PACKAGING OPTIMIZATION MODEL USING COST-BASED BEHAVIORAL PERSPECTIVE APPROACH IN FOOD AND BEVERAGE INDUSTRY

The high competition in the food and beverage industry in Indonesia, where packaging has a very important function, with the main function to protect the product, as well as being a factor in attracting consumers' interest in making purchases. Packaging production is dominated by several companies, which when categorized are divided into middle-up manufacturing and middle-low manufacturing. The research is necessary to create an optimal packaging design model by considering the culture and habits of consumer. Capturing customer behavior and costs has a control function. Ethnographic studies are used to explore packaging elements that are important to consumer and Structural Equation Modeling (SEM) was used for data processing.

The result provides a conceptual model as well as recommendations for food and beverage manufacturers in terms of the packaging used. Seven elements of packaging that deserve primary attention: design, image, typography, color, size, material and quality. Using habit and cost factors has the control variables, with maximum profit as the objective function. Recommendations for middle-up manufacturing are focused on four packaging elements: design, image, color and quality. It is recommended to maximize strategies for customer retention and improving customer loyalty. Middle-low manufacturing is focused on four packaging elements: color, size, material and quality. It is recommended to maximize strategies to encourage repeat business and boost productivity.

The features identified in this research are very possible to be implemented by food and beverage manufacturer, along with recommended strategies. For example, at the middle and low manufacturing level, it is very important to pay attention to product availability in several sizes

Keywords: packaging, food and beverage, typography, customer loyalty, customer retention, ethnography, encourage repeat business, boost productivity, customer behavior, cost factor

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1. Introduction

The high use of packaging in the food and beverage business process with a high level of competition demands is a good strategy in manufacturing operations. In Indonesia, there are still many packaging items that are still imported from other countries, which indirectly creates very high dependency and weakens existing competitiveness. The risk of delays in supply from abroad could cause disruption to operational processes which could result in delays in supply for consumers. This research tries to describe packaging in terms of consumer desires, as well as its influence on existing manufacturing operational strategies. The relevance between subjects: packaging – customer behavior and manufacturing strategy in this research is very strong, which has not been found in previous research so far. This research uses an ethnographic study which is used to explore the cognitive and affective aspects of consumers. The managerial implications of this research are directed at business strategies that can be practiced by a manufacturer.

Consumer purchasing behavior represents product quality and evidence provided by the company through product performance. This will create awareness for consumers to make repeat purchases. Awareness of a product will begin and be formed through packaging, so packaging is often associated with the product itself. This research aims to create an optimum packaging design model using consumers' desired attributes or instruments. This instrument's determination can form an analog or analytical model.

Ethnographic studies with a cross-cultural perspective are an eligible method for exploring information and collecting data that describes consumer conative and cognitive behavior to see packaging as a product representation. Researchers can develop scenarios related to the analytical model from this analog model. It is said that optimal packaging design is if the packaging design can increase consumers' awareness and conative aspects to carry out affective behavior in the form of purchasing products, followed by repeat purchases. Meanwhile, packaging with a high eco-efficiency value is achieved if the packaging is made with high value in terms of input, process, and output.

In line with the existence of different types of manufacturing, this research explains middle-up manufacturing and middle-low manufacturing, where the two kinds of manufacturing each have different capabilities and concentrations in producing packaging that can meet consumer needs and satisfaction. Middle-up manufacturing has a substantial production capacity, so in terms of volume, it can create

packaging in very high quantities. The latest technology is available to use materials flexibly and optimal packaging sizes flexibly. This is very different from middle-low manufacturing, which focuses on producing packaging with similar designs, is limited in design variations, and needs more flexibility than middle-up manufacturing. However, both manufacturers have the same task of providing packaging with quality according to consumer desires.

From studies that several researchers have conducted, discuss various technical aspects of packaging, including packaging materials, design, production, distribution, and safety, while providing recommendations related to aspects of quality testing, industry standards, and best practices in the packaging industry [1]. [2] has provided recommendations for developing packaging technology that protects products from damage during transportation and storage. Whereas [3] offer more input from aspects of packaging ergonomics and human interaction with packaging. Understand how packaging design can influence product comfort and ease of use.

In modern condition as a now with the level of competition in the food and beverage manufacturing industry is getting tighter, and the variety of food and beverage products on the market is becoming more numerous and varied, and consumer desires are very dynamic, meaning they change very quickly, so it is very important to carry out a comprehensive studies regarding the relationship between packaging – consumer behavior – manufacturing as a producer. These studies are very important in an era of increasingly high competition in the food and beverage industry. They will to ultimately provide several recommendations in terms of packaging aspects which are of primary concern to consumers, as well as recommending strategies for food and beverage manufacturing, both middle-up and middle-low manufacturing. In practice, the recommendations provided from these studies can be applied directly in the manufacturing process, with the availability of packaging according to consumer desires, as well as the implementation of appropriate manufacturing strategies, it is hoped that it can bring maximum profits to manufacturers.

2. Literature review and problem statement

[1] examines the relationship between different packaging design characteristics and their influence on consumer purchasing decisions. It is found 5 main parts that are the main considerations for consumers before making a purchase. These five things, namely color, shape, images, lines and typography, are the main factors that can influence consumers to make purchases. These five factors are packages that always appear and are put forward in packaging. Taking advantage of the psychology of consumers, the majority of whom are impressed at first sight seeing, these five things become the dominant factors in preparing innovative packaging with an appearance that has a great appeal to consumers.

[2] provides an illustration that there are 4 main elements of packaging that can influence consumer buying interest, these four elements are: design, graphics, color and material. Choosing the right type of material, and supported by choosing the right design, graphics and colors, will produce good quality packaging. More importantly, determining the type of material with the right color is very crucial. So that it is possible to contrast, in terms of appearance, the packaging becomes a package with good harmonization.

[3] states that packaging attributes such as: protection, comfort, portability and storage, information, sustainability, branding and involvement, can increase consumer buying interest in a product. In this research, packaging is assessed based on the direct impact that can be received by consumers, the packaging's ability to protect the product, be easy to carry and reflect strong branding are the main concerns and choices for consumers.

In [4], the relative importance of packaging affect brand preferences manufacturers. The appearance of the packaging also describes the manufacturer who produced it. Many consumers have a very high emotional attachment to a manufacturer's product based on the branding of the manufacturer that makes it. It is very important to creating a packaging design that is unique, easy to remember and has strong branding.

In [5], the integration of visual elements (colors, graphics and images) and the perfect combination in packaging can arouse consumers' emotional aspects towards the product. The compatibility between image and color choices as well as additional combinations in the form of lines or graphics will create a separate image of a packaging. A display with its unique characteristics will be easy to remember and more impressive for consumers.

In [6], packaging color and design are the most attractive factors during the purchase by customers. A unique packaging design with distinctive colors will make it easier for consumers to remember the products they have used. At the same time, distinctive designs and colors can represent strong branding of a product.

In [7], importance of understanding one of the functions of packaging is given as a marketing tool. Packaging not only aims to protect the contents of the product, but the packaging must present an innovative appearance in terms of shape, color choice, typography and other attributes. Displaying innovative packaging will really help consumers' understanding of the product, as well as determining the product's success when marketed.

In [8], four main elements of packaging: design, graphics, color and material have a very significant influence in arousing consumers' desire to make a purchase. It is very important to create an optimal combination of these four elements to produce good packaging. Providing a unique design, combined with the right choice of graphics and colors, as well as the right choice of material, will present a package with good quality.

In [9], packaging is one of the publications between producers and consumers which is displayed through images, colors, symbols, lines and several other accessories. A good combination of these components will present a packaging package that is very popular with consumers.

In [10], the sustainable packaging should be reduce their environmental impact. Every producer or manufacturer is obliged to provide packaging that not only satisfies consumers, but the packaging provided also does not have a negative impact on the environment. In line with the increasingly high level of consumer awareness regarding environmentally friendly packaging choices, the availability of environmentally friendly packaging has become a major concern for every food and beverage manufacturer.

Of the several articles that have been reviewed by researchers, the majority only review a few parts. Research [1, 2, 5, 6, 8] provides a review of packaging elements that are important and can attract consumers' interest in

making purchases. Meanwhile, research [3] explains functional of packaging. Research [4, 7, 9] focuses on packaging as a marketing tool as well as the brand preferences of the manufacturer that produces the product. And research [10] focuses on the sustainability impact of packaging. From this, the topics discussed in previous literature only focus on packaging aspects. Meanwhile researchers try to explore several important things about packaging which are the main focus of consumers, which will then be used as the main basis in determining the conceptual model for manufacturing as well as determining strategies in an effort to obtain maximum profits.

There are not many studies about packaging that provide recommendations for manufacturers to focus on several aspects of packaging while also providing strategy recommendations for manufacturers to get maximum profits. Several previous studies inspired the author to conduct research to explore what are the main points of packaging that can increase consumer interest in a product. Where the next step is to be able to provide strategic recommendations for a manufacturer in determining the optimal strategy in an effort to obtain maximum profit.

Several problem statements that need to be considered in this research include: how to involve consumers in providing constructive responses to packaging. It is hoped that direct involvement from consumers can provide positive things and objective input. Next, the second problem statement is how to determine the control function, related to the packaging elements obtained. This is very important to later understand the relationship between packaging elements and the control function towards the objective function, in this case the maximum desired profit.

Packaging design is an important aspect that can influence customer perceptions about products and brands. Some of the principles that are used and can be applied in creating attractive and practical packaging include:

a) packaging design can meet the interests of consumer satisfaction [4];

b) have compatibility with the product, [5];

c) have a strong brand identity [6];

d) informative and innovative packaging design [7];

e) design is distinguishing [8];

f) packaging design meets ergonomic aspects [9];

g) packaging design can fulfill aspects of product safety and protection [10];

h) packaging design displayed meets the sustainability aspect [11].

Some of the research results above show that the packaging not only has the function of wrapping and protecting the products, but there are many functions that must be fulfilled by packaging to become something that has high value for consumers.

Packaging must be designed with a focus on customer satisfaction. This includes understanding the needs and preferences of target customers. The packaging design displayed can provide solutions to consumer needs. Suitability of packaging to the product is defined as the packaging design must be appropriate to the type of product being packaged [12]. For example, food and beverage products will always have differences starting from the type of material, shape, size, and other properties to support good packaging design.

Meanwhile, packaging must represent brand identity, which means the packaging's ability to reflect the product's brand identity. This includes choosing colors, letters, images, lines, and other visual elements that illustrate brand consistency. According to [13], good packaging can build brand equity and drive sales. [14], a brand is a name, term, sign, symbol or design or a combination of all of them contained in a packaging, which is expected to identify goods or services from a group of sellers and is expected to differentiate these goods or services from competitor products. A brand is a sign in the form of an image, name, word, letters, numbers, color arrangement, or a combination of these elements, which has distinguishing power and is used in trading activities for goods or services [15]. A brand is a name, term, sign, symbol, design, color movement, or combination of other product attributes on a packaging that is expected to provide identity and differentiation from competitors' products [16]. Many companies see that packaging is a critical way to communicate to consumers and create a brand impression of a product in their minds [17]. Packaging design is one component of a series of multivariate marketing activities designed to create brand loyalty and sell products [18].

Packaging meets the informative aspect, meaning that the packaging can provide clear information about the product, starting from the product name, description, instructions for use, information regarding the expiration date, and information regarding nutritional content if it is deemed to still have strong relevance. One of the functions of packaging is to communicate the product through the information listed. Product information can help consumers make purchasing decisions more carefully [19]. Many companies see packaging as a critical way to communicate to consumers and create a brand impression of a product in their minds [17]. Packaging also provides information that can attract potential buyers to try and compare with products that have previously been used so that when consumers feel positive things (value increasing), they will switch brands [9]. Packaging with good information attributes can increase consumer trust if the information provided follows the product being made [15].

On the other hand, packaging must have distinguishing capabilities, which means the packaging has unique characteristics, so it has a significant difference from competitors' products. Special characteristics can be unique designs, symbols, or visual elements that attract consumers. Packaging can create consumer loyalty due to various aspects, including increasing consumer awareness in recognizing brands (brand awareness) because the packaging has different characteristics from other packaging and is more likely to symbolize the brand [20].

Ergonomic aspects will be fulfilled when packaging is designed, taking into account how users will interact with it [21, 22]. This includes ensuring the packaging is easy to open and use and does not cause difficulties for customers. When creating packaging, consumers, who are the target market, need to be considered. Designing a product packaging does not only think about the product but also the consumers who will use the product. For example, if the target market is older consumers, it is possible to design packaging that is not too difficult to pull. If the target market is children under five, then the manufacturer can make packaging that is easy to carry and not too heavy. Packaging that is made to suit the target market can improve the experience or interaction between consumers and the product. Ergonomic packaging must be able to protect the product inside [23]. Apart from protecting against dirt and dust, ergonomic packaging must also protect the product during delivery. So that the product that reaches consumers remains in good condition.

One type of packaging cannot be used for all types of products. Lunch box packaging cannot be used for soupy foods or hot drink cups cannot be used for cold drinks and vice versa. Apart from the type, the size of a package cannot be used as a one-size-fits-all because it needs to be adjusted to the product that will be packaged in it. Adjusting the size and type of packaging will ensure that the product reaches consumers' hands [24]. If the product requires packaging that uses a handle, pay attention to the shape and comfort when holding it. Manufacturers need to consider whether the product's weight is compatible when carried with one hand or when pouring, whether the shape of the packaging is suitable for holding, and other things. For packages that require a handle, make sure the surface is non-slip so that when held, it does not come off easily.

Meanwhile, for packaging that has a round shape, adjust it to the surface of the packaging to provide a good grip. When manufacturers pay attention to the ergonomic aspects of packaging, consumers will be more comfortable using it. This is because producers think about how the product can reach the hands of consumers well. That way, the interaction between the product and consumers will be well established, and the consumer's experience with the product will provide positive value.

Product safety and protection will be fulfilled when the packaging design displayed can protect the product according to the product's age and can protect the product during transportation [25, 26]. Increasing consumer awareness of environmental safety, as well as increasingly stringent government regulations on environmental safety and security, have spurred manufacturers to provide packaging that is environmentally friendly and easy to recycle so that it will provide added value to products and brands.

Several elements of packaging, or what we can call indicators of packaging, have a huge impact on the success of a product in the market. Design (shape), image, typography, color, size, material, and quality are several attributes of packaging that can attract interest and foster consumer loyalty toward a product.

Shape influences protection and safety functions in touching, pouring, and storing [27]. Meanwhile, according to Silayoi & Speece states that simpler forms are more attractive than packaging forms that look strange in the eyes of consumers or can be said to be quite difficult for consumers to understand, which causes consumers to need time to understand the shape of packaging. Most consumers prefer rectangular packaging rather than squares. In [28], packaging design variables consist of 3 dimensions: graphic design, design structure, and product information. It can be interpreted as graphic design being represented by the images, lines, typography and colors used. While the design structure refers to the form of packaging used, of course the form of packaging with certain characteristics will differentiate it from other products. Meanwhile, information products state that the existing packaging appearance must be able to explain the product and be easy for consumers to understand. A unique and different packaging design is a visual attraction that quickly greets consumers' eyes [29].

The image or pictures on a packaging include photos, illustrations, symbols/icons, and characters [20]. Images also attract attention, clarify the presentation of ideas, and illustrate/decorate facts that might quickly be forgotten or ignored, not depicted.

Typography uses letter shapes to communicate verbal language visually [20]. Typographic forms can be letters or individual characters, words, shapes, or symbols. Typography has several principles: legibility, clarity, visibility, and readability. Legibility is the quality of letters that makes them legible. In design work, cropping, overlap ping, etc., can occur, which can reduce the legibility of a letter. To avoid this, a designer must know and understand the character rather than the shape of a letter well. Apart from that, using letters that have the same character in a word can also cause the word not to be read correctly [1].

Readability is the use of letters by paying attention to their relationship with other letters so that they are visible. When combining letters, whether to form a word or sentence, it is necessary to pay attention to the relationship between one letter and another. Inaccuracy in using spaces can reduce the ease of reading information, making the information conveyed in a design seem less clear [1].

Visibility is the ability of a letter, word, or sentence in a design work to be read within a certain distance. Every design work must have a target reading distance and the letters used in the design must be legible within that distance so that the design work can communicate well [1].

Clarity is the ability of the letters used in design work to be read and understood by the intended target observer. For a design work to be able to communicate with its observer, the information conveyed must be understandable by the intended observer [1].

Packaging concentrates more on the use of color and the sustainability of the packaging. Color is a graphic component that is always present in packaging. At least one color or more than one color is used in the packaging. Color has the most robust sensory cues in a package, has a more extended reach compared to other aspects, and can provide a first impression and has a significant contribution in increasing consumer interest as a continuation of the consumer and packaging interaction [30].

The color on the packaging is intended to improve product visualization and be an extrinsic element as a representation of the brand and product, which is intended to influence consumer purchasing behavior while in the store [30–35]. The color on the packaging is intended to improve the quality of the product's appearance, arouse consumer associations with the product, and is also intended to attract consumer interest in making purchases when they see the product displayed in the retail area [34, 35]. In the range of 62–90 % of purchasing decisions are determined by consumer interest in the color of the packaging [36].

In [30], the color of packaging expected to provide a physiological reaction so that it can trigger consumers to make a purchase. Determining the color of the packaging will greatly determine the success of a product. Color is not only to enhance the appearance of packaging. Color also reflects the contents of the product as well as the branding of a product. Stated that color has a considerable influence, considering that the first sightseeing process, which involves consumers and packaging, will determine consumer interest, which will then determine consumer purchasing decisions [37]. In [38], the color on the packaging gives the packaging its appeal, so it has a significant impact on the overall appearance of the packaging, can increase consumer interest and influence consumer purchasing behavior.

On the other hand, color on packaging also serves as a means of product communication to consumers, conveying meaning which is expected to influence consumer evaluation of the brand, product quality, and understanding of the product category [19, 33, 39–42].

Packaging with a specific color display provides an extrinsic signal as well as a visual representation of the product, which is intended to have a significant impact on consumers while in the store. The color of the packaging is also intended to communicate particular meanings that are expected to be captured by consumers, such as telling consumers to adopt a healthy eating pattern [33].

Consumer responses can be triggered based on the appearance of the color on the packaging [37, 40]. For example, it is not recommended for packaging to use red as the primary color of a brand or product because red harms environmental friendliness and product sustainability [43].

Indirectly, packaging color directs specific consumer behavior toward product preferences. In the long term, the color of the packaging will guide consumers in determining sustainable product choices. For example, the green color on the packaging is intended to be connected to nature and be environmentally friendly [44–47]. The environmentally friendly impression will support the packaging image as a sustainable product. Consumers have the perception that packaging models that represent environmental friendliness will have a huge influence on consumers in making choices while increasing the success of products when marketed [44]. Consumer awareness is increasing regarding the impact of packaging on the environment, this encourages consumers to choose more environmentally friendly packaging, one of which is represented by the choice of green color attached to a packaging [48]. Besides green, other colors considered natural and environmentally friendly include brown and cream. So, it can be said that packaging that displays green, brown and cream is known to consumers as a product with high environmental friendliness.

The packaging size will provide flexibility for each consumer in choosing and determining the product according to their needs or financial side. Flexibility in packaging size is undoubtedly an added value for a product to become the primary choice for consumers. With the frequency of use of products in high capacities, products with large packaging sizes are the primary choice. On the other hand, for some consumers who only need products with low frequency, the choice of products with small packaging sizes is more suitable and optimal.

The history of using packaging materials has been going on for a long time. Initially, the packaging materials included leaves, animal skins, glassware, and bags. Packaging materials influence consumer perceptions of product quality. Packaging materials can evoke certain emotions and feelings, usually without the person realizing it. Packaging is a creative design that links shape, structure, material, color, image, typography, and design elements with product information to market the product. In [20] packaging is used to wrap, protect, send, release, store, identify, and differentiate a product. With the very complex function of packaging, a good level of packaging quality must start from choosing the type of material, model used and several other attributes that can increase the value of the packaging, as well as differentiate it from products from other competitors. The selection of material as the primary material for packaging and labeling on packaging has several objectives, namely barrier protection, which means protecting the contents of the packaging from damage due to the influence of oxygen (O_2), water vapor (H_2O), dust, and so on. Material usage decisions can be important because they lead to adequate product protection, transportation, and consumer satisfaction [18].

Packaging can represent a product's quality; at this stage, the brand in the packaging shows the company's value [28]. In [29], packaging describes the innovations carried out by the company, primarily related to improving quality. Packaging illustrates the innovation carried out by the company, especially related to improving quality. The level of consumer satisfaction is dynamic, always changing over time, and in order to remain competitive in the market, the development of packaging is absolutely necessary. Several innovations in shape or modifications to add color variations are several innovations that can be carried out to develop existing packaging. State that there are ten criteria for assessing packaging quality, including practical, safe, nontoxic or inert, watertight, not easy to leak, relatively heat resistant, efficient, attractive, economical, and standardized. Packaging quality is the aspect consumers assess on packaging that can influence purchasing decisions, such as shape, material, color, size, logo, and packaging attractiveness. The quality of packaging can trigger a positive or negative reaction from consumers, influencing consumer purchasing decisions.

Understanding culture in packaging design is essential because product packaging can influence customer perceptions about the product and brand. Effective packaging design must consider cultural differences in aesthetic preferences, symbolism, and values that may influence how consumers interact with the product. The following are several factors that need to be considered in understanding cross-culture regarding packaging design.

In creating a packaging design, it is essential to understand the existing culture. This will be related to how much the packaging can influence customer perceptions about the product and brand. Effective packaging design considers cultural differences in aesthetic preferences, symbolism, and values that can influence consumers' interaction with the product, for example, determining the color of the packaging. Colors have always had different meanings and symbolism in different cultures. For example, the use of red is interpreted as a symbol of good luck in several cultures in the Asian region. Meanwhile, in Western culture, red is interpreted as a warning or danger. Understanding the meaning of the colors used in packaging concerning the local context is very important as a basis for considering product success in the market.

Cultural symbols and icons, such as religious symbols, good luck symbols, or icons that have special meanings and are related to specific cultures, must be considered with a higher level of care when displayed in packaging design. Mistakes in using cultural symbols and icons can result in product and brand failure. Meanwhile, the language and text displayed on a packaging design should use language and text that is easy to read, understand, and follow the target market share. Misinterpretation or inappropriate translation related to inappropriate language can cause misunderstandings or even cultural conflicts.

The shape and size of packaging is very likely to vary based on cultural preferences. Some regions prefer packaging with a larger size, while other regions prefer packaging that is smaller, simpler, and more concise. Next, the determination of the packaging design will relate to and reflect the lifestyle and habits of local consumers. For example, products created for the urban market are likely to have different packaging designs from products aimed at the rural market. Meanwhile, the images used on packaging must be chosen more carefully, to ensure that the image displayed does not

violate cultural norms or local values. However, images considered taboo in one region or culture are not necessarily considered taboo in another region or culture.

Some manufacturers want to build their products and brands by linking them to certain cultures, so that in general the packaging design displayed depicts local cultural associations. Strengthening product identity certainly requires an understanding of local culture to be displayed in packaging design, which can later trigger product success in the market. Strengthening this product identity is part of brand consistency in the market. Brand consistency in packaging design in the global market is essential while still considering existing cultural differences. The product remains recognized as part of the same brand in various locations.

Purchasing behavior is not static but dynamic, constantly changing over time according to marketing stimuli [13] consumer's buying intention, using a 2×2 between-subjects experimental design. We also tested whether interest in healthy food is a moderating factor. We found no evidence to support that visual cues (color. It is possible to state that packaging design can increase product value, which has an impact on consumers' cognitive aspects in making purchases [20]. The verbal and visual aspects of packaging have a very significant role. The verbal aspect will communicate the product information you want to convey, while the visual aspect is intended to arouse the consumer's emotional side towards the product [28]. Good packaging can display a logo or symbol that represents the organization and is an element of packaging, in addition to design components, materials, color, and image.

Stated that quality packaging design can prevent product losses from occurring. The selection of solid materials, sound design, and proportional packaging size will allow the product's contents to be secured for as long as possible. Ideally, every packaging design is aimed at increasing consumer buying interest, as well as describing the benefits and consumer behavior in the future [17]. Packaging has a very crucial function as the final communication instrument in the marketing process before a purchasing decision is made. It is significant for marketers and packaging designers to determine designs according to consumer perspectives and needs.

Visualization of packaging with several existing elements can arouse the emotional side of consumers in increasing interest in a product. Images, colors and graphics are some visual elements that can be the main predictors in arousing consumers' emotional side to make a purchase. In the range of 62–90 %, consumers evaluate a product based on the color of the packaging [36]; it can be interpreted that color can improve the process of recognizing a product more quickly. Packaging for a product has several essential elements. According to it, producers or designers must meet several critical elements when creating packaging: shape, size, color, image, material, and taste. Consumer purchasing decisions can be influenced by two elements: the verbal package and the nonverbal package, where the verbal package consists of the product name, brand, manufacturer, information, and how to use it. Meanwhile, the nonverbal package includes color, shape, size, image, picture, and smell.

Manufacturing allows further development through technology, process methods, and product structure (design typology). This is because manufacturing has reasons for development, including redefining manufacturing, where

the manufacturing industry is dynamic and is developing rapidly to fulfill the desires of stakeholders, especially from the aspect of owners, namely maximizing profits, consumers related to maximizing value, and society to fulfill needs (fulfillment orders). So, redefining itself is an effort to fulfill consumer needs related to products by always changing strategy, improving quality, increasing value, and facilitating distribution [9].

Furthermore, manufacturers can permanently eliminate obstacles in fulfilling the industrial product needs of consumers or society. Consumer needs are dynamic and unlimited. Consumers expect manufacturers to always have more value in the evolution of their products. Such as digitalization systems, connectivity, integration, and ease of acquisition (achieved by delivering). Manufacturing as hybrid manufacturing, where the development of the manufacturing industry has led to a complete automation system, where many human roles are replaced by robot functions so that the development of thought patterns, work processes, and engineering systems uses many digital systems supported by the concept of artificial intelligence [9].

However, not all consumers are able to adapt and adapt quickly. This is for several reasons, including the ability to obtain products is not the same, the ability to master technology not the same, and the utility of functions is not the same as regulations from the country concerned (cross-culture regulation).

Manufacturing can develop resources, especially those related to labor (workforce) and raw materials. Due to the high level of demand for a product and population growth, resources will decrease, resulting in scarcity, which can cause material prices to rise. In this case, manufacturers must be able to innovate materials as product substitutes without having to reduce the main function of the product.

Besides that, manufacturers must develop workforce skills per technological demands as a prerequisite for the production process (to enter the production process). With the support of technology, the ability to produce output with high capacity, and the speed of product availability in a fast period of time, manufacturing is a forum for product development. A fast response in fulfilling consumer desires, with various models according to consumer wishes, can be fulfilled by a manufacturer with its facilities [32].

The food and beverage company are one of the manufacturing sectors operating in the food and beverage industry. Most of the food and beverage companies in Indonesia are proliferating. Judging from the number of companies listed on the Indonesian Stock Exchange from period to period, there are more and more. Food and beverage companies were chosen because they are essential in meeting consumer needs. Food and beverage companies are still surviving compared to other sectors because some food and beverage products are still needed under whatever conditions. Because this product is a necessity for people throughout Indonesia. In Indonesia, many companies are operating in the food and beverage industry, both small and large, so business competition is very tight.

3. The aim and objective of the study

The aim of the study is to provide a conceptual model for food and beverage manufactures regarding the packaging

used by considering aspects of consumer behavior and costs to obtain maximum profits.

To achieve this aim, the following objectives are accomplished:

– to conduct an ethnographic study in an effort to explore the importance of packaging aspects for consumers, which is then processed using the SEM method, to obtain an optimal model for middle-up manufacturing;

– to conduct an ethnographic study in an effort to explore the importance of packaging aspects for consumers, which is then processed using the SEM method, to obtain an optimal model for middle-low manufacturing;

– to provide recommendations for manufacturing operations to obtain maximum profits, through several strategic recommendations introduced by the author.

4. Materials and methods

4. 1. Object and hypothesis of the study

The object of this study is the extent of consumers' perceptions of food and beverage packaging, which will later be used as a strategic determinant for manufacturers in carrying out their production processes.

The main hypothesis in this research is that packaging has a very strong relationship with consumer behavior. However, not all elements of packaging are the main consideration for consumers. A more in-depth study needs to be carried out to find out what elements are the main priority for consumers.

Assumption built in this research is to explore input from various types of consumers regarding packaging. It is very important that respondents provide honest responses, in accordance with existing conditions, and that all respondents involved are representatives of the existing population.

And simplification in this research will refer to the type of food and beverage packaging, in accordance with the main objective of this research, as the main trigger in determining strategies for manufacturing.

This research begins with an ethnographic study, namely exploring the packaging perspective of existing consumer behavior. Consumer involvement is very large in this research. Responses based on experience during consumption, directly involved in use, of course provide very useful input in exploring very important variables in packaging. Data processing using SEM is intended to process data by analyzing the relationship between variables. SEM can be used to: test theoretical models, obtain precise parameter estimates, test model suitability with empirical data, identify variables that have a significant influence on other variables.

4. 2. Methodology

Fig. 1 shows the conceptual model of the research that has been carried out. This research began with a design identification process, which was carried out through data mining using cross-culture studies. The ethnographic data obtained will be processed using Quirkos.

Several attributes will be obtained, verified, and validated using FGD, and then the KAPPA index will be determined. These attributes will then be tested using the path analysis method to determine the causal relationship between each attribute. The goodness of Fit is sought to model existing attributes and as a step to finding the best formula for the proposed packaging design. Several packaging experts will discuss the proposed model as a validation and feasibility test of the proposed model. In the final stage, a stable parameter design is proposed based on data mining and testing that has been carried out.
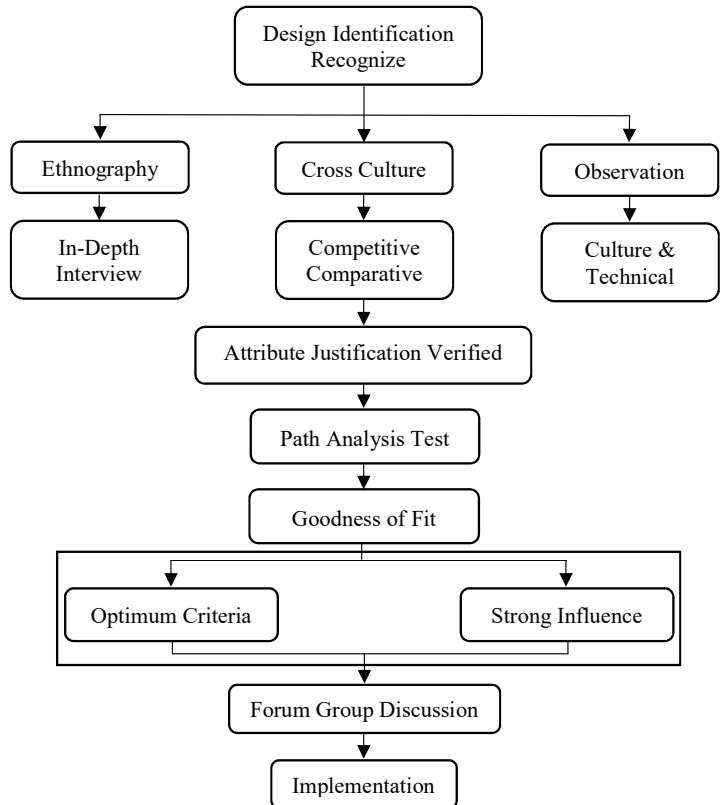

Fig. 1. Conceptual model

The explanation of the conceptual model above is as follows:

a) design identification recognizing.

Identify and collect instruments that refer to attributes and critical informants with expertise and capacity related to consumer behavior in viewing product packaging through a proportional sampling perspective;

b) ethnography.

Researchers made observations of critical information who had experience and knowledge related to the consumption and use of packaging. The questions asked by researchers are questions with open and accessible option answers;

c) cross culture.

In studies that study culture, respondents are related to culture, habits, and behavior when consuming a product. Cross culture aims to determine relevant attributes by considering primary factors to determine key indicators in research;

d) observation.

Researchers carry out observations in the field to obtain additional information from the researcher's perspective. These observations can take the form of visual observations or listening freely to respondents' opinions;

e) in-depth interview.

Researchers conducted in-depth interviews with respondents using various information-gathering instruments that had been collected previously so that truly representative answers were obtained;

f) competitive comparative.

Researchers are looking for information about several competitors in the packaging industry, especially about their business strategies and various business advantages;

g) culture and tactical.

Researchers studied consumption culture and consumer behavior and attempted to explore consumers' motives in choosing and determining packaging;

h) attribute justification verification

Researchers ensure that the attributes and indicators used are suitable for measurements in research, both in terms of validity and reliability;

i) path analysis test.

The path test is used to determine the size of the influence of exogenous variables on endogenous ones by intervening with factor-loading measures;

j) goodness of fit.

The goodness of fit is used to determine the suitability of the measured variables and the expected values in the path test. This results in an intervening analysis between exogenous and endogenous variables;

k) optimum criteria.

Researchers must be able to determine optimal value criteria from the perspective of minimizing costs by reviewing the cost of production, minimizing potential risks related to the production and use of packaging, as well as strategies for optimizing profit maximization;

l) strong influence.

Researchers will test the influence of various exogenous variables from the perspective of consumer behavior and packaging design on packaging value with the cost variable as a moderator;

m) forum group discussion.

Several packaging experts were involved in the FGD, which aimed to discuss and provide recommendations on the optimal suitability of variables in packaging design based on cross-cultural studies that have been carried out;

n) parameter design establishment.

In the end, this research is expected to provide recommendations regarding the variables that are important in designing packaging, so it is hoped that the packaging displayed will be of high value and be in accordance with consumer desires.

Tables 1, 2 describe the details of the respondents involved in this research, which this research focuses on, to find out the characteristics of each existing type of manufacturing: middle-up manufacturing and middle-low manufacturing. For middle-up manufacturing, data collection was carried out on 272 respondents, while for middle-low manufacturing, data collection was carried out on 157 respondents.

The Tables 1, 2 above show data on respondents involved in this research. Respondent data includes male and female gender, education level, ranging from senior high school graduates, bachelors, masters to doctors. The level of education is very important in extracting this data, considering that a good level of education will provide good input regarding perceptions about packaging.

Table 1

Respondent data

Gender	Middle-up manufacturing		Middle-low manufacturing	
	Total	Percentage (%)	Total	Percentage (%)
Male	152	55.9	86	54.8
Female	120	44.1	71	45.2

Table 2

Respondent education

Education	Middle-up manufacturing		Middle-low manufacturing	
	Total	Percentage (%)	Total	Percentage (%)
Senior High School	59	21.7	46	29.3
Bachelor	167	61.4	84	53.5
Master	34	12.5	21	13.4
Doctor	12	4.4	6	3.8

4. 3. Data instrument quality test

The data instrument quality test was carried out to assess whether the research instrument met the validity and reliability criteria. Validity measures the extent to which the indicator measure can reflect its theoretical latent construct. Construct validity provides confidence that the size of the indicators taken from the sample depicts the true score in the population with a minimum value of validity for each indicator, namely 0.50 [49]. The reliability test is a measure of the internal consistency of the indicators of a formed variable, which shows the degree to which each indicator indicates a generally formed variable. The measurement method used is composite (construct) reliability with a cut-off value of construct reliability of at least 0.70. Thus, composite (construct) reliability can be calculated using a formula [49]:

$$ CR = \left\{ \frac{\left(\sum_{i=1}^{p} \lambda_i \right)^2}{\left(\left(\sum_{i=1}^{p} \lambda_i \right)^2 + \left(\sum_{i=1}^{p} V(\delta) \right) \right)} \right\}, \qquad (1) $$

Explanation.

The standard loading value comes from the standardized loading value for each indicator.

The error value is obtained from the error measurement results of each indicator: $(1-\text{Loading}^2)$.

A research instrument is declared reliable if the acceptable limit value for the level of reliability is construct reliability >0.7. Meanwhile, a reliability of $0.6-0.7$ is still acceptable [49]. Based on construct reliability calculations with SEM software, the following results have been obtained.

Construct reliability is a measure of the internal consistency of the indicators of a formed variable which shows the degree in the formed variable. Construct reliability is reflected in the Cronbach's alpha value. If the Alpha value is >0.90 then the reliability is perfect, Alpha is between $0.70-0.90$ then the reliability is high, Alpha – $0.50-0.70$ then the reliability is moderate, Alpha<0.50 then the reliability is low. In this research, construct reliability values were calculated for packaging variables (design, image, typography, color, size, material and quality), as well as control variables (habit and cost) as shown in the Table 3 below.

Table 3

Construct reliability value for middle-up and middle-low manufacturing

No.	Variable	Middle-up manufacturing		Remark	Variable	Middle-low manufacturing		Remark
		Result	Cut off value			Result	Cut off value	
1	Design (X1)	0.767		Reliable	Design (X1)	0.752		Reliable
2	Image (X2)	0.717		Reliable	Image (X2)	0.711		Reliable
3	Typography (X3)	0.780		Reliable	Typography (X3)	0.775		Reliable
4	Color (X4)	0.702		Reliable	Color (X4)	0.702		Reliable
5	Size (X5)	0.712	>0.70	Reliable	Size (X5)	0.717	>0.70	Reliable
6	Material (X6)	0.758		Reliable	Material (X6)	0.796		Reliable
7	Quality (X7)	0.718		Reliable	Quality (X7)	0.759		Reliable
8.	Habit (Y1)	0.763		Reliable	Habit (Y1)	0.714		Reliable
9	Cost (Y2)	0.708		Reliable	Cost (Y2)	0.727		Reliable
10	Max profit (Z)	0.722		Reliable	Max profit (Z)	0.730		Reliable

Based on the calculation results obtained from testing the reliability of the research instrument in the table above, because the construct reliability coefficient value is 0.7, it can be stated that the research instrument is reliable (Table 3).

4. 4. Structural model evaluation

Model evaluation is carried out to determine the structural model for the data used. The model evaluation consists of data normality tests and outlier tests. Normality test is a statistical test used to determine whether the distribution of research data for each variable is normal. If it is found that the data is not normally distributed, it is feared that the results of the research analysis will be biased. The normality test can be seen based on the critical ratio (CR) value from the multivariate (Tables 4, 5), where the data can be said to be normally distributed if it is at a significance level of 0.01 if the critical ratio (CR) value from the multivariate, skewness or sharpness is in the range ±2.58.

SEM is very sensitive to the characteristics of data distribution, especially distributions that violate multivariate normality or the presence of high kurtosis (distributional skewness) in the data. For this reason, before the data is processed, it must first be tested to determine whether there are outliers in the data, and the data distribution must be expected. Outliers are observations that have unique characteristics, look very different from other observations, and appear in the form of extreme values. The criteria used are at the $p<0.001$ level. This distance is evaluated using X2 at degrees of freedom equal to the number of measured variables used in the research [49]task load is an important issue among special education teachers in general and teachers of Special Education Integration Program in particular. This issue has been going on for a long time. Some studies have found that there are a number of factors that influence the task load of teachers of Special Education Integration Program, including leadership issues at school, working conditions, work intensity and also resources or facilities. In this study, a fully quantitative approach is used to determine factors in the task load of teachers of Special Education Integration Program. The questionnaire was distributed online using the Google form platform to randomly collect data from 400 respondents across Malaysia. The data obtained were then analysed using Structural Equation Modelling (SEM).

All packaging variables in middle-up manufacturing have a CR value in the range of ±2.58, which means the data has a multivariate normal distribution.

Table 4

Calculation of critical ratio for middle-up manufacturing variable

No.	Variable	Critical ratio (CR)			Remark
		Result CR (1)	Result CR (2)	Range CR	
1	Design (X1)	0.289	0.355		Accepted
2	Image (X2)	0.037	0.444		Accepted
3	Typography (X3)	0.850	1.477		Accepted
4	Color (X4)	0.393	0.963	±2.58	Accepted
5	Size (X5)	0.558	1.460		Accepted
6	Material (X6)	1.408	1.528		Accepted
7	Quality (X7)	0.360	1.455		Accepted

Table 5

Calculation of critical ratio for middle-low manufacturing

No.	Variable	Critical ratio (CR)			Remark
		Result CR (1)	Result CR (1)	Range CR	
1	Design (X1)	0.538	0.189		Accepted
2	Image (X2)	0.662	0.222		Accepted
3	Typography (X3)	0.789	0.276		Accepted
4	Color (X4)	0.249	0.621	58.2±	Accepted
5	Size (X5)	0.322	0.227		Accepted
6	Material (X6)	0.038	0.119		Accepted
7	Quality (X7)	0.508	0.150		Accepted

All packaging variables in middle-low manufacturing have a CR value in the range of ±2.58, which means the data has a multivariate normal distribution.

4. 5. Model feasibility test

The model feasibility test is a suitability test carried out on the model used in the research. This test is carried out by knowing the Goodness of Fit value. Goodness of Fit is used to assess the feasibility of the structural model. If the resulting Goodness of Fit value is good, then the model is acceptable. Table 6 describing related Goodness of Fit for middle-up manufacturing, and Table 7 describe for Goodness of Fit middle-low manufacturing.

The suitability index that can be used to test the feasibility of a research model is as follows [50]:

a) chi-square statistic.

The model being tested is considered good if the chi-square value is low. A low and insignificant value is expected so that the null hypothesis is difficult to reject, and the basis for acceptance is probability with a cut-off value of $p≥0.05$ or $p≥0.10$;

b) probability (p), the acceptable probability value is $p≥0.05$;

c) Root Mean Square Error of Approximation (RMSEA).

RMSEA index is used to compensate for the chi-square statistic in large samples, indicates the expected goodness of Fit in population estimates. The RMSEA value=0.08 is an acceptable index for the model, which reflects a close fit model based on degrees of freedom;

d) Goodness-of-fit Index (GFI).

This index calculates the weighted proportion of the variance in the sample covariance matrix that is explained by the estimated population covariance matrix GFI, which is a non-statistical measure that has a value range between 0 (poor Fit) to 1.0 (perfect Fit). A high value (>0.9) represents "better fit";

f) AGFI.

The recommended acceptance level is if the AGFI has a value equal to or greater than 0.90. A value of 0.90 can be interpreted as a good level of overall model fit (good), while a value between 0.90–0.95 indicates a sufficient level (adequate Fit);

g) CMIN/DF.

Namely, the chi-square value is divided by the degree of freedom. Some researchers recommend using this size ratio to measure fit. A ratio value of 5 (five) or less than five is a reasonable measure. Meanwhile, other researchers suggest that a ratio value<2 is a measure of Fit;

h) Tucker Lewis Index (TLI).

TLI is an alternative incremental fit index that compares a model being tested against a baseline model. The recommended value for accepting a model is ≥0.95, and a value close to 1 indicates a perfect fit;

i) Comparative Fit Index (CFI)

The value range for this index is between 0–1, where the closer to 1, the highest level of Fit is identified as very good Fit, and the recommended value is CFI≥0.95;

j) PNFI (Parsimonious Normed Fit Index).

The higher the PNFI value, the better the Fit of a model;

k) Loading factor.

It is a standard estimate (estimate weight) that connects factors with indicators, where the loading factor has a standard of 0 to 1. In general, the value of the loading factor must be >0.60, thus indicating that the value is above the error variance value.

From the Table 6 above, the goodness of fit value of the packaging variable in middle-up manufacturing is above the cut off value. This indicates that the data is acceptable.

From the Table 7 above, the goodness of fit value of the packaging variable in middle-low manufacturing is above the cut off value. This indicates that the data is acceptable.

From the two tables above (Tables 6, 7), it appears that each variable meets the requirements for Goodness of Fit; this is indicated by the fulfillment of several variable values that are above the allowable cut-off value.

Table 6

Calculation of goodness of fit middle-up manufacturing variables

No.	Parameter	Cut off value	Variable									
			Design (X1)	Image (X2)	Typo. (X3)	Color (X4)	Size (X5)	Material (X6)	Quality (X7)	Habit (Y1)	Cost (Y2)	Profit (Z)
1	Chi-Sq.	Small	3.876	28.922	3.205	17.326	21.415	8.664	7.67	18.935	19.858	28.954
2	Probability	≥0.05	0.567	0.067	0.201	0.138	0.314	0.254	0.568	0.125	0.279	0.532
3	RMSEA	≤0.08	0	0.052	0.047	0.04	0.022	0.066	0	0.041	0.067	0.071
4	GFI	≥0.90	0.993	0.96	0.992	0.979	0.978	0.984	0.989	0.976	0.971	0.986
5	AGFI	≥0.90	0.986	0.934	0.977	0.963	0.968	0.959	0.982	0.961	0.952	0.967
6	CMIN/DF	≤2.00	0.775	1.214	1.603	1.444	1.127	1.166	0.852	1.457	1.206	1.465
7	TLI	≥0.90	0.935	0.972	0.957	0.958	0.928	0.937	2.651	0.928	0.982	0.941
8	CFI	≥0.90	0.962	0.935	0.923	0.914	0.957	0.952	1	0.975	0.931	0.962
9	PNFI	Adj	0.953	0.927	0.961	0.937	0.934	0.948	0.983	0.969	0.959	0.959

Table 7

Calculation of goodness of fit middle-low manufacturing variables

No.	Parameter	Cut off value	Variable									
			Design (X1)	Image (X2)	Typo. (X3)	Color (X4)	Size (X5)	Material (X6)	Quality (X7)	Habit (Y1)	Cost (Y2)	Profit (Z)
1	Chi-Sq.	Small	26.145	41.527	0	31.512	24.321	5.894	27.542	20.568	27.376	21.634
2	Probability	≥0.05	0.156	0.263	0.999	0.082	0.111	0.207	0.125	0.0567	0.261	0.374
3	RMSEA	≤0.08	0.068	0.052	0	0.028	0.053	0.055	0.041	0.068	0.068	0.059
4	GFI	≥0.90	0.956	0.937	1	0.972	0.961	0.983	0.935	0.962	0.929	0.956
5	AGFI	≥0.90	0.927	0.939	1	0.936	0.936	0.956	0.952	0.933	0.947	0.915
6	CMIN/DF	≤2.00	1.894	1.762	0	1.587	1.431	1.474	1.971	1.714	1.493	1.967
7	TLI	≥0.90	0.983	0.954	42.95	0.959	0.958	0.958	0.984	0.954	0.987	0.974
8	CFI	≥0.90	0.976	0.981	1	0.962	0.973	0.988	0.969	0.972	0.965	0.968
9	PNFI	Adj	0.917	0.972	0.982	0.945	0.937	0.952	0.944	0.941	0.916	0.926

5. Results of research for middle-up manufacturing and middle-low manufacturing, to determine the appropriate scenario for each manufacturer

5. 1. Model of middle-up manufacturing

This research was conducted for two different types of manufacturing: middle-up manufacturing and middle-low manufacturing. Where each uses different respondent data. For middle-up manufacturing, data from 272 respondents is used, and for middle-low manufacturing, data from 157 respondents is used. Below are the SEM simulation results for middle-up manufacturing.

Fig. 2 below shows a simulation using SEM for middle-up manufacturing.

Overall, the indicators resulting from simulations using SEM show ideal results, where all indicators meet the target value to obtain a fit model. In Table 8 let's found the Goodness of Fit Calculation for middle-up manufacturing.

The goodness of fit calculation for middle-up manufacturing shows that the overall value is above the allowable value limit. This indicates that the level of feasibility and accuracy is very good and meets the requirements.

The calculation of the Sobel value in this research is intended to test the significance of the packaging variables (design, image, typography, color, size, material and quality), the control function (habit and cost), and the objective function (maximum profit). The Sobel value also describes the influence of packaging variables for maximal profit through the control functions, namely habit and cost.

Table 9 below shows the calculation of the Sobel value for middle-up manufacturing. From the Sobel values below (Table 9), the Design, Image, Color, and Quality variables have higher Sobel values when compared to the other three variables. This could mean that for middle-up manufacturing, it is better to focus on the four things mentioned above.

The calculation of the Sobel value as a link between the packaging variables, the control function in this case habit and cost with the objective function of maximizing profit shows a positive value. This means that the relationship shown is very close. Where in middle-up manufacturing, it was found that four variables design, image, color and quality had higher values when compared to the values of the other variables.

Table 8

Middle-up manufacturing Goodness of Fit calculation

No.	Parameter	Goodness of Fit		Remark
		Cut off value	Result	
1	Chi-Square	Small	46.415	Fit
2	Probability	≥0.05	0.450	Fit
3	RMSEA	≤0.08	0.051	Fit
4	GFI	≥0.90	0.925	Fit
5	AGFI	≥0.90	0.999	Fit
6	CMIN/DF	≤2.00	1.245	Fit
7	TLI	≥0.90	0.921	Fit
8	CFI	≥0.90	0.946	Fit
9	PNFI	Adj	0.939	Fit

Table 9

Sobel value calculation for middle-up manufacturing

Correlations	A	B	S.Ea	S.Eb	SE(ab)1	SE(ab)2
Design→Habit→Max. Profit	0.54	0.67	1.245	0.245	0.84458	1.39438
Design→Cost→Max. Profit	1.18	0.59	2.146	0.495		
Image→Habit→Max. Profit	0.81	0.67	9.903	0.245	6.63798	1.11578
Image→Cost→Max. Profit	0.55	0.59	1.834	0.495		
Typography→Habit→Max. Profit	0.52	0.67	0.385	0.245	0.2877	0.33554
Typography→Cost→Max. Profit	0.59	0.59	0.28	0.495		
Color→Habit→Max. Profit	1.04	0.67	0.849	0.245	0.62329	0.51422
Color→Cost→Max. Profit	0.63	0.59	0.693	0.495		
Size→Habit→Max. Profit	0.59	0.67	0.62	0.245	0.43983	0.33922
Size→Cost→Max. Profit	0.54	0.59	0.354	0.495		
Material→Habit→Max. Profit	0.61	0.67	0.133	0.245	0.174	0.32436
Material→Cost→Max. Profit	0.64	0.59	0.118	0.495		
Quality→Habit→Max. Profit	1.53	0.67	0.846	0.245	0.67956	0.34017
Quality→Cost→Max. Profit	0.53	0.59	0.367	0.495		
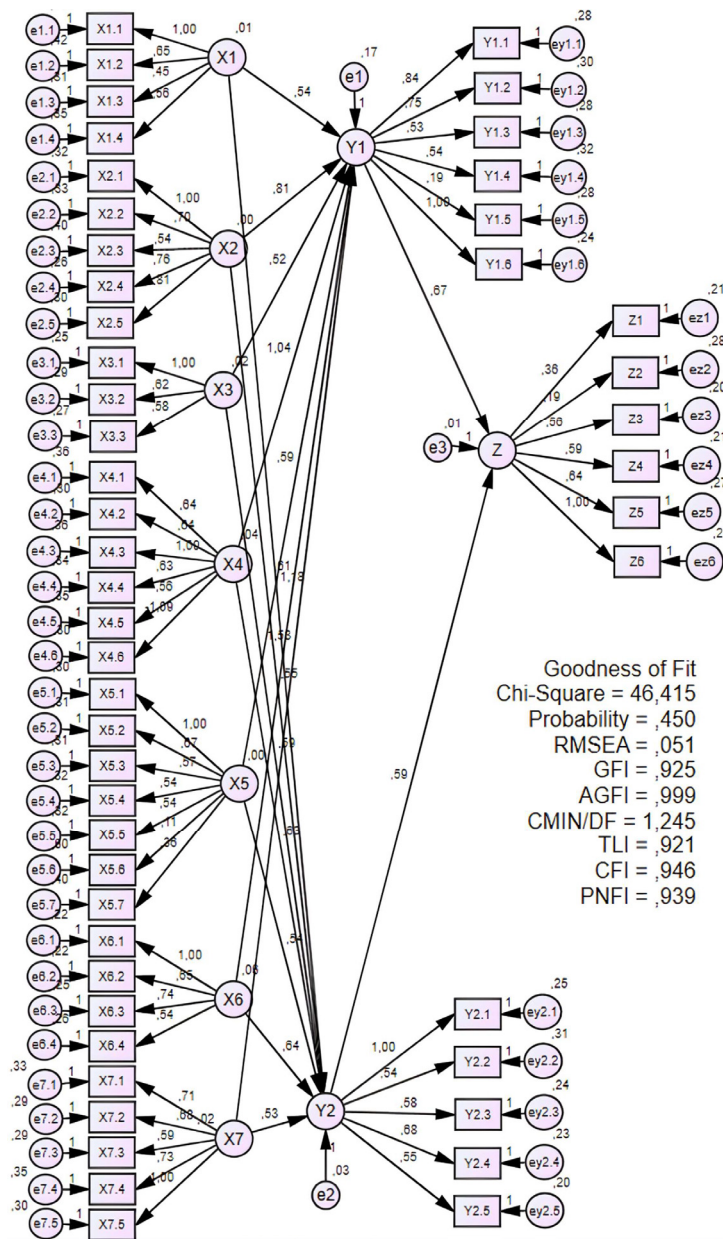
Fig. 2. SEM middle-up manufacturing

5. 2. Middle-low manufacturing model

Meanwhile, the simulation results for middle-low manufacturing, with a total of 157 respondents, are shown in the image below (Fig. 3), following are the parameters of Goodness of Fit that are met as a whole.

Overall, the indicators resulting from simulations using SEM show ideal results, where all indicators meet the target value to obtain a fit model (Table 10).

Table 10

Middle-low manufacturing goodness of fit calculation

No.	Parameter	Goodness of Fit		Remark
		Cut off value	Result	
1	Chi-Square	Small	54.423	Fit
2	Probability	≥0.05	0.091	Fit
3	RMSEA	≤0.08	0.048	Fit
4	GFI	≥0.90	0.963	Fit
5	AGFI	≥0.90	0.923	Fit
6	CMIN/DF	≤2.00	1.438	Fit
7	TLI	≥0.90	0.907	Fit
8	CFI	≥0.90	0.938	Fit
9	PNFI	Adj	0.935	Fit

The goodness of fit calculation for middle-low manufacturing shows that the overall value is above the allowable value limit. This indicates that the level of feasibility and accuracy is very good and meets the requirements.

The calculation of the Sobel value in this research is intended to test the significance of the packaging variables (design, image, typography, color, size, material and quality), the control function (habit and cost), and the objective function (maximum profit). The Sobel value also describes the influence of packaging variables for maximal profit through the control functions, namely habit and cost.

In Table 11 below, there is a calculation of the Sobel value for middle-low manufacturing.

Fig. 3. SEM middle-low manufacturing

Table 11

Sobel value calculation for middle-low manufacturing

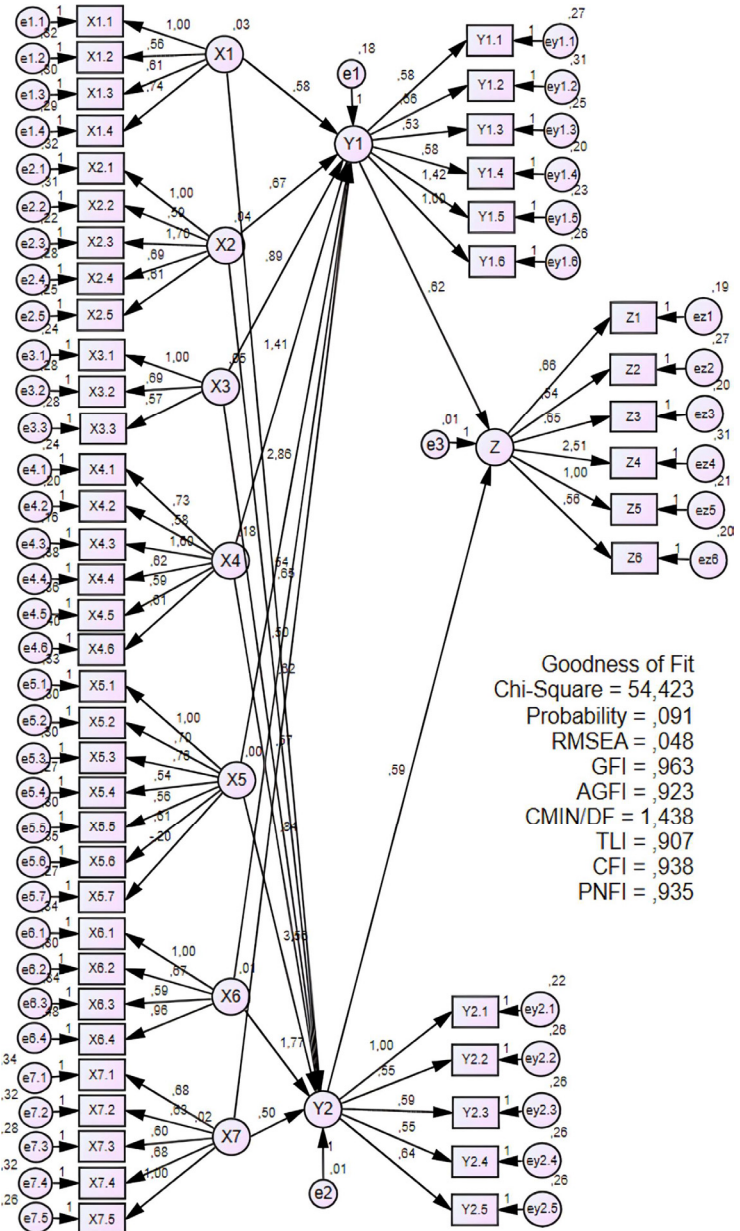| Correlations	A	B	S.Ea	S.Eb	SE(ab)1	SE(ab)2
Design→Habit→Max. Profit	0.58	0.62	0.448	0.157	0.292306	0.311529
Design→Cost→Max. Profit	0.65	0.59	0.524	0.059		
Image→Habit→Max. Profit	0.67	0.62	0.342	0.157	0.236698	0.266255
Image→Cost→Max. Profit	0.62	0.59	0.447	0.059		
Typography→Habit→Max. Profit	0.89	0.62	0.229	0.157	0.199205	0.214463
Typography→Cost→Max. Profit	0.57	0.59	0.359	0.059		
Color→Habit→Max. Profit	1.41	0.62	0.95	0.157	0.629226	0.094814
Color→Cost→Max. Profit	0.84	0.59	0.137	0.059		
Size→Habit→Max. Profit	2.86	0.62	0.31	0.157	0.488426	0.260791
Size→Cost→Max. Profit	3.56	0.59	0.262	0.059		
Material→Habit→Max. Profit	0.54	0.62	6.685	0.157	4.145567	0.493789
Material→Cost→Max. Profit	1.77	0.59	0.818	0.059		
Quality→Habit→Max. Profit	0.502	0.62	0.482	0.157	0.309058	0.393462
Quality→Cost→Max. Profit	0.501	0.59	0.665	0.059		

The calculation of the Sobel value as a link between the packaging variables, the control function in this case habit and cost with the objective function of maximizing profit shows a positive value. This means that the relationship shown is very close. Where in middle-low manufacturing, it was found that four variables – color, size, material and quality – had higher values when compared to the values of the other variables.

5. 3. Scenario

Based on the research results we have carried out and calculations and data processing, several recommended scenarios have been obtained for middle-up and middle-low manufacturing.

Fig. 4 below explains the scenario for middle-up manufacturing, as well as explaining the focus on several existing packaging elements, as

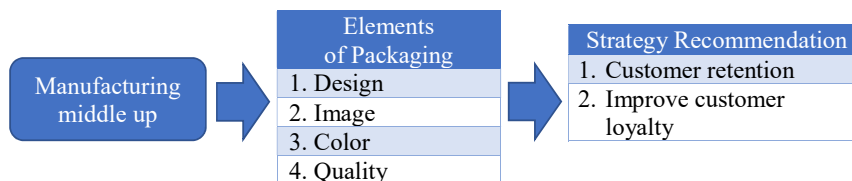well as the selection of strategies in an effort to get maximum profit.

For middle-up manufacturing, from the results of the data processing that has been carried out, it is recommended to focus more on the 4 existing packaging elements, from the 7 elements that have been described previously. These four elements include: design, image, color and quality. Meanwhile, the recommended strategy is to make efforts to increase customer retention and improve customer loyalty.

Fig. 5 below explains the scenario for middle-low manufacturing, as well as explaining the focus on several existing packaging elements, as well as the selection of strategies in an effort to get maximum profit.
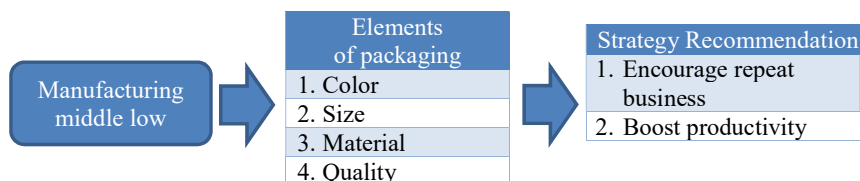

Fig. 4. Scenario for middle-up manufacturing

Fig. 5. Scenario for middle-low manufacturing

For middle-low manufacturing, from the results of the data processing that has been carried out, it is recommended to focus more on the 4 existing packaging elements, from the 7 elements that have been described previously. These four elements include: color, size, material and quality. Meanwhile, the recommended strategy is to make efforts to increase encouragement of repeat business and to boost productivity.

6. Discussion of the research results on the conceptual model as well as recommendation for food and beverage manufactures in terms of the packaging

Meanwhile, this research discusses the detailed aspects of packaging that must be fulfilled according to consumer desires. Consumer involvement in providing objective and constructive input will provide positive input for the sustainability of this research. This research also provides recommendations to manufacturers regarding ideal strategies in terms of the packaging aspect which is the main concern for consumers. The recommendation aspect in the form of this strategy also differentiates this research when compared with previous research. This research has very significant sustainability, knowing the packaging aspects according to consumer desires, which can then be used as recommendations for manufacturers in determining optimal strategies.

Processing results using SEM showing that middle-up manufacturing focus with four packaging elements such as: design, image, color and quality, and recommendation use strategy focus on customer retention and improving customer loyalty, in accordance with Fig. 4. Fig. 5 describes, middle-low manufacturers focus with four packaging elements:

color, size, material and quality, with focus on strategies to encourage repeat business and boost productivity. This research is able to explore the important elements of packaging as well as provide recommendations for strategic options that can be implemented by manufacturers. The advantages of recommendations from this research are the added value of this research when compared to previous research which was only limited to discussing packaging and its elements, without providing recommendations in terms of strategies for manufacturing related to packaging.

The limitation of research data is based on objects in the western Indonesian region as the basis for research, so it does not holistically discuss other regions with various demographic characteristics, which can give rise to compulsive exogenous variables and determinants (various). Hence, it needs to be focused on more specific regions to make it easier for researchers to carry out clustering. This research is limited to the cost aspect of obtaining optimal packaging design. Other aspects can be factors that are no less important than the cost factor. Directly, this research provides recommendations that the strategy for determining packaging design is very effective by considering aspects of culture, habits, and consumer purchasing ability.

In the future, researchers recommend that further research consider other aspects besides cost, such as risk or other factors. Combining cost factors and other factors as drivers in determining a packaging design is possible.

7. Conclusions

1. From the ethnographic study that has been carried out, it was found that 7 variables are most dominant in the consumer perspective, design, image, typography, color, size, material and quality.

2. Data processing with SEM has good results. All packaging variables and control variables have: construct reliability values above the minimum value, namely above 0.7. The critical ratio has a good value and is allowed because it is between ±2.58. The Sobel value shows a very high relationship or has very high significance between the packaging variables, control variables and objective function.

3. For middle-up manufacturers, they can focus on packaging elements: design, image, color and quality by implementing customer retention and strategies and improving customer loyalty. Meanwhile, for middle and low manufacturing, it can focus on: color, size, material and quality, by implementing strategies to encourage repeat business and boost productivity.

Conflict of interest

The entire author of this article has absolutely no conflict interest in writing this article. Whether from a financial, personal or other perspective. It is ensured that this article is absolutely the researcher's own work, is not

copied from other articles, and has never been submitted for publication elsewhere.

Data availability

Data will be made available on reasonable request.

Use of artificial intelligence

The authors confirm that they did not use artificial intelligence technologies when creating the current work.

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