producer will put necessary information related to the product and company to make the customer understand the product (Vardhan and Amulya, 2014). Riaz said in his research that some attributes need to be put on the packaging are color, packaging material, logo, and pictures used (Riaz and Ghafoor, 2019). In other research said that color influences the perception and emotion of the consumer and it will affect the preference and choice towards the product. Liao took the example of black and silver will build exclusive and luxury perception and green for the fresh and organic related (Xinwei *et al.*, 2015).

Packaging holds a role important in marketing for first approach of a product towards the consumers originated from the packaging. The appearance, shape, and design of the packaging can influence consumer purchasing decisions (Dung, Anh and Huyen, 2013). Design packaging that is unique and interesting can affect the satisfaction of customers who are directly going to affect the assessment of consumers towards the product (Djatna and Dwi, 2015). One of the functions of packaging is as a medium of information. The information represents products and companies or manufacturers of products, so that consumers can know the picture of the product are offered (Vardhan and Amulya, 2014). Packaging as media information covers several categories including information tracking, information products and information marketing and brand (Sedlacekova, 2017).

Marketing is a medium in which to discuss about the analysis and identification of the community social needs. To get a product that is a need by the consumers, the consumer will make a purchase. Before making a purchase, the consumers will judge the products that exist based on some aspect compared to similar products (Asamoah, 2012).

According to (Draskovic, 2016), there are several essential attributes on the packaging, including:

- a. Shape and design
- b. Size
- c. Color
- d. Packaging material

e. Information

f. Graphic applications such as logos, images, and fonts that are used (Draskovic, 2016).

2.4. Types of packaging for food

According to (Ojha *et al.*, 2015) the types of packaging materials that are often used for the food packaging include:

a. Glass

Glass is a material that is first used as an ingredient of the packaging. According to Sacharow and Griffin in the articles of science written by Ojha and Sharma (2015), glass as a packaging material has appeared since 2000 BC (Ojha *et al.*, 2015). The glass packaging is made by heating the material mixture of silica, sodium carbonate, calcium carbonate, and alumina. The heating process is done by the very high temperature that made the mixture fluid viscous. The liquid is then molded into several forms according to the product needed. The packaging made of glass has inert properties, or it does not react with other compounds. So it is suitable to use as material packaging for food (Ojha *et al.*, 2015).

b. Metal

Metal is a material that is also widely used in the manufacture of packaging for food products. Metals have an excellent combination of protection, can be recycled, and easy to decorate. The types of metal that is often used for coating material of food are aluminum and steel. Aluminum is often used to can manufacture, laminated paper, and foil (Ojha *et al.*, 2015).

c. Plastic

According to the Federal Indian Chamber of Commerce and Industry, plastic is the packaging material that is most used with a percentage of 42%, followed by the board paper, metal, and glass (Núñez-Cacho *et al.*, 2020). Many types of plastics are used as packaging, such as Polyethylene Terephthalate (PET), polypropylene (PP), High-Density Polyethylene (HDPE), Low-Density Polyethylene (LDPE), polystyrene (PS), and Polyvinyl Chloride (PVC) (Núñez-Cacho *et al.*, 2020). The characteristics and uses of each type of plastic can be seen in **table 2.6**.

Table 2.6. *Type of plastic and its characteristics*

Plastic Type	Characteristics	Uses
PET	Very hard, dense, strong, rigid, good thermal stability, minimal expansion due to temperature changes, low water absorption.	Packaging bottled beverages, bottled cosmetics
HDPE	Not transparent, complex, small ability to stretch, and does not resist the chemistry materials, low humidity absorption.	Shopping bags, frozen food packaging
PVC	Transparent, high density, hard, brittle, resistant to the chemistry materials, low moisture absorption	Capsules, for pharmaceutical purposes
LDPE	Not transparent, low density, complex, highly sensitive to the temperature, does not resistant to the chemistry materials	frozen foods, packaged for un-greasy foods and not applicable for high-temperature treatment
PP	good ability to stretch, stability to heat, resistance to the chemistry materials, low absorption of humidity	For food packaging that has a high-temperature condition
PS	Transparent, stiff, not stable to heat, not resistant to the chemistry materials, low absorption of humidity	Packaging for a fragile product, used for the tablet and capsule medicine

Source: (Núñez-Cacho *et al.*, 2020)

d. Paper

Paper is a material that is made from cellulose (Ojha *et al.* , 2015). Paper is also widely used as a primary material for packaging. Paper-based packaging is more friendly to the environment than plastic because paper can be recycled and readily biodegradable (Núñez-Cacho *et al.*, 2020). Paper-based packaging can be used as both primary and secondary packaging of a food product. Packaging made from paper usually used as the packaging of ice cream, bottled milk, pizza, etc. Paper packaging is divided into several groups based on several parameters. For the parameters of the processing level, the paper packaging is divided into virgin paper and recycled paper.

Paper-based packaging fineness is divided into two categories: printing or labelling paper (a paper in the bleaching) and coarse paper (paper that has not in bleaching).

According to the Food Safety and Standards Authority of India (FSSAI), only paper packaging from the virgin paper class is used as primary packaging for food products or packaging that directly contacted with food. The characteristics and uses of paper can be seen in **Table 2.7**

Table 2.7 The characteristics of paper and its uses

Paper Type	Characteristics	Uses
Kraft	Made from pulp that is not in bleaching, strong	Paper bag, flour, sugar, dried fruit, and vegetable packaging
Bleached paper	In production with the addition of chemical compounds, bleached, soft textured	
Greaseproof	Can hold oil	Packaging for products with a high level of fat or oil
Glassine	High density, transparent, smooth, glossy surface	Used for biscuits and cooking fats, used for the grilling base
Multiwall paper sacks	Lightweight, biodegradable	For packaging of flour, milk powder, grains, and sugar
Rigid boxes	Sturdy, strong, high density	For packaging of the milk-based product

Source: (Núñez-Cacho *et al.*, 2020)

2.5. Chocolate product packaging

According Sedlacekova (2017) the packaging materials often used for chocolate products are plastic, paper, and aluminum foil. The plastic-based packaging for chocolate products is predicted to be popular in the past decade (Sedlacekova, 2017). Plastic-based packaging that is commonly used is plastic films Polyethylene Terephthalate (PET). The advantages of plastic-based packaging are lightweight and easy to be given an additional decoration design and it is also low in cost. In contrast, the disadvantages of plastic are not environmentally friendly and enable the migration of chemical compounds into a packaged product (Sedlacekova, 2017). Another material used for the chocolate packaging is aluminum foil. Aluminum-based packaging has a high preservation level because of the lack of pores as a pathway out the entry of particle contaminants. Aluminum foil is usually combined with paper or cardboard materials to extend the shelf life of a product. The advantages of aluminum foil are inexpensive and little chance of migrating chemicals substances from the packaging to the product (Coles and Kirwan in (Sedlacekova, 2017).

Paper is also a packaging material that is often used for chocolate products. It's already described in previous sub-section that the paper is made from pulp wood that is more environmentally friendly and easy to be degraded (Núñez-Cacho *et al.*, 2020). The advantages of the paper based packaging is easy in design drawings or design printing, packaging made from paper also has lightweight and very cheap. The disadvantage of paper packaging is the lack of ability to protect the product due to the large number of pores that allow the foreign

particles to enter. Packaging paper is also not sufficiently strong to protect the product so that the possibility of product for damaged is quite high (Sedlacekova, 2017). A summary of the comparison of each packaging material can be seen in **Table 2.8**

Table 2.8 Comparison of each packaging material

	UV Protection	Odor Protection	Moisture protection	Protection of pressure	Holding ability	Flexibility	Sterility	Recyclability	Reusability	Degradation ability	Renewability	Price	Weight	superposition	Total score
Aluminum foil	3	3	3	1	1	3	3	3	1	1	1	3	3	3	32
Paper	1	1	1	1	1	3	2	2	1	3	3	3	3	3	28
Plastic film (PET)	1	3	3	2	3	2	2	2	2	1	2	3	3	2	31

Source: (Sedlacekova, 2017).

Based on the research that is carried out by Sedlacekova (2017), aluminum foil was a material of packaging that is often used in chocolate manufacture. From **Table 2.8** also shows that the ingredient of aluminum foil has the value of the highest end of the top which makes aluminum foil as the material of packaging that was deemed appropriate for the chocolate product (Sedlacekova, 2017).

2.6. Willingness to Pay

Consumers' decisions in purchasing products is influenced by the extrinsic characteristic and the appearance of the products (Gunaratne *et al.*, 2019). The extrinsic visual such as design, nutrition information, price, and label generates the consumers' expectations. The price prediction is essential for the marketer to predict how many offered products will be bought at different prices. To predict this case, the marketer needs to understand the reaction of the customers to different pricing schedules (Breidert, 2006). Willingness to pay is the highest price that is accepted to pay for some products or services (Breidert, 2006). Each consumer has a maximum price that is willing to pay through a product that equals the product's value to the customer.

Consumer behavior is a critical aspect of market analysis. Consumer behavior is the process of a person's decisions and actions towards a purchase transaction activity and product use (Hervé and Mullet, 2009). According to Makarewicz (2013), consumers behavior is an activity that aims to obtain and use a product, both goods and services, and the decisions taken before making a purchase (Makarewicz, 2013).

2.7. Discrete Choice Experiment

Consumer preference has long been considered as a critical component in marketing research. Consumer preference represents the consumer's voice about the preferable quality of the product that will influence their satisfaction (Li *et al.*, 2013). Consumer satisfaction is essential to develop the loyalty of the customer (Asamoah, 2012). Customer preference research is conducted to develop and improve the quality whether products or services. The research was also used as product evaluation and reference to create a plan to compete with the competitor. Customer preference research has been long studied with different combination concept features (van den Heuvel *et al.*, 2011).

Discrete Choice Experiments (DCE) is a method that asks the respondent to indicate their preference for a varied set of product profiles (van den Heuvel *et al.*, 2011). The preference is practically expressed by the choice to make one or more product alternatives depending on research design (van den Heuvel *et al.*, 2011). The discrete choice experiment was considered as the most appropriate approachment for the study related to consumer preference. DCE allows estimation of tradeoff among alternatives because it represents realistic purchasing scenarios and enabling the evaluation of multiple attributes (Otieno and Ogutu, 2020). DCE methods create a prototype from the combination of the level of attributes. The prototype is also called the profile. The alternative of profiles will be given in a set called *choice set*. One *choice set* may contain a 3-4 profile option include the "none" option. The alternatives in a set are suggested to be no more than 4 because it can cause over information and confusing the respondents (Li *et al.*, 2013).

According Profeta *et al.*, (2021) DCE is a method based on the theory of micro-economy in which consumers will always try to gain maximum advantage of a product that is offered. Consumers will tend to choose products that offer many advantages. It's become the basis for the DCE method in analyzing the consumers' preferences. Consumers will be offered some choice of products and are required to choose one among the products. The selection process will be based on the wishes and assessment of consumers on the character of products offered. The DCE method was also given a "none" option. Consumers can choose "none" of several offered products if the fundamental characteristics of the products do not meet the criteria of consumers (Profeta *et al.*, 2021). The DCE method has been widely used in various studies to determine a person's preference for a product as an initial form for product development. Some studies that use methods DCE are listed in **Table 2.9**

Table 2.9. Previous research that use methods DCE

Resources	Country	Product	Research focus
(Lombardi, Berni and Rocchi, 2017)	Tuscany	Milk	Analyzing how information and communications could impact consumer's attitude towards climate neutral fresh milk
(Yin <i>et al.</i> , 2020)	China	Tomatoes	Preferences analysis of organic tomatoes brand and food safety labels
(Meyerding, Trajer and Lehberger, 2019)	Germany	Tomatoes	Exploring the consumers prefer specific lokal food labeling strategies to others and where there is a difference between fresh and processed tomatoes
(Wanyama <i>et al.</i> , 2019)	Africa	Porridge Flour	Analyzing whether poor consumers in Africa would purchase foods with more nutritious ingredients and the related willingness and ability to pay
(Wang <i>et al.</i> , 2019)	China	Milk powder	Estimating consumers' preferences for test/measurement indicators and a new cue of "own farm" for milk powder
(Rodríguez-Entrena <i>et al.</i> , 2016)	Western Honduras	Brown Sugar	Understanding consumer preference which is considered a key to increase smallholder farmers' income in rural areas
(Quan <i>et al.</i> , 2018)	China	Milk	A combination of two successive CEs are designed with focus on consumers' demand for the attributes of baby milk formula in China
(Yin <i>et al.</i> , 2019)	China	Tomato	Assessing consumers' preferences for tomatoes
(Yang, Hobbs and Natcher, 2020)	Canada	Arctic food	Examining consumers' perceptions of and willingness to pay (WTP) for foods originating from the Canadian Arctic, and their receptivity to certification for sustainability, authenticity, and origin
(Wongprawmas and Canavari, 2017)	Thailand	Chinese cabbage	Evaluating Thai consumers' preferences for food safety labels and brands on fresh produce

(Zheng <i>et al.</i> , 2012)	China	Pork	Examine factors that affect consumers' perception of a food traceability system, and determine their willingness to pay for having the system
(Yin <i>et al.</i> , 2018)	China	Milk	Considering the attribute of infant milk-base formula
(Yin <i>et al.</i> , 2020)	China	White shrimp	Preference for white shrimp (slang for <i>Litopenaeus vannamei</i>) toward interactions between Organic labels and traceable information
(Britton and Tonsor, 2019)	United States	Beef	Consumer willingness to pay (WTP) for genetically modified foods produced using RNA interference (RNAi)
(Zhu <i>et al.</i> , 2018)	United States	Tomato Juice	Determining consumer attitudes towards current tomato juice offerings and willingness to pay for high flavor quality products
(Zhou <i>et al.</i> , 2017)	China	Rice	Willingness to Pay for eco-labels of rice to provide policy implications for the design of proper strategies to develop the eco-labeled food market
(Zheng <i>et al.</i> , 2012)	United States	Cherry	Investigating heterogeneous consumer preferences and willingness to pay (WTP) for various sweet cherry attributes
(Kallas, Escobar and Gil, 2013)	Spain	Red Wine	Analysing the heterogeneity of consumers' preferences toward a red wine for a special occasion in Catalonia (Spain)
(Lima, 2015)	Germany	Yellow Chili Papper	Evaluating the consumers' preferences in middle- and highincome districts in Lima for three organic and Fairtrade certification
(LI <i>et al.</i> , 2019)	China	Milk	Understanding consumer confidence and its effect on consumption behavior is important to restore consumer confidence and enhance the competitiveness of domestic dairy industry

(Dominici <i>et al.</i> , 2019)	Italy	Wine	Investigating preferences for wine made from hand-harvested grapes, and the interactive effect between this attribute and organic certification
(Lambooij <i>et al.</i> , 2019)	Netherlands	Freezing meat	Consumers' preferences towards meat that 3-4 was frozen to reduce the risk of toxoplasmosis and more specifically to estimate consumers' willingness to pay (WTP) for frozen meat using
(Miller <i>et al.</i> , 2017)	UK, Japan, India, and Indonesia	Fruit and Vegetable	Assessing WTP for social responsibility in fruit and vegetables and also comparing developed economy markets (UK and Japan) with developing economy markets (India and Indonesia)

2.8. Previous studies

The previous studies that has been conducted by Liao were analysing about the emotional responses towards food packaging. The research was done in Australia. The research used three factors or attributes with three-two level including image (none, positive, negative), color (low wavelength, high wavelength), and typeface (simple, ornate). The attribute was selected by discussion with the expert in a graphic design. This research used 120 participant as the respondents. The result was being analysed by ANOVA test. The result of this research was that there were significant effects of packaging elements, colors, and typefaces. The negative emage evoked greater physiological arousal than the positive or no image option. This research were able to analyse the emotional effect of consumer towards the visual of the packaging. From this research, The consumer preference towards the packaging can be an interesting finding and further research that can support the study that has been conducted by the Liao. The attributes used in the Liao's research was image, color and the typeface of the packaging while in this current research the attributes used was design, packaging material and prices. This research also can support the limitation of previous research by calculating the willingness to pay of the chocolate product. Both research were supposed to be has similar goals which analysing about the preference which formed by the emotion that has been built towards analysing the visual of the packaging.

2.9. Hypothesis

The hypothesis of this research are:

2.2.1. There are some attributes and level of the attribute that is preferred by the consumer toward the packaging of local chocolate product

2.2.2. Consumer preference toward the attribute of the packaging influence the willingness to pay the local chocolate product





CHAPTER III. RESEARCH METHODOLOGY

3.1. Time and Location

The research was conducted in Tulungagung City, West Java, Indonesia from October 2020 until May 2021.

3.2. Experimental Design

This research used devices such as laptops and mobile phones as equipment for the collection and processing of data. In addition to the researchers also used the network of the internet as support in collecting data. The data used in this study was primary data obtained from the distribution of online questionnaires through the google form. The product reference used in this study was a chocolate bar variant of milk chocolate with 80 grams of weight. Based on Sabarisman and Purwaditya's (2019), milk chocolate was the most chosen chocolate flavor with the total respondents 37.6%. The second was 50% cocoa dark chocolate with a total of 30.3% respondents (Sabarisman and Purwaditya, 2019). Although the previous research showed that The Indonesian people tend to consume milk chocolate, this research was using dark chocolate rather than the milk chocolate. The dark chocolate product was being chosen in order to give the new experience to the chocolate product consumer and to make the consumer of chocolate aware about dark chocolate product.

Discrete Choice Experiment was the method that used to analyse the consumer preference towards the chocolate packaging attributes. The Experimental design was referred and modified from the previous research that was conducted by (Syrengelas, 2017). The choice experiment method made a different combination of attributes to produce a model of product. Attribute is the variable that planned to be analysed. The attributes used are contain several level. The levels of each attribute will be generated by the RStudio software in order to make several variety of profiles. Different number of attribute and level attributes may produce different number of choice set or profile. Discrete choice experiment method has certain properties to define the choice set. The mechanism of this method is that the respondents are being asked to choose one alternative among several option that is offered including "none" option as the representative of unpurchased decision.

This experiment was conducted with several stages such as attribute and level attribute determination, made the choice set, calculated the number of respondents, generated the questionnaire, distributed the questionnaire, extracted the data, and final analysis of the data. This research was done by online survey and took place in October 2020 until July 2021. The survey was distributed online through social media in order to get the respondent. The attributes used in this research were chosen from the previous research that was conducted by Silayoi

and Speece (2007) that used design, materials packaging, and price as the attribute in the packaging. Gunaratne also mentioned that the external attributes, including design, price, and label, can affect the expectations of consumers (Gunaratne et al., 2019). The attributes that found from previous methods were then discussed together with the supervisors in the small forum discussion to get the fixed decision as the attribute in this research. From the discussion there were three attributes that used in the research which were design (design 1, design 2, and design 3), material of the packaging (paper, plastic, and aluminum foil), and price (Rp. 49.000; Rp. 52.500; and 56.000) that represent the lowest, average, and highest price of dark chocolate 80 grams in the market.

In the discrete choice experiment model it is suggested to not use too many attribute and level of attributes since that can bias the result by increasing the importance of the specific attributes in the experiment (Van Loo et al. 2011). Furthermore, in the real purchasing activity, the consumers have available choice where some level may not be accepted or fulfilling the requirement of the consumer, so the less attributes can help the consumer in comparing between the product offered. It was also stated in the Syrengelas research that there should be a few levels with a obvious differences to avoid the respondent ignores the attributes completely (Syrengelas, 2017b).

The choice set and the questionnaire were generated by RStudio. In this research there were three option offered which were two model of products and "none" option. The respondent was asked to choose one among three option offered including two choices of packaging models and none option. The choice set was made as a full factorial design with three attributes (design, packaging material, and price) and three level of each (design; 1, design 2, design 3; packaging material; paper, plastic; aluminum foil, price; Rp. 49.000, Rp. 52.500, Rp. 56.000). The full factorial design were formed by the total of level attributes. The number of profile can be calculated as LA , where L represent the number of levels, and A represent the number of attributes. This research has three attributes with three levels of each so the full factorial profile of the research is 27 choice set. Those amount of choice sets are too many to be used. The orthogonal array design is used in order to shorten the amount of the choice sets by selecting the possible alternatives.

The choice sets were generated by RStudio and the design is optimal orthogonal design. RStudio contain a lot of packages, a group of several function, that help in analysing the data. The package that was used in the RStudio for DCE method are Support.CEs, readxl, and survival. The first step happened was that the RStudio generated the full factorial design by the attributes and level of attributes used in the research (Aizaki and Nishimura, 2008). The

full choice sets were reduced from twenty seven into nine choice sets. The choice sets that was made then were visualized using Microsoft Power Point to make the respondent easier comparing the product offered. The design of choice set are shown in the **Figure 3.2**. The stimuli or models of product were visualized using design rugged as the profile's appearance that was appropriate to the level attributes were listed. The design was done by using *canva*. The design of the packaging that was used can be seen in **Figure 3.3**. Product profile visualization was carried out to equalize respondents' perceptions of packaging attributes so that there were no errors or differences in the interpretation towards the models of the packaging.



Figure 3.2: Design of the packaging

Questionnaires were made as the main method of data collection in this study (Attachment 1). Questionnaires were divided into several sessions. The first sessions were made to collect the data information of respondents so that the questionnaire will be included several questions about the demographics of respondents such as name, age, gender, and job. There were also questions about the respondent's preferences for the given stimuli. The number of alternatives in the choice set used was 3, including alternatives of the "none" option. The number of choice sets that were used depends on the results of the calculation of R Studio..

The minimum amount of respondents needed in this research was determined by the formula that was invented by Johnson and Orme (Bekker-grob et al., 2015), where the number of respondents (N) is influenced by the amount of choice set (t), the number of alternative (a), and the number of attributes along with the option not to choose (c). So the formula of calculation of the number of respondents was :

$$N > (500 \times c) / ((t \times a))$$

$$N > (500 \times 4) / ((9 \times 2))$$

$$N > 2000 / 18$$

$$N > 111,11$$

In this study, there were 9 choice set (t) (Choice set 1, Choice set 2, Choice set 3, Choice set 4, Choice set 5, Choice set 6, Choice set 7, Choice set 8, Choice set 9), 2 alternatives (a) (Product 1 and Product 2), and 4 attributes along with the choice of "none" option (Design, Material, Price, and None). So that the final calculation results obtained 111.11, therefore the minimum number of respondents for this study was 111 people. Respondents who filled out the questionnaire here were selected based on several criteria: men or women who were citizens of Indonesia and aged at least 18 years, respondents who selected the must be a consumer of chocolate or ever bought chocolate products knowing the Indonesia chocolate product. It was mentioned that the rule of thumb suggests that as DCE design, sample sizes over 100 are able to provide a basis for modelling the preference of data. The empirical experience of Lanctar and Louviere was one of rarely requires more than 20 respondents per questionnaire to estimate the reliable models, but undertaking significant post hoc analysis to identify and estimate co-variate effect invariably requires larger sample (Bekker-grob et al., 2015). 111 people was intended to be minimum threshold if this research could not afford to do better, it will be better if the research could have more than minimum respondents required.

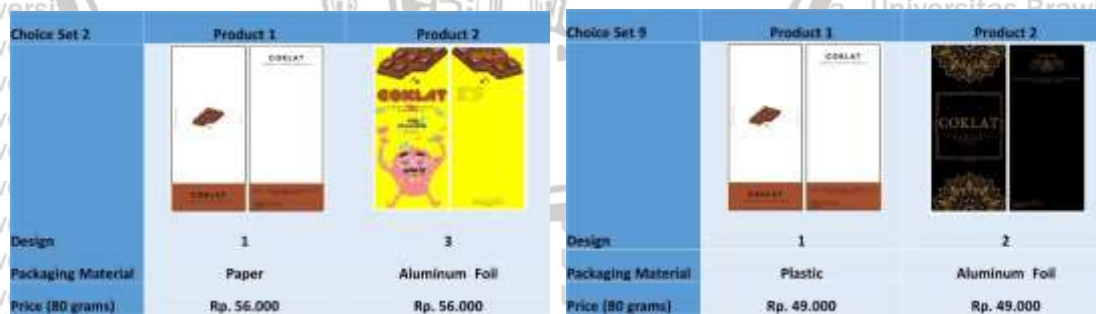


Figure 3.3. The example of choice set

3.3. Survey Procedure

The questionnaire contained several sections, where the first section contained some demographic questions such as name, age, job, etc. The next section was a choice section that contains several profiles set options that the respondent should choose. The profile set was given in several sections depending on the whole set formed by the combination between

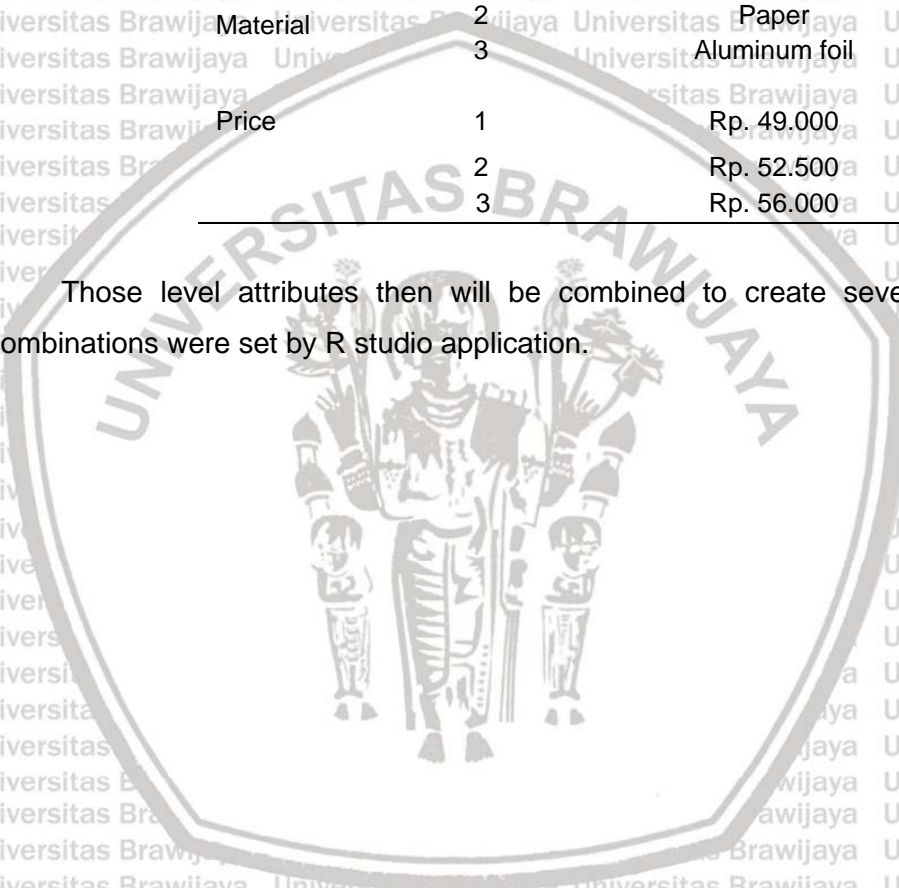
level attributes. Attribute and level of attributes were defined before conducting the questionnaire. Regarding the consumer preference towards chocolate packaging, several attributes were chosen. According to relevant literature, there are four main packaging elements potentially affecting customer purchase decisions. They are separated into two visual categories and information elements (Silayoi and Speece, 2007). This research chooses several attributes related to the visual and information element. The extrinsic visual such as design, nutrition information, price, and label generates the consumers' expectations (Gunaratne *et al.*, 2019). The design and material of the packaging were chosen as the attributes that represented the visual element. Attribute "design" consists of three levels which are Design 1 (white), Design 2 (black), and Design 3 (yellow). Those level attributes were visualized by design modeled using *canva* and some product design as the references. The material of the packaging attribute consisted of three levels: plastic, aluminum foil, and paper. Those materials were chosen because those the most used packaging material.

This research was also conducted to analyze the willingness to pay of the consumer towards the products set given. The attribute regarding the price should be decided to estimate the willingness of consumers to pay. The level of price attributes was chosen to reflect the current price. The previous research said that the level of price attribute was set between the lowest to the highest price of a similar product and avoiding using more than four levels to avoid the number-of-level effect (Loo *et al.*, 2017). The price of local chocolate product in Indonesia with the weight 80 grams were range between Rp. 49.000 – Rp. 56.000. This research will use three levels of the price that represent the minimum, middle, and maximum value between the range. The prices used are Rp. 49.000, Rp. 52.500, and Rp. 56.000.

Table 3.10. Attributes and level attributes

Attributes	Levels	Description
Design	1	Design 1
	2	Design 2
	3	Design 3
Packaging Material	1	Plastic
	2	Paper
	3	Aluminum foil
Price	1	Rp. 49.000
	2	Rp. 52.500
	3	Rp. 56.000

Those level attributes then will be combined to create several profiles set. The combinations were set by R studio application.



3.4. Observation and Data Analysis

Respondents that fulfilled the questionnaire were selected by criteria that already determined to adjust the data analysis by the target respondents were required. Respondents were required men or women who are citizens of Indonesia and aged at least 18 years. The respondents needed chocolate or ever buy products chocolate even once, and knowing the local chocolate products. The questions were listed in **Table 3.11**

Table 3.11. Respondent's criteria

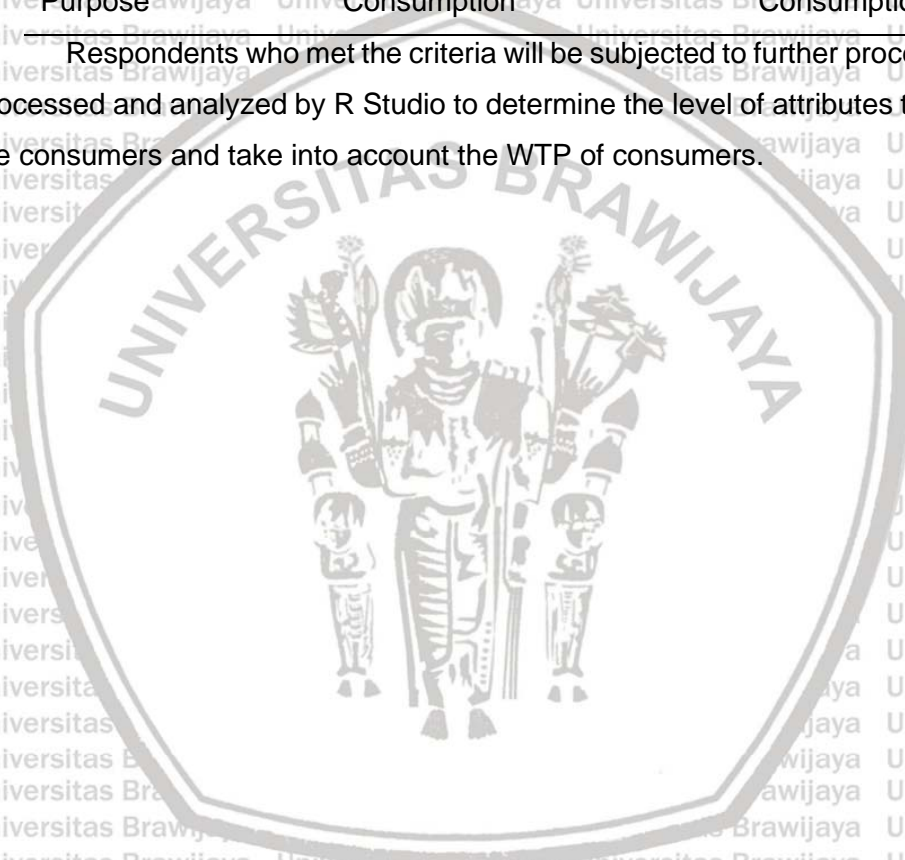
No.	Question	Selection	Criteria
1.	Age	<18 18-25 26-30 31-40 >40	Minimum 18 years old
2.	The respondents' action in chocolate product purchasing process	Producer Consumer	Consumer
3.	Have you ever bought a chocolate bar product?	Yes Not	Yes
4.	How many times do you buy chocolate product in a year?	Never 1-3 4-6 7-10 >10	1-3

Regarding to the limitation of this research, the respondent needed were only they who are no less than 18 years old and they who are consumer of chocolate that represent by their chocolate purchasing experience. The definition of consumer could be different with customer. Consumer is a person who act as an end-user of the product. Meanwhile, customer is they who purchase something in some form of exchange transaction. Simply the customer can be a consumer but in contrast the consumer is not always a customer (Datta, 2016). Here is some comparison between consumer and customer.

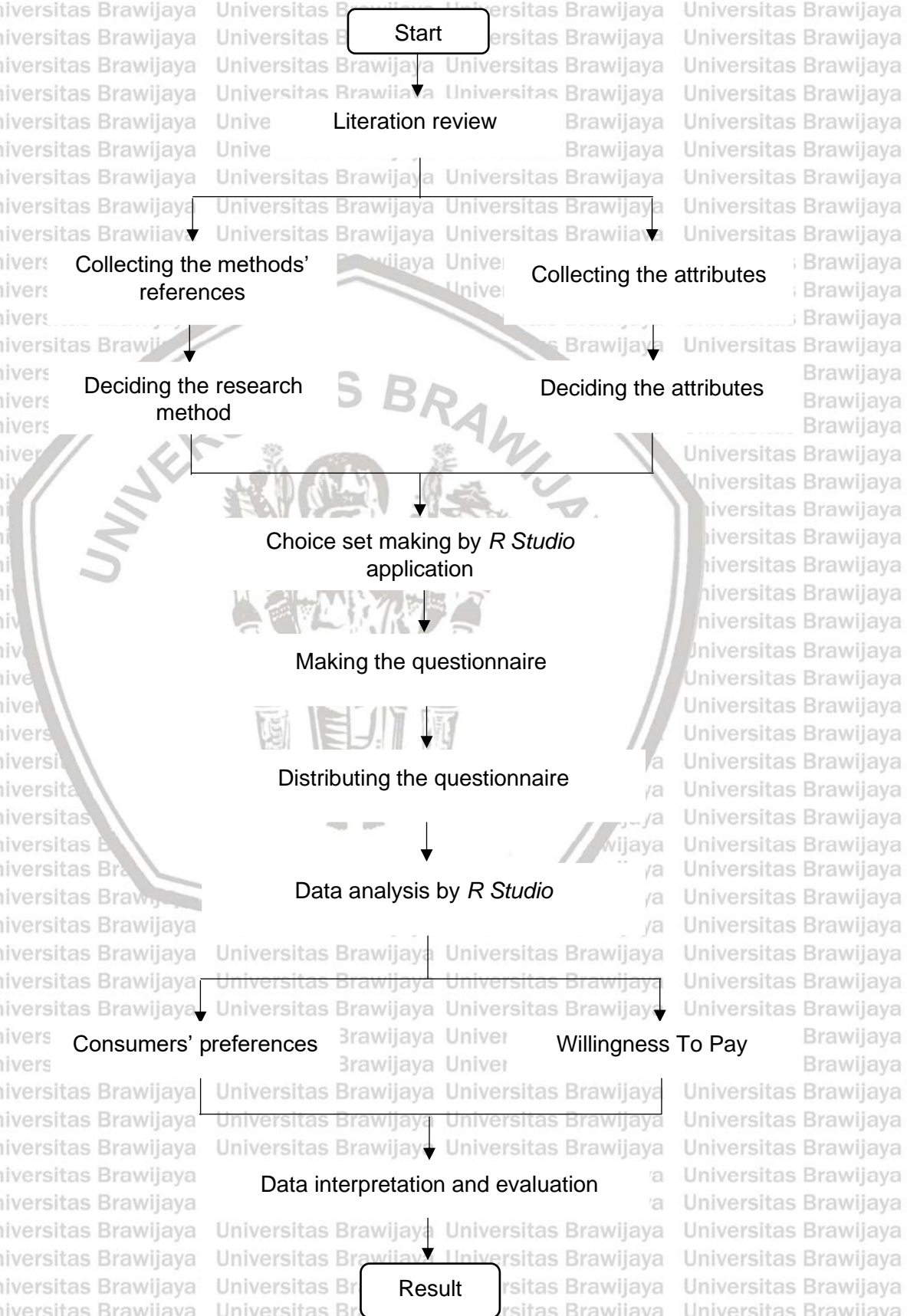
Table 4.12. The difference of consumer and customer

Basis comparison	Consumer	Customer
Meaning	The end-user of product or services	The purchaser of product or services
Resell	They do not resell the product	Has possibility to resell the product that they purchased
Purpose	Consumption	Consumption or resell

Respondents who met the criteria will be subjected to further processing. The data were processed and analyzed by R Studio to determine the level of attributes that were preferred by the consumers and take into account the WTP of consumers.



3.4. Experimental Process



CHAPTER IV. RESULTS AND DISCUSSION

4.1 Description of Respondents

The respondents involved in this research were 345 people. Those amounts have already fulfilled the Johnson and Orme formula requirement for the minimum data needed to be analyzed. The respondents data were sorted by screening through pre-set criteria shows in **Table 3.11**. The screening process got 222 data that was selected for further analysis. The distribution of demographic data of respondents was shown in **Table 4.12**.

Table 4.13. Respondent characteristics

No.	Respondent characteristics	Amount	Percentage (%)
1.	Gender	Male	17
		Female	83
2.	Area	East Java	60
		West Java	3
		Jabodetabek	17
		Central Java	4
		Sumatera	3
		Kalimantan	2
		Other	11
		18-25	99
3.	Age	26-30	0
		31-40	1
		>40	0
		Junior High School	0
4.	Education	Senior High School	41
		Bachelor	55
		Magister	0
		Other	4
		Student	83
5.	Job	Public/government Employee	0
		Private Employee	5
		Entrepreneur	2
		Freelancer	4



	Other	13	6
6. Income	<Rp. 500.000	110	50
	Rp. 500.000 – Rp.1000.000	52	23
	Rp. 1.100.000– Rp. 3.000.000	48	22
	Rp. 3.100.000– Rp. 7.000.000	10	4
	Rp.7.100.000–Rp.10.000.000	2	1
	>Rp. 10.000.000	0	0

Based on **Table 4.12**, the gender that dominated the respondents were women with 184 people (83%); meanwhile, the men totaled 38 (17%). According to Elfhag and Linne, Taecleab (2015) cited that women tend to consume food as a form of response to emotions and feelings. Women have a tendency to consume sweet food included chocolate, compare to men (Tecleab, 2015). Women dominated this research. East Java dominated the result with a total of 134 respondents (60%). Respondents Jabodetabek as many as 38 people (17%), Central Java 8 people (4%), West Java 6 people (3%), Sumatra 6 people (3%), Kalimantan 4 people (2%), and other areas as many as 24 people (11%).

On the age criteria, 220 of 222 responses had a range of ages 18-25 years, and two people had a range of ages 31-40 years. The data showed that 99% of respondents who filled the questionnaire had aged 18-25 years. According to Sondhi, age affected the willingness to purchase chocolate. People of adolescent age have a high interest in chocolate products (Sondhi and Chawla, 2017). Some studies showed the highest level of chocolate consumption was in the community with a range of ages 21-26 years (Sondhi and Chawla, 2017) and 15-28 years (Naveed, Hameed and Sharif, 2015).

The education criterion showed that 91 people who filled the questionnaire (41%) were high school graduates, and 122 people (55%) were graduate students of bachelor degrees. In addition, there was also one respondent who was a graduate student of Master degrees, and eight people (4%) choose other options. Velarde said that the level of education could affect the tendency to consume chocolate. The higher the education level, the purchase level also increases because the stress level also increases. Purchasing chocolate products based on the desire to relieve stress makes purchasing chocolate products for students high (Stara, 2018).

The distribution of respondents' employment indicates the results of which were dominated by the student as 185 or (83%). Distribution as Private Employee had total 10 people (5%), 1 (0%) as Civil Servant of State, 4 (2%) Entrepreneurs , 9 (4%) Freelancer, and 13 (6%) choose another option. According to Prete (2020), the type of profession does not affect the tendency of a person to carry out the purchase of chocolate, but the prices influenced them (Del Prete and Samoggia, 2020). The income below Rp. 500.000 dominated the income criterion with a total of 110 of all respondents (50%). In addition, there are 52 people (23%) who have incomes in the range of Rp. 500,000 – Rp. 1,000,000; 48 people (22%) with an income of Rp. 1,100,000- Rp. 3,000,000; 10 people (4%) who earn Rp. 3,100,000 – Rp. 7,000,000; 2 people (1%) with an income of Rp. 7,100,000 – Rp. 10,000,000. Research by Del Prete (2020) showed that income influences the level of buying the chocolate product. The higher the income, the propensity to buy chocolate will be high up products with a high brand and quality (Del Prete and Samoggia, 2020).

4.2 General Information on Purchase activities of Local Chocolate Products

4.2.1 Role of Consumers in the chocolate purchasing process

The number of respondents who obtained the research was 345. This research needed respondent that takes the role as a consumer of chocolate. Respondents who obtained 100% or the entire respondents have a role as consumers of chocolate and 0% as producers. The research expectations were because the research focused on consumers' preferences towards local chocolate packaging products. The data obtained was already appropriate and supported the study.

4.2.2 Consumer's purchase frequency

Data experience of respondents in doing purchase analyzed via the frequency of respondents in purchasing chocolate products for one month and when the last time did purchase products chocolate. The distribution of respondents' experience data in making purchases can be seen in Figure 4.5. In the picture, as many as 211 respondents did purchase chocolate 1-3 times in one month, six people out of the total respondents did purchase 2-6 times, one respondent did purchase 7-10 times, and four respondents did purchase the chocolate more than ten times in one month.

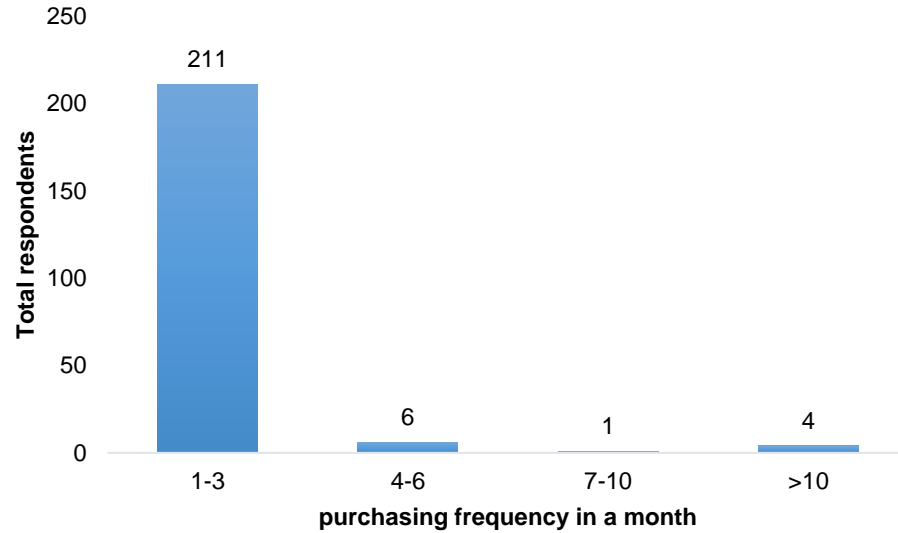


Figure 4.4. Frequency of Purchase of Chocolate Products in 1 Month

The span of the last time to carry out the purchase of chocolate products were also analyzed. The distribution of data can be seen in **Figure 4.6**. In the figure, the "one month" option dominated the result by the number of respondents as many as 152; 12 of the respondents in total stated that they purchased products chocolate one day before they filled the questionnaire; while 52 respondents expressed purchased chocolate products one week before they filled the questionnaires and there were six people who declare not been or had more than one month did not purchase products chocolate

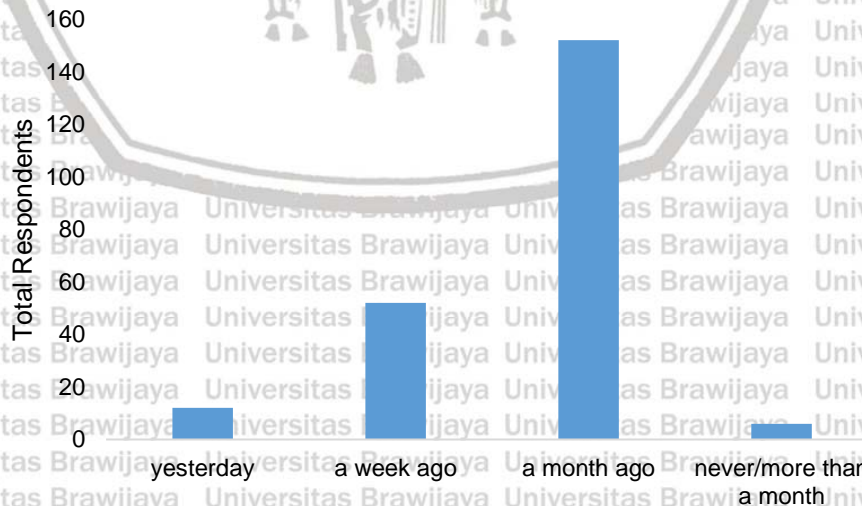


Figure 4.5. The span of the last time on purchasing chocolate products

4.2.3 Purchase Location

The place where the respondent made a purchase was the place most frequently visited to get or buy chocolate products. There were several options for this question, including supermarkets, mini shops, online stores (Tokopedia, Shopee, Lazada, etc.), official websites (websites belonging to the company that produces the chocolate being purchased), and others. From the data obtained, 198 respondents purchased the chocolate product in the supermarket, 17 people purchased in the mini-store, 3 people purchased in the online store, a person purchased on the official website, and three respondents were purchased in places not included. The distribution of data can be seen in **Figure 4.7**

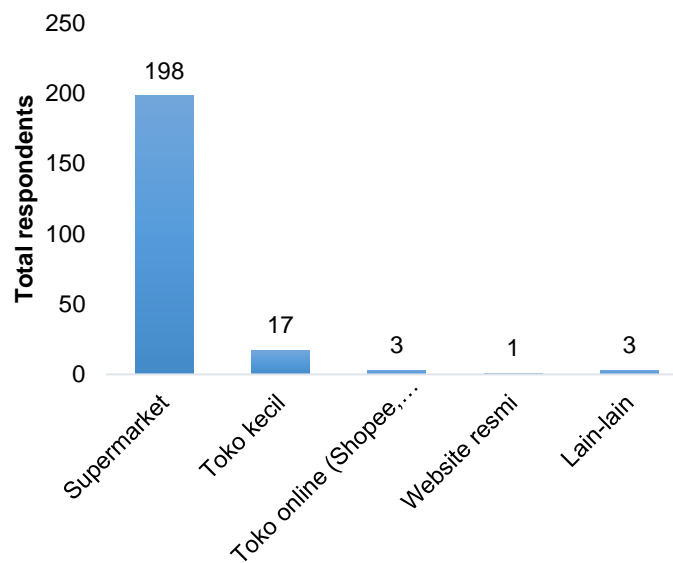


Figure 4.6. The Place of Purchasing Chocolate

4.2.4 Reasons to purchase

This session of questions concerning the reasons respondents purchase chocolate in research was given several options and respondents could choose more than one option. The respondents' reasons for making purchases can be seen in **Figure 4.8**. In the picture shown that the 173 respondents purchased the products the self consumption, 8 respondents bought chocolates as a someone's gift, 14 respondents did purchase chocolate because there were promotions or discounts, 1 respondent did purchase because of curiosity with the product, 18 people chose the option to material additional dishes, and 8 people choose other options that were not listed in the previous option.

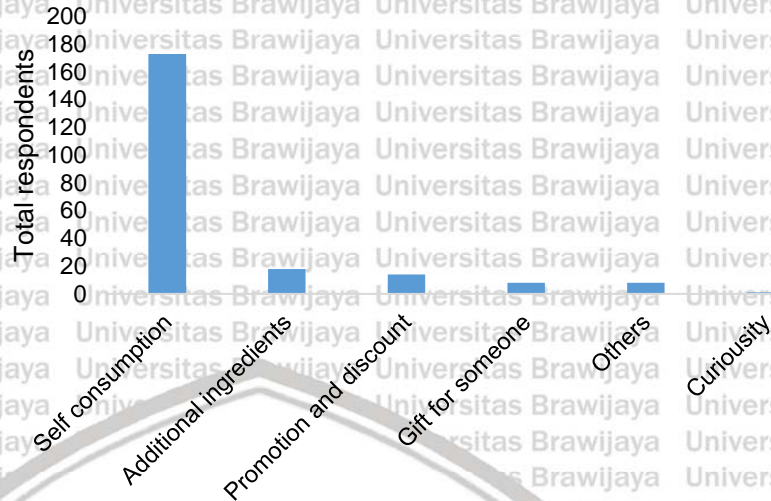


Figure 4.7 Reasons to purchase

4.2.6 Factors Affecting Selection of Chocolate Products

Consumers will face the various brands and types of chocolate products that certainly had different tastes, ingredients, prices, models, and criteria when making a purchase. A question was given several options for pursuing the information. Respondents were welcome to choose more than one option. Data on the distribution of factors influencing the purchase of chocolate products by respondents were presented in **Figure 4.9**. The figure showed that 144 respondents assumed that prices determine why they bought a chocolate product, and 65 respondents chose packaging as a factor that affected them in making purchases. 110 of 222 respondents also chose brands as the factors that affected the respondents in the purchase of the chocolate product, 193 respondents chose the option flavour as the factors that influence them in buying chocolate, and six respondents chose the other option that was not listed on the option.

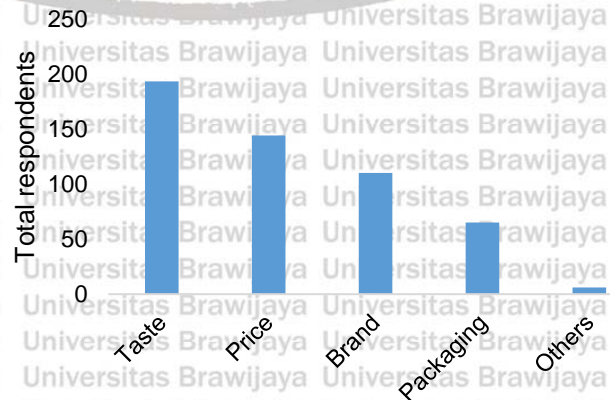


Figure 4.8. Factors that affect Respondents in Buying Chocolate

4.2.7 Packaging Attributes

The distribution of attribute choices that were considered important for respondents is shown in Figure 4.7. In the picture seemingly that 157 respondents assume that the design of the packaging was an important attribute in packaging, 73 respondents also choose the color of the packaging as an attribute that is important, the attribute information into a selection that was dominated with total respondents 172 people, 68 of respondents also chose packaging materials as an attribute that is important in packaging , and 14 people chose other options not listed.

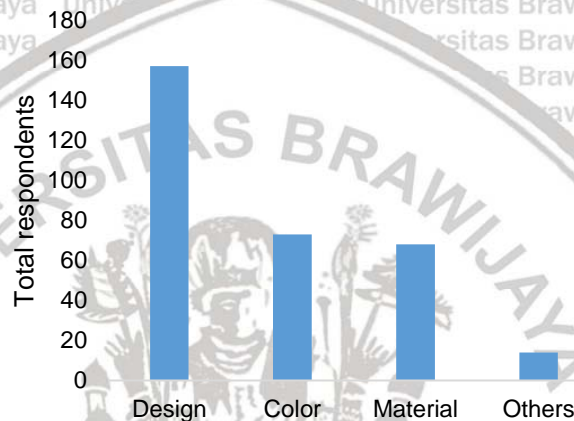


Figure 4.9. Attributes Important In Packaging Products Chocolate

4.3 Consumer preference towards chocolate packaging attributes

Analysis of consumer preferences for packaging attributes was carried out using R Studio software. The application can process the data results of the questionnaire to bring up the value of the utility of each attribute. The results of data processing consumer preferences for chocolate packaging attributes can be seen in Table 4.3

Table 4.14. Data Preferences Respondents Against Attributes Packaging Chocolate

	Coef [*]	p [*]
ASC *	6565	1.05×10^{-11}
Design 3	-343.8	9.78×10^{-4}
Design 2	531.8	8.64×10^{-7}
Aluminum Foil	1547	2×10^{-16}
Paper	853.1	8.35×10^{-13}
Price	0.1056	1.35×10^{-9}

*ASC: Alternative Specific Constant

Coef: Coefficient value

P : p-value

Consumer preference analysis was carried out using the Rstudio application. In this study, three packaging attributes were used, with each attribute having three levels. In the design attribute, there were levels of Design 1, Design 2, and Design 3. The second attribute used was material packaging with the attributes of plastic, paper, and aluminum foil. At the same time, the attributes of price used range price market, which represents the price of the lowest, the price of the middle, and the price of the highest in the product brown stem with the weight of 80 grams.

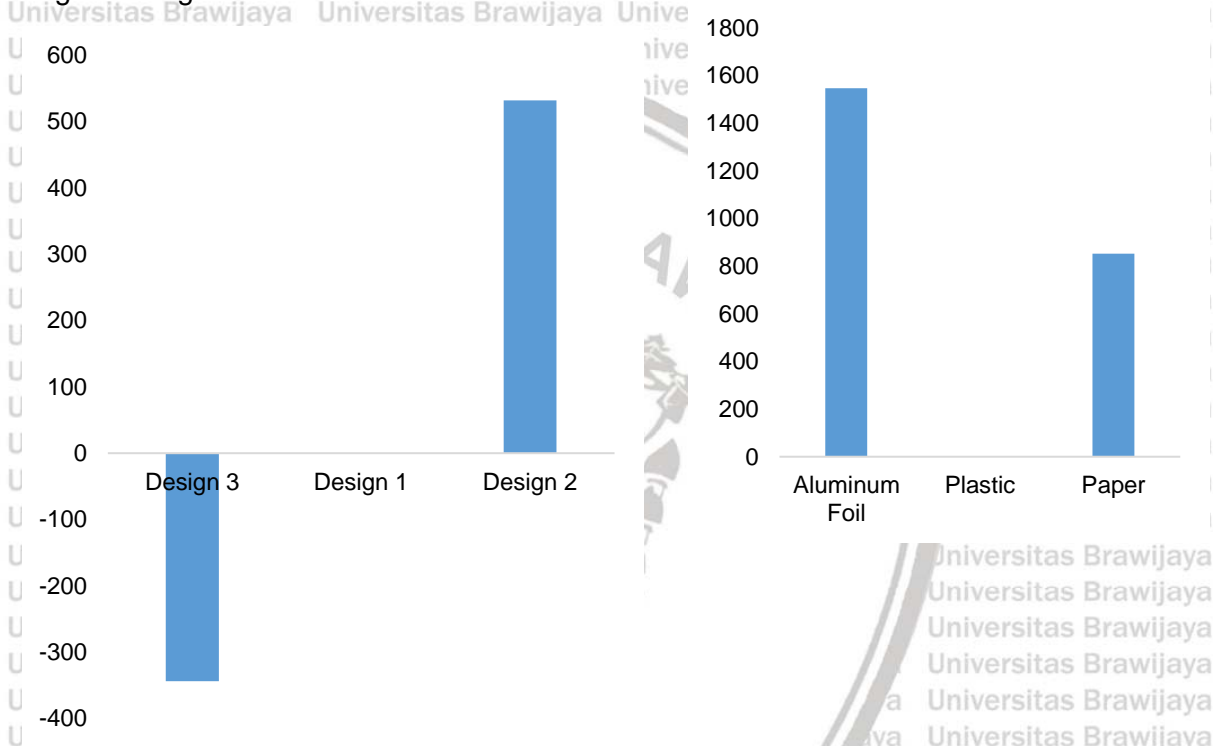


Figure 4.10. Preference Respondents Against Attributes Packaging Chocolate

In the data analysis, each attribute (beyond attributes the price) had a level that was used as a level control. The control level was used as a comparison from other levels to know the respondent's preference based on the respondent's choice. In the design attribute, the Design 1 level was chosen as the control level, while in the packaging material attribute, the plastic level was chosen as the control level. The two levels were chosen randomly.

The results of the analysis are shown in Table 4.13. The p-value of ASC was smaller than the significance of the 95% that is $1,05 \times 10^{-11}$. It indicated that respondents tend not to pick or choose the "none" option on selected products listed in the questionnaire were distributed. In addition to the category of ASC, the results of the analysis of attributes that were used show the results of which significantly due to the value p-value shows the number was less than the significance value 95% or less than 0.05 so that the entire attribute had an

influence on the decisions of consumers to choose the product that was offered. The design attribute resulted from negative on the Design 3 (yellow) level and provided positive value at the level attributes of a Design 2 (black). The utility value on the Design 3 (yellow) level was – 343.8, while the value of Design 2 (black) was 531.8. Both attributes indicated the p-value less than 0.05, which can be interpreted that both levels' attributes significantly influence respondents' tendency to choose.

Data results of the research on design attributes, level of Design 1 (white) had been chosen as the controlled attribute. Attributes control was assumed to have a value of 0. The controlled level was used as a data comparison of each level of attributes. The comparison of attribute levels in this study indicates that the design 2 (black) has a high coefficient value compared to the Design 1 (white). It is indicated that the packaging with the model design 2 (black) is preferable compared with packaging design 1 (white). At the same time, the level design 3 (yellow) has a coefficient value lower than the level of design 1 (white) and design 2. It indicates that the design 3 (yellow) is not preferable compared to design 1 (white) and design 2 (black). The comparison of preferences between levels on design attributes can be seen in

Figure 4.11

There are three levels of packaging material attributes, namely aluminum foil, plastic, and paper. In the packaging material attribute, the plastic level was selected as the controlled level. The analysis results are obtained because the level of aluminum foil has the value of the coefficient of the highest that is worth 1547. In other words, The aluminum foil level is the most popular level compared to the other two levels. In addition, the packaging attribute shows a positive result on its utility value (*coef* value). It indicates the level of attributes is preferable in comparison with the level of attribute control. Based on the data in **Table 4.13**, it can be seen that the utility value of the packaging material attributes with the aluminum foil level is 1547 while at the paper level it is 853.1. Between the two levels of the aluminum foil and paper, the value of the utility levels of aluminum foil showed the highest result compared with the level of the paper. It indicates that the packaging aluminum foil is favored than the paper packaging.

The attribute preference to material packaging was supported by the literature that said that packaging made from the base of aluminum foil is a packaging that is often used in chocolate products is the packaging made of base aluminum foil. Based on the research carried out by Sedlacekova (2017), The difference in the value of the characteristics of the material packaging can be seen in **Table 2.7**. The table indicates that the material of aluminum foil having a value higher end of the top, which makes aluminum foil the material of packaging deemed appropriate for the chocolate product. (Sedlacekova, 2017).

The analysis process is based on the *coef* value, which shows the utility value of each attribute level. Rstudio works by using the RUM system or the Random Utility Model. RUM is a model of analysis used in selecting the individual against the alternative set of products that are different. According to (Horowitz et al., 1994), a person's preference in choosing an alternative product is assumed to have a utility function. A person tends to choose the alternative with the highest utility value where utilities are dependent on the attributes and how someone analyzes an alternative product. The utility is a random variable, so that the utility value could not predict a person's choice with certainty, but rather leads to the provision of possible attributes to be selected.

4.4 Willingness to Pay

Willingness to Pay is a predictive value of a desire or someone's willingness to pay for the product that has been offered. The WTP value is the result of the conversion of the utility value at each attribute level. WTP value is connected to the value of the utility level attribute, so if the value of the utility level attribute has a value of negative, then it will be converted to WTP as the value of unwillingness of respondents to pay the worth of the results of the immediate conversion of the controlled product. The value of WTP conversion can be seen in

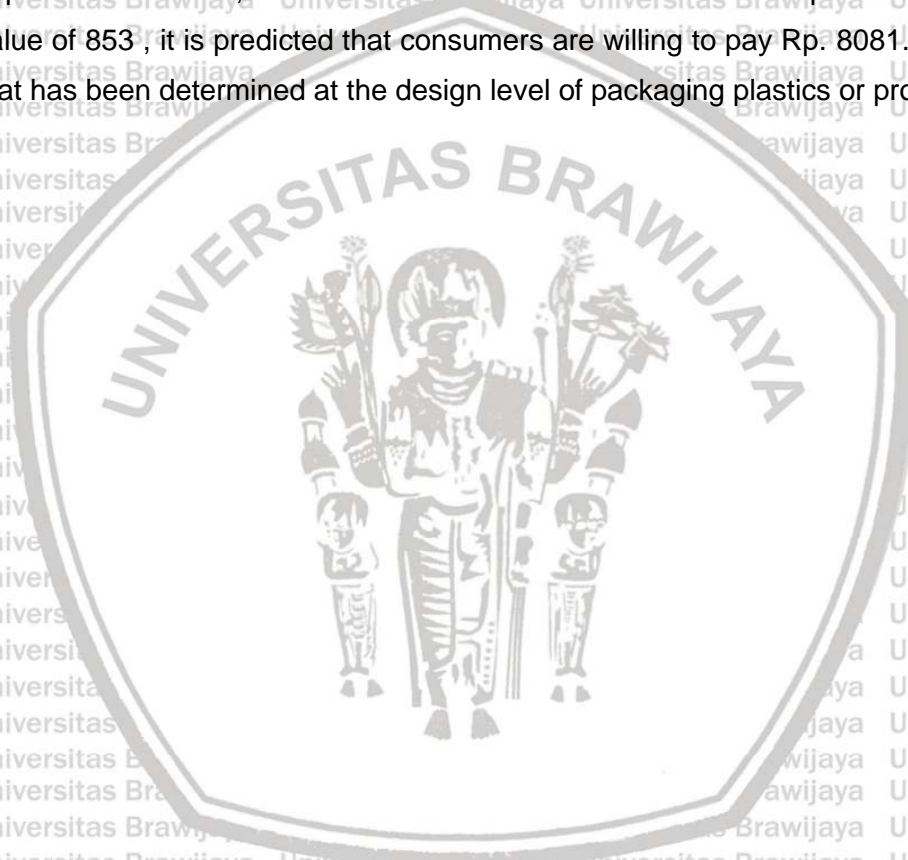
Table 4.14

Table 4.15. WTP value conversion

	WTP
Design 2 (black)	5037.4
Design 1 (white)*	Controlled*
Design 3 (yellow)	-3256.4
Aluminum Foil	14650.3
Paper	8081.2
Plastic*	Controlled*

Table 4.14 shows that the level Design 3 (yellow) and Design 2 (black) design has a value of the positive conversion. The result of WTP conversion of Design 3 (yellow) level is -3256.4 or equal to Rp. 3.256.4. It indicates that consumers are predicted to buy a product with a price of Rp. 3.256.4 lower than the price of which has been determined on the product control

with the design Design 1 (white). Same as with the Design 3 (yellow) level, the Design 2 (black) model has a value of conversion 5037.4 or equal to Rp. 5.037 with a utility value of 531.8, so consumers are predicted to buy products for Rp. 5.037 more than the price of which has been determined on the product control with design Design 1 (white). In the material packaging attribute, aluminum foil has a value of conversion 14650.3 or equal to Rp. 14,650,- with a utility value of 1547. It is predicted that consumers are willing to pay Rp. 14.650 more than the price that has been determined at the design level of packaging plastics or product control. At the paper attribute level, the WTP conversion value is 8081.2 or equal to Rp. 8081 with a utility value of 853 , it is predicted that consumers are willing to pay Rp. 8081.2 more than the price that has been determined at the design level of packaging plastics or product control.



CHAPTER V CONCLUSIONS AND SUGGESTIONS

5.1 Conclusion

In conclusion, the current study and findings have shown that

1. The Design 2 (black) level attributes were chosen as the consumer's preference as a packaging design (Design 2 (black), Design 3 (yellow) and Design 1 (white)). Meanwhile, aluminum foil was the preferred materials for the packaging material attributes (plastic, paper, and aluminum foil).
2. The consumer preference towards the level of attributes on chocolate packaging affected the willingness to pay (WTP) of the consumer towards the product.
3. Best finding in this research was that the value of consumer preference towards an option could be converted into a value of money to predict how much the consumer willing to purchase the product

5.2 Suggestions

Our study has limitations that leads to suggestion both for the readers and future research. as the suggestion for the readers, The values generated in this research result from the calculation system in which is to predict the range of the willingness of consumers to reach a price connected to the products offered. The industry needs to keep doing the calculations before determining the price of a product. The design and materials of packaging that selected and created by the research is not a reference surely so that it should be emulated precisely by industry, the design of which was made in the study is intended to equalize the perception of the respondents to the picture of each level on the attribute that is recommended for the reader to use the methods and attribute by the needs.

It is also suggested to researchers who want to use the model of similar analysis to describe the method, and level attributes as detailed as possible and apparent to prospective respondents to the perception that generated will approach the word uniform and produce data that is valid. Since the limitation of this research was just analysing the consumer preference towards the attribute of the packaging, it is suggested for the next research to analyzing about how the demographic affect the purchase decision towards the product. There are several attributes that suggested to be focused on the next research such as packaging information and typography since those attributes were not analyzed in this research.

REFERENCES

- Afoakwa, E. (2014) *History and Taxonomy of Cocoa, Cocoa Production and Processing Technology*. Boca Raton: John Wiley & Sons. doi: 10.1201/b16546-3.
- Afoakwa, E. (2016) 'World cocoa production , processing and chocolate consumption pattern'.
- Afoakwa, E. O. *et al.* (2013) 'Chemical composition and physical quality characteristics of Ghanaian cocoa beans as affected by pulp pre-conditioning and fermentation', 50(December), pp. 1097–1105. doi: 10.1007/s13197-011-0446-5.
- Aggarwal, A. and Langowski, H. (2020) 'Packaging Functions and Their Role in Technical Development of Food Packaging Systems: Functional Equivalence in Yoghurt Packaging', *Procedia CIRP*, 90, pp. 405–410. doi: 10.1016/j.procir.2020.01.063.
- Aggarwal, A. and Langowski, H. C. (2020) 'Packaging Functions and Their Role in Technical Development of Food Packaging Systems: Functional Equivalence in Yoghurt Packaging', *Procedia CIRP*, 90, pp. 405–410. doi: 10.1016/j.procir.2020.01.063.
- Andrzejuk, A. (2014) 'The Analysis of Production and Trade Patterns in Cocoa Market Worldwide and in Poland', *Scientific Journal of Warsaw University of Life Sciences*, 14(4), pp. 5–14.
- Asamoah, G. (2012) *Factors Which Influence The Buying Behaviours of Customers With Multiple Regular Customer Cards*. Arcada.
- Barišić, V. *et al.* (2019) 'The Chemistry Behind Chocolate Production', *Molecules*, 24(17). doi: 10.3390/molecules24173163.
- Beg, M. S. *et al.* (2017) 'Status, supply chain and processing of cocoa - A review', *Trends in Food Science and Technology*, 66, pp. 108–116. doi: 10.1016/j.tifs.2017.06.007.
- Breidert, C. (2006) 'Estimation of willingness-to-pay: Theory, measurement, application', *Estimation of Willingness-to-Pay: Theory, Measurement, Application*, (April), pp. 1–135. doi: 10.1007/978-3-8350-9244-0.
- Britton, L. L. and Tonsor, G. T. (2019) 'Consumers' willingness to pay for beef products derived from RNA interference technology', *Food Quality and Preference*, 75(February), pp. 187–197. doi: 10.1016/j.foodqual.2019.02.008.
- Carvajal-larenas, F. E. *et al.* (2015) 'Consumer liking , purchase intent , and willingness to pay for *Lupinus mutabilis* Sweet in relation to debittering treatments', *Food Quality and Preference*, 40, pp. 221–229. doi: 10.1016/j.foodqual.2014.10.006.
- Castro-Alayo, E. M. *et al.* (2019) 'Formation of Aromatic Compounds Precursors During Fermentation of Criollo and Forastero Cocoa', *Heliyon*, 5(1). doi: 10.1016/j.heliyon.2019.e01157.
- Cevallos-Cevallos, J. M. *et al.* (2018) 'Time-Related Changes in Volatile Compounds during Fermentation of Bulk and Fine-Flavor Cocoa (*Theobroma cacao*) Beans', *Journal of Food Quality*, p. 14. doi: 10.1155/2018/1758381.
- Clercq, N. De (no date) *Changing the functionality of cocoa butter*.
- 'Cocoa bean processing and the manufacture of chocolate' (2011), pp. 268–289. doi: 10.1016/B978-0-85709-125-3.50009-4.

- Datta, B. S. (2016) 'ISSN : 2321-1784 International Journal in Management and Social Science (Impact Factor- 5 . 276) International Journal in Management and Social Science ISSN : 2321-1784 International Journal in Management and Social Science (Impact Factor- 5 . 276) In', 04(09), pp. 109–114.
- Djatna, T. and Dwi, W. (2015) 'A system analysis and design for packaging design of powder shaped fresheners based on Kansei engineering', *Procedia Manufacturing*, 4(less), pp. 115–123. doi: 10.1016/j.promfg.2015.11.021.
- Dominici, A. et al. (2019) 'Consumer preference for wine from hand-harvested grapes', *British Food Journal*, 122(8), pp. 2551–2567. doi: 10.1108/BFJ-04-2019-0301.
- Draskovic, N. (2016) 'PACKAGING CONVENIENCE : CONSUMER PACKAGING FEATURE OR PACKAGING CONVENIENCE : CONSUMER PACKAGING FEATURE OR MARKETING TOOL ?', (January 2010). doi: 10.5848/APBJ.2010.00061.
- Dung, V. A., Anh, N. T. N. and Huyen, N. T. (2013) 'Building a Survey Tool to Assess Consumers ' Perception and Behavior Towards Green Consumption', *VNU Journal of Economics and Business*, 29(2), pp. 142–150.
- Fenko, A., Schifferstein, H. N. J. and Hekkert, P. (2010) 'Shifts in Sensory Dominance Between Various Stages of User-Product Interactions', *Applied Ergonomics*, 41(1), pp. 34–40. doi: 10.1016/j.apergo.2009.03.007.
- Firmanto, H. (2018) 'Cocoa Butter Characteristic on Different Roasting Temperature and Its Final Sensory Profiles', *Pelita Perkebunan (a Coffee and Cocoa Research Journal)*, 34(3), pp. 175–182. doi: 10.22302/iccri.jur.pelitaperkebunan.v34i3.312.
- Georgina Russell, C. et al. (2017) 'The impact of front-of-pack marketing attributes versus nutrition and health information on parents' food choices', *Appetite*, 116, pp. 323–338. doi: 10.1016/j.appet.2017.05.001.
- Gunaratne, N. M. et al. (2019) 'Heliyon Effects of packaging design on sensory liking and willingness to purchase : A study using novel chocolate packaging', *Heliyon*, 5(February), p. e01696. doi: 10.1016/j.heliyon.2019.e01696.
- Hervé, C. and Mullet, E. (2009) 'Age and Factors Influencing Consumer Behaviour', *International Journal of Consumer Studies*, 33(3), pp. 302–308. doi: 10.1111/j.1470-6431.2009.00743.x.
- van den Heuvel, F. P. et al. (2011) 'Identification of Employment Concentration and Specialization Areas : Theory and Application', *Beta Working Paper*, 354(August), p. 26p. doi: 10.1002/agr.
- Joel, N. et al. (2013) 'Production and Quality Evaluation of Cocoa Products (Plain Cocoa Powder and Chocolate)', *Am. J. Food. Nutr.*, 3(1), pp. 31–38. doi: 10.5251/ajfn.2013.3.1.31.38.
- Kallas, Z., Escobar, C. and Gil, J. M. (2013) 'Analysis of consumers' preferences for a special-occasion red wine: A dual response choice experiment approach', *Food Quality and Preference*, 30(2), pp. 156–168. doi: 10.1016/j.foodqual.2013.05.008.
- Lambooi, M. S. et al. (2019) 'Consumers' preferences for freezing of meat to prevent toxoplasmosis– A stated preference approach', *Meat Science*, 149(October 2018), pp. 1–8. doi: 10.1016/j.meatsci.2018.11.001.

- LI, S. *et al.* (2019) 'Consumer confidence and consumers' preferences for infant formulas in China', *Journal of Integrative Agriculture*, 18(8), pp. 1793–1803. doi: 10.1016/s2095-3119(19)62589-x.
- Li, W. *et al.* (2013) 'Conjoint analysis and discrete choice experiments for quality improvement', *Journal of Quality Technology*, 45(1), pp. 74–99. doi: 10.1080/00224065.2013.11917916.
- Lima, D. I. (2015) 'Willingness to pay for organic and fairtrade certified yellow chili peppers: Evidence from middle and high income', *British Food Journal*, 117(2), pp. 929–942. doi: 10.1108/BFJ-11-2013-0321.
- Lombardi, G. V., Berni, R. and Rocchi, B. (2017) 'Environmental friendly food. Choice experiment to assess consumer's attitude toward "climate neutral" milk: the role of communication', *Journal of Cleaner Production*, 142, pp. 257–262. doi: 10.1016/j.jclepro.2016.05.125.
- Loo, E. J. Van *et al.* (2017) 'Consumers' willingness-to-pay for food safety labels in an emerging market: The case of fresh produce in Thailand', *Food Policy*, 69, pp. 25–34. doi: 10.1016/j.foodpol.2017.03.004.
- Makarewicz, A. (2013) 'Consumer behavior as a fundamental requirement for effective operations of companies', 6(1), pp. 103–109.
- Manalu, R. (2018) 'Pengolahan Biji Kakao Produksi Perkebunan Rakyat Untuk Meningkatkan Pendapatan Petani', *Jurnal Ekonomi & Kebijakan Publik*, 9, pp. 99–111.
- Meyering, S. G. H., Trajer, N. and Lehberger, M. (2019) 'What is local food? The case of consumer preferences for local food labeling of tomatoes in Germany', *Journal of Cleaner Production*, 207, pp. 30–43. doi: 10.1016/j.jclepro.2018.09.224.
- Miller, S. *et al.* (2017) 'Estimation of consumer willingness-to-pay for social responsibility in fruit and vegetable products: A cross-country comparison using a choice experiment', *Journal of Consumer Behaviour*, 16(6), pp. e13–e25. doi: 10.1002/cb.1650.
- Muñoz, M. S. *et al.* (2020) 'An overview of the physical and biochemical transformation of cocoa seeds to beans and to chocolate: Flavor formation', *Critical Reviews in Food Science and Nutrition*, 60(10), pp. 1593–1613. doi: 10.1080/10408398.2019.1581726.
- Naik, B. and Kumar, V. (2014) 'Cocoa Butter and Its Alternatives: A Reveiw', 1, pp. 7–17.
- Nair, K. P. P. (2010) *Cocoa (Theobroma cacao L.)*, *The Agronomy and Economy of Important Tree Crops of the Developing World*. doi: 10.1016/b978-0-12-384677-8.00005-9.
- Naveed, S., Hameed, A. and Sharif, N. (2015) 'iMedPub Journals Chocolate Consumption in Children and Adults', *Archives of medicine*, 7(14), pp. 1–6.
- Núñez-Cacho, P. *et al.* (2020) 'Plastics and sustainable purchase decisions in a circular economy: The case of Dutch food industry', *PLoS ONE*, 15(9 September), pp. 1–16. doi: 10.1371/journal.pone.0239949.
- Ojha, A. *et al.* (2015) 'Food packaging – materials and sustainability-A review', *Agricultural Reviews*, 36(3), p. 241. doi: 10.5958/0976-0741.2015.00028.8.
- Oracz, J. and Nebesny, E. (2016) 'Antioxidant Properties of Cocoa Beans (Theobroma cacao L.): Influence of Cultivar and Roasting Conditions', *International Journal of Food Properties*, 19(6), pp. 1242–1258. doi: 10.1080/10942912.2015.1071840.

- Otieno, D. J. and Ogutu, S. O. (2020) 'Consumer willingness to pay for chicken welfare attributes in Kenya', *Journal of International Food and Agribusiness Marketing*, 32(4), pp. 379–402. doi: 10.1080/08974438.2019.1673275.
- Pohlan, H. A. J. (2020) 'Growth and Production of Cacao', *Encyclopedia of Life Support Systems*.
- Del Prete, M. and Samoggia, A. (2020) 'Chocolate consumption and purchasing behaviour review: Research issues and insights for future research', *Sustainability (Switzerland)*, 12(14). doi: 10.3390/su12145586.
- Profeta, A. et al. (2021) 'Discrete Choice Analysis of Consumer Preferences for Meathybrids—Findings from Germany and Belgium'.
- Quan, S. et al. (2018) 'WTP for baby milk formula in China: Using attribute nonattendance as a priori information to select attributes in choice experiment', *Agribusiness*, 34(2), pp. 300–320. doi: 10.1002/agr.21535.
- Riaz, T. and Ghafoor, M. M. (2019) 'Strategic Logo Placement on Packaging-Using Conceptual Metaphors of Power in Packaging-Evidence from Pakistan', *Procedia Computer Science*, 158, pp. 582–589. doi: 10.1016/j.procs.2019.09.092.
- Rodríguez-Entrena, M. et al. (2016) 'Analysing granulated brown sugar – panela – market in Western Honduras', *British Food Journal*, 118(2), pp. 495–512. doi: 10.1108/BFJ-04-2015-0130.
- Sabarisman, I. and Purwaditya, A. K. (2019) 'Analisis Deskriptif dan Perilaku Konsumen Bar Chocolate di Yogyakarta', *Jurnal Sains dan Seni ITS*, 8(2), pp. 302–304.
- Sedlacekova, Z. (2017) 'Food Packaging Materials', *Food Packaging Materials*, (November). doi: 10.4324/9781315374390.
- Silayoi, P. and Speece, M. (2007) 'The importance of packaging attributes : a conjoint analysis approach', 41(11), pp. 1495–1517. doi: 10.1108/03090560710821279.
- Sondhi, N. and Chawla, D. (2017) 'Segmenting and Profiling the Chocolate Consumer: An Emerging Market Perspective', *Journal of Food Products Marketing*, 23(2), pp. 123–143. doi: 10.1080/10454446.2017.1244784.
- Stara, C. V. L. (2018) 'Pengaruh Persepsi Konsumen Atas Rasa , Harga Dan Kemasan Pada Minat Beli Ulang Brand'.
- Tecleab, H. V. (2015) 'How Are Consumers Influenced By Gender Stereotypes of Food Advertisements ? Hogyan Befolyásolják Az Élelmiszer Reklámokban Alkalmazott Nemi Sztereotípiák a Fogyasztókat ?', pp. 95–104.
- Toker, O. S. et al. (2018) 'Developing Functional White Chocolate by Incorporating Different Forms of EPA and DHA - Effects on Product Quality', *Food Science and Technology*, 87, pp. 177–185. doi: 10.1016/j.lwt.2017.08.087.
- Vardhan, G. H. and Amulya, M. (2014) 'Visual Influence of Packing on Consumer Buying Behavior of Ready To Eat Food Products', *Journal of Business and Management*, 19(5), pp. 52–68. doi: 10.9790/487X-1907040106.
- Vega, C. and Kwik-Urbe, C. (2012) *Theobroma cacao—An Introduction to the Plant, Its Composition, Uses, and Health Benefits, Cocoa Butter and Related Compounds*. Urbana:

- AOCS Press. doi: 10.1016/B978-0-9830791-2-5.50005-0.
- Wang, E. *et al.* (2019) 'Chinese consumers' preferences for food quality test/measurement indicators and cues of milk powder: A case of Zhengzhou, China', *Food Policy*, 89(September), p. 101791. doi: 10.1016/j.foodpol.2019.101791.
- Wanyama, R. *et al.* (2019) 'Poor consumers' preferences for nutritionally enhanced foods', *British Food Journal*, 121(3), pp. 755–770. doi: 10.1108/BFJ-09-2018-0622.
- Wongprawmas, R. and Canavari, M. (2017) 'Consumers' willingness-to-pay for food safety labels in an emerging market: The case of fresh produce in Thailand', *Food Policy*, 69, pp. 25–34. doi: 10.1016/j.foodpol.2017.03.004.
- Xinwei, L. *et al.* (2015) 'Emotional responses towards food packaging : A joint application of self-report and physiological measures of emotion', *FOOD QUALITY AND PREFERENCE*, 42, pp. 48–55. doi: 10.1016/j.foodqual.2015.01.009.
- Yang, Y., Hobbs, J. E. and Natcher, D. C. (2020) 'Assessing consumer willingness to pay for Arctic food products', *Food Policy*, 92(August 2019), p. 101846. doi: 10.1016/j.foodpol.2020.101846.
- Yin, S. *et al.* (2018) 'Consumer preference for infant milk-based formula with select food safety information attributes: Evidence from a choice experiment in China', *Canadian Journal of Agricultural Economics*, 66(4), pp. 557–569. doi: 10.1111/cjag.12183.
- Yin, S. *et al.* (2019) 'Chinese consumer preferences for fresh produce: Interaction between food safety labels and brands', *Agribusiness*, 35(1), pp. 53–68. doi: 10.1002/agr.21585.
- Yin, S. *et al.* (2020) 'Chinese urban consumers' preferences for white shrimp: Interactions between organic labels and traceable information', *Aquaculture*, 521(October 2019). doi: 10.1016/j.aquaculture.2020.735047.
- Zheng, S. *et al.* (2012) 'Willingness to pay for traceable pork: Evidence from Beijing, China', *China Agricultural Economic Review*, 4(2), pp. 200–215. doi: 10.1108/17561371211224782.
- Zhou, J. *et al.* (2017) 'Habit spillovers or induced awareness: Willingness to pay for eco-labels of rice in China', *Food Policy*, 71, pp. 62–73. doi: 10.1016/j.foodpol.2017.07.006.
- Zhu, Y. *et al.* (2018) 'Consumer preference and willingness to pay for tomato juice', *International Food and Agribusiness Management Review*, 21(8), pp. 1167–1183. doi: 10.22434/IFAMR2017.0117.
- Zyzelewicz, D. *et al.* (2014) 'Influence of Roasting Conditions on Fatty Acid Composition and Oxidative Changes of Cocoa Butter Extracted from Cocoa Bean of Forastero Variety Cultivated in Togo', *Food Research International*, 63, pp. 328–343. doi: 10.1016/j.foodres.2014.04.053.

ATTACHMENT

Attachment 1. Questionnaire models

PREFERENSI KONSUMEN TERHADAP ATRIBUT KEMASAN PRODUK COKELAT LOKAL

Assalamu'alaikum. Shalom. Omswastiastu. Salam sejahtera untuk kita semua.

Perkenalkan nama saya Mifhah Seldyah, mahasiswa tingkat akhir program studi Teknologi Pangan, Universitas Brawijaya. Saat ini saya sedang mengerjakan tugas akhir dengan judul Analisis Preferensi Konsumen Terhadap Atribut Kemasan Serta Pengaruh Pada Keinginan Pembelian Produk Cokelat Lokal Menggunakan Metode Discrete Choice Experiment di bawah bimbingan Ibu Wenny Bekti Sunarhanum, S.TP, M.Food. St., Ph.D.

Kuisiioner ini membutuhkan waktu 5-7 menit yang mana terdiri dari 2 sesi utama, sesi yang pertama adalah sesi pengisian data responden dan sesi kedua adalah sesi pemilihan alternatif produk berdasarkan kesukaan responden.

Data dari responden sangat berarti bagi penelitian saya, mohon untuk anda berkenan mengisi dengan baik, jujur, dan Aftias. Apabila anda menemui kendala pengisian silahkan menghubungi melalui email mifhahseldyah20@gmail.com

Terimakasih karena cautaran! telah berkenan meluangkan waktu untuk mengiui kuisiioner saya. Jangan lupa pakai masker dan cuci tangan :)

***Required**

Nama *

Your answer

Usia *

<18
 19-25
 26-30
 31-40
 >40

Jenis Kelamin *

Perempuan
 Laki-laki

Kota Asal *

Your answer

Pendidikan terakhir *

SMA/Sejenis
 Mahasiswa S1
 Mahasiswa S2
 Lainnya

Peran anda terhadap produk cokelat *

Konsumen/Pembeli
 Produsen/Penjual

Pekerjaan *

Pelajar/Mahasiswa
 Pegawai Negeri Sipil
 Pegawai Swasta
 Wirausaha
 Prentani
 Lainnya

Pendapatan *

<Rp. 500.000
 Rp. 500.000 - Rp. 1.000.000
 Rp. 1.100.000 - Rp. 2.000.000
 Rp. 2.100.000 - Rp. 3.000.000
 >Rp. 3.000.000

Apakah anda pernah membeli produk cokelat barang? *

Ya
 Tidak

Kapan terakhir kali anda membeli cokelat? *

1 hari yang lalu
 1 minggu yang lalu
 1 bulan yang lalu
 Tidak pernah

Dimana anda biasa membeli produk cokelat? *

Supermarket
 Toko kecil
 Warung-warung
 Toko online (Shopee, Tokopedia, dll.)

Apakah tujuan anda membeli produk cokelat? *

Konsumsi pribadi
 Hadiah untuk seseorang
 Ada promosi/diskon
 Pemasaran dengan produk
 Untuk bahan tambahan makanan
 Lainnya

Apakah ada rencana pembelian terhadap produk cokelat untuk kedepannya? *

Ya
 Tidak

Berapa kali anda membeli produk cokelat barang dalam satu bulan? *

Tidak pernah
 1-5

Berapa kali anda membeli produk coklat batang dalam satu bulan? *

Tidak pernah
 1-3
 4-6
 7-10
 >10

Apakah anda mengetahui merek/brand coklat lokal (produksi Indonesia) ?

Ya
 Tidak

Apa yang mempengaruhi anda dalam memilih produk coklat? *

Harga
 Kemasan
 Merek/Brand

Atribut apa yang menurut responden penting pada kemasan? *

Desain kemasan
 Warna Kemasan
 Informasi (Brand, komposisi, informasi nutrisi, nama perusahaan dsb.)
 Bahan Kemasan
 Lain-lain

CHOICE EXPERIMENT

Pada saat ini saya ingin mengajak anda dalam suatu proses penelitian. Produk yang akan saya beli adalah coklat batang produksi lokal dengan berat 80 g.

Anda akan diberikan pilihan tentang berbagai macam produk berdasarkan dari desain kemasan, bahan/materi kemasan, dan juga harga. Anda harus perlu memilih produk yang paling anda sukai.

Jika Anda tidak mempunyai pilihan yang diberikan dalam satu choice set, maka Anda berhak untuk memilih pilihan "tidak memilih".

Akan ada 9 choice set dimana pada masing-masing set ada 2 pilihan produk dan satu pilihan "tidak memilih".

Untuk memulai silahkan klik berikutnya!

CHOICE SET 1

CHOICE SET 1

Jika hanya ada 2 pilihan produk coklat batang ini, mana yang akan anda pilih?

Q1/Q9 *

Choice Set 1	Produk 1	Produk 2
		
Desain	Minimalis	Minimalis
Bahan Kemasan	Alumunium Foil	Paper
Harga (80 gram)	Rp. 52.500	Rp. 56.000

- Produk 1
 Produk 2
 Tidak memilih

Attachment 2. RStudio Analysis

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1 #atribut dan level keragaman CONDOCAT lokal##
2 #desain : minimalis, klasik, modern
3 #kemasan : plastik, Paper, AlumuniumFoil
4 #marga : Rp49000, Rp32500, Rp54000
5
6
7 #creating the ce design
8 library(support.cea)
9 nct <- notation.design(attributes.names = list(desain = c("minimalis", "klasik", "modern"),
10 #kemasan = c("Plastik", "Paper", "AlumuniumFoil"),marga = c("49000", "32500", "54000")),
11 #alternatives = 2, #blocks = 1, row.names = FALSE, randomize = TRUE, seed = 987)
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Choice sets:

alternative 1 in each choice set	BLOCK	QES	ALT	Desain	Kemasan	Harga
8	1	1	1	minimalis	AlumuniumFoil	52500
7	1	2	1	minimalis	paper	56000
1	1	3	1	modern	AlumuniumFoil	56000
5	1	4	1	modern	paper	49000
3	1	5	1	klasik	paper	52500
9	1	6	1	klasik	alumuniumFoil	49000
2	1	7	1	modern	plastik	52500
6	1	8	1	klasik	plastik	50000
4	1	9	1	minimalis	plastik	49000

```

13 #atribut dan level keragaman CONDOCAT lokal##
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alternative 2 in each choice set

alternative 2 in each choice set	BLOCK	QES	ALT	Desain	Kemasan	Harga
3	1	1	2	minimalis	paper	56000
1	1	2	2	modern	alumuniumFoil	56000
6	1	3	2	modern	paper	49000
4	1	4	2	klasik	paper	52500
8	1	5	2	klasik	plastik	50000
1	1	6	2	minimalis	plastik	49000
5	1	7	2	minimalis	alumuniumFoil	52500
9	1	8	2	modern	plastik	52500
7	1	9	2	klasik	alumuniumFoil	49000

Candidate design:

A	B	C
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3	1	3
4	1	4
5	1	5
6	2	1
7	1	2
8	1	3
9	1	4
10	1	5



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RStudio
File Edit Code View Plots Session Build Debug Profile Tools Help
[Icons] Go to the function - Address -
[Icons]
[Icons] CHOICEJETRIK - Suburmatik - AnalisisR - CL app -
22 #PRACTICING QUESTIONNAIRE SURVEY
23 questionnaire(choice.experiment.design = nct)
24
25
26 #menangis() dataset
27 library(readxl)
28
29 Diggitly <- read_excel("E://ADIPATI 55/RE/SKRIP-C/MUJAL EMF 0 YK/ON PROGRES/DNE ST
30 data_syn.res1
31 Diggitly[1,1,1]
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Environment History Connections Tutorial

- Global Environment
- DATA_FIX_OLAH 222 obs. of 15 variables
- dataset1 5994 obs. of 16 variables
- desmat1 27 obs. of 8 variables
- diggitly 222 obs. of 13 variables
- nct List of 3
- syn.res1 300 obs. of 12 variables
- wtp Large wtp (4 elements, 803.5 kb)

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- Getting Help with R

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- Writing R Extensions
- R Data Import/Export

Reference

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- R Installation and Administration
- R Internals

Design Information:

- number of blocks = 1
- number of questions per block = 9
- number of alternatives per choice set = 2
- number of attributes per alternative = 2

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> #creating questionnaire survey
> questionnaire(choice.experiment.design = nct)

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Block 1

Question 1

	alt.1	alt.2
Desain	"Minimalis"	"Minimalis"
Kemasan	"Aluminium Foil"	"Paper"
Harga	"\$2500"	"\$6000"

Question 2

	alt.1	alt.2
Desain	"Minimalis"	"Modern"
Kemasan	"Paper"	"Aluminium Foil"
Harga	"\$6000"	"\$6000"

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RStudio
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[Icons] Go to the function - Address -
[Icons]
[Icons] CHOICEJETRIK - Suburmatik - AnalisisR - CL app -
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Environment History Connections Tutorial

- Global Environment
- DATA_FIX_OLAH 222 obs. of 15 variables
- dataset1 5994 obs. of 16 variables
- desmat1 27 obs. of 8 variables
- diggitly 222 obs. of 13 variables
- nct List of 3
- syn.res1 300 obs. of 12 variables
- wtp Large wtp (4 elements, 803.5 kb)

Files Plots Packages Help Views

Home - Find in Files

R Resources

- Learning R Online
- CEAN Task Views
- R in Slack/Overflow
- Getting Help with R

RStudio

- RStudio IDE Support
- RStudio Community Forum
- RStudio Cheat Sheets
- RStudio Tip of the Day
- RStudio Packages
- RStudio Products

Manuals

- An Introduction to R
- Writing R Extensions
- R Data Import/Export

Reference

The R Language Definition

- R Installation and Administration
- R Internals

Question 2

	alt.1	alt.2
Desain	"Modern"	"Modern"
Kemasan	"Aluminium Foil"	"Paper"
Harga	"\$6000"	"\$49000"

Question 4

	alt.1	alt.2
Desain	"Modern"	"Klasik"
Kemasan	"Paper"	"Paper"
Harga	"\$49000"	"\$2500"

Question 5

	alt.1	alt.2
Desain	"Klasik"	"Klasik"
Kemasan	"Paper"	"Plastik"
Harga	"\$2500"	"\$6000"





Question 6


	alt.1	alt.2
Desain	"Klasik"	"Minimalis"
Kemasan	"Aluminium Foil"	"Plastik"
Harga	"\$49000"	"\$49000"





The screenshot displays the RStudio environment. The top-left pane shows R code for data import and model fitting. The top-right pane lists loaded data objects. The bottom-left pane shows the console output, including model fit statistics and a table of parameter estimates.





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## CHOICEJETIKER
## Suburmat2
## AnalisisR
## CL app
## Run
## Source
22: MULTICHOICE QUESTIONNAIRE SURVEY
23: questionnaire(choice.experiment.design = nct)
24:
25:
26: emonang() dataset
27: library(readxl)
28:
29: Diggitly <- read_excel("E:/ADIPATI 55/RE/SKRIP-C/MU/TAI EM/1 0 YK/ON PROGRES/DNE ST
30: data_syn.res1)
31: Diggitly[1:3, ]
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Attachment 3. Choice set models

Choice Set 8	Product 1	Product 2
		
Design	2	3
Packaging Material	Plastic	Plastic
Price (80 grams)	Rp. 56.000	Rp. 52.500
Choice Set 7	Product 1	Product 2
		
Design	3	1
Packaging Material	Plastic	Aluminum Foil
Price (80 grams)	Rp. 52.500	Rp. 52.500

Choice Set 6	Product 1	Product 2
		
Design	2	1
Packaging Material	Aluminum Foil	Plastic
Price (80 grams)	Rp. 49.000	Rp. 49.000
Choice Set 5	Product 1	Product 2
		
Design	2	2
Packaging Material	Paper	Plastic
Price (80 grams)	Rp. 52.500	Rp. 56.000

Choice Set 4	Product 1	Product 2
		
Design	3	2
Packaging Material	Paper	Paper
Price (80 grams)	Rp. 49.000	Rp. 52.500
Choice Set 3	Product 1	Product 2
		
Design	3	3
Packaging Material	Aluminum Foil	Paper
Price (80 grams)	Rp. 56.000	Rp. 49.000

Choice Set 2	Product 1	Product 2
		
Design	1	3
Packaging Material	Paper	Aluminum Foil
Price (80 grams)	Rp. 56.000	Rp. 56.000
Choice Set 1	Product 1	Product 2
		
Design	1	1
Packaging Material	Aluminum Foil	Paper
Price (80 grams)	Rp. 52.500	Rp. 56.000

Choice Set 9	Product 1	Product 2
		
Design	1	2
Packaging Material	Plastic	Aluminum Foil
Price (80 grams)	Rp. 49.000	Rp. 49.000

