



# UI/UX Analysis of Integrated E-Commerce System with Smart Village Concept to Promote MSMEs (UMKM) and West Nusa Tenggara Tourism with Design Thinking Method

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**Abstract.** West Nusa Tenggara (NTB) has the potential to increase the economy so rapidly amid the momentum of the international MotoGP event. Unfortunately, currently available systems and information technology have not optimally supported this potency to stimulate economic improvement. The wealth of natural resources, processed products, and tourism in NTB are currently ineffectively marketed. In this study, we develop an integrated E-Commerce information system with the smart village concept to promote Micro, Small, and Medium Enterprises (MSMEs) and tourism in NTB. We use a design thinking method as our baseline analysis. Based on the testing results conducted by using the System Usability Scale (SUS) method on the application prototype we built, we reached a SUS score of 70. This result indicates the usability of the application prototype that has been built is high.

**Keywords:** Design Thinking Method · E-commerce · MSMEs (UMKM) · System Usability Scale · West Nusa Tenggara Tourism

## 1 Introduction

West Nusa Tenggara (NTB) tourism has snowballed in recent years. This rapid development began when NTB won The Best Halal Destination Award, The Best Halal Honeymoon Award at the 2015 World Halal Travel Awards event organized by the United Arab Emirates [1]. Achievements related to tourism in West Nusa Tenggara have increasingly attracted the world's attention, especially after the Mandalika Special Economic Zone exists. The development of NTB tourism visitors can be seen in Fig. 1 [2]. In Fig. 1, Wisman stands for “Wisatawan Mancanegara” (international tourists), while Wisnus stands for “Wisatawan Nusantara” (domestic tourists).

According to data on tourist visitation to NTB province, NTB needs to introduce its cultural diversity to the world. Domestic and foreign tourists usually shop for unique

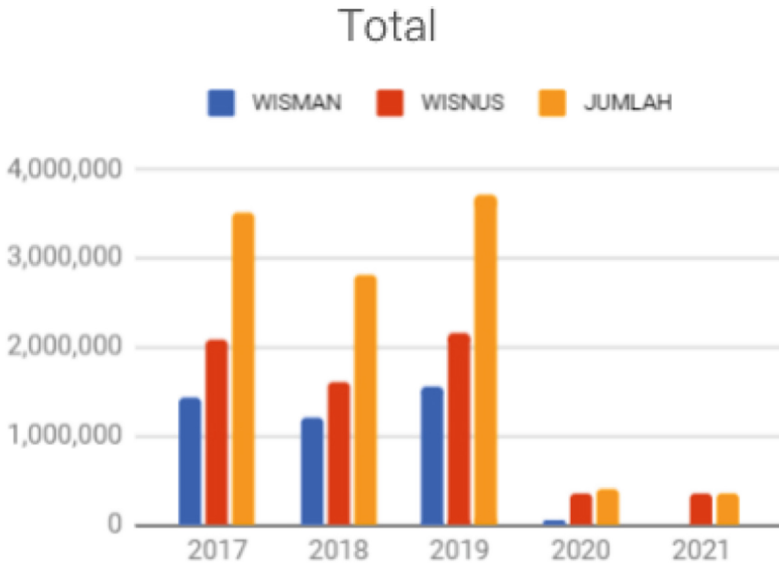


Fig. 1. Statistic of Tourist Visit to NTB (2017–2021) [4]

goods and bring them as souvenirs to their respective regions or countries. As digitalization has become global, the most promising option is shopping online. Shopping through e-commerce is an option that attracts many tourists because they can do one-stop shopping [3].

In the NTB region, the use of e-commerce is still not optimal, especially those related to Micro, Small, and Medium Enterprises (MSMEs). In Indonesia, MSME is usually called as UMKM (Usaha Mikro Kecil Menengah). They do need digital means to optimize the marketing of their products, such as handicrafts and typical foods potentially purchased by tourists.

Providing e-commerce is one of the efforts to make MSMEs go digital [5]. Good e-commerce certainly needs to pay attention to the user interface and user experience (UI/UX). The advantages that can be obtained by creating an exemplary user interface and experience will make the tourists feel at home shopping [6]. One of the methods used to build applications with good UI/UX is design thinking. Design thinking is a method that prioritizes design science. The design thinking method combines two sides, both humans and systems [7].

To create e-commerce that meets the needs of tourists and MSMEs, a developer needs an appropriate UI/UX design. The design thinking method will be combined with a smart village concept because the application is also expected to be used by MSMEs in rural areas of NTB.

## 2 Literature Review

### 2.1 User Interface (UI) and User Experience (UX)

UI and UX facilitate interaction between information systems, in this case, e-commerce, and humans who use it. UI and UX have been used since 1960. That year, UI/UX was part of Human-Computer Interaction (HCI) [7]. The use of UI/UX is more focused on how to provide guidelines related to human cognitive capacities associated with the ability of the system to interact [8, 9].

### 2.2 Design Thinking

Design thinking is used to get to know and meet user needs. Design thinking uses a two-way method, which fulfills user needs starting from exploring the needs and desires of users to the testing stage of the system [10–12].

### 2.3 Proposed Method Analysis

From the discussion in Sect. 1, the implementation of e-commerce is the main focus of this research. The implementation of e-commerce that is made using the design thinking method has some benefits. For example, the benefits are reducing costs, increasing sales, reducing time in product searches, making it easier for customers to do one-stop shopping, and expanding the market by MSMEs [13, 14]. E-commerce is an option that can be given to MSMEs to enable them to expand the market. By expanding the market, MSMEs can increase the production of products.

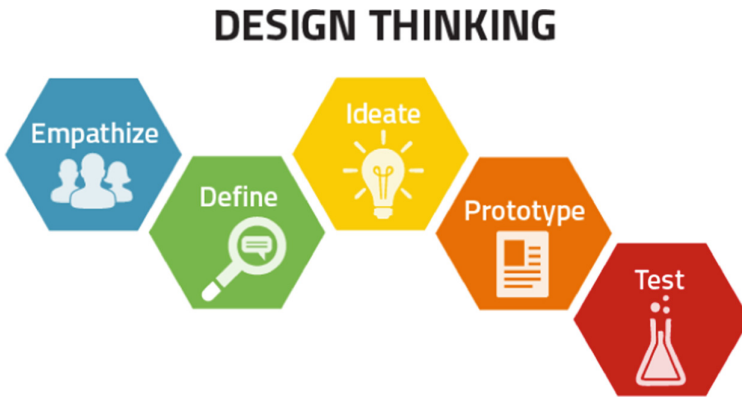
In this paper, the testing phase uses a SUS method. The SUS method is chosen because this method is popularly used to check the usability of products [15, 16]. The validity and sensitivity of SUS have good reliability. SUS is also a fast method of inferring the average from the processed data [17, 18].

## 3 Research Methodology

Figure 2 describes the flow in the design thinking method [14]. The design thinking method starts from the empathy stage to testing. The explanation of the method used is as follows:

### 3.1 Research—Empathize

At this stage, observation and interviews were carried out on several MSMEs in NTB. Observations and interviews were conducted with MSMEs who were ready to take part in digitalization training using e-commerce. MSME data was obtained from the Department of Cooperatives and MSMEs in the Province of NTB. Five MSMEs are



**Fig. 2.** Design Thinking Method

chosen as samples for observations and interviews. The number of MSMEs observed was represented by the type of MSME. This stage focuses on monitoring the existing problems and finding how to make e-commerce that fulfills each MSME's needs and desires [19].

### 3.2 Define

In the define stage, the interviews and observations results in the empathize stage are analyzed deeply to find which problems will be solved first [20, 21].

### 3.3 Ideate

This stage focuses on generating ideas and finding solutions to previously analyzed problems. The problems identified will be the basis for determining the manufacture of prototypes at a later stage [22].

### 3.4 Prototype

At the prototype stage, we pour the ideas conveyed in the previous stage into some appropriate pictures. Any feedback for each image will show how well humans interact with the system using UI/UX. The prototype uses two wireframes: low-fidelity and high-fidelity prototyping [23, 24].

### 3.5 Test

The testing stage is carried out on the UI / UX that has been made at the prototype stage. The testing phase uses the System Usability Scale (SUS). Usability evaluation is needed at the stage of checking system requirements. Usability is a stepping stone to finding out whether the system requirements with the interface implementation have been running well. SUS is the right method to determine the appropriate usability for the prototype that has been built.

## 4 Result and Discussion

### 4.1 Empathize

At the empathize stage, the results were obtained from interviews and observations. Based on the results of interviews conducted on several MSMEs used as samples, some problems were acquired, including the following:

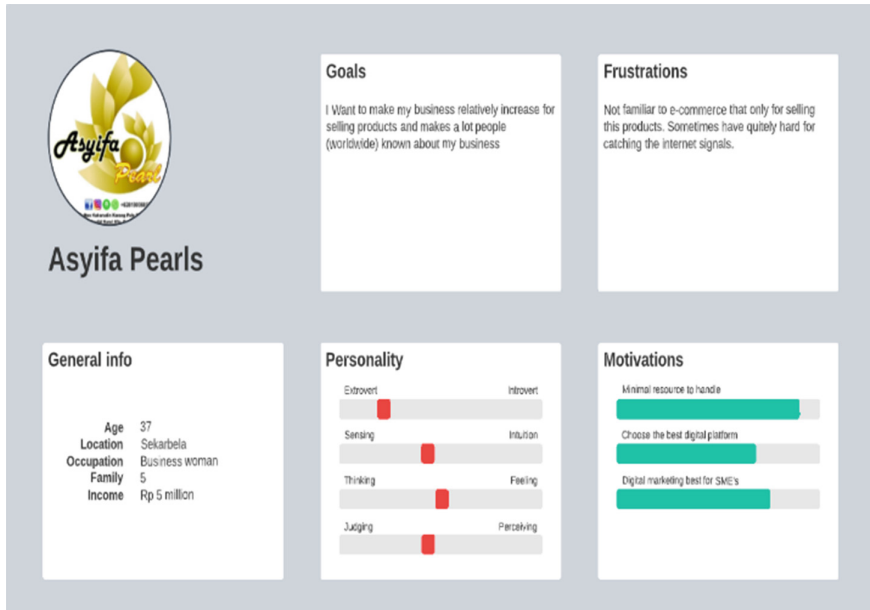
1. *Human resources still lack digital knowledge*: Human resources who work and the owners of MSMEs still have difficulty carrying out digital literacy.
2. *Determining the appropriate digital platform*: MSMEs still find it challenging to determine what kind of digital platform they need to develop their business in the future.
3. *Digital marketing strategy is suitable for MSMEs*: Due to MSMEs in the NTB area, it is still challenging to determine the digital platform, the marketing used must also, of course, be adapted to the digital platform. The right marketing strategy is one of the concerns in meeting the needs of MSMEs.

### 4.2 Define

The problems analyzed in the empathize stage are then described at the define stage. Data from the empathize process were processed into a user persona. User personas are described using artificial characters that represent the target user. According to our problem domain, the target user is MSME users. The user persona that will be created must represent the character in terms of demographics, attitudes/behaviors, motivations, influences, goals, and difficulties. An example of a user persona is shown in Fig. 3.

### 4.3 Ideate

In the ideate stage, ideas are grouped from the previous phase. At this stage, the idea is translated into prototyping after brainstorming. The prototype uses a wireframe to explain the prototype's stages better.



**Fig. 3.** User Persona Example of an MSME

#### 4.4 Prototype

1. *Low-Fidelity Wireframe*: In this section, the stages that are almost similar to the initial sketch of the desired system are described. The initial design sketch determines what the system will look like. This sketch is depicted without using the colors and attributes that follow standard fonts, but it is more concerned with the layout and actualization of the system to be built. The low-fidelity wireframe design can be seen in Figs. 4, 5 and 6.
2. *High-Fidelity Wireframe*: High Fidelity Prototype displays the actual picture of the desired system. In this section, we have used the appropriate colors and fonts to simulate their intended form. The images, colors, and active icons are added to the advantages of this type of wireframe. The high-fidelity wireframe design can be seen in Figs. 7, 8 and 9.

#### 4.5 Test

In this paper, the testing stage uses System Usability Scale (SUS). SUS is one of the common testing methods for usability testing, which John Brooke introduced in 1986 [13, 14, 18]. SUS consists of 10 questions that respondents must fill on a 1–5 scale based on agreeing or disagreeing with every question. The given 1–5 scale is ordered from strongly disagree to strongly agree with the question. The questionnaire consists of the following items, which are shown in Table 1.

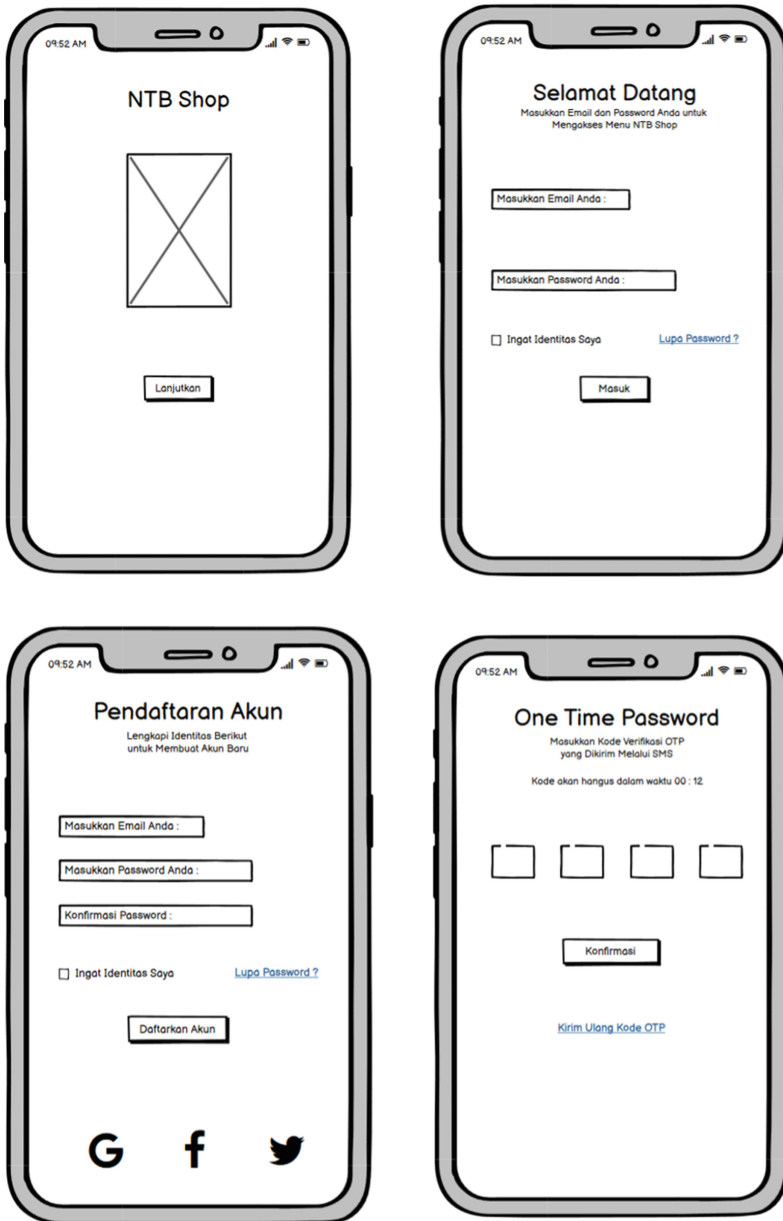


Fig. 4. Low-Fidelity Wireframe NTB Shop for Account Registration

After the respondents fill out all the questions, the next step is to calculate the SUS score following these three steps:

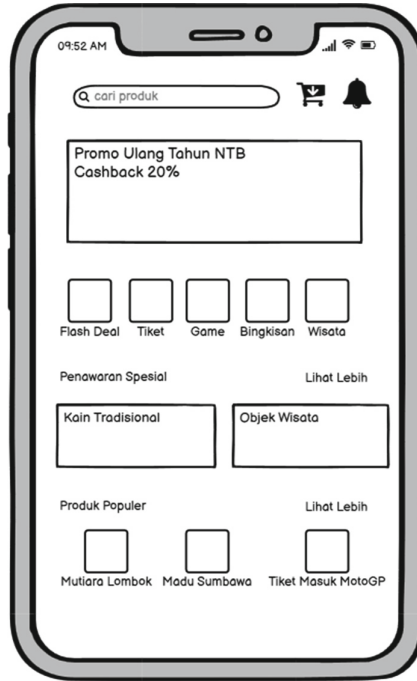


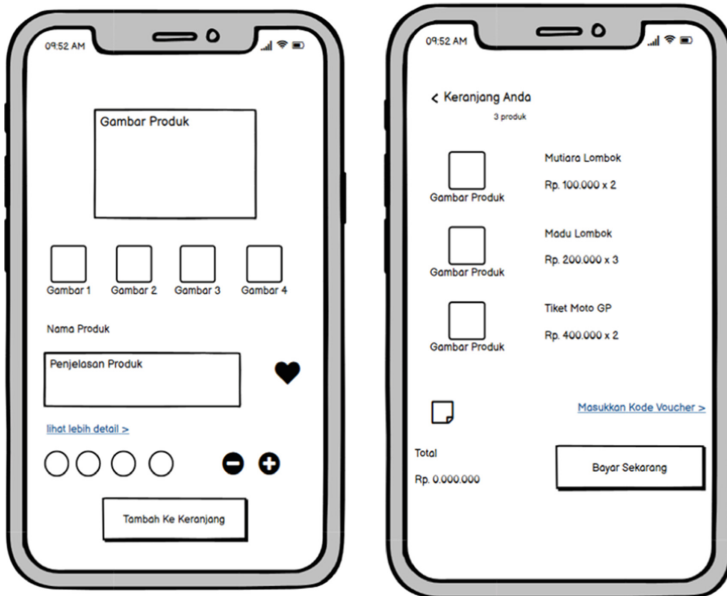
Fig. 5. Low-Fidelity Wireframe NTB Shop Main Page

1. For odd-number questions, the score of every odd-number question must be subtracted by 1 (odd number score – 1).
2. For even number questions, 5 must be subtracted from the score of every even number question (5 – even number score).
3. Sum all the scores generated from the previous steps, then multiply it by 2.5. It will be the SUS score.

The steps before are applied to ten questions of respondents. After that, all the respondent scores are calculated, and the final SUS score is obtained by calculating the average of all SUS score using Formula (1).

$$\bar{X} = \frac{\sum x}{n} \tag{1}$$





**Fig. 6.** Low-Fidelity Wireframe NTB Shop for Product Descriptions and Details

Table 2 shows the SUS score results, which ten respondents fill. The result shows that the app's SUS score is 70. Based on [25], the obtained SUS score means that the app has an acceptability score of "acceptable", a grade scale of "D", and an adjective rating of "OK". This information indicates that the app is already good, but on the other hand, the app still requires a few improvements.

## 5 Conclusion

In this research, we develop an integrated e-commerce information system with a smart village concept using a design thinking method. The use of design thinking methods that focus on UI/UX combined with a smart village concept has shown good results. Based on the tests conducted on ten respondents, the application SUS score is 70. In terms of the acceptability range, the application is categorized in the "Acceptable" category. Meanwhile, the Grade Scale is in the "Grade D" position, and the Adjective Rating is in the "OK" status. In other words, we can conclude that our information system design can bring benefits to society with good acceptance from its user.

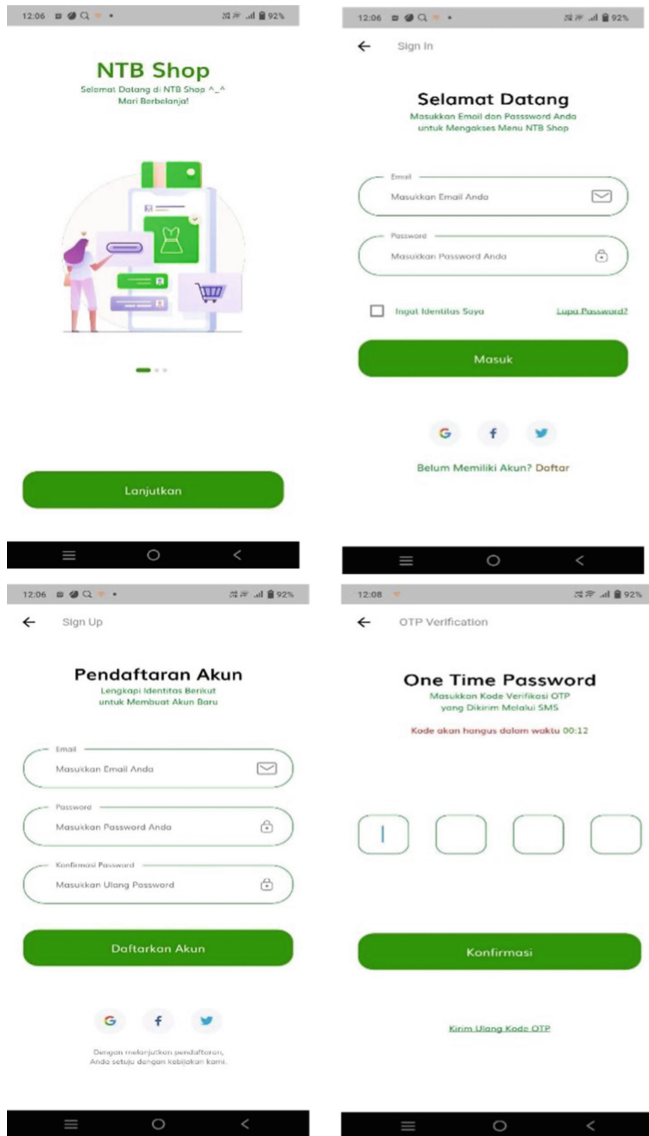


Fig. 7. High-Fidelity Wireframe NTB Shop for Account Registration

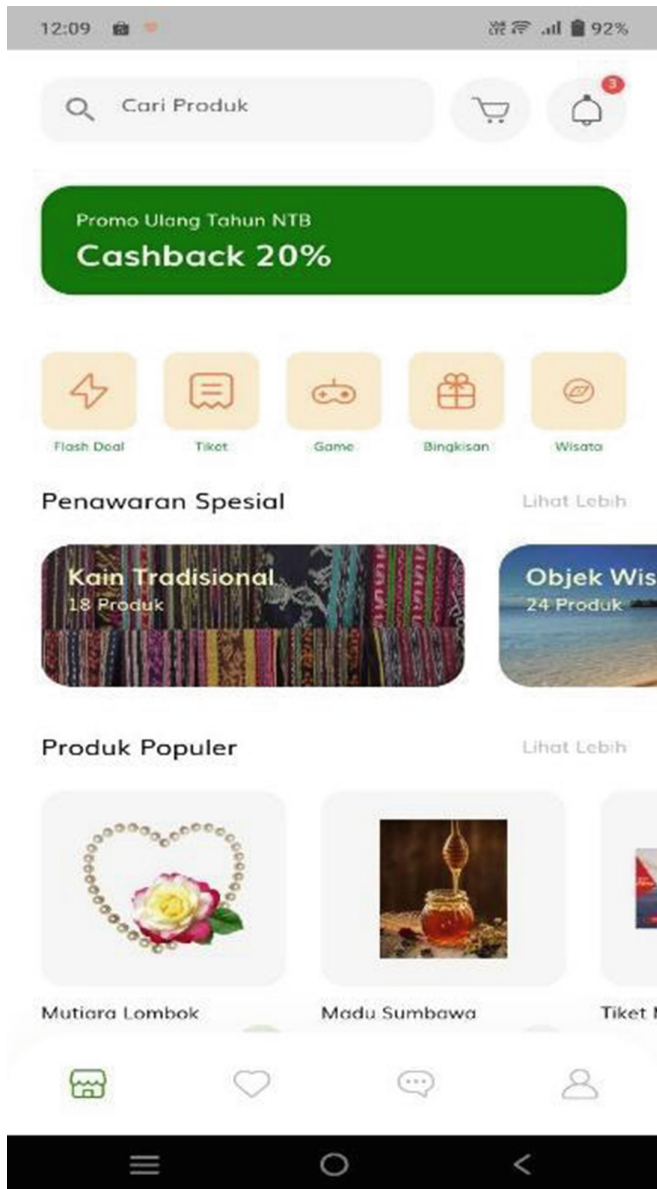


Fig. 8. High-Fidelity Wireframe NTB Shop Main Page

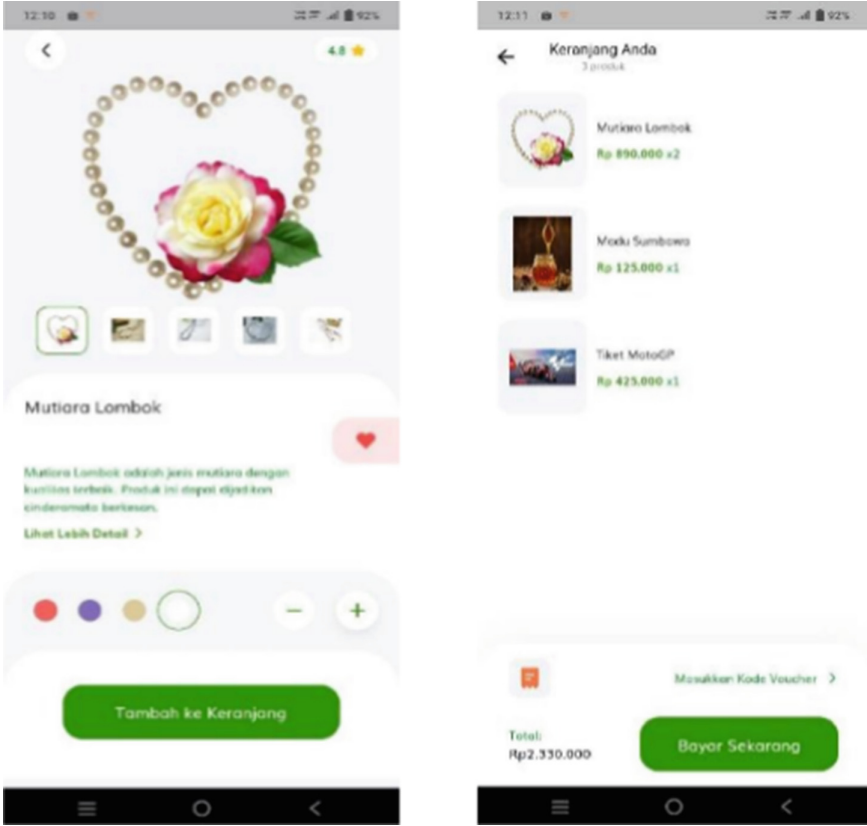


Fig. 9. High-Fidelity Wireframe NTB Shop for Product Descriptions and Details

Table 1. SUS Questions

No	Question
1	I think I will use this system again
2	I find this system complicated to use
3	I find this system easy to use
4	I need help from someone else or a technician in using this system
5	I feel that the features of this system are working properly

(continued)

**Table 1.** (continued)

No	Question
6	I feel that many things are inconsistent (incompatible with the system)
7	I feel that others will understand how to use this system quickly
8	I find that this system confusing
9	I feel that there are no obstacles to using this system
10	I need to get used to it first before using this system

**Table 2.** SUS Result

Respondent	Score $\times$ 2.5	SUS
1	18	45
2	25	62,5
3	17	42,5
4	31	77,5
5	31	77,5
6	33	82,5
7	31	77,5
8	32	80
9	32	80
10	30	75
Final SUS Score		70

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