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An Android-Based Application for Pasar Rabu Tani

Siti Sa'adiyah[1.]

[1] *Management Informatic, Faculty Information Technology, Padang State Polytechnic, Padang, Indonesia*

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CORRESPONDING AUTHOR

*E-mail: sitisaadiyahap16@gmail.com

A B S T R A C T

Koperasi KMDM in collaboration with the Independent Farmers and Breeders Cooperative (KP2M) and the Melati Mini Women's Farmers Group Cooperative (KWT), held a Wednesday Farmer Market activity. The organization of the Salingka Farmers Market on the Campus aims to provide healthy food needs for consumers, especially for lecturers and education personnel at the Andalas University Campus and also the general public. In its current management, the MDM Cooperative carries out product marketing using Google Forms. The MDM Cooperative provides all food needs at the price of each product. The use of Google Forms as an Online Store in marketing products that results in an error in ordering a product. The running system is also ineffective in displaying product descriptions. Therefore, it is necessary to make an android-based application that will help the manager of the MDM Cooperative. This application is named 'Pasar Rabu Tani'. Applications are made with the aim of providing satisfaction for consumers and producers in meeting food needs. The method used to develop this application is the waterfall method. This application was developed using android, flutter framework, JSON (JavaScript Object Notation). The final result of this research is an application that can be accessed via various smartphone devices. With the Pasar Rabu application, it will be a good thing for the community to meet their food needs by staying at home but getting healthy food quickly and precisely.

Contribution to Sustainable Development Goals (SDGs):

SDG 2: Zero Hunger
SDG 8: Decent Work and Economic Growth
SDG 12: Responsible Consumption and Production

1. INTRODUCTION

1.1. Research Background

The rapid advancement of information technology plays a vital role across various sectors of human life, particularly in the economy and business. Information technology serves as an essential tool to streamline human labor, provide valuable information, and accelerate transaction processes[1]. Public dependence on this technology became even more critical during the Covid-19 pandemic, during which people were required to utilize mobile devices like smartphones to support their daily activities from home[2].

One organization impacted by this shift and seeking to adapt to technology is the Mandiri dan Merdeka Cooperative (KMDM). This cooperative collaborates with the Farmers and Livestock Breeders Mandiri Cooperative (KP2M) and the Women Farmers Group (KWT) Melati Mini Cooperative to organize "Pasar Rabu Tani" (The Campus Salingka Farmers Market). The program aims to provide healthy food supplies for consumers-specifically lecturers, educational staff within Andalas University, and the general public-while simultaneously supporting small local farmers in marketing their products.

However, in terms of order management, KMDM still relies on conventional digital media such as Google Forms, WhatsApp, and Instagram. Utilizing Google Forms as an online store storefront presents significant drawbacks, as it lacks standard e-commerce features such as payment confirmation forms, payment

and shipping method selections, profile editing pages, and effective product description displays. These limitations frequently cause order data errors and lead to consumer confusion when selecting products. Therefore, a more informative, effective, and efficient Android-based e-commerce system is needed to ensure transactional data accuracy and facilitate quick and accurate access to healthy food shopping from home[3].

1.2. Literature Review

The development of e-commerce applications and food price information systems has been widely researched to improve transaction efficiency. A study regarding the *Application of Grocery Sales using the Rapid Application Development (RAD) Method* showed that involving users in the design phase eases application adaptation for managing stock, selling prices, and transactions[4]. Furthermore, research on the *Information Application of Food and Grocery Product Prices in Karawang District Markets* demonstrated that a valid and relevant Android-based application can successfully overcome food price speculation caused by a lack of accurate information in the community[5].

On the other hand, the architecture of e-commerce applications generally features a clear separation of systems. Research on an *Android-Based Online Bag Store Application* split the system into two parts: the backend side (administrator website and database) and the frontend side (Android-based mobile client application)[6]. In terms of modeling, a study on the *Design of an Android-Based Batik Sales Application* successfully implemented Unified Modeling Language (UML) diagrams, such as Use Case Diagrams, using the Waterfall method[7].

Lastly, research on a *Mobile-Based Training Class Ticket Sales Application using Flutter* emphasized that the Flutter framework is highly suitable for cross-platform mobile application development because it runs smoothly on both Android and iOS, while utilizing MySQL for local database management and PHP to build web services[8]. Based on these previous studies, this research concludes that the implementation of Flutter, JSON[9], PHP[10], and MySQL[11] is highly relevant for building a responsive and user-friendly Pasar Rabu Tani application[12]

1.3. Research Objective

Based on the formulated problems, the objectives of this research are:

1. To explain the profile and operational mechanism of the Mandiri dan Merdeka Cooperative (KMDM) in managing healthy food.
2. To build an Android-based e-commerce application that directly connects producers (local farmers) with consumers.
3. To facilitate producers in marketing their food products effectively amid public mobility limitations.
4. To provide convenience, speed, and accuracy for consumers throughout the product selection and purchasing process within the Pasar Rabu Tani application.

2. MATERIALS AND METHODS

The method utilized in developing the Pasar Rabu Tani application is the **Waterfall** model, structured according to the *System Development Life Cycle* (SDLC) stages. The steps include:

1. Requirement Analysis: The process of collecting software requirements through direct observation of KMDM's ongoing system. Input data requirements (consumer data, products, categories, units, payment, shipping, producers) and output requirements (admin web backend and Android frontend) were thoroughly identified.
2. System Design: Specifying the system architecture and designing the user interface. Data flow was modeled using the Unified Modeling Language (UML), consisting of *Use Case Diagrams*, *Class Diagrams*, *Sequence Diagrams*, and *Activity Diagrams*. The data storage structure was designed using an *Entity Relationship Diagram* (ERD), which maps into 14 main database tables (such as tb_user, tb_produk, tb_konsumen, tb_keranjang, etc.).
3. Implementation (Coding): Programming was divided into two major components:
   a. Backend Side (Admin Web): Built using PHP with the Codeigniter 3.1.11 Framework and a MySQL database Backend Side (Admin Web): Built using PHP with the Codeigniter 3.1.11 Framework and a MySQL database
   b. Frontend Side (Mobile Client): Developed using the Flutter Framework with the Dart programming language. Data integration from backend to frontend was achieved using JSON (JavaScript Object Notation) and the HTTP client Retrofit (Rest API) via Web Services
4. Integration & Testing: Merging the backend and frontend modules, followed by comprehensive functional system testing (Black-box testing) to ensure the system operates according to the interface design and use case scenarios.
5. Operation & Maintenance: The final phase involves deploying the application onto Android smartphones (minimum specification of Android 7.0 Nougat) and performing necessary post-release bug fixes

3. RESULT AND DISCUSSION

3.1. Result

. This research successfully delivered two main systems integrated via Web Services: a web-based backend for the Administrator and a mobile Android application for Consumers:

a. Admin Backend Side (Website): Successfully implemented using the Codeigniter Framework. Admins can log in via the Login Page

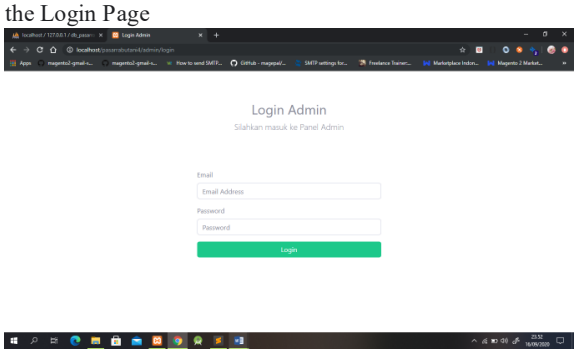

Figure 1. Login Page

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to access the Dashboard Home Page

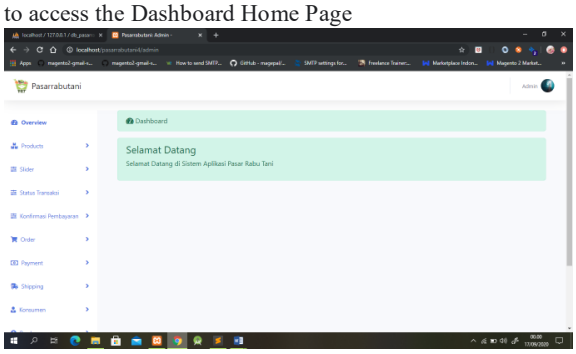

Figure 2. Dashboard Page

The admin menu provides full CRUD (Create, Read, Update, Delete) features for managing products, units, product statuses, categories, sliders, transaction statuses, payment confirmations, orders, carts, payment configurations, shipping configurations, consumers, producers, and admin account management.

b. Consumer Frontend Side (Android): Successfully developed using Flutter. The application initiates with a *Splashscreen*

Figure 3. Splashscreen Page

followed by the Login and Register Pages.

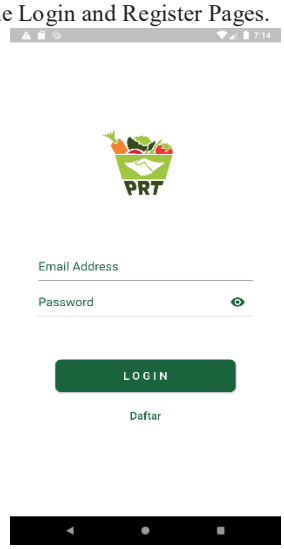

Figure 4. Login Page

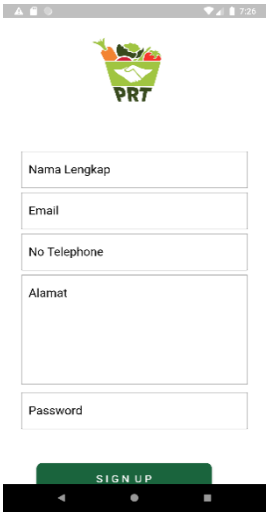

Figure 5. Register Page

On the Home Page,

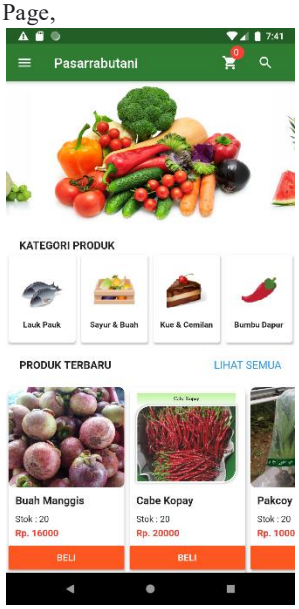

Figure 6. Dashboard Page

consumers can view banner sliders, product categories, newest products, and best-selling products arranged in a GridView layout. Consumers can filter products by category,

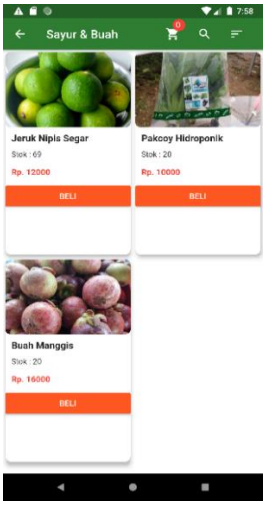

Figure 7. Product List By Category Page

view details along with product descriptions and quantity selectors

Figure 8. Detail Product Page

add items to the Cart Page,

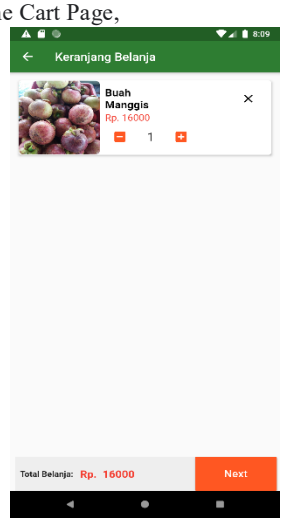

Figure 9. Cart Page

enter delivery addresses and select courier methods on the Checkout Page,

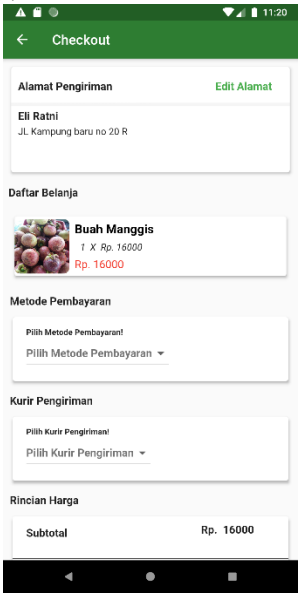

Figure 10. Checkout Page

and complete transactions on the Success Page

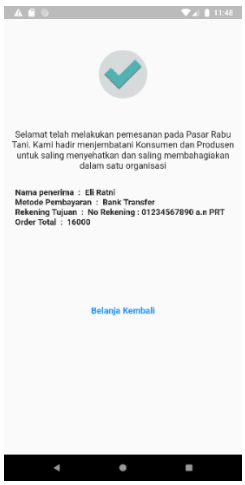

Figure 11. Success Page

Supplementary features such as *Order History*

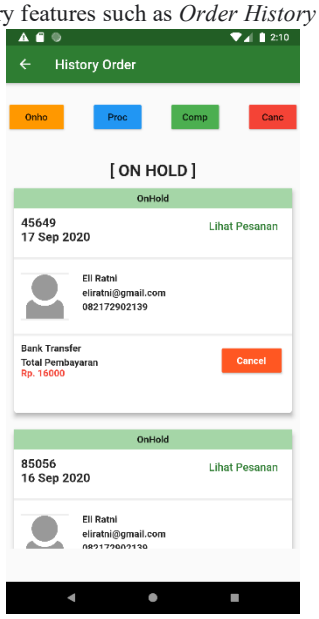

Figure 12. Order History Page

Edit Profile,

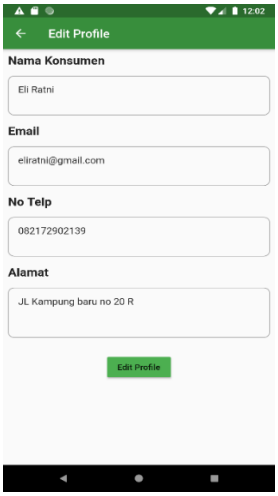

Figure 13. Edit Profile Page

and a manual *Payment Confirmation* form with proof-of-transfer image uploading

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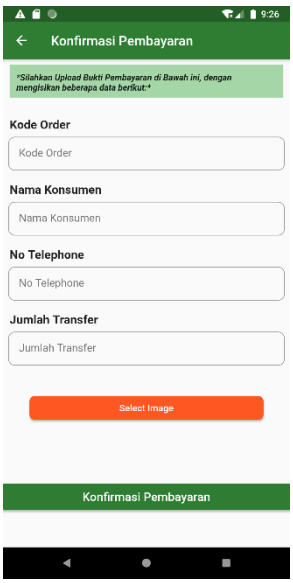

Figure 14. Payment Confirmation Page

also operate seamlessly.

3.2. Discussion

Transitioning the marketing system from Google Forms to the Android-based Pasar Rabu Tani application has brought significant improvements to KMDM's operational efficiency. Order data discrepancies, which frequently occurred due to the static limitations of online forms, have been minimized. The structurally sound MySQL database allows admins to monitor transaction histories in *real-time*, eliminating the need to manually compile data into Microsoft Excel spreadsheets.

From the consumer perspective, the hybrid mobile interface developed with Flutter has proven highly informative and interactive. Consumers face no more confusion when selecting products, as descriptions, pricing, stock levels, and high-quality images are clearly laid out on the product detail page. The integration of automated features such as total cart calculations, local courier integration tailored for the Padang city area, and an independent payment confirmation menu—provides consumers with a convenient and reliable way to quickly purchase healthy food options directly from home.

4. CONCLUSION

Based on the analysis, design, and implementation conducted throughout this Final Project, the following conclusions can be drawn:

1. This research successfully built the Android-Based Pasar Rabu Tani Application, utilizing the Flutter framework for the mobile frontend and the Codeigniter framework backed by a MySQL database for the web admin backend.
2. The new system successfully replaces the inefficient use of Google Forms, minimizing product ordering errors and ensuring excellent transactional data accuracy for KMDM.
3. This application delivers tangible convenience and efficiency for local producers and farmers, enabling them to expand their food marketing channels digitally.
4. For consumers, the application offers a practical, informative, and secure shopping solution, enabling the academic community of Andalas University and the general public of Padang City to meet their healthy food needs quickly and safely while staying at home

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[11] Literature reference regarding the Retrofit API Client on the Android platform.
[12] Literature reference regarding the performance benefits of using the Retrofit framework.