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Sustainable Innovation in Everyday Wearable Bag Design: The Case of Oh My Craft!

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ABSTRACT

Oh My Craft! is a micro, small, and medium enterprise that specializes in crafting bags made from traditional Indonesian textiles, marketed both online and offline. The company actively engages in sustainability by repurposing fabric and leather waste into other innovative products. This paper explores sustainable practices and innovation in traditional bag product design while focusing on voice of customers. From preliminary surveys to their customers, more than 50% of customers place significant importance on the functionality of bags—such as size, capacity, and features when making a purchase decision. The customers also suggested that Oh My Craft! introduce product variations based on bag functionality. The purpose of this paper is to recommend bag product design innovation that will fulfill sustainability practice and voice of customers with Quality Function Development method. The outcome is an innovative two-ways sling-tote batik bag product design with enhanced functionality that can be used both as small sling bag and shopping tote bag, designed to meet the needs of Oh My Craft!'s market, while minimizing material waste and promoting the reuse of materials.

Keywords –Innovation, Product Design, Quality Function Development, Sustainability, Voice of Customers

INTRODUCTION

Fashion and textile waste present major environment challenges in 2024, which global fashion industry contribute to 92 million tons of textile waste annually with less than 15% being recycled (*85% of Clothes Discarded Annually: A Wake-Up Call for Fashion's Waste Crisis - Environment+Energy Leader*, n.d.). In response to these challenges, it is crucial to put sustainability practices into textile production that focus on minimizing the environmental impact through product design and development and product's lifecycle, including using suitable materials like natural organic materials, reducing waste by utilizing leftover fabrics and materials from production to create new products, designing innovative bags for durability and multifunctional use. By implementing sustainable practices into the product design process, it can improve the social and environmental impacts.

New product development is essential for business growth and sustainability as it gives competitive advantages whether for large or small and medium enterprises (Iqbal & Suzianti, 2021). SMEs has

significant role in the economic development of the country (Salavou & Avlonitis, 2008). However, the new product development in SMEs is different from large enterprises. It is less formal process and often the key person in SMEs handles various decision making, including technical and strategic aspects. They also have limited resources to execute new product development processes. The same practice happens in Oh My Craft!.

Oh My Craft! is a micro, small, and medium enterprise that specializes in selling a wide range of handcraft products. Established in 2018, the company has focused on creating products with a traditional Indonesian aesthetic, including items such as bags, wallets, hats, and other accessories. The materials used in the production process are primarily sourced locally from across the Indonesia and are often combined with other materials such as leather, canvas, and burlap. This blend preserves the distinct traditional Indonesian character of the products, which serves as a unique selling point for Oh My Craft! in reaching both local consumers who appreciate traditional crafts and non-local customers that are interested in Indonesian culture.

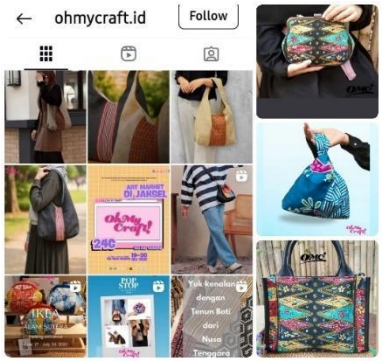


Fig. 1. Oh My Craft! Products and Social Media

In its production process, Oh My Craft! demonstrates a strong commitment to environmental sustainability by implementing a less waste management approach. This involves minimizing residual materials that could contribute to waste and environmental pollution. To achieve this, Oh My Craft! repurposes leftover materials from the production of one product into new or alternative products. This process continues until the remaining materials can no longer be reused or repurposed, thereby reducing waste generation to the greatest extent possible.

Customers can purchase Oh My Craft products through offline channels (such as exhibitions), social media platforms (Instagram and TikTok), as well as e-commerce platforms (such as Tokopedia). Consequently, there is a significant portion of the customer base consists of young individuals, particularly those from the millennial generation and younger. Sustainability topic is significant among younger generations. Customer demand for ethical and sustainable products is increasing. More shops have replaced plastic grocery bags with cloth tote bags. Cloth tote bags have been used not only for shopping, but also for keeping things (books, stationery, documents, etc.). Therefore, there is increasing demand for cloth tote bags. In the interview with the owner, the current products are designed and made based on the owner's personal preference and creativity without any market research or survey to understand customer demand and preference. Thus, authors conduct surveys of Oh My Craft's customers. Based on survey,

more than 70% of Oh My Craft!'s customers place significant importance on the quality and functionality of bags—such as size, capacity, and features when making a purchase decision and suggest that Oh My Craft!'s introduce product variations based on bag functionality.

In this research, authors aim to recommend bag product design innovation that will fulfill voice of customers with Quality Function Development (QFD) method and sustainability practice by adding functionality and material reuse. The bag product design will be based on the customer demands of multifunctionality and sustainability practice (material re-use, durability, and longevity).

LITERATURE REVIEW

Product design is the process of conceptualizing, creating and iterating products to solve customers' problems and to address the market need (Product Design Definition | Arena, n.d.).

According to (Lutters, 2019) product development is the creation of products with new or different characteristics that offer new or different benefits for customers, which focuses on creating or modifying the products to meet evolving customer needs or requirement.

Product design and development are the activities that start with the perception of a market opportunity and ending in the production, sales, and delivery of products (Ulrich & Eppinger, 2016). It is the process of creating and developing products that optimize functionality, aesthetics, and user experience. It typically involves research, conceptualization, development, prototyping, and production. Effective product design incorporates considerations of aesthetics, ergonomics, sustainability, and added value for the user. A well-designed product should be visually appealing, user-friendly, efficient, and capable of delivering positive overall experience (*What Is Product Design? - Prodi Desain Produk*, n.d.).

Qualify Function Development (QFD) is the method for customer-oriented products development. It is a planning process that implements technical support tools to prioritize each problem. House of Quality (HOQ) is the tool of QFD that shows the relationship between customer needs and the matrix to fulfill the customer needs and give focus for design team to produce quality products (Motta et al., 2020). Some research use QFD and HOQ for different products such as women's backpack (Taptajani et al., 2024), smart home products (Li et al., 2022), which the tool identifies design features (e.g., compartments, ergonomics) based on user needs. The wide use of House of Quality within QFD for product design across various sectors and serves as a structured bridge between customer needs ("WHATs") and technical specification ("HOWs").

According to (Jason F. McLennan, 2004) in *The Philosophy of Sustainable Design*, the product designer should eliminate negative environmental impact through skillful and sensitive design which share some common principles:

1. Use non-toxic, sustainably produced, or recycled materials which have a lower environmental impact than traditional materials.

2. Use manufacturing practice and produce products which are more energy efficient than traditional practice

3. Design products to be durable and highly functioning, reducing the need for frequent replacements and thereby minimizing the environmental costs associated with producing new items

4. Create products with reuse and recyclability in mind—ensure they can be easily disassembled so components can be repurposed into new products.

5. Refer to sustainable design standards and guidelines

6. Consider product life cycle and use life cycle analysis tools to assist sustainable product design

7. Transition from models of individual ownership to service-based systems that fulfill the same function.

8. Material should be sourced from nearby, sustainably managed renewable sources that can be composed at the end of their functional life.

Sustainable product design is a sustainable design approach that focuses on both social and environmental impacts while eco design focuses only on reducing environmental impacts at every step of product life cycle. Few eco design strategies are: product stewardship (ensure the product stays in the value system and is not lost at the end of its life), dematerialization (reducing weight, size and material used in design), modularity (product must be designed that every part can be transformed to fit customers need so the products have longer lives), longevity (products have longer lives possible), disassembly (products can be easily taken apart for recycling at the end of its life), and recyclability (every part of the products are designed to be recyclable) (Acaroglu, n.d.)

METHODOLOGY

This research uses interview and survey as the research methods. Authors interviewed the owner and customers to understand the business, products, material, market trends and challenges that were faced. Based on interviews with the owner of Oh My Craft!, Ms. Dilla, each product is designed and developed based on her personal judgment, without direct engagement with customers to identify their specific needs and preferences (voice of the customer). As a result, Oh My Craft! relies heavily on a trial-and-error approach in marketing and selling its bag products. Afterwards, surveys were conducted among the community and customers to understand the demographics of customers and the purchasing preferences/ aspects (size, material, functionality, strength and weakness of current products). The 2nd surveys were conducted to understand more about the design and functionality of the bag that customers prefer. Based on the survey results, customer requirements were determined and given hierarchy of importance. The customer requirement importances is used in target specifications using Quality Function Deployment (QFD) and House of Quality (HOQ). HOQ was also employed to benchmark Oh My Craft!'s products against those of its competitors. This process led to the generation and conceptualization of ideas aligned with the target specifications. A selection matrix was used to evaluate and choose the most suitable concept for prototyping. During the conceptualization and prototyping stages, the product was further refined and improved based on feedback from both the business owner and customers.

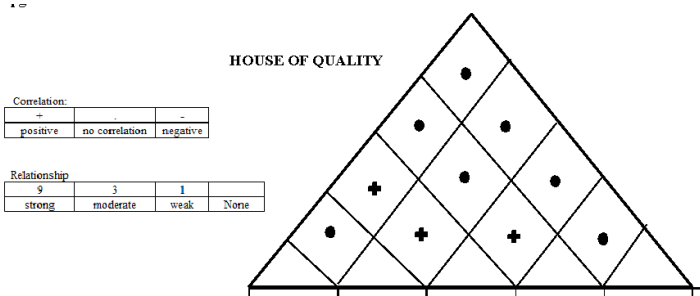
RESULTS AND DISCUSSION

From interviews and surveys with customers, customers' requirements aspects were determined with hierarchy of importance. There are 9 aspects that impact the customer's purchasing decisions with the importance rating:

Table 1. Customer Requirements Aspects and Importance Rating

Requirement No.	Customer Requirement	Customer Importance Rating
1	Functionality	5
2	Easy to clean	5
3	The flexibility of bag dimension to meet varying user requirements.	5
4	Capacity	4
5	Quality (durability)	4
6	Comfort & weight	3
7	Aesthetic	2
8	Price	1
9	Safety	1

Customer requirements that have high importance rating are functionality, easy to clean, and flexibility, follow by capacity and quality of bag (durability). For the flexibility aspect, 85.4% of customers interested with idea of purchasing 2 ways bags that combine the fashionable bag and tote shopping bag. The customer requirement hierarchy translates into QFD with House of Quality diagram.



Customer Requirements	Importance	Bag Dimension	Bag Material	Bag Shape	Bag feature	Bag Color	weighted score	Customer Competitive Assessment	
								Competitor 1 (Duanyam)	Competitor 2 (Bagteria)
Functionality	5	3	1	3	9		80	3	2
Easy to clean	5		9	3		3	75	2	2
The flexibility of bag dimension to meet varying user requirements.	5	1	3	3	9		80	5	2
Capacity (including compartments)	4	9	1	3	3		64	4	3
Quality (durability)	4		9	1	1		44	5	5
Comfort & weight	3	3	9	9	9		90	4	5
Aesthetic	2	1	9	9	1	9	58	5	5
Price	1	9	9	3	3	1	25	2	1
Safety	1		3	1	9		13	2	1
Technical Importance: Absolute		76	162	110	147	34			
Importance (%)		14%	31%	21%	28%	6%			
Priorities Rank		4	1	3	2	5			

Fig. 2. QFD based on voice of customers Breakdown to Engineering Characteristic

In House of Quality, there is benchmark with Oh My Craft's competitors: Du Anyam and Bagteria. The benchmark is based on appraisal, product observations and buyers' testimony in the marketplace. From HOQ, the target specification is listed.

Table 2. Target Specification

Customer Requirement No	Metric	Units	Marginal Value	Ideal Value
1, 3, 4, 6, 9	Dimension	cm	Length: 26-28, width: 30-32	Length: 27, width: 31
1,2, 5, 6, 7, 8	Material Characteristics (fiber)	denier	<2	1.3-1.5
1, 4, 5, 6, 9	Max Load	kg	>5	>7
1, 4, 5, 6, 9	Material strength	MPa (tensile strength unit)	30-80 Mpa	55 Mpa
7, 8	Bag Profile/ appearance	subjective	subjective	subjective
1, 3, 4, 6, 7	Bag Feature	list	all	all

2, 7	Bag Color	hex code/ RGB index	maroon (R: 40-43%, G:2-4%, B:9-13%)	maroon (R: 40-43%, G:2-4%, B:9-13%)

Following the target specifications, the process of idea generation and conceptualization was initiated. As illustrated in Figure 3, the initial concepts were developed with an emphasis on multifunctionality, aligning closely with both the voice of the customer (VoC) and sustainable design practices. Feedback from several customers indicated a common issue: they frequently forget to bring reusable shopping bags when grocery shopping, often resulting in the need to purchase additional shopping bags. In response to this concern, the authors proposed a design solution that integrates the functions of a sling bag and a tote shopping bag, resulting in a two-way convertible sling-tote bag. This approach addresses the identified customer pain point and enhances multi functionality and flexibility while also minimizing material waste by reducing the need for repeated shopping bag purchases. By consolidating two distinct bag functions into a single, multifunctional product, the design not only enhances user convenience but also promotes more sustainable practice. Figure 4 presents three conceptual design alternatives for the two-way sling-tote bag. From three concepts, authors arrange the meeting with owner and customers to gather feedback and input that lead to selection.

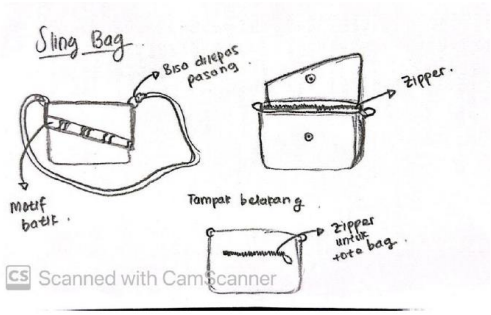


Fig. 3. Initial Idea Generation

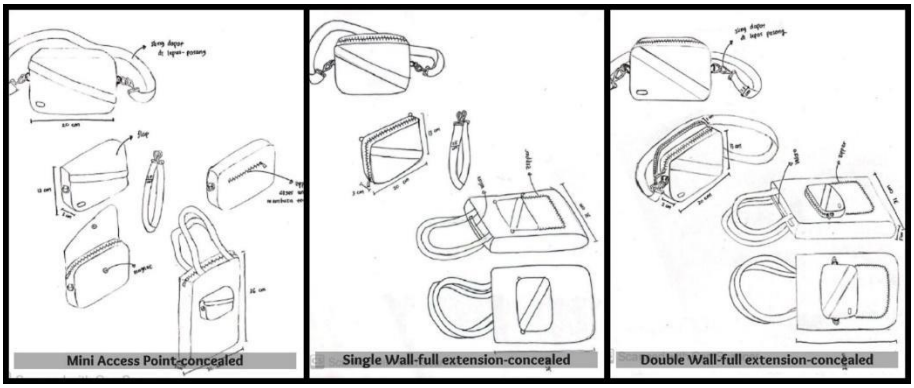


Fig. 4. Idea Generation and Conceptualization

Aligned with customers' requirements aspects no. 2, 5, 6 (easy to clean, quality/ durability, comfort and weight), the authors evaluated several materials commonly used in bag manufacturing. For sling bag

material, cotton was selected due to lightweight, affordable and breathable. For the tote shopping bag material, leather was excluded due to its excessive weight, high cost, and limited suitability in terms of flexibility and material strength for this specific application. Cotton, while lightweight and affordable, was deemed unsuitable due to its relatively low tensile strength, which is a critical factor given that shopping bags are expected to carry substantial loads. Based on these considerations, polyester was selected for the tote bag material as the most appropriate material for the two-way sling-tote bag prototype, owing to its high tensile strength, durability, and ease of maintenance. (Obiana & Fadipe, 2023). The prototype uses polyester, but for future development, the use of recycled polyester is recommended to further enhance the product's sustainability profile without compromising performance. ((Recycled Polyester - What Is It? Is It Sustainable? Why Use It? – Oliver Co, n.d.).

Material reuse is also implemented in the design. The batik accent for the sling bag uses the residual material from previous production.

Fig. 5. Final Two Ways Sling-Tote Bag Prototype

CONCLUSION

Business plays significant role in sustainability. Products that are designed and developed must have sustainability practice such as high/ multi functionality, quality (durability) and material re-use. The purpose of this paper is to recommend bag product design innovation that will fulfill sustainability practice and voice of customers with QFD method with HOQ tool. Based on interviews and surveys conducted with Oh My Craft!'s owner and customers, more than 70% of customers suggest that quality and functionality are the most significant aspects of purchasing decisions. Aligned with sustainability practice that Oh My Craft has implemented and with voice of customer with QFD method, the outcome is an innovative two-ways sling-tote batik bag product design with enhanced functionality, material reuse and durability. The design can be used both as small sling bag and shopping tote bag, designed to meet the needs of Oh My Craft!'s market, while minimizing material waste and promoting the reuse of materials.

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