



## Application of Design Thinking in creating packaging designs for MSMEs in food and beverage

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#### Article History:

Submitted: 06-01-2026

Accepted: 20-01-2026

Published: 27-01-2026

#### Keywords:

Design Thinking; Design or Design; Eco-Friendly; Food and Beverage MSMEs; Packaging.

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### ABSTRACT

Micro, Small, and Medium Enterprises (MSMEs) in the food and beverage sector play a crucial role in the national economy and have shown rapid growth in the digital era (JDIH BPK RI, 2008; Indonesian SMEs, 2023). The widespread use of internet-based delivery services facilitates product distribution but simultaneously increases the consumption of single-use plastic packaging, which poses serious environmental challenges (Databoks, 2021; Waste-free, 2021). Plastic waste constitutes approximately 17% of total national waste (National Waste Management Information System, 2020), highlighting the urgency for innovative and sustainable solutions (Ministry of Environment and Forestry, 2021). This study aims to design environmentally friendly packaging for MSMEs in the food and beverage industry by integrating user needs with sustainability considerations. The research employs a design thinking-based innovation approach that includes stages of problem exploration, concept development, and product testing (Lewrick et al., 2020). The focus is on developing primary packaging solutions for soupy foods and cold beverages distributed through online delivery platforms. In conclusion, implementing eco-friendly packaging innovations represents a strategic and effective approach to minimizing plastic waste impacts while ensuring the efficient and sustainable distribution of food and beverage products.

### INTRODUCTION

Micro, Small, and Medium Enterprises (MSMEs) are a rapidly growing sector and have a significant contribution to the Indonesian national economy. One of the MSME sectors that is experiencing rapid development is the food and beverage industry. Along with technological advances in the digital era, MSMEs in the food and beverage sector have experienced significant changes in the marketing and distribution system of products. One of the notable changes is the increasing use of internet-based delivery services that make it easier for consumers

However, the rapid growth of food delivery services also has a negative impact on the environment, especially in terms of increasing the use of single-use plastic packaging. A study conducted by the Indonesian Institute of Sciences (LIPI) shows that around 96% of food and beverage packaging used in online-based delivery services still uses plastic (Waste Free, 2021). This is in line with data from the National Waste Management Information System (SIPSN) which states that the proportion of plastic waste reaches 17% of the total national waste, making it the second most common type of waste after organic waste (National Waste Management Information System, 2020)

This phenomenon shows that MSME activities in the food and beverage sector contribute to the increase in the amount of plastic waste in Indonesia (Sari, 2022). If the use of plastic packaging by MSMEs is not evaluated and controlled, the volume of plastic waste will continue to increase and have the potential to damage the environment (Nurdin, 2021). Therefore, innovative solutions are needed to reduce the negative impact of the use of plastic packaging, while still paying attention to the needs of MSMEs in distributing their products efficiently ((Widyaningsih, 2021)

Based on these problems, this study aims to design environmentally friendly packaging for MSMEs in the food and beverage sector by considering the needs of users, both from the side of business actors and consumers. The approach used is the design thinking methodology, which includes the stages of problem exploration, concept development, and product testing (Lewrick, 2020); (Nielsen Norman Group, 2016). The focus of this research is on the design of primary packaging repair for soupy foods and cold drinks ordered through online food delivery services in the Jember area. The results of the study are expected to provide packaging design recommendations that are not only environmentally friendly, but also functional and economically valuable for MSME actors (Lestari, 2020; Zhao, 2021).

### LITERATURE REVIEW

#### Micro, Small, and Medium Enterprises (MSMEs)

In the era of globalization and technological advancement, MSMEs are required to be able to innovate, both in terms of products, distribution systems, and marketing strategies to maintain their competitiveness.





### Packaging and Its Function in Product Marketing

In addition, packaging also serves to protect products from damage and maintain quality during the distribution process. Therefore, packaging innovation is one of the important aspects in increasing the competitiveness of MSMEs in a competitive market. Kemasan Ramah Lingkungan (Eco-Friendly Packaging)

According to Lestari (2020), consumers in Indonesia show increased awareness of environmental issues and tend to prefer products with environmentally friendly packaging. This is supported by Widyaningsih (2021) who found that environmental awareness has a significant effect on consumer interest in using products with sustainable packaging. Furthermore, Zhao (2021) explained that the application of green packaging in the food industry has a positive effect on consumer purchasing behavior because it is considered a form of corporate social responsibility.

### The Impact of Plastic Packaging Use on the Environment

The use of single-use plastics still dominates in the food and beverage sector. Based on the Waste-Free (2022) report and the National Waste Management Information System (2020), around 96% of food and beverage packaging in Indonesia is plastic-based, with the contribution of plastic waste reaching 17% of the total national waste.

Sari (2022) emphasized that the increase in the consumption of ready-to-eat food and delivery services exacerbates the accumulation of plastic waste that is difficult to decompose. Therefore, MSMEs need to innovate in the use of more sustainable packaging to support the national waste management policy of Biodegradable-Based Packaging Innovation for MSMEs. Biodegradable-based packaging innovation is one of the alternative solutions that is environmentally friendly. Nurdin (2021) through his study on culinary MSMEs in Jember shows that the use of packaging materials such as cassava starch, bamboo, and recycled paper is able to reduce dependence on plastics while increasing the positive image of MSMEs. In addition, Santoso (2021) stated that factors influencing MSMEs' decisions to switch to sustainable packaging include: environmental awareness, production costs, and consumer demand. Thus, the implementation of sustainable packaging innovations not only has an impact on the environment, but also provides economic added value for MSME actors.

According to Lewrick et al. (2020), design thinking helps business actors understand consumer problems in depth and produce solutions that are more creative, efficient, and environmentally friendly.

### The Relationship of Packaging Innovation with Consumer Behavior

Consumers tend to choose products that are not only functional but also have a positive image towards sustainability (Zhao, 2021). Therefore, eco-friendly packaging innovation is a strategy that is in line with the trend of modern consumer behavior that is increasingly environmentally conscious.

## METHOD

The troubleshooting process is carried out systematically with a focus on the users involved. Figure 1 shows the steps taken from the beginning to the end of the study, from determining the topic to drawing conclusions and recommendations.

In the initial stage of the research, a preliminary study and preliminary data collection were carried out by distributing questionnaires to a number of respondents living in Jember. The goal is to identify the frequency of food and beverage orders through online motorcycle taxis and evaluate the level of public awareness of the packaging used by MSMEs in the food and beverage sector. Based on the results of the questionnaire, the research was continued with an in-depth observation of the packaging used by MSMEs, as well as additional interviews to explore the perspectives of MSME owners regarding the packaging they apply

### Data

This research uses two types of data: Primary Data, obtained through: Direct observation of the operational process of MSMEs (packaging selection, packaging, distribution). A questionnaire to consumers (34 respondents) to find out environmental concerns and preferences for environmentally friendly packaging. In-depth interviews with 4 MSME owners and 15 additional resource persons (business actors and consumers) at the Empathize stage. FGD (Focus Group Discussion) to test the acceptance of prototypes. Secondary data, obtained from: Scientific literature related to sustainable packaging, consumer behavior, and the application of design thinking (Kotler & Armstrong, 2008; Lestari, 2020; Müller & Schaefer, 2019). Agency data such as SIPSN (2020) and Waste-Free (2022) related to plastic waste statistics.

### Analysis Method

The data analysis in this study uses a descriptive qualitative approach combined with the Design Thinking stage. Data was obtained through observation, interviews, questionnaires, and FGDs, then analyzed thematically to find patterns of user needs, problems, and preferences for environmentally friendly packaging. The questionnaire data was processed in a quantitative descriptive manner using percentages and frequencies to describe the level of consumer concern for environmental issues. Furthermore, the results of the analysis of each stage of Design Thinking—including





Empathize, Define, Ideate, Prototype, and Test—are synthesized into the basis for the development of packaging designs that are oriented towards sustainability and user needs.

## RESULT

This research began with a preliminary study through observations, questionnaires, and interviews conducted on MSMEs that provide soupy food and cold drinks. Observations of MSMEs selected based on popularity and the number of transactions on GoFood and GrabFood revealed that the majority still use plastic packaging (Databoks, 2021). Furthermore, the questionnaire distributed to respondents in Jember showed environmental concern, with 22 out of 34 respondents worried about the impact of plastic use, and 18 of them expressed discomfort with packaging (Free Waste, 2021). Interviews with four MSME owners—two soup food owners and two cold drink owners—confirmed that packaging choices are based on affordability and availability, although they recognize the importance of switching to more environmentally friendly alternatives.

The Empathize phase approach was carried out through exploratory interviews involving 15 resource persons, consisting of 5 MSME actors in the food soup sector, 5 MSME actors in cold drinks, and 5 consumers. The data obtained was analyzed to map the stages of the process experienced by MSME owners and consumers. In Table 1, it is explained that MSME owners go through four stages starting from packaging selection, purchase, order receipt, to food/beverage preparation, while consumers go through the process of selection, order receipt, consumption, and packaging disposal. This data-compiled customer journey map provides a comprehensive overview of both parties' experiences and identifies several issues such as difficulties in determining the ideal packaging size, impracticality of packaging when opened, and lack of reference of eco-friendly materials. Based on these findings, development opportunities to improve packaging quality were identified. The first opportunity is to provide recommendations for packaging materials that are more environmentally friendly so that the selection can be made wisely (Waste Free, 2021). The third opportunity is to switch to using better quality packaging to improve customer ratings and satisfaction so that both parties can experience long-term benefits.

In the Definition stage, the user's needs are outlined through three points of view. The first point of view highlights soupy food MSMEs that need packaging with the right size, tightness, and safety to store hot food to keep it in optimal condition. The second point of view is related to cold drink MSMEs who also want packaging according to portions, safe, and tight so that drinks stay fresh. Meanwhile, the third point of view emphasizes the needs of consumers who expect packaging that can be directly used as a consumption container, made from environmentally friendly materials, and has the potential to be reused or recycled. To develop solutions to these needs, the Ideate stage is carried out. The 6-3-5 brainwriting method involves representatives from MSMEs, consumers, and independent designers to gather innovative ideas related to packaging (Lewrick, Link, & Leifer, 2020). The resulting ideas are divided into three categories: materials, forms, and innovations. Examples of ideas for soupy foods include the use of paper-based packaging, the design of bowls with thicker bases, the addition of partitions, and the integration of spoon features on the lid. As for cold drinks, it is recommended to use paper cups, lids with gaps for direct drinking, and washable packaging for repeated use. The screening results (Table 4) show that the main ideas for soupy foods include the use of cardboard materials, the addition of recycling steps, and washable packaging, while for cold drinks, the options chosen are the use of paper material, the addition of plantable seeds, and the lid with a gap for direct drinking.

Final selection process of ideas is carried out through the dot voting method which involves collaboration between MSME owners, consumers, and designers. The voting results support the development of prototypes in the form of packaging with the integration of recycling features and the support of packaging recycling organizations.

The prototyping stage is divided into three main parts. First, the development of prototype packaging materials: for soupy food, chemically recycled Kraft paper is used with the advantages of lightness, tear resistance, and availability in various sizes (240–960 ml) at a price of Rp 2,500–Rp 5,000 per package. For cold drinks, paper cups with food grade coatings are used, available in sizes of 115–450 ml, with a price per unit of IDR 286–IDR 546 and a special lid with a price between IDR 500–IDR 1,000 per set. Second, the packaging sticker prototype includes a seed sticker (complete with a small envelope containing the seeds and the expiration date) as well as a sticker with a QR code that provides information on recycling steps and planting instructions.

The Testing stage was carried out by holding a focus group discussion (FGD) involving 10 respondents, consisting of 5 buyers and 5 MSME owners. Testing via prototype video gathered feedback grouped into four quadrants: suggestions for improvement, positive feedback, questions, and innovative ideas. Some of the improvements implemented include the addition of an invitation to plant seeds with the message "by planting me, you have participated in saving the environment!", the addition of an expiration date on the seed envelope, the use of cayenne pepper seeds that are more resistant to extreme conditions, and the addition of an invitation "and get attractive prizes" on QR code stickers. In addition, the placement of stickers is left to each MSME so as not to interfere with the packaging design, and the PackagingKu coin redemption option is expanded to include agricultural equipment or media such as seeds, soil, and fertilizer.

Overall, this study succeeded in identifying the challenges of using plastic packaging by MSMEs and revealed the desire of consumers and business actors to switch to more environmentally friendly alternatives. The developed





prototype integrates sustainability aspects through the use of recycled materials, practical design innovations, and an incentive system based on digital platforms. The PackagingKu initiative is expected to be able to support systemic packaging waste management and encourage active participation from consumers and MSMEs so that they can improve service quality and protect the environment in a sustainable manner.

### DISCUSSION

The findings of this study indicate that the use of plastic packaging by food and beverage MSMEs remains dominant due to factors such as low cost, easy availability, and practicality. This condition is consistent with previous studies which state that economic considerations are the main reason MSMEs have not fully transitioned to sustainable packaging (Santoso, 2021; Sari, 2022). However, the results also reveal a growing awareness among both MSME actors and consumers regarding the environmental impact of single-use plastic packaging, particularly in the context of online food delivery services.

From the **Empathize and Define stages**, it was found that MSMEs and consumers have different yet interconnected needs. MSME actors prioritize packaging safety, tightness, and affordability, while consumers expect packaging that is practical, environmentally friendly, and reusable. These findings support Widyarningsih (2021), who emphasized that consumer environmental awareness significantly influences interest in sustainable packaging, although it must still meet functional requirements.

The application of the **design thinking approach** proved effective in bridging these needs. Through iterative stages of ideation, prototyping, and testing, the research successfully generated packaging solutions that are not only environmentally friendly but also functional and acceptable to MSMEs. This aligns with Lewrick et al. (2020), who state that design thinking enables innovation by deeply understanding user experiences and translating them into feasible solutions.

One notable contribution of this study is the development of **two alternative solutions**: (1) eco-friendly packaging made from recycled Kraft paper and food-grade paper coatings for MSMEs willing to switch materials, and (2) the use of eco-stickers and collaboration with PackagingKu for MSMEs that are not yet ready to change packaging materials. This dual-solution strategy is important, as it recognizes the diverse readiness levels of MSMEs and offers a gradual transition model toward sustainability, rather than a rigid, one-size-fits-all approach.

The inclusion of **incentive-based innovations**, such as seed stickers and QR-code-based recycling information, further strengthens consumer engagement and encourages pro-environmental behavior. This supports Zhao (2021), who found that green packaging initiatives positively influence consumer purchasing behavior and brand perception. Moreover, integrating digital platforms like PackagingKu contributes to systemic waste management efforts and supports long-term behavioral change among consumers and business actors.

Overall, the discussion confirms that sustainable packaging innovation for MSMEs is not solely a material substitution issue, but a comprehensive design challenge involving functionality, cost efficiency, user behavior, and environmental responsibility. By applying design thinking, this research demonstrates a practical pathway for MSMEs to adopt eco-friendly packaging while maintaining competitiveness and service quality in the digital food delivery ecosystem.

### CONCLUSION

The conclusion of the research regarding the proposal for environmentally friendly packaging design for food and beverage MSMEs with the design thinking method is that users need environmentally friendly packaging designs, able to package food and beverages with appropriate, tight, and safe sizes when delivered to buyers. In addition, packaging is also needed that can function as a food or beverage container that can be reused after use. Therefore, two types of environmentally friendly packaging are designed: one for MSMEs who are willing to change their packaging, and the other for MSMEs who have not or do not want to make these changes. For MSMEs who want to change the packaging, a packaging design made of Kraft for soupy food and paper coated with food-grade material for cold drinks is prepared. Meanwhile, for MSMEs that have not or do not want to change their packaging, solutions are provided in the form of packaging stickers that can be attached to the packaging, as well as cooperation with the PackagingKu organization to support the further packaging recycling process.

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