

Innovative Design of ITTS Mart Application with Design Thinking & System Usability Scale Method

Habib Mirza Alfansuri^{1)*}, Perdana Suteja Putra²⁾, Rizqa Amelia Zunaidi³⁾

^{1,2,3)}Telkom University Surabaya, Indonesia

¹⁾habibmirzaalfansuri22@gmail.com, ²⁾perdanasuteja@telkomuniversity.ac.id,

³⁾rizqazunaidi@telkomuniversity.ac.id

Submitted : Apr 8, 2024 | **Accepted** : Apr 25, 2024 | **Published** : Jul 1, 2024

Abstract: Including ease of accessing the internet through mobile devices. The emergence of social media applications, such as virtual friend applications, has also played a role in increasing the number of Internet users, primarily through mobile devices. In addition to functioning as a forum for virtual friends, social media also acts as a means of promotion, one of which is to promote online shopping applications, which contribute to an increase in online shopping transactions in Indonesia. One of the strategic choices taken is to use online shopping platforms to market educational institutions' products in the hope that they can make it easier for customers to shop and stimulate significant growth. Design thinking is used in idea formulation and problem-solving. As for creating applications that describe the emotional desires of users, this research uses the Kansei Engineering approach. Data collection was conducted through questionnaires, interviews, and literature studies. Later, it will generate several selected Kansei Words. Furthermore, to determine the best design that suits user needs, application prototypes are tested through Performance Metrics tests to determine the level of Effectiveness, efficiency, and errors, as well as performance and usability evaluations using System Usability Scale (SUS) questionnaires.

Keywords: *Design thinking, Kansei Engineering, E-commerce, Performance Metrics, System Usability Scale.*

INTRODUCTION

Internet usage on mobile phones has become deeply ingrained in the lives of Indonesian individuals, with over 196.7 million people actively accessing the Internet through their mobile devices in 2019-2020 (Zunaidi et al, 2023). This rapid growth has been fueled by the rise of social media and online commerce applications, resulting in a widespread adoption of online shopping. These advancements have not only transformed how consumers behave but have also opened up vast possibilities for the E-commerce sector. According to predictions from Bain & Company and Facebook, the online shopping industry in Indonesia is projected to experience significant growth, reaching a value of US\$ 48.3 billion by 2025 (Putra & Suzianti, 2022).

This online shopping application was explicitly selected for mobile users, allowing them to conveniently purchase IT Telkom Surabaya products at their convenience, no matter where they are. In addition, IT Telkom Surabaya has the chance to expand its market presence in this area (Rahmayani & Desrianty, 2015). Based on previous research conducted on the ITTS MART application, user satisfaction with the ITTS MART user interface display has not been achieved (Zunaidi et al, 2023). There is a clear need for a methodical and comprehensive approach to ensure effective renewal (Fatimah et al, 2023).

*name of corresponding author



This is an Creative Commons License This work is licensed under a Creative Commons Attribution-NonCommercial 4.0 International License.

Considering the given situation, the Design Thinking approach is deemed suitable. It has yet to be utilized in designing e-commerce application interfaces that are also combined with Kansei Engineering and usability approaches (Bisnis et al, 2020). Kansei Engineering offers the benefit of designing or developing a product based on the user's emotions or feelings towards it (Muhaemin,2020; Putra et al.,2022). Meanwhile, design thinking will prioritize the identification of problems by gaining a thorough understanding of users, highlighting creativity, and generating groundbreaking solutions (Ayu&Wijaya, 2023). The System Usability Scale (SUS) is a valuable tool for assessing the usability of application displays. It provides an objective measure of how well the product meets usability standards (Faisal, 2021). The goal of this research is to develop a cutting-edge design for the ITTS MART application interface, taking into account the user's emotions. Additionally, we will conduct usability testing of the ITTS MART application design using the System Usability Scale approach.

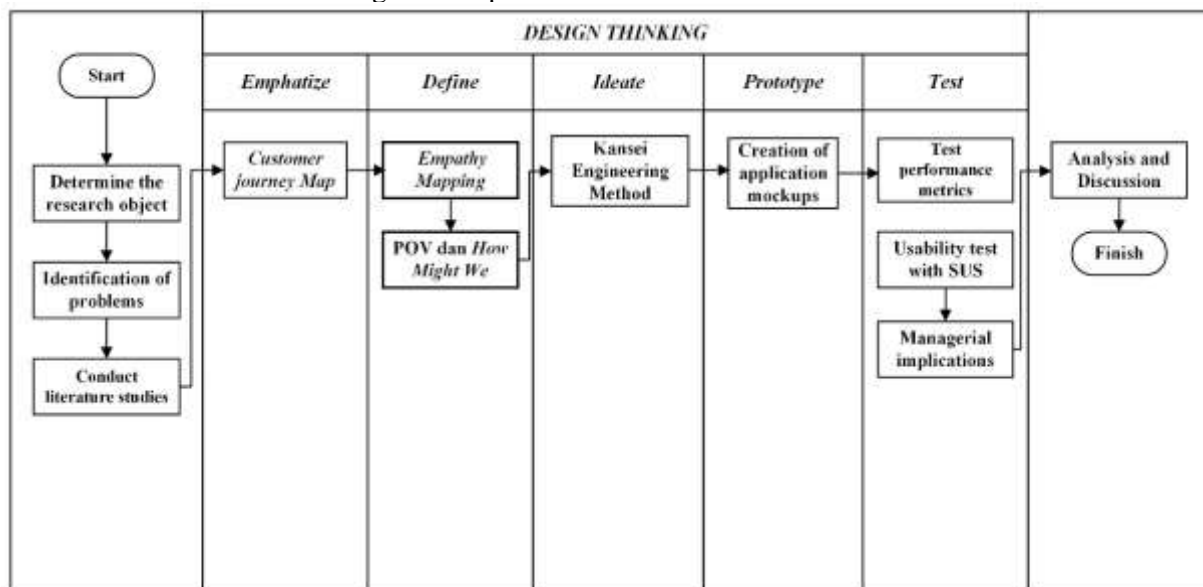
LITERATUREREVIEW

Design thinking involves finding a balance between different elements of business and art (Isa&Ariyanti, 2021). When it comes to implementation, design thinking is often seen as a product development method that prioritizes consumer needs. It places a strong emphasis on understanding and addressing those needs, rather than getting caught up in other factors during the development process (Ginanjar &Supendi, 2017). The design thinking process consists of various stages, such as empathizing, problem definition, idea generation, prototyping, and testing (Purnama &Rinandi, 2023).Meanwhile, Kansei Engineering is a technology that merges the realms of emotions and engineering principles (Djirong &Kadir, 2022). Applied in product development, Kansei Engineering focuses on achieving consumer satisfaction by analyzing human feelings and emotions and incorporating them into product design. The primary focus of Kansei Engineering is to develop products by thoroughly understanding consumer emotions (Megasyah,2019; Taflikhati & Canta, 2022; Musrifah et al.,2022).

METHOD

This study used a semi-quantitative research methodology, which involves multiple stages, as depicted in the accompanying image.

Figure 1 Depicts the Flow of the Research Process



According to the research flow depicted in Figure 1, the initial stage involves Determining the Observation Object. It entails identifying the specific focus of the research, which in this case is the cooperative business process, namely urban farming operations at the Telkom Surabaya Institute of Technology. Once the target of observation has been established, the subsequent stage is to identify the problem. During this phase, issues pertaining to the object of observation are recognized, such as the absence of an online and mobile platform for purchasing and selling urban farming products (Rahmayani&Desrianty, 2015). The literature study phase is conducted to examine theories that are

*name of corresponding author



pertinent to the study subject thoroughly. It is accomplished by consulting diverse sources, such as scientific publications, books, and references cited in the final assignment (Auliasari et al, 2021). The Emphasize method is the initial stage that entails the act of carefully watching and conducting interviews with people. The objective is to comprehend consumer requirements and inclinations by means of firsthand observation and thorough interviews. During the Define step, the highlighted problems are further elucidated and precisely specified. This step is completed after the collection of information from the preceding stage. The customer journey map was developed to provide a comprehensive understanding of users' interactions with the ITTS MART application services from initial introduction to actual usage.

Additionally, it aims to provide valuable insights regarding client loyalty. The Ideate stage entails a collaborative and creative process aimed at generating innovative ideas and solutions for pre-identified problems. These principles served as the foundation for developing design concepts through the utilization of Kansei Engineering. The implementation of the Kansei Engineering method commences by gathering Kansei words from around 250 participants, followed by validating these words, collecting competitor products for comparison, distributing semantic differential questionnaires to approximately 200 participants, conducting statistical tests, identifying and executing the primary components of analysis, and finally performing dimensional grouping using partial least squares. During the Prototype process, researchers develop an application prototype to represent the anticipated ideas visually. It is accomplished via a design program such as Figma. The last phase is Testing, during which the product that has been designed is subjected to user testing in order to obtain feedback. Evaluation will rely on performance statistics and surveys measuring the system usability scale. Testing is conducted to assess the benefits and drawbacks of the designed product.

RESULT

Customer Journey Map

Within this customer journey map, our initial step is identifying the primary phases that clients progress through (Riza et al,2022). For instance, the progression of knowledge regarding demands, information search, visits to stores, product selection and purchase, payment, and product consumption or usage. Subsequently, we outline the particular acts that customers engage in and their corresponding emotions/responses at each phase (Soedewi et al, 2022). The subsequent output is a customer journey map developed using prior observations and interviews.

Figure 2 customer journey map






Stage	Awareness	Consideration	Decision	Services	Loyalty
Customer's Activities	Get information from friends	Research products and compare	<ul style="list-style-type: none"> Visit the shop Buy products 	Receive the product then pay to the cashier	Repeat purchases and share experiences
Different Touchpoint	Social media and verbal information	Social media	Mobile conversation	Chat, Phone	Verbal reviews and social media
Customer's Experience					
Key point Indicators	The number of people aware of the application	Number of application users	<ul style="list-style-type: none"> Conversion rate Online sales 	<ul style="list-style-type: none"> Online transactions Delivery of goods 	Customer retention ratio and satisfaction score
Business Objectives	Increase awareness and interest	Increase the number of customers	<ul style="list-style-type: none"> Increase purchasing activity Customer satisfaction is achieved 	<ul style="list-style-type: none"> Minimize waiting time Improve service 	Create positive reviews
Team Members/ Dept Involved	Increase awareness and interest	Sales	<ul style="list-style-type: none"> Developer Sale Product team 	Customer service	Customer succer dan Developer

Figure 2 above displays a customer journey map that outlines the progression of the customer experience from the initial awareness stage to the final loyalty stage. During the Awareness stage, buyers maintain a neutral stance as they acquire knowledge about products through social media. Customers are becoming aware of the presence of ITTS Mart. Subsequently, during the Consideration stage, clients experience a sense of optimism as they engage in product comparisons on various social media platforms. Customers are prompted to consider purchasing things when they acquire information from

*name of corresponding author

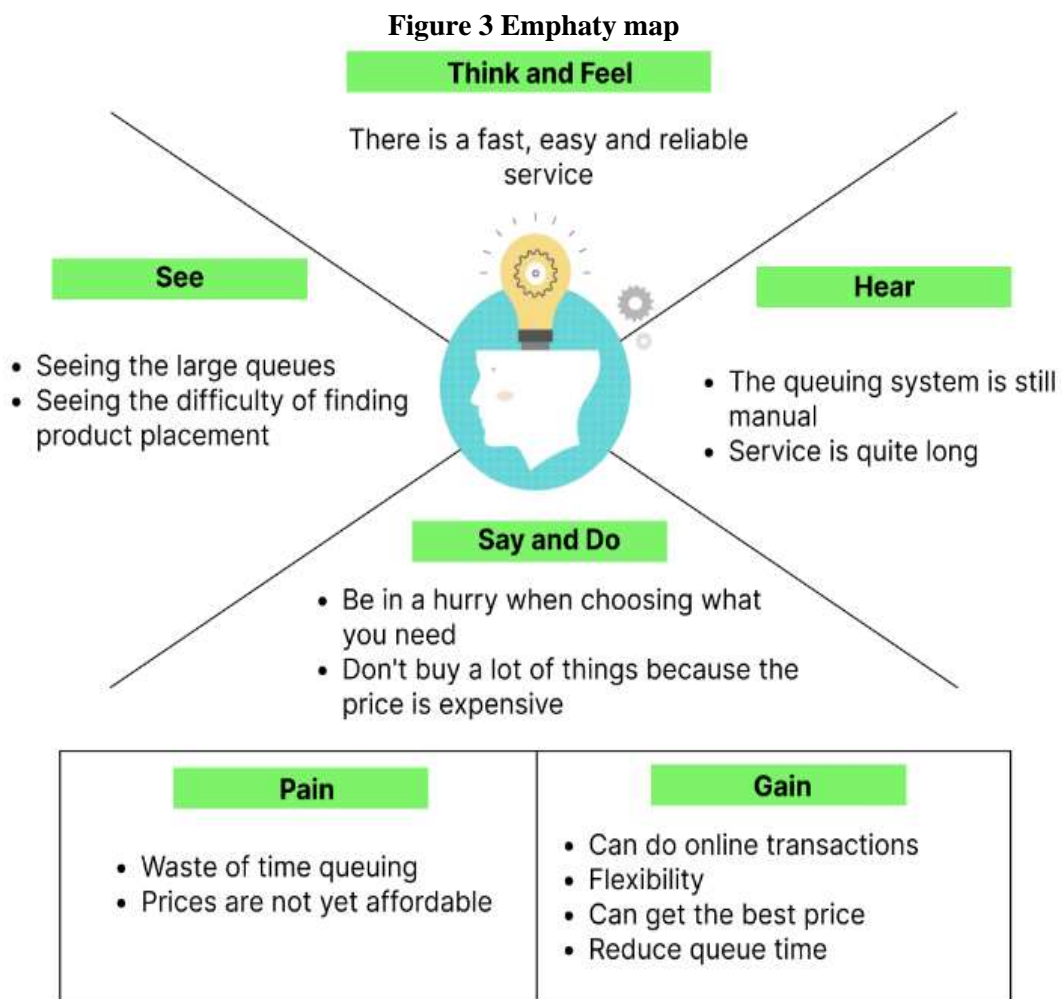


This is anCreative Commons License This work is licensed under a Creative Commons Attribution-NonCommercial 4.0 International License.

their immediate environment. During the Decision stage, clients experience a high level of satisfaction as they find it convenient to physically visit the store and initiate the process of acquiring things. The decision to purchase ITTS Mart products was made willingly. During the services stage, clients begin to experience a decrease in comfort due to the continued use of a manual servicing system. Customers have the option to acquire things and, after that, remit payments straight to the cashier. Enhancements in service are required to enhance client satisfaction. At the Loyalty stage, customers experience a sense of appreciation when they offer feedback on social media. Having a pleasant experience with ITTS Mart can enhance consumer loyalty and encourage regular purchases.

Empathy Mapping

Empathy mapping is a valuable tool for gathering insights from focus group discussions to gain a deeper understanding of a product from the user's point of view (Cairns et al, 2021). Figure 3 displays the information:



According to Figure 3, the think and feel points indicate that people have a preference for a service that is fast, easy, and dependable. It highlights the necessity for a transaction procedure that is both more efficient and emotionally impactful. Upon reaching the checkout area, users encounter extensive lines and need help locating product displays. Furthermore, people voiced their discontent with the manual queue method and the sluggishness of the service during the recent discussion. During the decision-making process, customers experience a sense of urgency and feel pressured to make quick choices. As a result, they often restrict their purchases due to the exorbitant prices. Users often experience annoyance at pain spots, which arise from time wasted in queues and pricing that are difficult to reach. Regarding gaining points, customers articulate the advantages of online transactions, flexibility, obtaining the most favorable prices, and diminishing waiting times in queues.

*name of corresponding author



Poin Of View

Based on the information gathered from the preceding empathy map, the next step is to synthesize critical observations and insights into the Point of View. The following is an example of Point Of View.

Figure 4 Point Of View

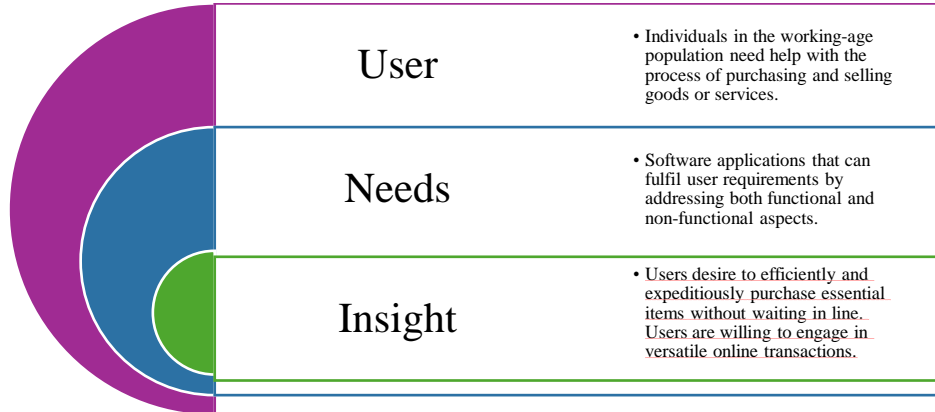


Figure 4 illustrates that consumers are dissatisfied with the transaction process and demand solutions that meet functional and non-functional requirements. It was discovered that users desired a rapid and effortless shopping experience without the inconvenience of waiting in line. POV's primary focus is to create a user-friendly and efficient application that caters to the requirement for convenience and flexibility in the purchasing process.

How Might We

How Might We be a methodology for crafting inquiries that foster inventive and innovative resolutions in addressing challenges or attaining specific objectives. This research utilizes the How Might We approach to provide multiple solutions that address the requirements of user personas [17]. Below is a compilation of questions provided to users: 1) Suppose we develop an application that may assist users in cooperative purchasing and selling services at ITTelkom Surabaya. 2) What if we develop an E-commerce application that offers visually appealing functionalities? 3) What if we develop an E-commerce application with an aesthetically pleasing colour scheme, visually appealing visuals, and attractive fonts? 4) What would be the outcome of developing an E-commerce application with a well-designed page layout? 5) What if we develop an E-commerce application with a functional and efficient menu system? 6) What if we develop an E-commerce application with a rapid and efficient loading system? 7) What if we develop an E-commerce application with a design that ensures an entirely error-free and bug-free system? 8) What if we develop a mobile E-commerce application that offers unrestricted access from any location and anytime? 9) What if we develop an E-commerce application with interactive functionalities for users? 10) What if we develop an E-commerce application that is distinct and remarkable compared to other applications? 11) What if we develop an E-commerce application with many captivating features?

Kansei Word

The Kansei terms extracted from previous research publications were further categorized. This grouping aims to amalgamate Kansei words that share characteristics or have commonalities to create novel Kansei words that can serve as representations (Faisal et al, 2021; Zhafira et al, 2021). *Kansei* is a term that refers to a classification system organized according to users' requirements and preferences.

Table 1 Definition of the word Kansei

User requirements	Word Kansei
Efficient service	Appealing
Straightforward service	
Reliable acquisition	
Product search convenience	Attractive
High-quality graphics	

*name of corresponding author



There is no requirement to wait in line.	Organized
Precise and unambiguous data	
Straightforward and uncomplicated	Practical
Rapid reaction procedure	Quick
It can decrease waiting time. Can be accessed at any time and from any location	Effective
High cost	Accessible
Establish promotional campaigns and implement discounts	Interactive
Fascinating characteristics	
Non-monotonous	Unique
Innovative Distinctive aesthetic compared to others	
Efficient service	Innovative
Straightforward service	

Table 1 shows that 206 samples were used in this research to test Kansei terms while determining them. The specified e-value or significance level is 0.05. Subsequently, computations are performed to ascertain the least number of samples needed (n) utilizing the suitable formula. Completing the calculations, a result of $n = 135.9736$ was obtained, then rounded to 136.

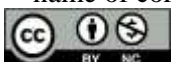
Subsequently, researchers conduct validity and reliability tests, which are crucial in assessing the quality of measuring instruments or survey tools (Ginjar & Supendi, 2017). The validity test assesses the degree to which the measurement instrument accurately measures the intended construct. In contrast, the reliability test seeks to examine the consistency of the measurement tool in producing the same results when administered to the same sample repeatedly (Jayakusuma et al, 2022). The subsequent data presents the outcomes of each Kansei term's reliability and validity assessments.

Table 2 Recapitulation of Reliability Test Results and Semantic Differential Validity Test One

Kansei Word	r Table	r Calculate Validity	r Calculate Reliability	Information
Appealing	0,137	0,456	0,748	Valid&Reliable
Attractive	0,137	0,411	0,754	Valid&Reliable
Organized	0,137	0,439	0,75	Valid&Reliable
Practical	0,137	0,426	0,752	Valid&Reliable
Innovative	0,137	0,428	0,751	Valid&Reliable
Quick	0,137	0,431	0,751	Valid&Reliable
Effective	0,137	0,499	0,742	Valid&Reliable
Accesable	0,137	0,412	0,754	Valid&Reliable
Interactive	0,137	0,427	0,752	Valid&Reliable
unique	0,137	0,421	0,752	Valid&Reliable

Table 2 above presents the outcome of validity and reliability tests conducted on the ten observed Kansei terms. Every Kansei word is assigned a fixed r table value of 0.137. Additionally, each word has a validity r value and a reliability r value, derived using data from the study. The validity test results indicate that all Kansei terms possess a computed r validity value that surpasses the r table value (0.137), thereby confirming the validity of the data. The validity of the result is confirmed since the calculated value of r is greater than the critical value of r from the table, using a significance level of 0.05. Ghozali states that if the r count is more than or equal to the table value of r (using a two-sided test with a significance level of 0.05), the instrument or question items are considered significantly correlated with the total score, indicating validity (Erlando et al, 2020). In addition, the results obtained from the reliability test were more significant than 0.70. The Cronbach alpha coefficient exceeds 0.7, indicating a high level of reliability. A construct or variable is dependable if it yields a Cronbach's Alpha value greater than 0.60. If the alpha value is close to one, then the data reliability is higher (Riza et al, 2022). It demonstrates that the measures obtained are consistent and dependable.

*name of corresponding author



This is anCreative Commons License This work is licensed under a Creative Commons Attribution-NonCommercial 4.0 International License.

Product Benchmarking

Product benchmarking is a crucial stage in developing a product or service, in which we analyze and compare existing products or services available in the market to obtain valuable information. Three benchmarking programs, specifically Segari, Sayurbox, and Titipku, comprehensively comprehend current patterns and optimal methodologies in E-commerce transactions and services. Below are the results of the comparative product analysis of the three:

Figure 5 Benchmarking Product Analysis

	SEGARI	SAYUR BOX	TITIPKU
Ratings	4,8	4,8	4,8
Downloads	1jt+	1jt+	500 rb+
Color theme			
Color	#F7F7FF #5A6142	#ADEFAD	#038A50
Code	Snow & Light green	Green	Drak green

The selection of these three applications was determined by their relevance to the services provided by ITTS Mart, namely in the context of online buying and selling of agricultural products. This decision was made based on the information presented in Figure 5. Segari is a rival application with an impressive rating of 4.8. The popularity of this program is evident from its download count, which exceeds 1 million. Furthermore, Sayurbox boasts an equally impressive rating of 4.8 and has garnered over 1 million downloads. Titipku now has an identical rating of 4.8, similar to the previous two programs. However, it has a slightly smaller number of downloads, approximately 500 thousand.

Subsequently, the questionnaire data obtained from the product comparison will be examined to assess its validity and reliability. Here are the outcomes of the validity and reliability assessments:

Table 3 Validity and reliability test of Benchmarking products

Apps	r Table	r Calculate Validity	r Calculate Reliability	Information
<i>Segari</i>	0,123	0,918	0,943	Valid&Reliable
<i>Sayurbox</i>	0,123	0,926	0,905	Valid&Reliable
<i>Titipku</i>	0,123	0,913	0,931	Valid&Reliable

Based on the information provided in Table 3, three Benchmarking products have been confirmed as genuine and dependable. According to the validity test, the data is considered legitimate since the calculated validity (r) is greater than the validity threshold (r table), based on a significance test with a significance level of 0.05. Ghozali states that if the count of r is more than or equal to the table value of r (using a two-sided test with a significance level of 0.05), then the instrument or question items are considered to have a substantial correlation with the total score, indicating their validity. While alpha > 0.80 indicates all items are reliable, and all tests consistently have excellent reliability, an alpha value of > 0.7 indicates sufficient reliability (Musrifah M et al., 2021). According to the reliability test findings, it is entirely trustworthy.

PCA Analysis (Principal Component Analysis)

The objective of Principal Component Analysis (PCA) is to detect latent patterns or structures in intricate data by decreasing the dimensionality of variables into a few primary components that are more easily interpretable (Haryono & Bariyah, 2014). PCA is a technique that reduces the complexity of data while preserving as much important information as possible (Ayu & Wijaya, 2023). Here are the PCA test results for the *Kansei* words that were previously obtained:

*name of corresponding author



Table 4 PCA test results

Rotated Component Matrix		
Kansei Word	Component	
	1	2
Organized	0.998	
Quick	0.993	
Attractive	0.946	0.326
Accesable	0.928	0.373
Innovative	0.852	0.523
Effective		0.994
Appealing	0.447	0.879
Interactive	0.447	0.879
Unique	-0.447	-0.879
Practical	-0.522	0.852

According to the findings in Table 4 of the Principal Component Analysis (PCA), we may infer the existence of two design concepts. These concepts are labelled as Concept 1 (Efficient Concept) and Concept 2 (Friendly Concept) accordingly. The first concept, the Efficient Concept, comprises several elements: Organized, Quick, Attractive, Accessible, and Innovative. The second, Friendly Concept comprises Effective, Appealing, Interactive, distinctive, and Practical elements.

Subsequently, the design features are determined to generate qualities and variables that will serve as the foundation for the application's prototype design. Each of these design elements has a crucial part in creating a delightful and fulfilling user experience. Below are the outcomes of the design aspects that have been gathered from the current design concept:

Table 5 Determination of element design

Top app bar	Top app bar color	Green #EBF5EA White #FFFFFF Black #000000 (transparan)	Top app bar color –Green #EBF5EA Top app bar color – White #FFFFFF Top app bar color – Black #000000 (transparan)
Body	Body background color	White #FFFFFF	Body background color - White #FFFFFF
	Body font style	Modern style Familiar style Formal style	Body font style – Modern style Body font style – Familiar style Body font style – Formal style
	Body font main color	Green #3F972E Hitam #000001	Body font main color - Green #3F972E Body font main color - Hitam #000000
Theme	Theme color	Snow & Light green Theme color - green Dark green	Theme color - Snow & Light green Theme color – green Theme color - Dark green
Menu Navigation	Menu Navigation - Icon Style	Round Square	Menu Navigation - Icon Style – Round Menu Navigation - Icon Style – Square
-	-	-	-
Pop up	Pop up connection style	teks teks & stiker	Pop up connection style - teks Pop up connection style – teks & stiker

Based on the design elements provided, multiple variables encompass different parts of the application design. In the "Top app bar" category, there is a sub-category called "Top app bar colour" that offers many colour selections, including Green (#EBF5EA), White (#FFFFFF), and Black (#000000,

*name of corresponding author



This is anCreative Commons License This work is licensed under a Creative Commons Attribution-NonCommercial 4.0 International License.

translucent). The availability of these colour choices allows for customising the application's appearance to align with your design preferences or intended theme. As an illustration, users can select green to create a rejuvenating impression or go for white to get a pristine and minimalist aesthetic.

PLS (Partial Least Square) Test

The following are the results of the PLS test:

Table 3.6 Partial Least Square Test

Category	Sub-Category	Concept 1: " <i>Efficient Concept</i> "		Concept2: " <i>Friendly Concept</i> "	
		Range average	0,006812	Range average	0,003665
		Range	Desain Elemen	Range	Desain Elemen
Top app bar color	Top app bar color	0,008420	Green #EBF5EA	0,005	White #FFFFFF
Body	Body background color	0,000000	NS	0	White #FFFFFF
Body	Body font style	0,008420	Modern style	0,005	Familiar style
Body	Body font main color	0,005459	NS	0,001	NS
Theme	Theme color	0,008420	Snow & Light green	0,005	Theme color - green
Menu navigation	Menu navigation - icon style	0,008420	Round	0,002	NS
Loading page	Loading page - type	0,010919	No text	0,002	NS
Main page	Main page - type	0,008420	category, recipe, basket, account	0,005	category, basket, order, account
Main page	Main page - Buy location	0,010919	NS	0,003	NS
Main page	Main page - delivery time	0,004997	NS	0,004	Yes
Setting	Setting - delete account	0,010919	NS	0,003	NS
Setting	Setting - menu profile	0,008420	Register orders, help, manage return addresses, join partners, refund me	0,005	Profile menu – Wallet, address, account, blog, privacy policy, terms and conditions, help, inbox
Setting	Setting - coin features	0,008420	Invite shopping friends (Referrals), fresh coins	0,005	Active Voucher, SayurPoin, Sayurfluencer (Referral)
Setting	Setting - Photo profile	0,005921	NS	0,006	Yes
Setting	Setting - account	0,008420	Cell phone number, Google account, Facebook	0,005	Mobile number, Google account
Po up	Pop up connection style	0,005921	NS	0,006	Text

*name of corresponding author



This is anCreative Commons License This work is licensed under a Creative Commons Attribution-NonCommercial 4.0 International License.

Based on the design elements provided, multiple variables encompass different parts of the application design. In the "Top app bar" category, there is a sub-category called "Top app bar colour" that offers many colour selections, including Green (#EBF5EA), White (#FFFFFF), and Black (#000000, translucent). The availability of these colour choices allows for customising the application's appearance to align with your design preferences or intended theme. As an illustration, users can select green to create a rejuvenating impression or go for white to get a pristine and minimalist aesthetic.

Prototype

The purpose of prototyping is to allow users to engage with the intended interface, in order to enhance user accessibility to the ITTS MART application and gather feedback from them (Ayu & Wijaya, 2023). The subsequent data presents the initial outcomes of the primary blueprint, specifically referred to as the Efficient Concept.

Figure 6 Efficient concept

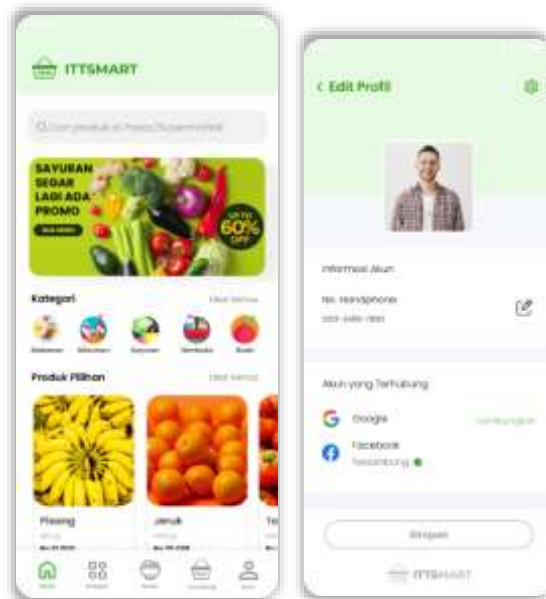


Figure 6 represents the design outcome of the efficient concept. This design exhibits an aesthetically pleasing visual look, with the main page adopting a circular layout. Here is the second design concept, called the Friendly Concept:

Figure 7 Friendly concept

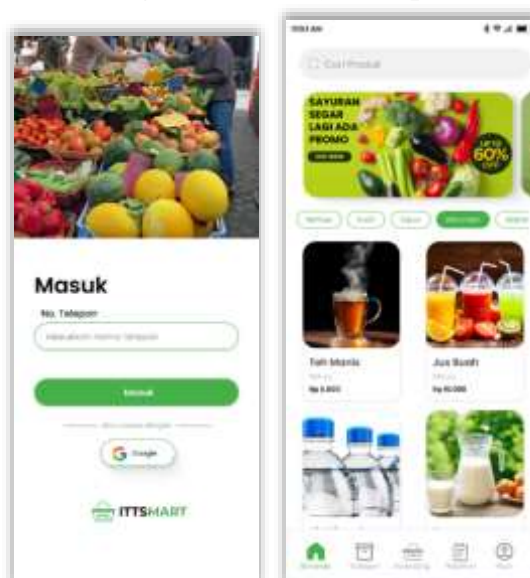


Figure 7 represents the design outcome of the efficient concept. Unlike a more efficient design, this design has a visual look characterized by a rounded box shape.

*name of corresponding author



This is anCreative Commons License This work is licensed under a Creative Commons Attribution-NonCommercial 4.0 International License.

Performance Metrics

a. Effectiveness

Effectiveness tests are employed to quantify the degree of achievement of each design concept. This efficacy assessment is predicated on a simulation wherein the user utilises the prototype (Soenandi et al, 2021). Below are the efficacy test findings for each ITTS Mart application design concept.

Table 7 Effectiveness test

Design Concept	Effectiveness Level
<i>Efficient Concept</i>	100% (Succeed)
<i>Friendly Concept</i>	100% (Succeed)

According to Table 3.7, the test findings indicate that the ITTS Mart prototype is highly effective in two key areas: efficient and user-friendly design principles. The Efficient design idea enabled the ITTS Mart prototype to achieve 100% effectiveness. This indicates that the system has been intentionally built to prioritize utilizing navigation tools and buttons. Users can efficiently do purchase operations, modify profiles, and make payments without any hindrances, consequently expediting the workflow to its conclusion. In addition, the Friendly idea has achieved a 100% effectiveness level. This verifies that the system is technically efficient, user-friendly, and understandable.

b. Efficiency

Efficiency testing evaluates performance levels by measuring the time it takes to execute the application design (Fatimah et al, 2023). Below are the efficiency test results for each design concept of the ITTS Mart application:

Figure 8 Graph of Efficiency Test Results

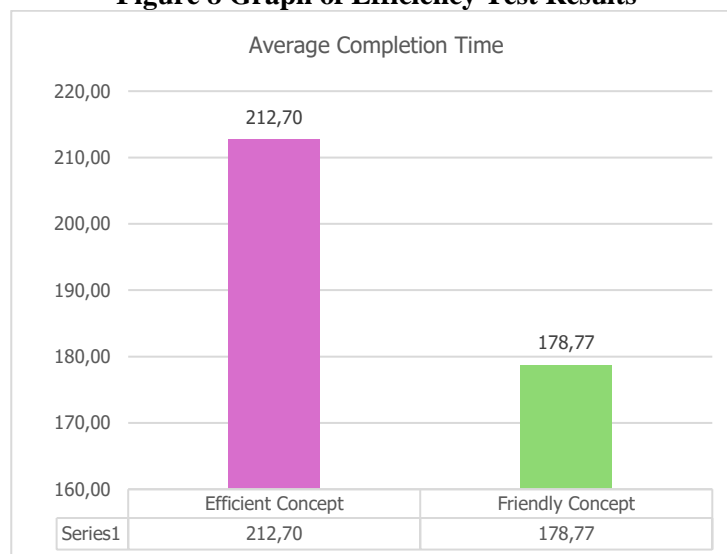


Figure 8 demonstrates that the efficiency tests conducted on the ITTS Mart prototype using time units (seconds) yield highly informative average completion times. The average application completion time for the Efficient idea is 212.7 seconds. Regarding the User Friendly principle, the average time it takes to complete an application is 178.77 seconds. Based on the data, it is evident that the User Friendly idea has a shorter average completion time in comparison to the Efficient concept. This demonstrates that while both approaches are equally effective in obtaining a high degree of efficacy, the User Friendly concept may offer a more time-efficient experience for users.

c. Error

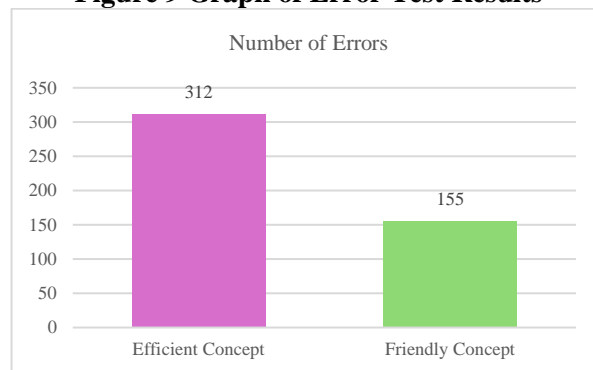
Error testing is a method employed to quantify the frequency of errors that occur while executing a prototype of an application. This is also correlated with the application's level of performance. Below are the error rate test findings for each ITTS Mart application design concept.

*name of corresponding author



This is anCreative Commons License This work is licensed under a Creative Commons Attribution-NonCommercial 4.0 International License.

Figure 9 Graph of Error Test Results



The error rate test findings for each ITTS Mart application architecture concept in Figure 9 demonstrate a compelling comparison. The idea of efficiency has an error rate of 312 mistakes. In contrast, the notion that is easy for users to understand and utilize has fewer errors, specifically 155 faults. The statistics show that the user-friendly idea effectively decreased the number of errors encountered during testing with the ITTS Mart prototype compared to the efficient concept.

System Usability Scale (SUS)

Next, a usability test stage was carried out using the System Usability Scale (SUS), which is a test with five scales to provide a usability evaluation on the application display (Taflikhati & Canta, 2022; Zunaidi et al, 2021). The following are the SUS test results of each ITTS Mart application design concept:

Figure 10 Graph of SUS Test Results

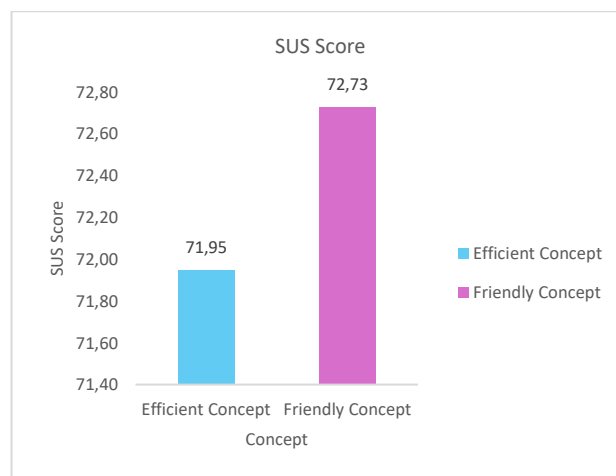


Figure 10 demonstrates that the two ITTS Mart application design concepts are efficient, as indicated by their System Usability Scale (SUS) test results with a score of 71.95. On the other hand, the Friendly idea has a marginally higher SUS score, precisely 72.73. While the disparity may be minimal, the elevated SUS scores for user-friendly ideas suggest that users generally provide slightly more favourable evaluations of their user experience with those concepts. High System Usability Scale (SUS) scores suggest that users see the application as user-friendly, effective, and pleasurable. The results corroborate prior research, indicating that concepts designed with user-friendliness in mind tend to yield a superior user experience, as evidenced by enhanced effectiveness, efficiency, and reduced error rates. Hence, the marginally elevated SUS scores for user-friendly concepts might be construed as further confirmation of the superiority of such designs in augmenting user pleasure and experience.

Managerial Implications

The goal of management implications is to offer guidance to managers or developers to concentrate on developing and implementing the Friendly concept in the ITTS Mart application. Below is a summary of the performance matrix and System Usability Scale (SUS) test results for each design concept of the ITTS Mart application:

*name of corresponding author



This is anCreative Commons License This work is licensed under a Creative Commons Attribution-NonCommercial 4.0 International License.

Table 8 Summary of usability tests

INDICATOR	RESULT	
	<i>Efficient Concept</i>	<i>Friendly Concept</i>
Effectiveness	100% (Succeed)	100% (Succeed)
Efficiency	212,7	178,77
Error	312	155
SUS	71,95	72,73

According to the summary table of test results conducted to evaluate the optimal design between the two ITTS Mart application concepts, it can be inferred that the user-friendly concept outperforms in various necessary measures, precisely efficiency, error rate, and System Usability Scale (SUS) score. Initially, regarding efficiency, the user-friendly idea achieved a lower average completion time than the efficient design. This demonstrates that users can expedite their jobs more efficiently by employing user-friendly principles, a pivotal element in enhancing productivity and user contentment. Furthermore, it has been demonstrated that user-friendly ideas have a reduced error rate compared to efficient concepts. By reducing the number of errors, users are more likely to have a seamless and less anxiety-inducing experience when using the app, which can enhance their confidence and contentment with the product.

Ultimately, when user-friendly concepts have higher System Usability Scale (SUS) scores, it indicates that consumers have a more positive perception of ease of use and overall satisfaction. A higher System Usability Scale (SUS) score indicates a superior and more gratifying user experience, which is the primary objective of user-friendly design. Based on the conducted test findings, it can be inferred that the user-friendly concept surpasses the efficient concept in terms of time efficiency, minimal error rate, and overall user satisfaction. Hence, it is advisable to persist in the advancement and execution of user-friendly principles in the building of the ITTS Mart application.

CONCLUSION

The research indicates that this E-commerce application's design was eventually based on *tenKansei* words: Appealing, Attractive, Organized, Practical, Innovative, Quick, Effective, Accessible, Interactive, and Unique. Based on the performance and usability testing results, it was determined that the "Friendly Concept" outperformed other concepts in terms of efficiency indicators, error rates, and SUS tests. The "Friendly" design approach was selected as an alternative to address the emotional requirements of consumers.

REFERENCES

- A. Chusnan Widodo and E. Gustri Wahyuni, "Penerapan Metode Pendekatan Design Thinking dalam Rancangan Ide Bisnis Kalografi," *Journal UII*, vol. 2, no. 2, 2021.
- A. Djirong and I. Kadir, "Product Packaging Design Bu Week Amplang Tenggeri," *Jurnal Seni Rupa Dan Desain*, vol. 1, no. 2, 2022.
- A. Erlando, L. Chrisantyo, and K. A. Nugraha, "Pembuatan Aplikasi Inventaris Sekolah Dengan Metode User Centered Design," *Jurnal Komputer dan Informatika*, vol. 15, pp. 219–227, 2020.
- A. Fatimah, R. Putri, D. Yunidar, and D. Andrianto, "Website Usability Testing using System Usability Scale," *e-Proceeding of Art & Design*, vol. 10, no. 1, pp. 13–29, 2023.
- A. P. Jayakusuma, N. Parwati, W. N. Tanjung, and A. T. Purwandari, "Pembuatan Building Blocks Dengan Mesin" CREATICS" Menggunakan Metode Design Thinking," *Jurnal Al-Azhar Indonesia Seri Sains Dan Teknologi*, vol. 7, no. 1, p. 50, Feb. 2022, doi: 10.36722/sst.v7i1.843.
- A. Riza, A. Sidharta, R. I. Rokhmawati, and D. Priharsari, "Perancangan Learning Management System menggunakan Metode Design Thinking (Studi Kasus: SMK Prajnaparamita Malang)," *Jurnal Pengembangan Teknologi Informasi dan Ilmu Komputer*, vol. 6, no. 2, pp. 838–847, 2022, [Online]. Available: <http://j-ptiik.ub.ac.id>

- Arief Ginanjar and Yiyi Supendi, "Kansei Engineering Implementation in Designing a News Portal for Education and Child Health Information Mobile Website Interface," *Jurnal Tiarsie*, 2017.
- Astridya Paramita and Lusi Kristiana, "Teknik Focus Group Discussion Dalam Penelitian Kualitatif (Focus Group Discussion Tehnique in Qualitative Research)," *Buletin Penelitian Sistem Kesehatan*, vol. 16, no. 2, 2013.
- D. Faisal, L. D. Fathimahhayati, and F. D. Sitania, "Penerapan Metode Kansei Engineering Sebagai Upaya Perancangan ulang Kemasan Takoyaki (Studi Kasus: Takoyakiku Samarinda)," *Jurnal TEKNO*, vol. 18, no. 1, pp. 1907–5243, 2021.
- D. Faisal, L. D. Fathimahhayati, and F. D. Sitania, "Penerapan Metode Kansei Engineering Sebagai Upaya Perancangan ulang Kemasan Takoyaki (Studi Kasus: Takoyakiku Samarinda)," *Jurnal TEKNO*, vol. 18, no. 1, 2021.
- I. Aang Soenandi, R. Josua Ondang, and A. Ningrum Sundoro, "Perancangan dan Pengembangan Produk Desk Organizer dengan Metode Kansei Engineering dan Model Kano," *Jurnal Ilmiah Teknik Industri*, vol. 9, no. 2, pp. 117–128, 2021.
- I. G. T. Isa and I. Ariyanti, "Kansei Engineering in Designing Web-Based e-Commerce UMKM Product," *Jurnal Online Informatika*, vol. 6, no. 2, p. 198, Dec. 2021, doi: 10.15575/join.v6i2.786.
- J. M. Bisnis, D. Saing, and U. Alwendi, "Penerapan E-Commerce Dalam Meningkatkan Daya Saing Usaha," *Jurnal Manajemen Bisnis*, vol. 17, no. 3, 2020, [Online]. Available: <http://journal.undiknas.ac.id/index.php/magister-manajemen/>
- M. A. Purnama and F. R. Rinandi, "Penerapan Metode Kansei Engineering Dalam Perancangan Antarmuka Website (Studi Kasus: Walanja Online Travel Agent) Application Of Kansei Engineering Method In Website Interface Design (Case Study: Walanja Online Travel Agent)," *Journal of Information Technology and Computer Science (INTECOMS)*, vol. 6, no. 1, 2023.
- M. Haryono and D. C. Bariyah, "Perancangan Konsep Produk Alas Kaki Dengan Menggunakan Integrasi Metode Kansei Engineering Dan Model Kano," *Jurnal Ilmiah Teknik Industri*, vol. 13, no. 1, pp. 71–82, 2014.
- M. Musrifah, Saleh, La Moh. and Titaley, Henriette D. (2021) "ANALISIS FAKTOR-FAKTOR PENYEBAB KETERLAMBATAN PADA PROYEK PEMBANGUNAN GEDUNG ASRAMA MAN 1 TULEHU MALUKU TENGAH," *JURNAL SIMETRIK*, vol. 11, no. 1, 2021.
- M. N. A. Muhaemin, "Pengembangan Fungsionalitas Sistem Informasi Dengan Pendekatan Kansei Engineering," *Infotronik : Jurnal Teknologi Informasi dan Elektronika*, vol. 5, no. 1, pp. 43–47, Jun. 2020, doi: 10.32897/infotronik.2020.5.1.6.
- M. Naimatu Taflikhati and D. Seltika Canta, "Penerapan Metode Importance Performance Analysis Untuk Kepuasan Pengguna Pada Aplikasi Google Classroom," *Jurnal Sosial dan Teknologi (SOSTECH)*, vol. 2, no. 4, 2022.
- N. Rahmayani and A. Desrianty, "Rancangan Kemasan Bedak Tabur (Loose Powder) Dengan Menggunakan Metode Kansei Engineering," *Jurnal Online Institut Teknologi Nasional Oktober*, 2015.
- P. S. Putra and A. Suzianti, "Design of a Food Sharing App Using Kansei Engineering and Fuzzy Linguistic Methods," pp. 1158–1166, 2022.

- Putra, P. S., Zunaidi, R. A., Mardhiana, H., & Mirza, H. (2024). Innovative Design of Ecommerce Mobile Application Using Kansei Engineering and System Usability Scale. SHS Web of Conferences 189, 01036.
- R. A. Zunaidi, A. Dhea, R. Purbantari, F. A. Syafani, H. Mardhiana, and A. I. Fuady, "Pengujian Usabilitas pada Prototype Aplikasi ITTS MART Usability Testing on ITTS MART Prototype," *SISTEMASI: Jurnal Sistem Informasi*, vol. 12, no. 1, pp. 2540–9719, 2023, [Online]. Available: <http://sistemasi.ftik.unisi.ac.id>
- R. P. Auliasari, H. Tolle, and D. Priharsari, "Perancangan User Experience Aplikasi Mobile Peserta Event Berbasis Sistem Dengan Menggunakan Metode Design Thinking (Studi Kasus: Dilo Malang)," *Jurnal Pengembangan Teknologi Informasi dan Ilmu Komputer*, vol. 5, no. 5, pp. 2548–964, 2021, [Online]. Available: <http://j-ptiik.ub.ac.id>
- S. Soedewi, A. Mustikawan, and W. Swasty, "Penerapan Metode Design Thinking Pada Perancangan Website UMKM Kirihuci," *Jurnal DKV UNIKOM*, vol. 10, no. 2, 2022.
- T. Buana Ayu and N. Wijaya, "Penerapan Metode Design Thinking Pada Perancangan Prototype Aplikasi Payoprint Berbasis Android," *MDP Student Conference (MSC)*, pp. 2985–7406, 2023, [Online]. Available: <https://www.payoprint.id/>.
- Taflikhati, M. Naimatu and Canta, D. Seltika. (2022) "PENERAPAN METODE IMPORTANCE PERFORMANCE ANALYSIS UNTUK KEPUASAN PENGGUNA PADA APLIKASI GOOGLE CLASSROOM," *Jurnal Sosial dan Teknologi (SOSTECH)*, vol. 2, no. 4.
- Y. Megasyah, "Implementasi Kansei Engineering pada Aplikasi E-learning Untuk Sekolah Menengah Kejuruan," *Jurnal Sistem Informasi Bisnis*, vol. 9, no. 2, p. 165, Nov. 2019, doi: 10.21456/vol9iss2pp165-176.
- Zhafira, N., Putra, P. S., Ilma, F., Rahmillah, R., & Sari, A. D. (2021). Innovative Design of Ironing Board Based on Kansei Engineering and Usability Test. *Jurnal Rekayasa Sistem Industri*, 10(2), 127-138
- Zunaidi, R. A., Yulianita, I., Putra, P. S., & Mardhiana, H. (2021). Usability Testing of ITTS MART v2.0 through Customer Satisfaction Index (CSI) Measurement using the E-SERVQUAL Model. *Jurnal Rekayasa Sistem Industri*, 10(2), 139-150.