Bandung Creative Movement 2024

Crafting Empathy: A Study on User Experience in Color Palette Generator Websites among The Indonesian SMEs

Wirania Swasty,[1*] S. Soedewi,[1] A. Mustikawan,[1] M.A. Mukmin,[2] M.A. Hafidzan[3]

[1]*Telkom University, Bandung, Indonesia*
[2]PT *Telkom, Jakarta, Indonesia*
[3]*SALT Indonesia, Jakarta, Indonesia*

*Corresponding email: wirania@telkomuniversity.ac.id

Abstract

The Color Palette Generator (CPG) website assists in selecting color palettes for various design purposes. This research introduces novelty by focusing on the user experience of Indonesian SMEs in using CPG websites for selecting color palettes. The primary objective is to understand the UX of CPG websites among Indonesian SMEs comprehensively. The paper focused on the outcomes of the empathize stage in the Study on User Experience in Color Palette Generator Websites among Indonesian SMEs. This paper outlines that the empathize stage utilizes data collection techniques such as online questionnaires and interviews. The data indicate a high level of perceived importance of color in product packaging across the industries. The study was further explored through in-depth interviews, allowing open-ended responses to reveal more detailed opinions and experiences. The in-depth interview reveals some pain points and opportunities, such as: a CPG helps them determine colors aligned with the product type and personal preference. This understanding is essential for the next phase of UX research, such as defining, ideating, and prototyping a color palette generator website that resonates with the target users and addresses their specific needs.

Keywords: design thinking, empathize, user experience, website, CPG

Introduction

The role of Small and Medium Enterprises (SMEs) holds significance in the economies of developing countries, including Indonesia. SMEs exhibit prolific growth across various regions, as evidenced by data reported by the Ministry of Cooperatives and Small and Medium Enterprises, indicating a total of 8.71 million SME units in Indonesia in 2022 (Santika, 2023). However, the Ministry of Finance notes that a majority of SMEs still face numerous challenges, such as difficulties in advancing to higher levels, limited digitalization access, hurdles in penetrating global markets, and a deficiency in financial services (Muhamad, 2023). Nevertheless, Indonesian SMEs contribute significantly by absorbing 97% of the workforce, contributing 57% to the Gross Domestic Product (GDP), and constituting 15% of the national exports (Muhamad, 2023).

The term "digitalization access" refers to the extent to which SMEs possess capabilities and a presence in the digital realm, employing information technology and the internet to

enhance operations and communicate with customers. This encompasses the use of digital platforms, applications, and cutting-edge technological tools to support business. One such application that can aid businesses is the Color Palette Generator (CPG) website, assisting in selecting color palettes for various design purposes, particularly packaging design.

To develop a human-centered CPG website, research employing a design thinking approach is necessary for a better user experience. Previous studies have addressed application development using design thinking (Darmawan *et al.*, 2022; Sungboonlue *et al.*, 2022; Chasapis *et al.*, 2023); however, there is a gap in the literature regarding challenges faced by SMEs in Indonesia when utilizing CPG websites. This research introduces novelty by focusing on the user experience of Indonesian SMEs in using CPG websites for selecting color palettes. The primary objective is to understand the UX of CPG websites among Indonesian SMEs comprehensively. Additionally, this research paves the way for subsequent stages of UX research, encompassing defining, ideating, prototyping, and testing, ultimately contributing to the development of user-friendly CPG websites aligned with the distinctive needs of Indonesian SMEs.

1. User Experience (UX)

As its name implies, user experience design involves creating all kinds of service or product experiences, including museum exhibition design. User experience design is mostly used for websites, web-based applications, and other software (Interaction Design Foundation 2020). User Experience (UX) means "a person's perceptions and responses that result from the use and/or anticipated use of a product, system, or service". Unlike usability, user experience is conceptualized as a subjective impression, not limited to the time a person spends with a product (Santoso & Schrepp, 2019). Usability (“how well users are able to comprehend and utilize a product to achieve their goals”) and acceptability (which consists of perceived value, usefulness, and desirability) are important parts of user experience (Gowarty *et al.,* 2021). Although UX developed from usability, it has evolved to encompass various aspects beyond usability. It is crucial to consider all facets of UX to ensure successful product delivery to the market (Interaction Design Foundation, 2020).

Seven factors influence user experience, which became a renowned instrument for understanding UX design. Cited from Interaction Design Foundation (2020), the seven factors are: Useful, Usable, Findable, Credible, Desirable, Accessible, and Valuable. The perception of something being 'useful' is subjective, and items can be considered 'useful' even if they provide benefits that are not practical, such as enjoyment or aesthetic value. Usable focuses on helping users efficiently and effectively accomplish their goals with a product. Findable means that the product should be easily locatable, and for digital and informational products, the

content within them should also be easy to find. Credible refers to the user's confidence, including its functionality, durability, and the accuracy and usefulness of the information it provides. Desirable refers to the quality of a product or service that evokes positive emotions, satisfaction, and a strong appeal to users. Accessible means providing an experience that can be used by users of all abilities, including those with hearing, vision, motion, or learning disabilities. Finally, valuable refers to the perceived benefits and advantages that a product or service offers to both creators and users. UX design covers so many topics, including interaction design, design thinking, and usability (Interaction Design Foundation 2020).

2. Design Thinking

Design thinking is seen as (1) a recipe or methodology, (2) the thinking of designers, and (3) practice-based design thinking (Auernhammer & Roth, 2020). Leonard Bruce Archer (1965) from the Royal College of Art in London was among the first designers to articulate "design thinking" as an organized method. Many present design thinking processes have three to seven phases, stages, or modes. Every stage involves specific heuristic approaches and related methods. However, all design thinking methods follow the same principles. Design thinking, as the thinking of designers, explores the evolution of research on designers' cognitive processes, influenced by developments in experimental psychology and methodologies like think-aloud protocols. Practice-based design thinking is rooted in somatic practice and specific situations, also known as embodied thinking. Embodied thinking highlights the interconnectedness of the mind and physical actions within the surrounding environment.
Design thinking is an iterative problem-solving approach that involves understanding users, challenging assumptions, and redefining problems to uncover alternative strategies and solutions, encapsulating both a mindset and a set of practical methodologies (Interaction Design Foundation 2020). Auernhammer & Roth (2021) have studied the origins and development of Stanford University's design thinking, analyzing documents from 1957 to 2005. The findings show that Design Thinking is a complex set of Thinking Modes, Attitudes & Values, Attributes, and Abilities that can be reinforced through Activities & Practices, Techniques, and a supportive environment to overcome emergent Blocks. Although described using different terminology across various theories, these activities and practices revolve around fundamental stages such as need-finding, problem definition, visualization, prototyping, refinement, and testing. For instance, according to the d.school's framework, Design Thinking unfolds across five distinct phases: Empathize, Define, Ideate, Prototype, and Test. Similarly, other models may delineate Design Thinking into different numbers of stages, ranging from three to eight. However, the essence remains consistent: identifying the problem, gathering and analyzing information, generating and evaluating ideas, synthesizing solutions, verifying their viability, and iterating as necessary.

Method

This research employed the design thinking approach formulated by the Interaction Design Foundation (2020), which consists of five (5) stages: empathize, define, ideate, prototype, and test. The paper focused on the outcomes of the empathize stage in the Study on User Experience in Color Palette Generator Websites among Indonesian SMEs. Emphatize is conducting research to develop an understanding of the users (Nielsen Norman Group 2016). As this paper outlines, the empathize stage utilizes data collection techniques such as questionnaires and interviews. The questionnaire used a Google form, featuring a user interface (UI) widely recognized in Indonesian society, and was distributed online through short messages and social media to solicit participant involvement. Table 1 details the questionnaire's list of questions.

Section	Questions
Personal Data	a) Name b) Cellular number for token of appreciation (optional) c) Age d) Domicile e) Gadget
Business Information	a) Type of Business b) Business Name c) Years in Operation d) Average Revenue (monthly turnover)
Product Information	a) Do you have packaging? b) Type of packaging c) How did you design the packaging? d) Elements considered in determining the packaging
Color Implementation	a) Background/reason why color was considered one of the elements in packaging design. b) References used to determine the color of the packaging. c) How crucial is the use of color in packaging. d) Challenges faced when deciding on the color for packaging.

Table 1: Questionnaire questions
Source: authors

Moreover, this study used semi-structured interviews, which followed a set of questions, giving several flexibilities to ask the questions. There were about six introductory questions and seven questions following the usability testing. Table 2 lists the set of interview questions.

Section	Instructions	Set of Questions
Introduction	N/A	1. Introduction between the interviewer and participant. 2. Reasons for designing packaging: a. Personally, or

		b. Using design services from a printing/offset company, or c. Engaging a professional packaging designer. 3. Background/reasons why color is considered one of the elements in packaging design. 4. Challenges faced in determining the colors to be used in packaging. 5. Methods for determining packaging colors (e.g., referencing Pinterest, using a color palette generator, selecting colors randomly). 6. Prior knowledge or experience with using a color palette generator.
Usability Testing	During the interview, participants were asked to try an online color palette generator.	Selected websites link: https://www.canva.com/colors/color-palette-generator/ https://colors.muz.li/ https://color.adobe.com/ https://mycolor.space/ http://colormind.io/
Experience	Participants were asked to answer some questions focusing on UI/UX design and usability after they had tried accessing five color palette generator websites	1. What is your overall impression/opinion of the websites you have tried? 2. How user-friendly were the websites? Which one was the easiest to use?
Evaluation	Next, participants were asked to choose one website they consider the best to be used as a source of information for the following questions.	3. What are the positive aspects of the chosen website? 4. What areas could be improved on the selected website?
Challenges	N/A	5. What challenges did you encounter when using the selected website?
Future improvements	N/A	6. Are there any suggestions for improvement regarding the identified shortcomings? 7. Are there any additional features or improvements you would like to see on the websites you've tried, and what benefits do you anticipate from these changes?

Table 2. Set of questions
Source: authors

1. Sampling

The sampling method employed in this study was purposive sampling, wherein participants related to the research object were invited to participate. The research subjects were defined as entrepreneurs in Small and Medium Enterprises (SMEs) with products featuring packaging. The total number of respondents involved in the survey was 35 individuals. Following the questionnaire survey, interviews were conducted by inviting selected participants to have a

significant impact, serving as key informants (N=9). The criteria for inviting key informants include being SME entrepreneurs with products featuring packaging and being selected as potential users.

The interviews were conducted to gain insights, including those related to online Color Palette Generators. During the interviews, key informants were asked to access several Color Palette Generators. Interviews were carried out both face-to-face and online, involving the presentation of specific questions and usability testing. Users were assigned tasks, observed, and questioned about their experiences while accessing the websites.

The criteria for questionnaire respondents (a minimum of 20 participants) are as follows: First, entrepreneurs who are newly venturing into business and wish to create product packaging. Second, located in Bandung-West Java, the Greater Jakarta Area, and Nationwide. Third, possess a physically packaged business product. Fourth, own a smartphone. Fifth, those who regularly use the internet for daily activities. The questionnaire dissemination channels included the Cooperative and SME Department of Bandung Regency, the *Ikaboga* SME Community, SME social media groups, and the Agricultural Extension Center in Lembang.

The criteria for Interviewees were as follows: first, selected from representative demographic profiles based on questionnaire results. Second, participants who completed the previous questionnaire. Third, prioritization was given to those with businesses less than one year old. Fourth, regular users of a Personal Computer/ laptop. Fifth, those willing to be interviewed either offline or online (depending on respondent preference).

2. Stimuli

The research subject (in this case, Color Palette Generator/ CPG) consisted of N=5 websites. The criteria for selecting these subjects involved identifying the top CPG websites based on Search Engine Optimization (SEO), which are believed to be the most popular. Another criterion is that the chosen CPGs should be implementable for packaging or similar purposes. Table 3 outlines the comparative analysis (advantages and limitations) of several top Color Palette Generator (CPG) websites based on the keywords "color palette generator." After a comparative analysis of the most popular eight (8) CPG websites on Google, five (5) CPG websites were selected for usability testing during interviews.

Link	Advantages	Limitation	Include/ Exclude
https://coolors.co/	Includes 5-10 colors in one palette, automatically generated by pressing the space bar. It features a palette browser, an	For customization, users need to click on shades manually. The functionality is limited, and users must	Excluded from consideration due to the requirement of

	image picker (extracting colors from images), and a contrast checker.	upgrade to the pro version to access the full features.	upgrading to the pro version for additional features.
https://www.canva.com/colors/color-palette-generator/	Allows users to upload images to obtain a color palette, explore color combinations by inputting keywords, and create custom colors. It is integrated with Canva Design, displaying design templates with the selected color palette.	Offers only four colors in one palette, and the input keywords must be in English.	Included
https://colors.muz.li/	Users can click on a base color (or type the color name), and alternative color schemes (analogous, monochromatic, complementary, etc.) will appear. The generator includes a live kit demo and various examples showcasing the application of the chosen palette in designs. Each palette consists of 5 colors. Additionally, there is an image picker feature.	The Search menu only accepts input in English. The customization options are limited as the initial color and schemes are predefined. While it is possible to create a palette by selecting individual colors, the process can become overwhelming. The live kit demo is restricted to UI/infographic applications.	Included
https://color.adobe.com/	In the "Create" menu, users can extract color palettes from uploaded images. In the "Explore" menu, users can input keywords to receive results in the form of images and corresponding color palettes. In the "Trends" menu, design references and associated color palettes are displayed.	The presence of numerous menus may be overly complex for beginners. Additionally, users must input keywords in English.	Included
https://colorhunt.co/	Includes colour code in hexadecimal	The color palette generator is limited to 4 colors in one palette and is constrained by the available preset palettes; customization options are not available.	excluded
https://mycolor.space/	offers 25 alternative gradients (palettes consisting of 3-6 colors). The process is simplified by entering hexadecimal color codes or using a color picker to display suggested palettes. Additionally, a color gradient generator is included.	Customization is not possible; it must align with the predetermined base color. Users are required to know the color code beforehand.	Included
http://colormind.io/	The color palette generator can extract color palettes from	The available templates include material dashboard	Included

	images. The algorithm operates in a semi-random manner, necessitating users to click "generate" again to view different results. The tool provides templates where the palette can be applied to designs, allowing users to visualize its implementation.	templates, but there are no templates specifically designed for packaging. To access additional features such as applying a material kit, users need to upgrade to the pro version.	
https://uigradients.com/#KyooPal	It displays the hexadecimal code and name of each color.	Only displays gradients between two colors.	excluded

Table 3. Comparative analysis of study objects
Source: authors

3. *Data Analysis*

In this research, the questionnaire served as the primary tool for data collection, enabling the gathering of insights from the participants. Following the data collection phase, a descriptive analysis was conducted to unveil the key characteristics inherent in the dataset. To enhance the descriptive analysis process, DATAtab - an Online Statistics Calculator – was used. DATAtab proved to be a valuable tool, and as online software, it is more accessible without installing any software on a computer.

Next, a descriptive analysis was conducted to unravel the patterns and themes within the qualitative interview responses. A crosstab analysis was performed to delve deeper into the relationship between participants with a design background and those without. This analytical approach facilitated a comparative examination, revealing distinctive perspectives based on participants' design backgrounds. For the systematic organization and interpretation of qualitative data, NVivo12 Software was employed, ensuring a rigorous and structured analysis that enhances the validity and reliability of findings.

Result and Discussion

1. Survey Findings

The participants involved were diverse in gender, design background, education, business sector, years of business, and monthly revenue. Respondents' profile is outlined in Table 4.

Item	Descriptions	Frequency	Percentage
Gender	Male	6	17%
	Female	29	83%
Design Background	Yes	8	23%
	No	27	77%
Education	High school	12	34%
	Diploma	8	23%
	Undergraduate	9	26%
	Master and above	6	17%
Business sector	Food & Beverage	25	70%
	Agriculture	3	9%
	Craft	2	6%
	Fashion	2	6%
	Others	3	9%
Years of Business	> 3 years	17	49%
	1-3 years	11	31%
	< 1 year	7	20%
Monthly Revenue	IDR 5-10 million	30	86%
	IDR 10-20 million	3	8%
	IDR 20 million above	2	6%

Table 4. Respondents' profile
Source: authors

Table 5 outlines the importance of color in product packaging and the difficulty in determining colors for product packaging according to respondents' perspectives, categorized by business sector. This categorization investigates potential significant differences between the importance and difficulty levels among businesses in different sectors. The data presented are descriptive, including frequency, mean, standard deviation, minimum, and maximum values.

Respondents from the F&B, craft, accessories, and agriculture sectors perceive color in product packaging as highly important, with mean scores ranging from 4.04 to 4.67. In contrast, fashion sector respondents rated color slightly lower in importance. Regarding the difficulty in determining colors for product packaging, respondents from the agriculture sector have the lowest perceived difficulty in determining colors for packaging, with a mean score of 2 and no standard deviation, indicating high agreement among them. On the other hand, Craft &

Accessories, Fashion, and other sectors perceive color selection for packaging as somewhat difficult, with mean scores ranging from 3.5 to 4.5. This study found that the Agriculture sector stands out with the lowest perceived difficulty, while the Fashion sector finds it relatively more challenging. Moreover, the F&B sector, despite perceiving color as highly important, also finds it moderately difficult to determine colors for packaging, with a mean score of 2.92 and a standard deviation of 1.19.

	Business Sector	Freq.	Mean	Std. Deviation	Min	Max
The level of importance of the color in product packaging	F & B	25	4.04	1.27	1	5
	Craft & accessories	2	4.5	0.71	4	5
	Agriculture	3	4.67	0.58	4	5
	Others	3	4.33	0.58	4	5
	Fashion	2	4	0	4	4
The level of difficulty in determining colors for product packaging	F & B	25	2.92	1.19	1	5
	Craft & accessories	2	3.5	0.71	3	4
	Agriculture	3	2	0	2	2
	Others	3	3.67	1.15	3	5
	Fashion	2	4.5	0.71	4	5

Table 5. Color in product packaging
Source: authors

Regarding the role of color in packaging, respondents indicated that its primary function is to attract potential buyers, with 23 respondents emphasizing this aspect. This indicates that SME entrepreneurs recognize the importance of color in capturing consumers' attention and stimulating their interest in products. Following closely behind, 16 respondents identified color's role in communicating various product attributes such as content, quality, and origin. Additionally, 15 respondents highlighted the significance of color in establishing a company or brand identity. This indicates that SME entrepreneurs recognize the importance of color in capturing consumers' attention and stimulating their interest in products. This highlights the multifaceted nature of color in packaging, not only as an attention-grabbing tool but also as a means of conveying information and reinforcing brand recognition.

However, only a few respondents, specifically 7, mentioned the role of color in distinguishing product lines or variants. While this aspect was less emphasized, it still underscores the importance of color in facilitating product differentiation within a brand's portfolio. However, the lower frequency of mentions suggests that SME entrepreneurs might not fully capitalize on color's potential for this purpose.

Based on the findings, when asked about the challenges in selecting packaging colors, more than 50% of respondents identified a lack of graphic design knowledge as the primary issue, while the remainder cited production costs. From this, it is evident that the lack of graphic design knowledge leads SME entrepreneurs to struggle in determining color palettes for their product packaging.

2. Interview Findings

Table 6 lists the informants' profile of the interview sessions.

Participants	Design Background	SME	Field of business	Education	Year of business	Revenue	Gender
Informant 01	yes	Preps Studio	Fashion	Master and above	1-3 years	IDR 20 million above	Male
Informant 02	no	Wakopay	Food and beverage	Master and above	1-3 years	IDR 5-10 million	
Informant 03	yes	Warga Sini	Food and beverage	Undergraduate	< 1 year	IDR 5-10 million	
Informant 04	no	Hilla Sarie	Food and beverage	Undergraduate	> 3 years	IDR 20 million above	Female
Informant 05	no	Ikaboga	Food and beverage	Undergraduate	1-3 years	IDR 5-10 million	
Informant 06	no	BPPP lembang	Agri food	Undergraduate	> 3 years	IDR 5-10 million	
Informant 07	no	BPPP lembang	Agri food	Master and above	> 3 years	IDR 5-10 million	
Informant 08	no	BPPP lembang	Agri food	Master and above	> 3 years	IDR 5-10 million	
Informant 09	yes	NeatPiles	Fashion	Master and above	1-3 years	IDR 5-10 million	

Table 6. Informants' profile
Source: authors

From Figure 1, it can be observed that most informants, both with and without design knowledge, express that they design packaging independently for their products. The reason for those without a design background is attributed to cost limitations in packaging production. Conversely, individuals with a design background prefer designing their own packaging because they possess an in-depth understanding of their product and want to stand out.

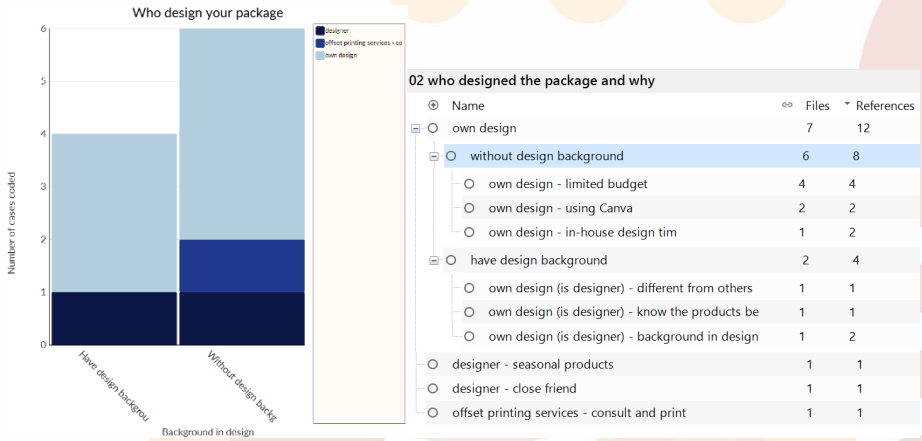


Figure 1. Who designed the packaging and the reason
Source: authors, 2024

The next question: why is color considered a crucial element in packaging design (Figure 2). From the interviews, it was revealed that both groups (with and without design background) agree on the significance of color for sales and marketing, particularly in attracting the attention of potential buyers. Additionally, both groups agree that color can evoke emotional value by leveraging color psychology. This finding aligned with a prior study (Martinez *et al.,* 2021), who suggest that color is a fundamental marketing technique that influences consumer behavior and purchase attitudes. The importance of colors in packaging design is underscored by its role in building the brand as a brand identity and guideline. Furthermore, color holds significance in packaging design due to its functional value, including its ability to effectively communicate the product inside.

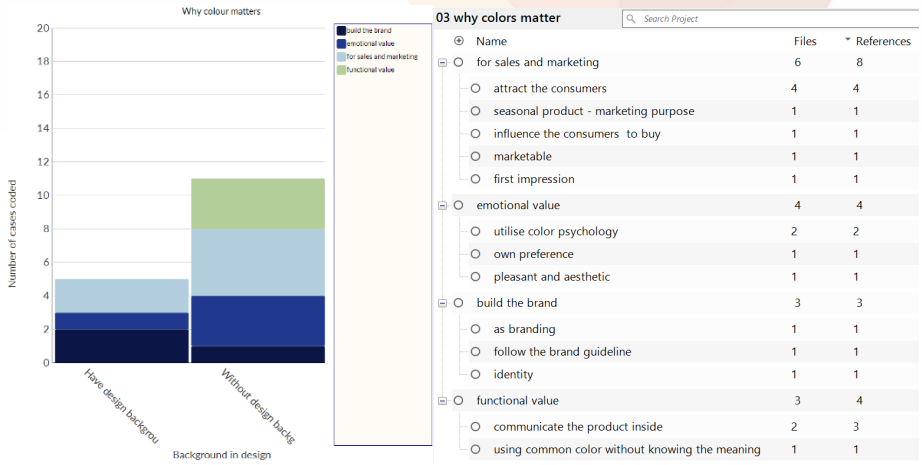


Figure 2. Why colors matter in packaging design
Source: authors, 2024

The next question pertains to the challenges of selecting colors for product packaging. Figure 3 indicates that individuals without a design background face more difficulties in color selection. Interviews reveal that the primary challenge lies in color management. Color management refers to controlled efforts to harmonize color representation across various devices, such as computer monitors, printers, offset printing machines, and appropriate media. The main objective is to achieve consistency among different color-rendering devices; for instance, ensuring that colors appear the same on a computer LCD screen and on the printed packaging.

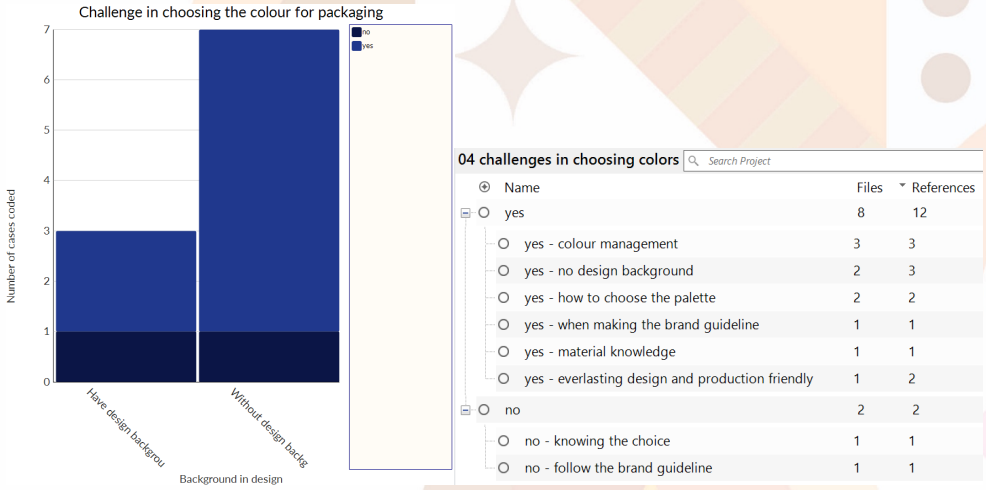


Figure 3. Challenges in choosing colors
Source: authors, 2024

Three informants without a design background express challenges in color selection, specifically in managing the disparity between colors displayed on a computer screen and those printed on the packaging. Another challenge is the limited understanding of design principles and a lack of knowledge on how to establish color guidelines. Conversely, an individual without a design background but facing no difficulties in color selection, as she is confident in her chosen color.

Next, the informants were queried about how to choose colors and combinations (Figure 4). The references were the primary sources chosen by informants without a design background to seek inspiration and determine the color scheme for their packaging. Four out of six informants without design backgrounds disclosed that they determine their packaging colors by referencing other products available in the market. In comparison, the remaining two informants without design backgrounds find inspiration through browsing the internet. Another consideration for those without a design background is the cost implication of packaging production, which directly affects the product's retail price.

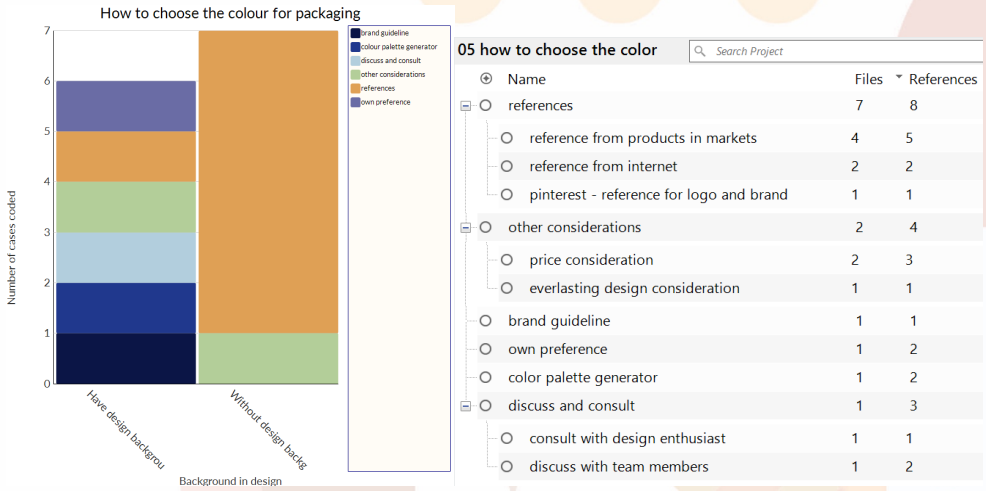


Figure 4. How to choose the color
Source: authors, 2024

For informants with a design background, choosing packaging colors involves either adhering to brand guidelines or relying on personal preferences while considering timeless colors. The use of the Color Palette Generator (CPG) for determining packaging color schemes was employed by one informant with a design background, a practice established during her design education. When asked whether they were previously aware of or had ever used CPG, this study found that all informants with a design background stated they were familiar with and had used CPG. Subsequently, participants were requested to access five CPG websites during the interview.

After accessing and conducting usability testing on the five websites, participants were asked to provide their overall impressions of the websites they had tried. Refer to Figure 5, both groups agreed that CPG websites are helpful for ideation and providing suggestions. Quoting informant 08, 'Especially for us who are not knowledgeable about colors and do not have any educational background in colors, it makes it easier to determine colors for packaging.' Additionally, participants expressed that the accessed websites were user-friendly for beginners, offering basic features and simplicity. However, informants with a design background assessed that the Adobe website (https://color.adobe.com/) is intended for advanced users.

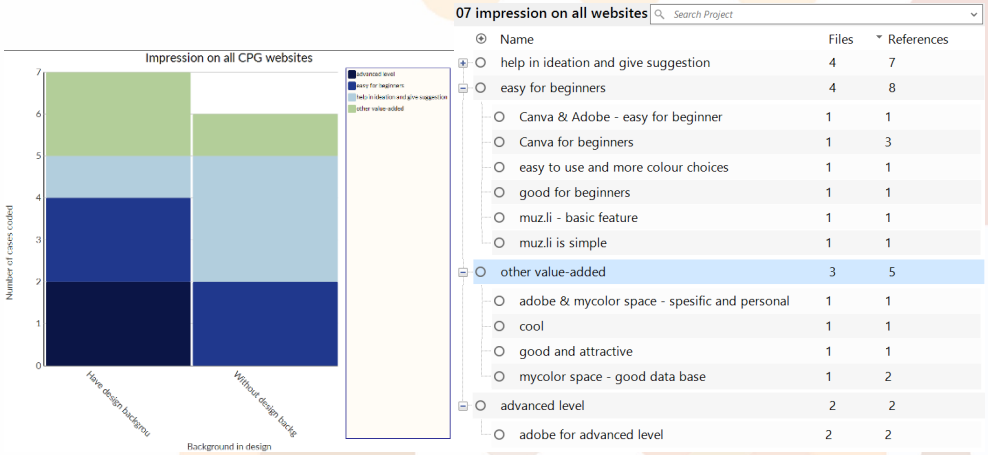


Figure 5. Impression on websites
Source: authors, 2024

The next question was regarding the ease of use of the websites and which was considered the most user-friendly (Figure 6). A participant without a design background stated that Canva and Adobe were easy to use due to the presence of the keyword input feature. Both groups agreed that websites with an image upload feature and a simple user experience (UX) were easy to navigate. The website rated as the easiest was https://mycolor.space/ because of its simple UX and single-page layout. This website was the most frequently selected by participants as their preferred choice (chosen by four informants) for reference in subsequent questions, followed by Adobe (three informants) and Canva (two informants).

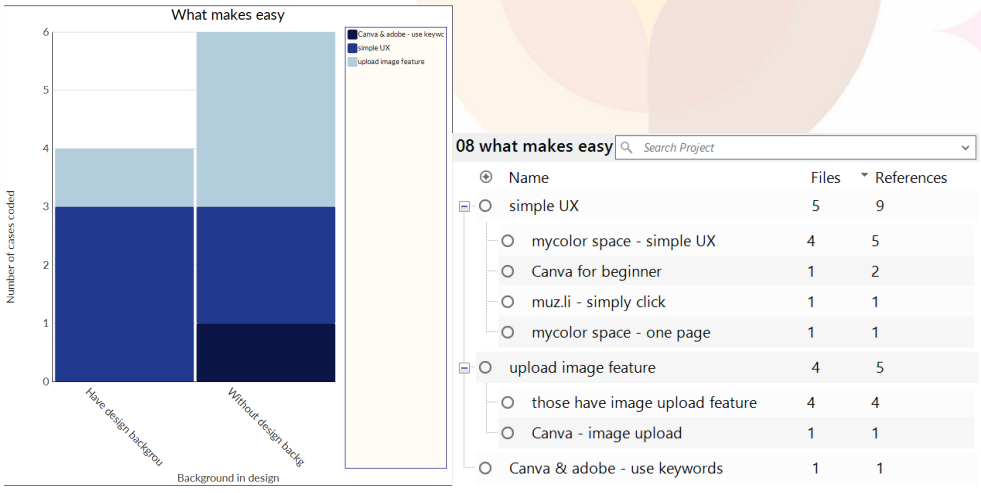


Figure 6. Easy level
Source: authors, 2024

Subsequently, participants were asked to evaluate the advantages of their chosen website (Figure 7). The primary advantages of the selected websites were attributed to the inclusion of more features, coupled with a simple user experience (UX). Prominent features included a keyword input feature, an image upload feature, an extensive template library, and the provision of color codes. Once again, mycolor.space was deemed to have a simple UX due to its single-page layout and straightforward approach, making it well-suited for beginners.

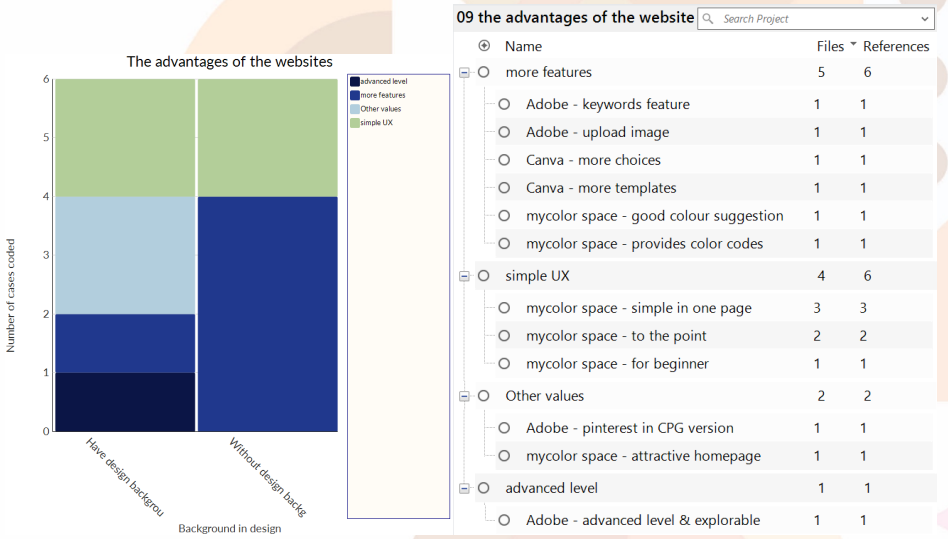


Figure 7. The advantages of the website
Source: authors, 2024

Furthermore, participants were also asked to evaluate the shortcomings of the websites they had explored (Figure 8). In general, the drawbacks were often associated with a lack of features. For example, Adobe was criticized for providing less information about the Color Palette Generator (CPG) tutorials. Additionally, despite mycolor.space being assessed for its simple UX, it was deemed to have several shortcomings, including a limited number of variants, an absence of an image prototype, a lack of information about color meanings, no login feature, and no image upload feature. One informant pointed out a drawback of Canva, citing the existence of a paid version. Adobe was criticized for its complicated and having an excessive amount of information. However, one informant expressed an inability to identify any shortcomings of the website as she had not thoroughly explored the website (lacking experience with the website) and, therefore, had not encountered any drawbacks.

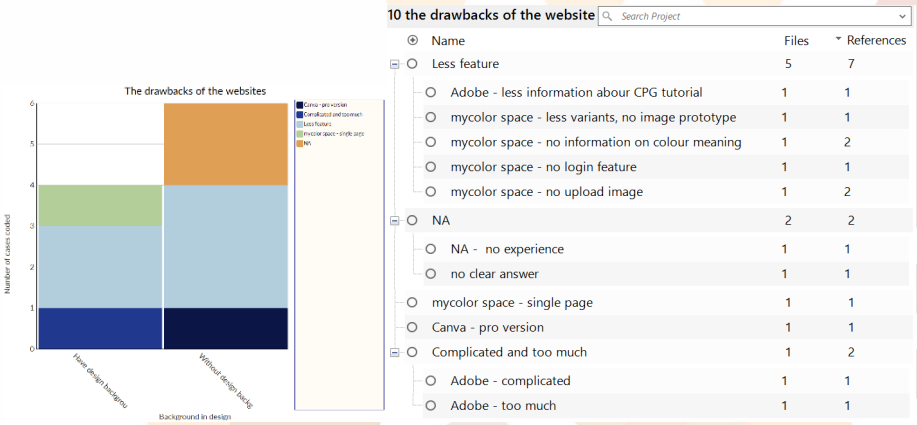


Figure 8. The drawbacks of the website
Source: authors, 2024

Similar to the challenges in identifying the drawbacks of the websites, the difficulties in using the websites were attributed to participants being novices without prior experience in utilizing these platforms and lacking a design background (Figure 9). Another primary obstacle was noted as the websites being less informative due to the absence of a homepage and a tutorial on how to use the platform. Language barrier was also identified, as all Color Palette Generator (CPG) websites used English, which was unfamiliar and not the participants' native language. Additionally, constraints were encountered due to limited features, notably the absence of an image upload feature. However, two informants reported no challenges during their website exploration. Informant 03 stated there were no obstacles because the website was easy to comprehend (single-page design), while Informant 04 expressed satisfaction with the completeness of features, asserting that everything needed was readily available on the website.

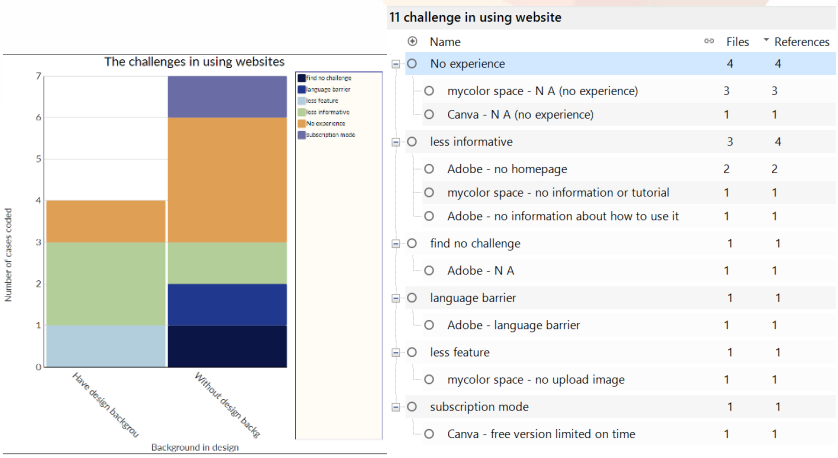
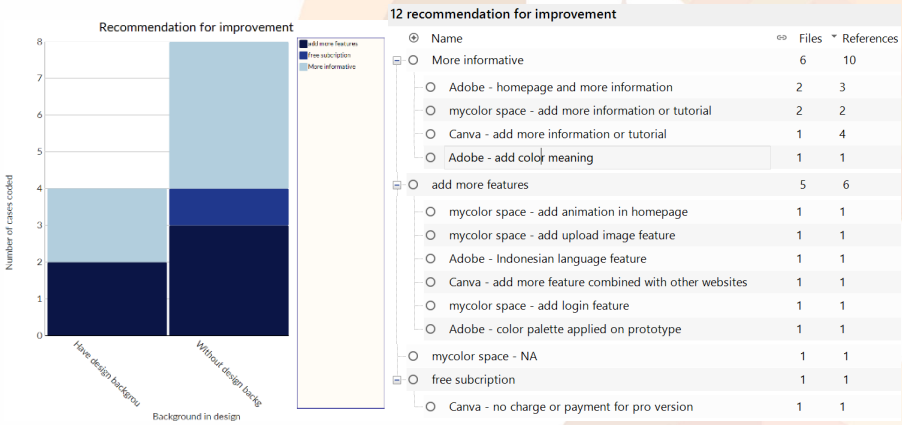


Figure 9. Challenges in using the website
Source: authors, 2024

Subsequently, participants were asked to provide suggestions for improvement regarding the identified shortcomings of the websites (Figure 10). Recommendations from both groups included incorporating more informative content and additional features. The key information suggested was the inclusion of tutorials on how to use the Color Palette Generator (CPG). Participants also recommended the addition of a homepage and information on color meanings. Other suggestions for improvement involved introducing more features, such as a login option and image upload feature, making the websites available in Bahasa Indonesia, and incorporating animations on the homepage to enhance visual appeal.



Name	Files	References
More informative	6	10
Adobe - homepage and more information	2	3
mycolor space - add more information or tutorial	2	2
Canva - add more information or tutorial	1	4
Adobe - add color meaning	1	1
add more features	5	6
mycolor space - add animation in homepage	1	1
mycolor space - add upload image feature	1	1
Adobe - Indonesian language feature	1	1
Canva - add more feature combined with other websites	1	1
mycolor space - add login feature	1	1
Adobe - color palette applied on prototype	1	1
mycolor space - NA	1	1
free subcription	1	1
Canva - no charge or payment for pro version	1	1

Figure 10. Recommendation for improvement
Source: authors, 2024

The final question pertained to the features participants would like to add or improvements they desired from the websites they had tried (Figure 11). The majority of participants echoed similar sentiments to the previous question, expressing the desire for more features and more informative content. Another feature participants hoped for was the inclusion of mock-ups or the application of color combinations into a design, allowing users to visualize the color combinations in a design mock-up. Informant 01 argued that while the Color Palette Generator (CPG) generates palettes, it still compels users to rethink their design application, especially for beginners. According to Informant 01, having a mock-up feature would be sophisticated and greatly beneficial.

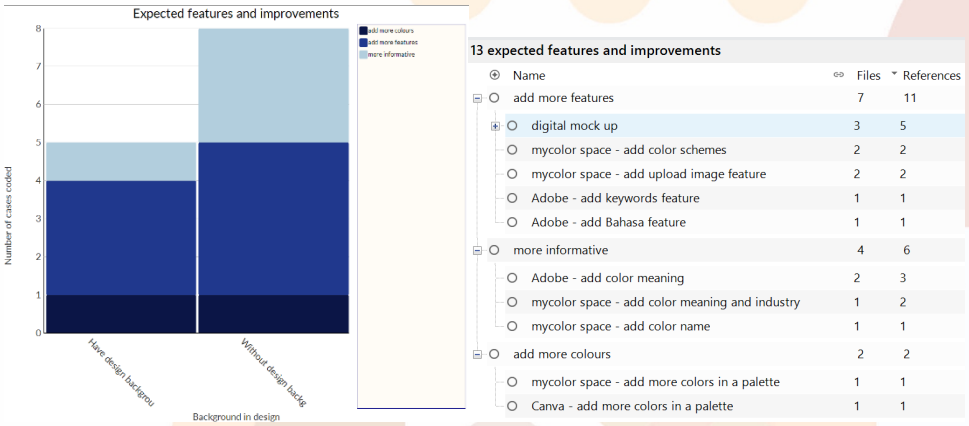


Figure 11. Expected features and improvements
Source: authors, 2024

The emphasis on 'more informative' centered on adding color meanings, color names, and industry-specific information related to the colors. Additionally, participants expressed the desire for more colors in a single palette. For instance, Canva produces four colors in one palette, while Mycolor.space generates several palettes, some containing only three colors in one palette. Therefore, participants expected the option to have more colors in one palette, ideally around five colors.

Conclusion

The research objective of this paper is to understand the user experience (UX) in color palette generator (CPG) websites among Indonesian SMEs. This understanding is essential for the next phase of UX research, such as defining, ideating, and prototyping a color palette generator website that resonates with the target users and addresses their specific needs.

The questionnaire revealed data such as personal information, business information, product information, and the color implementation in their packaging design. This data can be used to understand their preferences, experiences, and opinions, which can help improve the user experience. The data indicate a high level of perceived importance of color in product packaging across the industries. This finding aligned with a prior study (Tonthongkam, 2021) that showed the visual aspects of packaging, particularly color, have the most influence on attracting or repelling consumers, but this is still less important than product pricing.

This current study also revealed that determining colors for product packaging is perceived as moderately difficult. The study was further explored through in-depth interviews, allowing open-ended responses to reveal more detailed opinions and experiences. From the in-depth interviews, some pain points were revealed, such as those who have no design

background and designed packaging independently to control their production cost. The main challenge they faced in implementing colors on products was when the color representation varied between digital and physical formats, resulting in inconsistent branding colors. They faced challenges in deciding the colors for their product branding due to a lack of knowledge in graphic design. The issue revealed that they determined the colors for their product branding by seeking references from similar product branding through field observation and the internet.

Moreover, from the in-depth interview, some opportunities can be revealed, such as: a CPG helps them determine colors aligned with the product type and personal preference. The availability of information, knowledge, and guidance on using the CPG on the website's homepage is very helpful for beginners to achieve their desired goals. Features that can generate colors from images and explain the meaning of color combinations will enhance their experience when using the CPG website. In their opinion, a good CPG website has a simple user interface (UI), all features on a single page, and can generate colors from reference photos. This paper limits the description of the questionnaire and interview responses to the empathize stage of UX research. Therefore, the research should be continued into the subsequent stages of website development, including defining, ideating, prototyping, and testing. Additionally, it is important to acknowledge the study's limitations in sample size and sampling technique. The respondents lacked proportional representation regarding design background, gender, and business sector. Future studies could consider increasing the sample size and ensuring a proportional representation of respondents to address these limitations.

References

Auernhammer, J. and Roth, B., 2020. What is design thinking? *In*: C. Meinel and L. Leifer, eds. *Design Thinking Research*. Springer, 169–196.

Auernhammer, J. and Roth, B., 2021. The origin and evolution of Stanford University's design thinking: From product design to design thinking in innovation management. *Journal of Product Innovation Management*, 38 (6), 1–22.

Chasapis, P., Mitropoulos, S., and Douligeris, C., 2023. A prototype mobile application for the Athens Numismatic Museum. *Applied Computing and Informatics*, 19 (1–2), 144–172.

Darmawan, I., Anwar, M.S., Rahmatulloh, A., and Sulastri, H., 2022. Design Thinking Approach for User Interface Design and User Experience on Campus Academic Information Systems. *International Journal on Informatics Visualization*, 6 (2), 327–334.

Gowarty, M.A., Longacre, M.R., Vilardaga, R., Kung, N.J., and Ashley, E., 2021. Usability and Acceptability of Two Smartphone Apps for Smoking Cessation Among Young Adults With Serious Mental Illness: Mixed Methods Study. *JMIR Mental Health*, 8 (7), 1–16.

Interaction Design Foundation, 2020. *The Basics of User Experience Design*. The Basics of User Experience Design. Interaction-Design.org.

Martinez, L.M., Rando, B., Agante, L., and Abreu, A.M., 2021. True colors: Consumers' packaging choices depend on the color of retail environment. *Journal of Retailing and Consumer Services*, 59, 1–13.

Muhamad, N., 2023. Usaha Mikro Tetap Merajai UMKM, Berapa Jumlahnya? (Micro Businesses Still Dominate SMEs, How Many Are There?) [online]. *Databoks*. Available from: https://databoks.katadata.co.id/datapublish/2023/10/13/usaha-mikro-tetap-merajai-umkm-berapa-jumlahnya [Accessed 28 Jan 2024].

Nielsen Norman Group, 2016. Design thinking 101 [online]. Available from: https://www.nngroup.com/articles/design-thinking/ [Accessed 22 Oct 2023].

Santika, E.F., 2023. Jumlah UMKM di Indonesia Sepanjang 2022, Provinsi Mana Terbanyak? (The Number of SMEs in Indonesia Throughout 2022, Which Province Has the Highest?) [online]. *Databoks*. Available from: https://databoks.katadata.co.id/datapublish/2023/02/02/jumlah-umkm-di-indonesia-sepanjang-2022-provinsi-mana-terbanyak#:~:text=Ini terlihat dari data yang,juta unit usaha pada 2022. [Accessed 28 Jan 2024].

Santoso, H.B. and Schrepp, M., 2019. The impact of culture and product on the subjective importance of user experience aspects. *Heliyon*, 5 (9), 1–12.

Sungboonlue, P., Thanakaew, S., Rangseepanya, K., Tangpatong, T., and Siriborvornratanakul, T., 2022. A study of redesigning food delivery application in Thailand. *Telkomnika (Telecommunication Computing Electronics and Control)*, 20 (5), 1073–1082.

Tonthongkam, K., 2021. The Role of Packaging Designs for Agribusiness Product Marketing in Western Thailand. *The International Journal of Visual Design*, 16 (1), 1–16.