

Design Of Mobile Application Prototype For Surya Mart UM Buton Mini Market

Muhammad Abdur Rasyid Asruddin^{a1}, Darmawan^{a2}, Nasrul Amin^{a3}

^aProgram Studi Rekayasa Sistem Komputer, Fakultas Teknik, Universitas Muhammadiyah Buton, Kota Baubau, Sulawesi Tenggara, Indonesia
e-mail: ¹rasyidm552@gmail.com, ²darmawan.034@gmail.com, ³nasirulplts@gmail.com

Abstrak

Penelitian ini bertujuan untuk merancang prototipe aplikasi mobile bagi Surya Mart Universitas Muhammadiyah Buton dengan pendekatan Design Thinking, sebagai solusi terhadap tantangan operasional seperti transaksi manual, manajemen inventaris yang belum terintegrasi, serta keterbatasan layanan pelanggan. Metode penelitian mengikuti lima tahapan Design Thinking yaitu: empathize, define, ideate, prototype, dan test. Data dikumpulkan melalui observasi dan wawancara terhadap mahasiswa, dosen, dan staf sebagai pengguna potensial. Hasil analisis menunjukkan kebutuhan utama berupa akses informasi stok barang, pemesanan online, metode pembayaran digital, dan notifikasi promosi. Prototipe aplikasi dikembangkan menggunakan Figma dan diuji melalui User Acceptance Testing serta Usability Testing. Evaluasi menunjukkan bahwa mayoritas pengguna merasa prototipe mudah digunakan, navigasinya intuitif, dan fitur-fitur yang ditawarkan relevan dengan kebutuhan. Rekomendasi perbaikan mencakup penyempurnaan ikon navigasi, konfirmasi pembayaran, serta peningkatan fitur notifikasi. Penelitian ini menghasilkan prototipe aplikasi mobile dan publikasi ilmiah yang diharapkan dapat berkontribusi pada optimalisasi layanan ritel berbasis digital di lingkungan kampus.

Kata kunci: Aplikasi Mobile, Design Thinking, Prototipe, Figma

Abstract

This study aims to design a mobile application prototype for Surya Mart Universitas Muhammadiyah Buton with a Design Thinking approach, as a solution to operational challenges such as manual transactions, unintegrated inventory management, and limited customer service. The research method follows five stages of Design Thinking, namely: empathize, define, ideate, prototype, and test. Data were collected through observation and interviews with students, lecturers, and staff as potential users. The results of the analysis show the main needs in the form of access to stock information, online ordering, digital payment methods, and promotional notifications. The application prototype was developed using Figma and tested through User Acceptance Testing and Usability Testing. The evaluation showed that the majority of users found the prototype easy to use, the navigation was intuitive, and the features offered were relevant to their needs. Recommendations for improvement include improving navigation icons, payment confirmation, and improving notification features. This study produced a mobile application prototype and scientific publications that are expected to contribute to the optimization of digital-based retail services in the campus environment.

Keywords : Mobile Apps, Design Thinking, Prototipe, Figma

1. Introduction

In the ever-evolving digital era, digital transformation has become an important pillar in changing the way businesses operate, including in the retail sector. Digitalization not only aims to improve operational efficiency, but also plays an important role in optimizing customer service and maintaining competitiveness in an increasingly competitive market[1]. Information and communication technology has now penetrated various aspects of life, including how to shop and manage a retail business. Minimarkets, as a form of retail business, are no longer just providing daily necessities, but are also required to provide a comfortable and efficient shopping experience through the application of integrated technology[2].

Mobile applications are an innovative solution to increase speed and convenience in the shopping experience, especially in campus environments and communities with high mobility[3]. In this context, Surya Mart — a minimarket operating in the Muhammadiyah University of Buton (UM Buton) environment — has an important role in meeting the needs of students, staff, lecturers, and the surrounding community. However, as service needs increase, Surya Mart faces a number of challenges in operational management, such as inefficient transactions, manual inventory management, and the balance between the number of customers and workers, especially during peak hours. These challenges have an impact on decreasing customer convenience and overall operational efficiency.

Answering these needs, this study adopts the Design Thinking approach as the main framework for designing a mobile application prototype for Surya Mart. Design Thinking emphasizes a deep understanding of user needs before designing a solution, resulting in an application that is relevant to customer preferences and behavior patterns. Different from conventional approaches that only focus on technology. Design Thinking as stated by Karo et al[4] prioritizes user experience through the stages of exploring needs, developing ideas, designing prototypes, and direct testing. Thus, the resulting solution is expected to be more responsive, practical, and easy to implement.

The formulation of the problem in this study is directed at exploring how the application of the Design Thinking approach can be used in designing a mobile application prototype that can improve operational efficiency and user convenience at Surya Mart. The focus of this study also distinguishes itself from previous studies that are generally oriented towards large-scale retail applications, by offering novelty in the context of campus retail. An approach that focuses on the needs of academic users is expected to produce a solution that is more adaptive and relevant to the campus environment.

In addition, this study is in line with the Strategic Plan (*Renstra*) of Muhammadiyah University of Buton in promoting technological innovation and the development of digital-based campus services. The results of this study are expected not only to support the improvement of the quality of Surya Mart's services, but also to be a reference for similar development initiatives in other academic environments. The output targets of this research include designing a mobile application prototype and publishing research results in accredited national journals in the field of information technology.

Thus, this research is expected to provide real contributions in improving the operational efficiency of Surya Mart, improving user experience, and strengthening UM Buton's commitment to providing modern, structured, and adaptive services for the campus community.

2. Research Method

This research was conducted using the Design Thinking approach, which consists of five main stages, namely Empathize, Define, Ideate, Prototype, and Test. The stages of the research can be seen in Figure 1 below.

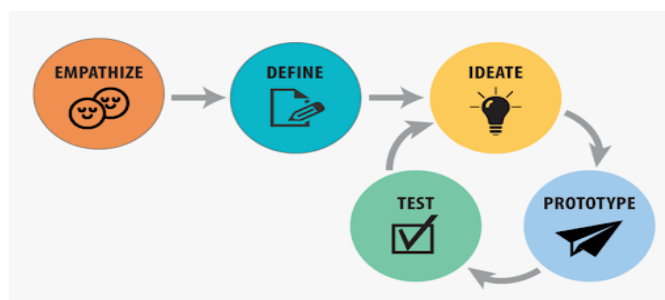


Figure 1. Design Thinking Stages

Figure 1 above explains the Design Thinking method flow which consists of five main stages that are interconnected, namely Empathize, Define, Ideate, Prototype, and Test. The process starts from the Empathize stage, where researchers try to understand user needs and problems through observation and interviews with students, staff, and lecturers as potential customers of Surya Mart. The information obtained is then analyzed at the Define stage to formulate the core problems that must be solved.

After the problem is clearly defined, the Ideate stage is carried out to produce various creative solution ideas that are in accordance with user needs. These ideas are then further developed into a real form at the Prototype stage, namely the design of a mobile application prototype with main features such as stock information, online ordering, and digital payments.

The prototype that has been created is then tested at the Test stage, where a group of users try the application to provide feedback regarding functionality and ease of use. The results of this test will be the basis for further improvement and development so that the resulting solution is truly in accordance with user needs. All of these stages form an iterative cycle that places users at the center of the innovation process.

2.1 Research Flowchart

The research flowchart can be described as follows:

- a. Problem Identification: Determine the main problems faced by users, in this case related to operations and services at Surya Mart.
- b. Literature Study: Review relevant theories and previous research to understand solutions that have been applied in similar fields.
- c. Data Collection (Observation & Interview): Collect primary data through direct observation at Surya Mart and interviews with potential users.
- d. Data Analysis: Analyze the data that has been obtained to identify the main needs of users and challenges that must be resolved.
- e. Prototype Design: Develop an initial design of the mobile application based on the results of the user needs analysis.
- f. Prototype Testing: Test the prototype that has been created to a selected group of users to get feedback.
- g. Evaluation and Improvement: Evaluate the test results, identify deficiencies, and make improvements to the prototype.
- h. Report Preparation: Document the entire research process, results, and recommendations for further development.

2.2 Research Location

This research was conducted at Surya Mart, Muhammadiyah University of Buton, which is the location of the case study. This location was chosen because of its relevance to the object of the study, namely minimarkets that require technology-based solutions to improve operational efficiency.

2.3 Research Design

This study uses a qualitative approach and experimental design. The qualitative approach is used in the Empathize stage to understand user needs through interviews and observations, while the experimental design is used in the Prototype and Test stages to test the effectiveness of the designed application.

2.4 Data Collection Techniques

Data collection techniques in this study include:

- a. Observation: Directly observing how customers interact with the current system at Surya Mart.
- b. Interviews: Conducting interviews with customers and minimarket staff to explore the needs and obstacles faced.
- c. Documentation: Collecting data related to the operational system of Surya Mart that has been running.

2.5 Data Processing and Analysis Techniques

The data obtained will be analyzed using the following methods:

- a. Thematic Analysis: Used to identify patterns and main themes from the interview results.
 - b. SWOT Analysis: To evaluate the strengths, weaknesses, opportunities, and threats in the implementation of mobile applications.
 - c. User Evaluation: Using the Usability Testing method to assess the level of ease of use of the application.
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By applying this research method, it is expected that the research can produce a mobile application prototype that is in accordance with user needs and increases the operational efficiency of Surya Mart.

3. Literature Review

The literature review discusses theories related to the writing of research reports.

3.1 Digital Transformation

Digital transformation consists of the combined effects of several digital innovations and technologies that introduce new structures, practices, values, arrangements, and beliefs that change, replace, or complement existing rules in organizations, ecosystems, industries. Digital transformation is important for all industrial companies and government sectors that rely heavily on systems, IT, strategy, and human resources. Digital transformation is about releasing value from business processes and returning it to customers and the use of data and analytics to create new and innovative experiences[5]. The digital transformation journey will make organizations driven by analysis and implementing embedded AI technology a habit.

Digital transformation is extensively considered as a driver of change in all contexts, especially in the business context, and affects all aspects of human life based on the use of technology and digitalization[6]. Digital transformation is extensively considered as a driver of change in all contexts, especially in the business context, and affects all aspects of human life based on the use of technology and digitalization. In developing this strategy, company managers need instruments that help in understanding the current phenomena and conditions of the organization, as well as good cooperation and communication between various parties[7]. According to Hadiono et al. There are 4 factors driving digital transformation. These factors are (a) regulatory changes; (b) changes in the competitive landscape; (c) shifts/changes to digital forms of industry; (d) changes in consumer behavior and expectations[8].

3.2 Design Thinking

Design thinking is present as a solution-based problem solving approach. Currently, design thinking has been widely applied in various fields, such as business, architecture, and engineering. Design thinking is an ideology or creative process for solving complex problems that are centered on humans (users), aka human-centric[9]. Design thinking is also known as Business of Experience (*BX*) this is a process that can be applied in various fields, from business to education, to develop innovative solutions[10]. This approach involves gathering a deep understanding of users, exploring creative ideas, experimenting, and repeating iterations to create innovative solutions. The Design Thinking approach produces potential solutions to a problem by providing better products and services, and an increase in productivity and operational improvements. The end result of this method is a solution to the problems faced by providing a design that is useful for users so that it helps a job. To produce a solution based on user problems, you must go through the following five stages of Design Thinking.

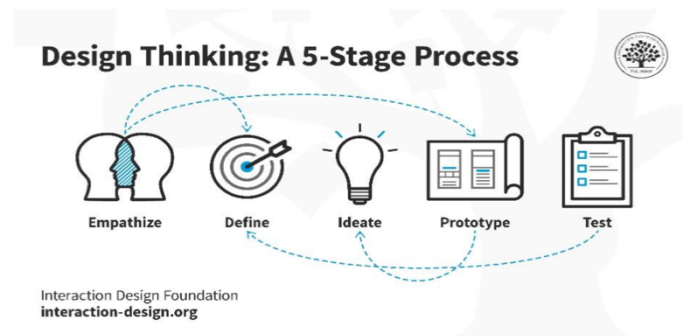


Figure 2. The five-stage design thinking process

Figure 2. Design Thinking is a stage in Design Thinking that consists of five main stages[11], including:

- a. Empathize: This stage involves a deep understanding of users and their experiences. The design team tries to see the user's point of view, conduct observations, interactions, and empathize to understand their needs, expectations, and challenges.

- b. Define: At this stage, the design team formulates the problem clearly based on a deep understanding of the user. They analyze data and findings from the Empathize stage to define the problem they want to solve.
- c. Ideate: This stage encourages the design team to generate as many creative ideas and potential solutions as possible. Using various techniques such as Brainstorming, Mind mapping, or Prototyping, the team tries to think out-of-the-box and generate a variety of ideas.
- d. Prototype: This stage involves creating a prototype based on the ideas generated in the previous stage. The prototype can be a physical model, visual representation, or interactive simulation. The goal is to test and iterate quickly on existing concepts.
- e. Test: The final stage is to test the prototype with users and get feedback from them. Through testing, design teams can gather valuable insights to refine and develop their solutions.

3.3 Figma

UI/UX design is one of the important components in creating applications and websites. One of the tools often used to design UI/UX is Figma. Figma is a design software that is often used to create mobile applications, desktops, websites, and various other design needs[12]. Figma can be used on Windows, Linux, and macOS operating systems as long as it is connected to the internet.

In general, Figma is widely used by professionals in the fields of UI/UX, web design, and other related fields. Application and website designers use Figma to design the user interface of an application or website, as well as create prototypes that function as temporary representations of the user experience before the design is further developed by the developer team.

Figma offers collaborative and real-time interface design features, allowing multiple designers to work together on one project efficiently. Using Figma can increase the effectiveness and flexibility of the UI/UX design process, while helping designers optimize creativity and collaboration. In addition to offering free features, Figma also provides a paid subscription option for users who need additional features. Thus, Figma becomes a flexible choice for designers, both for basic and advanced needs.

4. Result and Discussion

This discussion will describe in sequence starting from the initial conditions of the research location as a basis for understanding the existing problems, followed by the presentation of the results of the research implementation which includes the process of identifying needs and collecting data. Furthermore, the stages of designing a prototype are explained as a solution developed based on previous findings, followed by the results of trials to assess the functionality and effectiveness of the designed prototype, and ending with an evaluation to measure success and provide input for further development.

4.1 Initial Condition Analysis

Initial conditions at Surya Mart, Muhammadiyah University of Buton The researcher conducted observations and interviews to understand the operational and service conditions at Surya Mart, Muhammadiyah University of Buton. Based on the results of data collection, several major problems faced by this minimarket were found, including:

- a. Manual Transaction System
- b. Unintegrated Inventory Management
- c. Lack of Product and Promotion Information
- d. Labor Shortage during Peak Hours

Surya Mart does not yet have a mobile application that can support transactions, stock checks, or provide a more efficient shopping experience for customers. Based on these initial conditions, a technology-based solution is needed that can improve operational efficiency and provide a better shopping experience for customers. Therefore, this study develops a prototype of a mobile application based on Design Thinking as an effort to overcome the identified obstacles.

4.2 Results Of Research Implementation

This section presents the results of the study based on the Design Thinking approach. The study began with an analysis of user needs through observation and interviews to identify problems at Surya Mart. Based on these findings, a mobile application prototype was developed

as a solution which was then tested by users. The results of the trial were evaluated to refine the prototype to better suit the needs. In addition, this section also presents the research achievements and obstacles faced during the research process along with the steps to resolve them. This discussion provides a systematic overview of the implementation of the research and its contribution to improving Surya Mart services.

4.2.1 User Needs Analysis

User needs analysis was conducted to understand the main problems faced by Surya Mart customers and to design appropriate solutions. This process involves direct observation methods of user activities in minimarkets and interviews with several students, staff, and lecturers as potential customers. The results of this analysis will be the basis for designing the main features of the proposed mobile application.

Based on observations, several main obstacles were found in the current service system, including:

- a. Long queues at the cashier: Many users complain about the long transaction process, especially during peak hours, such as during lunch breaks or after class. This is due to the limited number of cashiers and the lack of digital payment options that speed up the transaction process.
- b. Limited stock information: Students often come to Surya Mart to buy certain items, but after arriving at the location, they find that the item is out of stock. The lack of stock information causes inconvenience for customers.
- c. Lack of online ordering system: Customers who want to buy goods quickly often have to come directly to the store and find the products they need themselves. With the online ordering feature, customers can choose and order items in advance before picking them up.
- d. Lack of promotions and discount notifications: Many customers are not aware of ongoing promotions or discounts due to the lack of information delivery media. With the notification system in the application, customers can get information faster and more timely.
- e. Limited payment methods: Currently, most transactions at Surya Mart are still made in cash. Some customers want digital payment options, such as e-wallets or QRIS, to increase convenience and efficiency in transactions.

The results of an interview with one of the students revealed:

"Often I come to Surya Mart to buy something, but the item I am looking for is out of stock. It would be better if there was stock information that could be accessed before coming to the store. In addition, the queue at the cashier is often long, so if there is digital payment it would be more practical."

To clarify the main needs of users, the following table presents a summary of the findings:

Table 1. Summary of Key User Needs

No.	User Needs	Description
1	Product Stock Information	Users need real-time access to product availability so they do not have to visit the store just to check stock.
2	Online Ordering	Students want to be able to place orders in advance for later pickup, saving time and simplifying the purchasing process.
3	Digital Payment Methods	Customers prefer cashless payment options such as e-wallets or QRIS to avoid long queues at the cashier.
4	Promotional and Discount Notifications	Users are interested in receiving promotional and discount information through the app to take advantage of the best offers.
5	Faster Checkout Services	Customers want a more efficient transaction process to reduce waiting time during purchases.

From the results of this analysis, it can be concluded that Surya Mart customers need an application-based system that not only provides stock information, but also allows online ordering,

digital payments, and promotional notification features. With these features, it is hoped that the customer shopping experience can be more convenient, efficient, and practical.

Based on these findings, the next stage in this study is to design a mobile application prototype with key features that can address the identified problems. This prototype will be tested on users to get feedback before further development.

4.3 Prototype Design

The design and development stage of the Surya Mart mobile application prototype was carried out using Figma based on user needs analysis. This process aims to ensure that the application meets needs such as stock checking, online ordering, and digital payments. The design was carried out iteratively with a focus on functionality and user experience. After the initial prototype was completed, an evaluation was carried out with potential users to obtain feedback for improvement before wider trials.

The following image shows the initial design of the Surya Mart application interface developed in this study.

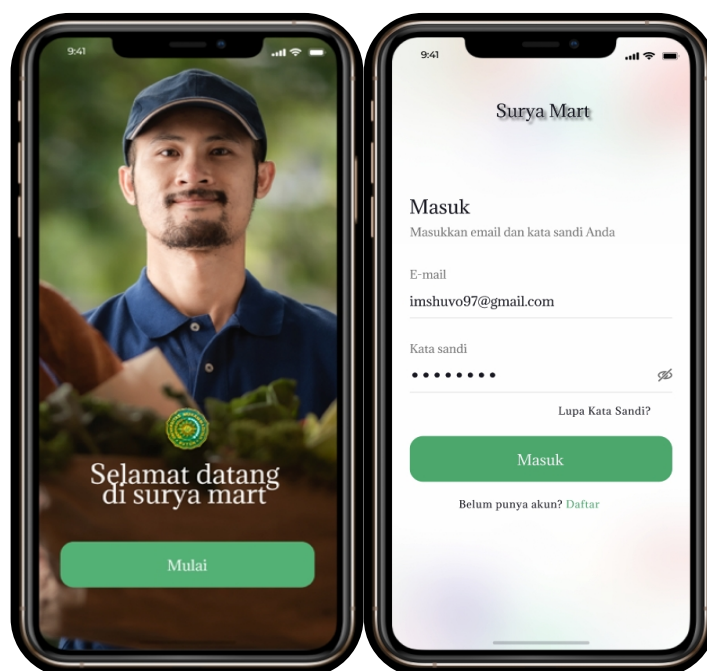


Figure 3. Login page interface display

Figure 3 shows the Surya Mart application login page display, which is designed with a simple and intuitive interface. At the top is the application name with an elegant text design. Users are asked to enter their email and password to access their account. There is an eye icon next to the password field that allows users to show or hide password characters for convenience when typing. Below it, there is a "Forgot Password?" option, which helps users restore access if they experience login problems. The green "Login" button with a striking design serves to confirm login. For users who do not have an account, there is the text "Don't have an account? Register" with a link to the registration page, making it easy for new users to create an account.

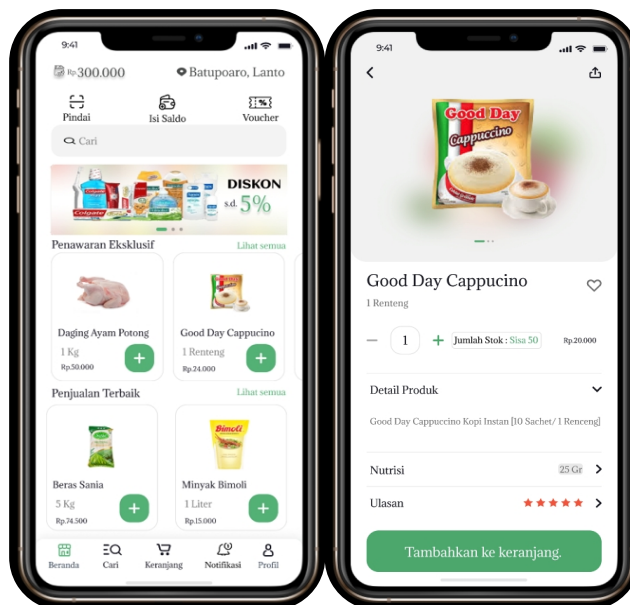


Figure 4. Homepage and product detail interface

Figure 4 shows the homepage and product detail interface. The homepage displays balance, location, quick menu, and product categories with a plus (+) button for quick shopping. The bottom navigation makes it easy to access the main features. The product detail page displays images, prices, stock, descriptions, and reviews. Users can adjust the purchase amount and add it to the cart with one click. The design is intuitive, supporting a practical and efficient shopping experience.



Figure 5. Product search page interface display

Figure 5 shows the product search page display. The product search page displays various categories, such as household needs, personal care, stationery, frozen products, medicines or supplements, and food and beverages. In addition, consumers can search for products according to their needs. For example, when searching for "eggs," the system will provide recommendations for various types of eggs based on the keywords entered.

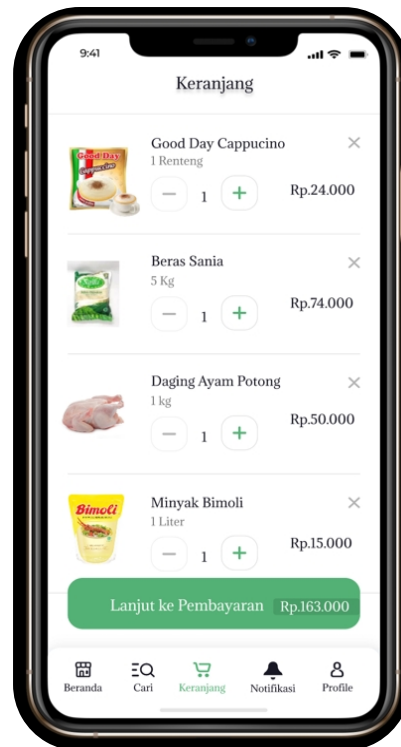


Figure 6. Display of the order cart page interface

Figure 6 shows the display of the order cart page. This page displays a list of consumer orders before proceeding to the checkout process. Available features include adding the number of orders, displaying the price per item, and the total price of all orders placed in the cart.

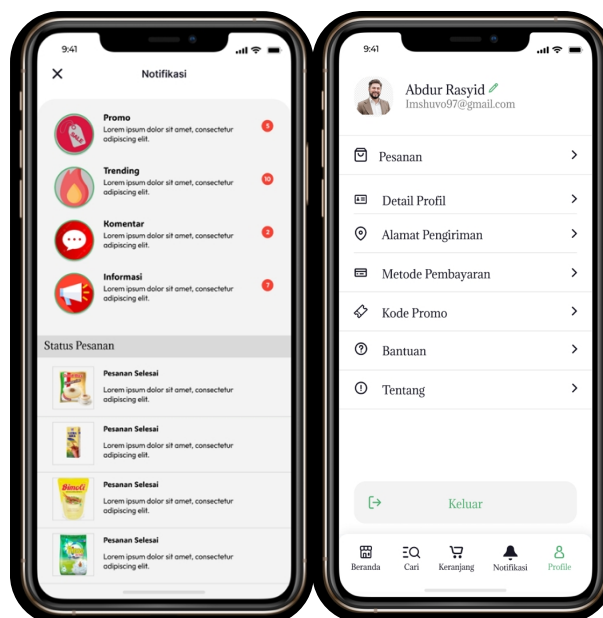


Figure 7. Notification and profile page interface display

Figure 7 shows the notification and profile page display. This page displays a notification page that displays various information, such as promos, shopping trends, comments, order status, and other information. In addition, this page also displays the consumer account profile.

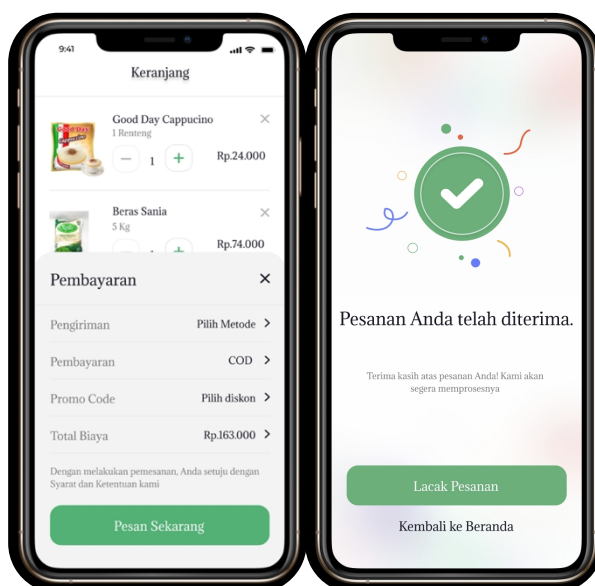


Figure 8. Checkout page and order status interface display

Figure 8 shows the checkout page and order status display. The checkout process page displays the payment method and total payment confirmation. After the payment is confirmed, the system will display a notification that the order has been received. In addition, users can select the order tracking feature or return to the home page.

4.4 Trial Results And Evaluation

After conducting trials using the User Acceptance Testing (UAT) and Usability Testing methods, the results obtained showed the level of effectiveness and ease of use of the mobile application prototype developed using Figma. Testing involved potential users who were asked to complete various scenarios to evaluate navigation, product ordering, payment flow, and design effectiveness.

a. Navigation and Ease of Use

In this stage, users are asked to search for products, view detailed product information, and understand the transaction flow in the prototype. The results show:

- 85% of users can easily understand the navigation without significant difficulty.
- 10% of users need a little time to understand the interface layout.
- 5% of users feel that there is a need for adjustments to the icons and labels to make them more intuitive.

Based on this feedback, improvements that are needed are refinement of the iconography and navigation labels to make them clearer for new users.

b. Product Order Simulation

Users are asked to select several products and add them to the shopping cart. The test results show:

- 90% of users can complete the ordering process without any obstacles.
- 10% of users have difficulty deleting products from the cart, indicating the need for improvements in the appearance and interaction of the delete button.

Overall, the ordering feature is quite good, but improvements are needed in the interaction aspect in the shopping cart.

c. Payment Flow Evaluation

Users were given a digital payment scenario to measure how easy it was for them to understand and complete the transaction. Here are the evaluation results:

- 88% of users were able to complete the payment quickly and without confusion.
- 7% of users felt that additional confirmation was needed before completing the payment.
- 5% of users felt that the payment flow was unclear and needed improvements to the display of instructions.

Based on these results, it is recommended to add a transaction confirmation feature before the payment is completed to improve user convenience.

d. Response to Notifications and Promotions

In this stage, users were given a simulation of promotional notifications and asked to provide feedback on the readability and attractiveness of the promotional design. The results:

- 80% of users stated that the notification design was quite attractive and easy to understand.
- 15% of users felt that the color and size of the text on the notification needed to be clarified.
- 5% of users suggested an option to set notification preferences to be more personal.

From these results, the recommended improvements are to increase the color contrast of the notification text and add a notification preference setting feature for users.

e. Design Effectiveness Analysis

Users were asked to rate the layout, color, iconography, and other interactive elements. The following are the average rating results using a Likert scale (1-5):

Table 2. Likert Scale Assessment

Assessment Aspect	Average Score (1–5)
Ease of Navigation	4.3
User Interface Design	4.5
Feature Completeness	4.0
Overall Satisfaction	4.4

Based on this evaluation, the majority of users were satisfied with the design and functionality of the prototype. However, some aspects still need to be improved to optimize the user experience.

5. Conclusion

Based on the results of the research that has been conducted, it can be concluded that:

a. Development of Mobile Application Prototype

The mobile application prototype developed using Figma successfully represents user needs based on the results of observations and interviews. The resulting design pays attention to aspects of functionality, ease of navigation, and an intuitive interface to improve the user experience.

b. Prototype Trial and Evaluation

The results of the trial show that the prototype design is able to increase efficiency and ease of use. Based on the evaluation results, the majority of respondents gave positive responses regarding the appearance, navigation, and usability of the application. However, there are several aspects that still need to be improved based on input from users.

c. Output Achievements

The outputs of this study include a mobile application prototype that can be used as a basis for further development, scientific publications that support academic studies, and recommendations for the development of user-based systems in the future.

Overall, this study shows that a user-based approach to prototype development is able to produce more relevant and effective solutions.

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