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Implementation of Android Apps in MSME Digital Transactions

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ABSTRACT

The objective of this study is to ascertain the challenges encountered by micro, small, and medium enterprises (MSMEs) in traditional transaction processes and to determine how Android application technology can serve as a novel remedy to these challenges. In this context, the need for consumers and MSME participants to conduct transactions quickly, securely, and easily is of the utmost importance. As a result, the functionality testing and prototyping of Android applications for MSME digital transactions constitute a crucial stage in assisting the growth of MSMEs in the digital age. The method of prototyping is an efficient strategy for the development of Android applications for MSMEs. Interface implementation and the system design phase of the Android application for MSME digital transactions have also been completed utilising the UML (Unified Modelling Language) modelling method. System testing employs seven test scenarios and the blackbox testing method; the outcomes demonstrate that every feature is operational in accordance with the system's functionality. Supporting the growth of micro, small, and medium-sized enterprises (MSMEs) in the digital age requires the development of Android applications for MSME digital transactions via prototyping and functionality testing, according to the findings of this study. It is anticipated that by facilitating digital transactions for MSMEs, this application will boost the development and competitiveness of MSMEs.

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INTRODUCTION

In the current digital era, technological transformation has touched almost all aspects of life, including the Micro, Small and Medium Enterprises (MSME) sector. MSMEs are the backbone of the economy in many countries, including Indonesia, with a significant contribution to Gross Domestic Product (GDP) and employment.(Triwahyono et al., 2023). However, the biggest challenge faced by MSMEs is adaptation to technological changes, especially in the aspect of digital transactions(Fauzi et al., 2023; Muhammad Wali et al., 2023). With the widespread use of Android-based smartphones, there is a big opportunity to integrate digital transaction applications that support MSME operations(Apriyansyah et al., 2024; Prihatiningtias & Wipraganang, 2022). With the development of information technology, MSMEs increasingly need digital platforms to market and sell their products(Kusuma & Darma, 2020; Rony, 2019). With this application, it is hoped that MSMEs can expand their market reach and increase their competitiveness.

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The need for fast, safe and easy transactions is a top priority for MSMEs and their consumers. This encourages the need to design Android applications that not only facilitate the digital transaction process, but also offer features that support the specific needs of MSMEs. This application is expected to increase operational efficiency, expand market reach(Rony et al., 2019; Trilaksono et al., 2023), as well as strengthening consumer confidence in MSMEs. the need for Android-based digital transaction applications among MSMEs, with a focus on the potential for application development that can support the sustainability and growth of MSME businesses in the digital era(Trinugroho et al., 2022).

Previous research(Kusuma & Darma, 2020; Prihatiningtias & Wipraganang, 2022; Sari et al., 2022; Sari & Syafrizal, 2024; Trinugroho et al., 2022)has shown that MSMEs need information technology support, especially in terms of digital transactions, to remain competitive in an increasingly digitally connected market. Along with the growth in smartphone use, Android applications have become a potential tool to help MSMEs in this regard. Therefore, designing and building Android applications for MSME digital transactions is a relevant and important step in supporting the development of MSMEs in the digital era (Anggrain et al., 2024; Darmawan, 2023; Harianto et al., 2023).

This research aims to identify the problems faced by MSMEs in conventional transactions and how Android application technology can be an innovative solution in overcoming these problems. The urgency of this research lies in the contribution that this application can make in supporting the growth of MSMEs in the digital era. Through this application, it is hoped that MSMEs can utilize technology to develop their businesses and increase market access(Harianto et al., 2022; Rony, 2017). The aim of this research is to create an Android application that makes it easier for MSMEs to transact digitally, so as to increase the competitiveness and growth of MSME businesses. Android applications can be an effective solution for MSMEs in facing digital transaction challenges(Ismail & Rosadi, 2022; Saputra et al., 2024; Tutik & Rosadi, 2022). This application can be designed to make it easier for MSMEs in terms of bookkeeping, stock management, payments and order tracking. In this way, MSMEs can be more efficient in running their business and more responsive to market demand. Apart from that, this application can also help MSMEs to expand their market reach through digital platforms, so they can compete with other business actors.

METHODS

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The prototyping method is an effective approach in developing the Android application in this research. This method allows developers to create an initial version of the application with key features that can be tested by users, so they can iteratively gather feedback from stakeholders.(Ibrahim et al., 2023; Khoiriyah et al., 2022; Sudipa et al., 2023; Trilaksono & Hiswara, 2021). The prototyping method applied aims to obtain a representation of the application modeling that will be created. The initial stage involves creating an application design in the form of a mockup, which is then evaluated by users(Hiswara et al., 2023; Rachmad et al., 2023; Rifqiyah & Amrulloh, 2023; Sumesta & Satyawan, 2024). After that, the mockup is used as reference material for software developers to build applications.

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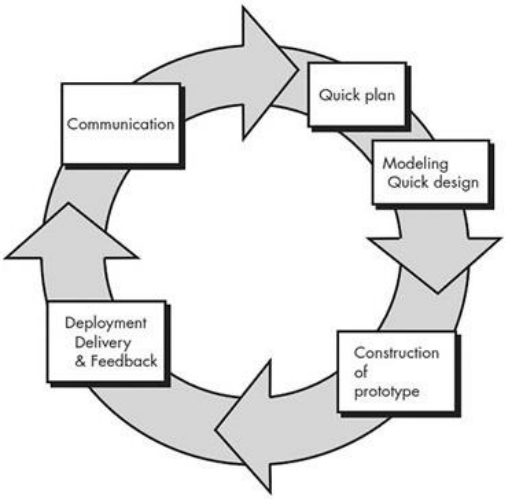

Figure 1. Prototyping Method

In the process of designing and building Android applications to support MSME digital transactions, the application of the prototyping method becomes very strategic and effective. This method begins with the user needs identification stage, which involves gathering detailed information about the essential features desired by MSMEs and their consumers to ensure efficient, secure and user-friendly transactions. Next, based on the identified needs, the development team designs the initial appearance of the application, including the interface and user experience. This design, although not final, provides a rough idea of the basic concept of the application and its functionality(Rohman & Subarkah, 2024).

Next, the process continues with the development of a prototype, which is an initial version of the application with a focus on the main function for carrying out digital transactions. This prototype can be a static mockup or a more complex interactive version, depending on the project needs. The prototype is then tested and evaluated(Rony et al., 2024), both by the development team and by potential users from the MSME community, to collect feedback regarding usability, functionality and aspects that need to be improved or added. This feedback is critical to ensuring the app meets user expectations.

Based on this evaluation, the prototype will undergo a series of iterations, where each iteration aims to improve the application based on the feedback received. This iterative process repeats until the prototype reaches the expected level of satisfaction and meets all functional requirements(Sudipa et al., 2020). Once the prototype is deemed adequate and validation from users is obtained, then development of the final application begins. This stage involves more detailed coding, integration of security features, and extensive testing to ensure the application is bug-free and ready to launch(Aditama et al., 2022; Ardiyansah et al., 2021). Thus, the prototyping method allows developers to reduce the risk of application failure by actively involving users in the design and development process, so that the final product truly meets user needs and expectations, especially in supporting MSME digital transactions.

RESULTS AND DISCUSSION

3.1. System planning

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The MSME digital transaction Android application was created using the UML (Unified Modeling Language) modeling method. UML is an object-oriented software modeling method that presents the system design created.

Use Case Diagrams

Use case diagrams describe the relationships or interactions between actors and use cases that will be created in the system. The MSME digital transaction Android application has 2 actors, namely admin and customer.

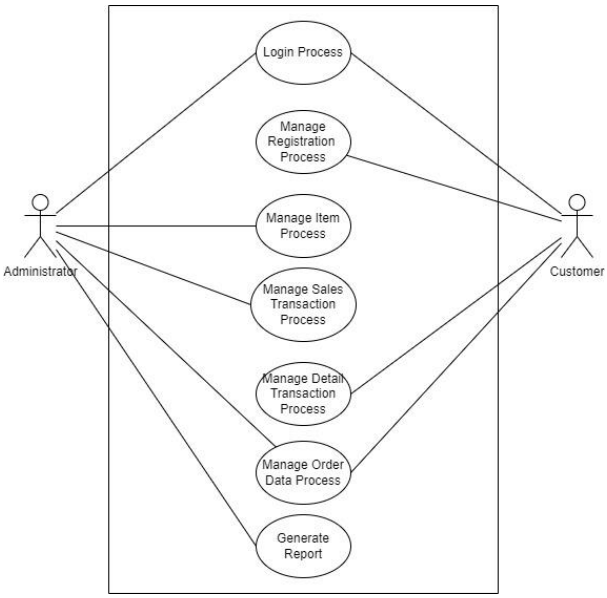

Figure 2. Use case diagram

Based on Figure 2, the processes that can be carried out by actors in the system can be explained, namely:

a) Registration
   Feature for users who want to register to the system
b) User Login
   Features to enter the system
c) Viewing and Searching for Items
   Feature for users to search and view information on items they want to rent.
d) Add Items
   Feature for admins to add item data according to user requests which will later be rented to the system.
e) Edit Item
   Feature for admins to change item data according to user requests in the system.
f) View Item Categories
   Features for users to view types of goods or select goods according to their wishes.
g) Goods Rental Transactions
   Feature for users who will later order and rent the selected items.
h) Check Transaction Details
   Feature for users to confirm items to be rented and confirm items have been returned.
i) Check Transaction reports
   Feature for admins to check and print transaction reports based on date, month and year period filters.

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Class Diagrams

Class diagram of the MSME digital transaction Android application, developed using MongoDB Not Only SQL (NoSQL). The following is the class diagram design for this system:

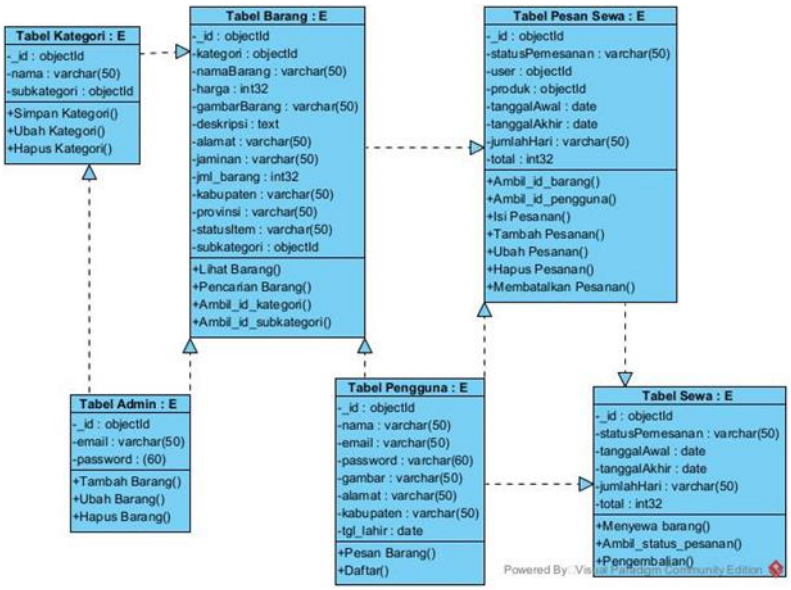

Figure 3. Class Diagram

3.2. Interface Implementation

Interface implementation is an explanation of the appearance of the application and the usability of the functions of each existing form. To clarify the form of interface implementation, below is the explanation and function of each display that has been created.

Registration Form Display

The Registration Form will appear when a prospective user wants to enter the system as a user. In the Registration Form, prospective users can complete the form provided, then press the Register and Success button, then prospective users will be directed to the Login Menu. The Registration Form display can be seen in Figure 4 below.

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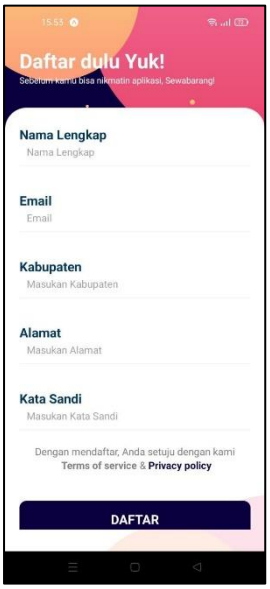

Figure 4. Registration Interface Display

Profile Page Views

On the Profile Page there is information about the user's personal data on the system. On the Profile Page there is a Settings button which functions to change the user's personal data, the About Us button contains information about the system used and the Exit button functions if the user has finished using the system and wants to exit the system. The profile page display can be seen in Figure 5 below.

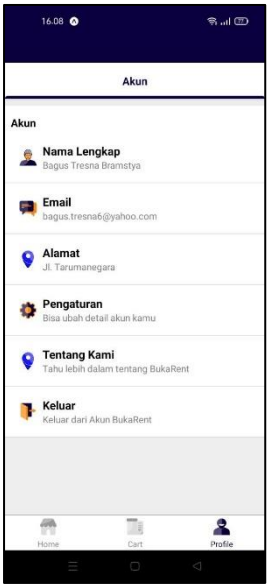

Figure 5. Profile Interface Display

Item Interface Display

On the main page there are several menus, namely Home, Cart, Profile, Search, Check History and Notifications. On the Home menu there is information about all available items. In the Cart menu

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there is information regarding transactions for goods to be rented. In the Profile menu there is a user account page. The Search menu functions to search for items according to what is needed. In the Check History menu there is information about the items being rented by the user and there is a History which functions to display all of the user's loan history. In the Notification menu there is information about all activities carried out in the system. The item interface can be seen in Figure 6 below.

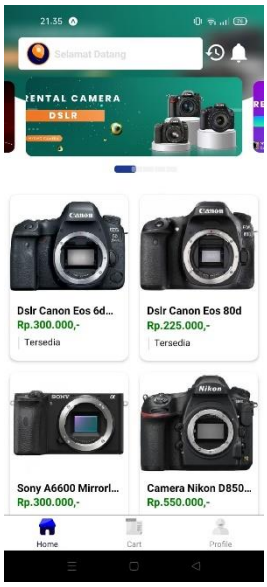

Figure 6. Item Interface Display

Transaction Details Interface Page

Next, there is a transaction detail interface that is accessed by customers after making their choice of goods. In the transaction details there are types of goods, estimated time and transaction costs. After pressing the OK button, the customer can then carry out the payment process. The detailed interface for goods transactions can be seen in Figure 7 below.

Figure 7. Transaction Details Interface Page

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Admin Main Page Interface Display

On the Main Admin Page there is a Dashboard which functions to display the Number of Users, Number of Goods and Number of goods transactions. In the Items Menu there are submenus, namely All Items and Add Items, in the All Items submenu displays all items registered in the system, in Add Items the function is to add the types of items that will be entered into the system. The appearance of the Admin Main Page can be seen in Figure 8 below.

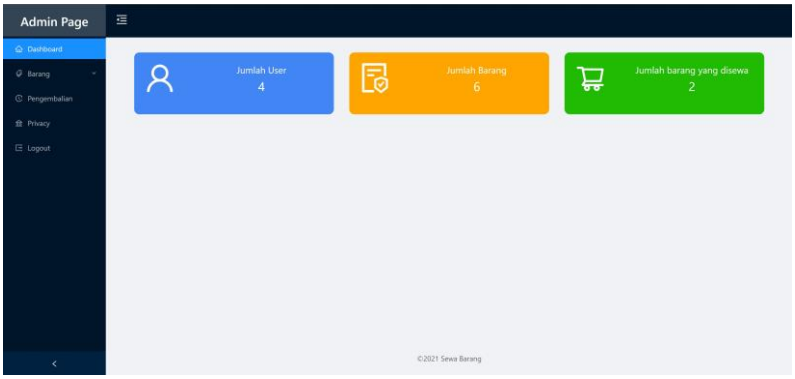

Figure 8. Main Admin Page Interface

Item Data Management Interface Display

On the Admin Items Page there are two submenus, namely All Items and Add Items, the All Items submenu functions to display information on all items that have been entered into the system, on the All Items submenu there is a Detail button and a Delete button, the Detail button functions to display item details and can also be used to change the description of goods, the Add Goods submenu functions to add types of goods that will be entered into the system, when adding goods you must enter the Goods Name, Price, Image, Address, Regency, Province, Description and Guarantee, when all forms have been filled in then click the Save button then the item information that has been entered will be stored in the system and will appear on the Main Page. The display of the goods data management interface can be seen in Figure 9 below.

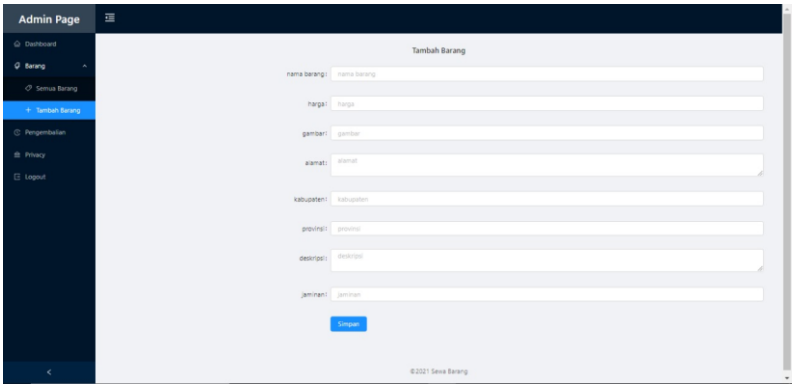

Figure 9. Item Data Management Interface Page

3.3. System testing

System testing applies the black box testing method. This method focuses on testing application functionality without the need to understand its internal structure or program code. In other words, black box testing is carried out from the user's perspective, where the tester only checks the input and output of the application without knowing how the application's internal processes work.

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This approach is very effective in identifying discrepancies between an application's actual behavior and its expected behavior, including errors in transaction processing, problems with the user interface, and failure to meet functional requirements.

Table 1. Blackbox Testing

System Features	Test scenarios	Results
Login	Functionality works fine	valid
Registration	Functionality works fine	valid
Goods Management	Functionality works fine	valid
Goods Category Management	Functionality works fine	valid
Goods Transaction Management	Functionality works fine	valid
Management of transaction details	Functionality works fine	valid
Print Report	Functionality works fine	valid

Based on the black box testing table, it can be explained that from the system features contained in the MSME digital transaction Android application which consists of login, registration, goods management, goods category management, goods transaction management, transaction detail management and report check features, all features can run. as expected and the test results are valid.

CONCLUSION

The research found that MSMEs must adapt to technological developments, particularly in digital transactions, in the digital age. Android smartphones are widely used, creating a tremendous chance to integrate MSME-friendly digital transaction apps. The software should increase market reach, operational efficiency, and consumer confidence in MSMEs. In the digital age, designing and building Android apps for MSME digital transactions is crucial to their growth. Android app development for MSMEs works well with prototyping. This strategy lets developers design an early app with important functionality that users can test to iteratively gather stakeholder input. Thus, prototyping reduces application failure by actively incorporating users in the design and development process to ensure the final product meets user needs and expectations, especially in enabling MSMEs' digital transactions.System design and interface implementation for the Android app for MSMEs' digital transactions have also been completed using UML. System testing employs blackbox testing to test application functionality without understanding its structure or programme code. Thus, developing and feature testing Android apps for MSME digital transactions is crucial to MSMEs' digital development. This app will help MSMEs transact digitally, boosting their competitiveness and growth.

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