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Development of a Mobile-Based Application for Gardening Services and Ornamental Plant Sales Using the Agile Methodology

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A B S T R A K

This research aims to develop a mobile application that integrates gardening services and ornamental plant sales into a single platform. The application development was carried out using the Agile method, which includes the stages of planning, design, development, testing, and implementation. The application is built using the React Native framework and tested using the Black Box Testing method to ensure the system functions according to requirements. The research results show that the application is capable of providing features such as a decorative plant catalog, garden service booking, shopping cart, checkout process, voucher usage, payment methods, and order status monitoring. Thus, the developed application can enhance transaction process efficiency and facilitate users in ordering garden services and purchasing decorative plants within a single integrated platform

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INTRODUCTION

The development of information technology has driven digital transformation in various business sectors, including the sale of ornamental plants and garden services. The utilization of information technology can enhance data management efficiency and facilitate the transaction process between sellers and customers. However, in practice, some ornamental plant sales businesses still record and transact manually, making data management and product stock less efficient (Sinulingga & Hardianto, 2024). Therefore, the use of mobile applications becomes a relevant solution to address these issues. The research by Aashiq et al. (2023) shows that mobile applications in the gardening business can enhance service accessibility and help entrepreneurs expand the marketing reach of their products and services more effectively.

Several studies have developed applications to support the process of selling ornamental plants. The research by Rasmila et al. (2022) developed an Android-based plant marketplace application that allows users to obtain plant information and conduct digital purchase transactions. Additionally, the research by Suharya and Azhari (2021) and Setiawan et al. (2024) shows that web-based plant sales applications can help manage transactions in a more structured manner compared to conventional methods. Sarulsetia's (2025) research also shows that the use of applications in managing ornamental plant sales can improve data accuracy and make it easier for users to obtain product information.

On the other hand, the utilization of technology is also advancing in the park service sector. Mobile applications allow the public to obtain information and order garden maintenance and repair services more practically without having to visit the service provider's location directly (Putra & Aliyah, 2023; Simanjuntak et al., 2018). The garden service in this study includes activities such as watering plants, fertilizing, pruning plants, replacing planting media, and repairing or installing garden grass.

Some previous studies indicate that the development of applications in the field of ornamental plant sales and garden service services is still conducted separately. Research focusing on ornamental plant sales only provides product transaction features, while research on garden services emphasizes mobile-based service ordering. This condition indicates a research gap, namely the unavailability of an application that can integrate both services into a single digital platform. Based on this description, previous research shows that system development is still conducted separately, necessitating an integrated solution that can combine the sale of ornamental plants and gardening services into a single digital platform. The problem formulation in this research is how to develop a mobile application that can integrate the sale of ornamental plants and gardening services into a single effective and efficient platform.

The novelty in this research lies in the development of an application that integrates ornamental plant sales services and gardening services into a single mobile platform, which were previously developed separately. With this integration, users can purchase products and order services within a single application, making it more practical and efficient. Additionally, this research

also contributes by providing an integrated mobile application solution that can enhance the efficiency of transaction processes and ease of access to services for users within one platform. Therefore, this research aims to develop a mobile-based application for gardening services and ornamental plant sales using the Agile method to support transaction and service ordering processes in a more structured, effective, and efficient manner.

THEORETICAL REVIEW

Mobile Applications

Mobile applications are software designed to run on mobile devices such as smartphones or tablets to provide services and information flexibly to users. The use of mobile applications allows for quick access to services without being limited by location and time, and enhances interaction between users and service providers. Various studies show that the implementation of mobile applications can enhance service efficiency and ease of information access across various sectors, including the ornamental plant sales and landscaping services sectors (Putra & Aliyah, 2023; Simanjuntak et al., 2018; Sinulingga & Hardianto, 2024).

Sale of Ornamental Plants

The sale of ornamental plants is a business activity that involves product management, transactions, as well as stock data recording and sales reporting. In practice, some businesses still use manual methods that have the potential to cause recording errors and limited access to information. With the advancement of technology, digital-based plant sales systems are capable of increasing data management efficiency, expanding marketing reach, and facilitating transactions for customers (Chaudhary et al., 2023; Sarulsetia, 2025; Setiawan et al., 2024; Suharya & Azhari, 2021). However, most research still focuses on the development of product sales systems without integration with garden service services.

Garden Service

Gardeners' services are a service that includes the maintenance and management of gardens according to customer needs, such as pruning, fertilizing, and arranging garden areas. In practice, the service ordering process is still done manually, making it less efficient in managing data and service schedules. The use of mobile applications in garden service services has proven to enhance service accessibility and efficiency in the ordering process (Aashiq et al., 2023; Putra & Aliyah, 2023; Simanjuntak et al., 2018). However, the development of applications in this field generally still stands alone and has not yet been integrated with the ornamental plant sales system.

Based on various studies, it can be concluded that, in general, the development of ornamental plant sales systems and garden service services is still carried out separately. This indicates a research gap, namely the unavailability of an application capable of integrating both services into a single digital platform. Therefore, this research proposes the development of an integrated mobile application that combines ornamental plant sales services and gardening services to enhance service efficiency and user accessibility.

Based on the identified gap, the research model is designed by integrating the ornamental plant sales system and gardening service into a single mobile application platform. This model illustrates user interaction with the system thru product search features, service ordering, and an integrated transaction process, ensuring that all user needs can be met more effectively and efficiently.

METHODOLOGY

This research uses the Agile software development method to design and build a mobile-based gardening service and ornamental plant sales application. The Agile method was chosen because it has a flexible and iterative development approach, allowing for gradual adjustments to the application according to user needs. Research by Larasati et al. (2021) shows that the Agile method is widely used in mobile application development because it enables the development process to be iterative and adaptive, allowing the system to be developed according to user needs. Research by Pratiwi and Sari (2024) also indicates that the application of the Agile method in mobile application development can enhance the effectiveness of the development process because each development stage can be continuously evaluated and refined. Thru this approach, the application development process is carried out in stages thru several development cycles that include the planning, design, development, testing, and implementation phases.

Data collection in this research was conducted thru interviews and direct observations with ornamental plant sellers and garden service providers to understand the transaction processes and user needs in ordering products or services. In addition, this research also employs a literature review by studying various previous studies related to ornamental plant sales, garden service providers, and mobile application development. The literature review is conducted to obtain information on relevant concepts, methods, and technologies as a foundation for application development.

The application testing in this research was conducted directly by the researcher using the Black Box Testing method. The testing was carried out by testing each main function of the system based on predetermined scenarios to ensure that all application features operate according to functional requirements. This approach is used to evaluate the conformity of the system's output to the given input without considering the program's code structure.

The stages of application development in this research follow the Agile method cycle, which consists of Plan, Design, Develop, Test, Deploy, Review, and Launch. The flow of the agile method stages is shown in Figure 1.

Figure 1. Flow of Method Stages

Plan

The planning stage is carried out to identify application needs based on the results of user needs analysis. At this stage, information is collected regarding the business processes of ornamental plant sales and garden service services. The result of this stage is a list of application requirements that includes several main features, namely a homepage to display product and service recommendations, product and service detail pages, a shopping cart feature, a transaction checkout feature, a payment feature, and an order status monitoring feature.

Design

The design phase is carried out to model the system before it is implemented into program code. The design focuses on modeling the interaction of actors with the system and the data flow that occurs within the application. The models used in this stage include Use Case Diagrams and Data Flow Diagrams (DFD).

Use Case Diagram

Use Case Diagram is used to illustrate the interaction between actors and the developed system. In this research, there is only one user as the main actor. Users can view data on ornamental plant products and garden service offerings, place orders, manage their cart, check out transactions, select vouchers and payment methods, monitor order status, and provide ratings and reviews after the order is completed. The flow of the use case diagram is shown in Figure 2.

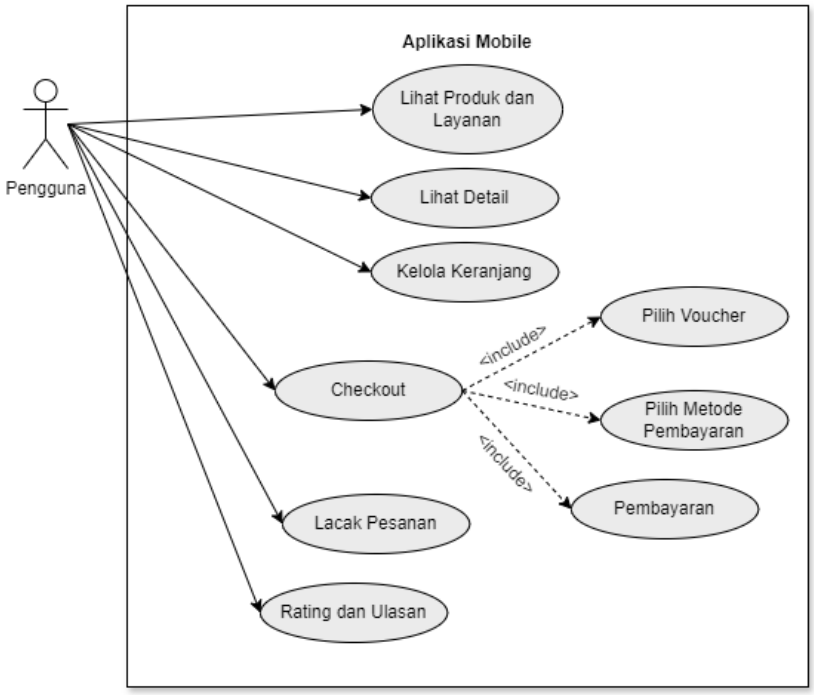

Figure 2. Use Case Diagram

Data Flow Diagram (DFD)

Data Flow Diagram is used to illustrate the flow of data within a system, both between external entities and the system, as well as between processes within the system.

DFD Level 0 (Context Diagram)

DFD Level 0 describes the system as a whole as a single main process that interacts with two external entities, namely users and admins. In this diagram, the data flow is shown in the form of order data, payment data, product and service data, as well as transaction reports generated by the system. The flow of the level 0 data flow diagram (context diagram) is shown in Figure 3.

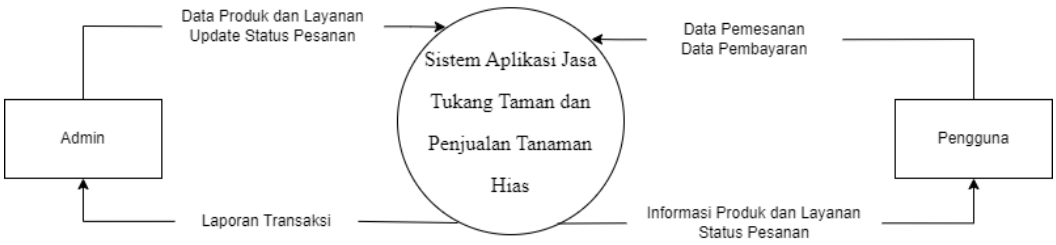

Figure 3. DFD Level 0

DFD Level 1

DFD Level 1 describes the system processes in more detail, including the management of product and service data, transaction processes, payment management, as well as order status management and system reporting. This diagram shows how data is processed and stored in the system before generating

output for users and admins. The flow of the level 1 data flow diagram is shown in Figure 4.

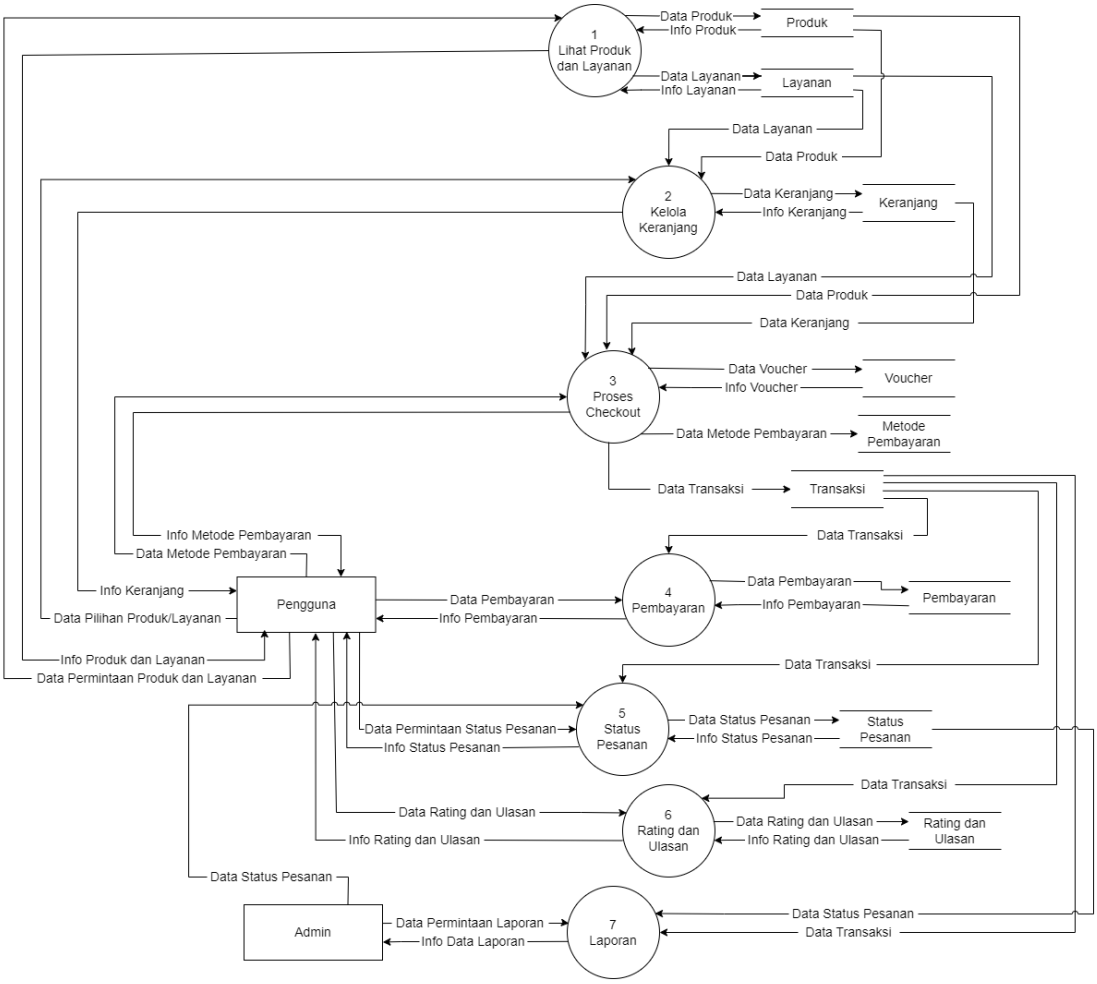

Figure 4. DFD Level 1

Development

The development stage is the process of translating the application design into code. The application is developed using the React Native framework so that it can run on mobile devices. The development process includes creating features for the homepage, product and service detail pages, shopping cart, transaction checkout process, voucher and payment method selection, online payment integration using Midtrans, as well as order status monitoring features. Additionally, the application is integrated with Firebase as a cloud-based database to store user data, product data, and transaction data in a structured manner so that it can be accessed in real-time by the application.

Test

The testing phase is conducted to ensure that each feature in the application functions according to the specified functional requirements. The application testing is carried out using the Black Box Testing method by testing several main features such as the homepage, product and service detail pages, shopping cart,

transaction checkout process, voucher selection and payment methods, payment process thru Midtrans, and the order status monitoring feature.

Deployment

The deployment stage is carried out by implementing the application that has undergone the testing process into the usage environment so that the application can be accessed by users thru mobile devices.

Review

The review stage is conducted to evaluate the application's performance after the implementation process. The evaluation is carried out by reviewing the test results and user feedback to identify any remaining deficiencies in the application.

Launch

The launch stage is the final stage in the application development process, which is the release of the application so that it can be fully used by users to order gardening services or purchase ornamental plants integrated into one platform.

RESEARCH RESULTS

This research resulted in a mobile application used for ordering garden services and purchasing ornamental plants on a single integrated platform. The application was developed using the React Native framework so that it can run on mobile devices. This application provides several main features that support the transaction process between users and service providers. Here is the appearance and explanation of some of the main features of the developed application.

Home Page

The homepage displays a list of recommended ornamental plant products and garden service offerings in a single integrated view. Thru this page, users can access product and service information directly without having to navigate away.

Additionally, the homepage provides several category menus, namely Ornamental Plants, Service Services, Portfolio, and Location. The Ornamental Plants menu displays a list of plant products, the Service Services menu displays a list of garden service offerings, the Portfolio menu showcases completed garden projects, while the Location menu displays seller location information integrated with Google Maps. At the bottom navigation section, there is a notification menu that displays information related to transactions and order status, as well as an account menu that includes profile, orders, ratings, and logout features. The homepage display is shown in Figure 5.

Gambar 5. Home Page

Detail Page

The detail page displays complete information about the selected ornamental plant products or garden services. The information presented includes images, names, descriptions, prices, ratings, and reviews, as well as ordering options.

This page also provides an order button and a feature to add products or services to the shopping cart, allowing users to continue the transaction process. The detailed page view is shown in Figure 6.

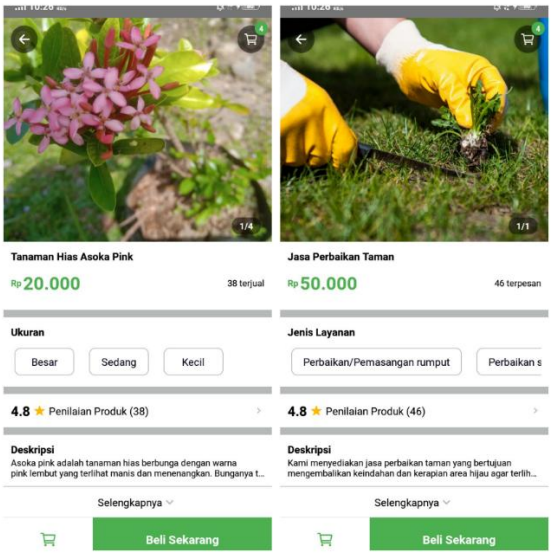

Figure 6. Detail Page

Cart Page

The cart page displays a list of orders selected by the user before proceeding to the checkout process. On this page, there are three main categories: Plants, Services, and P&S (Plants and Services).

This feature allows users to group or combine order types as needed. Additionally, the cart page also displays the number of items and the total price as information before the transaction process is carried out. The appearance of the cart page is shown in Figure 7.

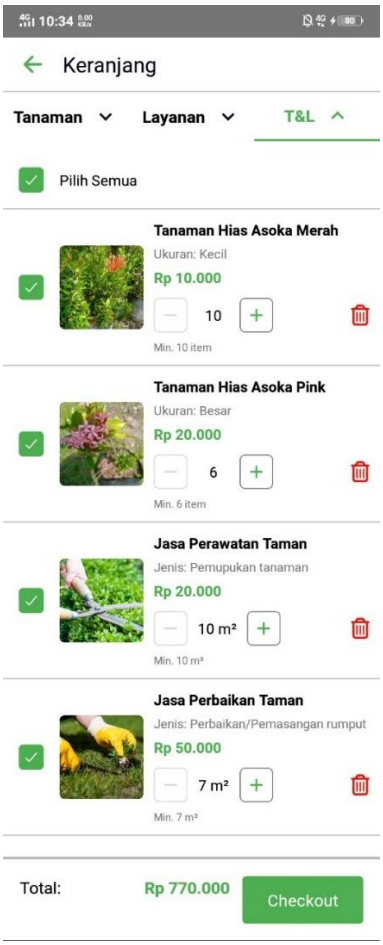

Figure 7. Combination Cart Page

Checkout Page

The checkout page is used to confirm orders before the transaction is completed. On this page, users select or manage the shipping address, choose vouchers, determine the payment method, and confirm the order.

The checkout page is divided into three types: checkout for ornamental plant purchases, checkout for service purchases, and checkout for a combination (plants and services). In the checkout for ornamental plant purchases, there is an option for delivery types, whereas in the checkout for service purchases and combinations, there is no such option. The appearance of the checkout page can be seen in Figure 8.

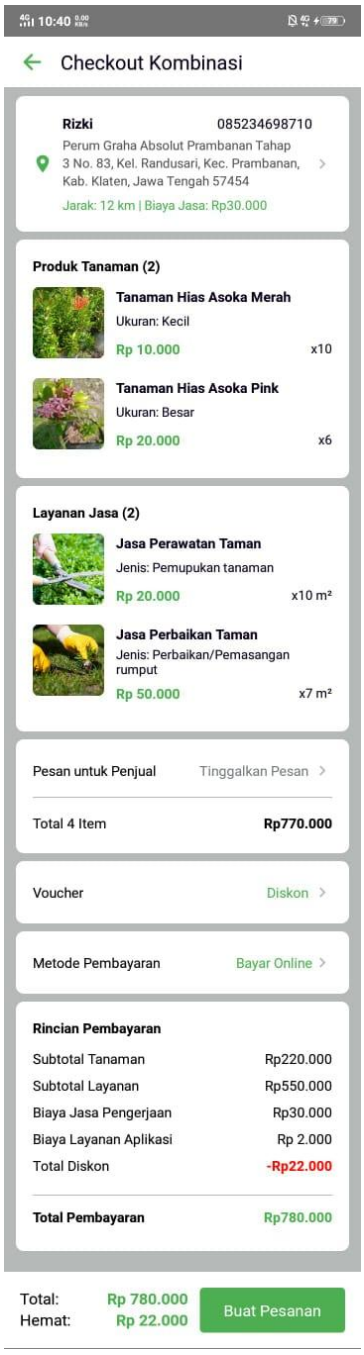

Figure 8. Checkout Page

Voucher and Payment Method Page

This page displays the available voucher options and payment methods. For the purchase of ornamental plants, free shipping vouchers and discount vouchers are available, while for service and combination services, only discount vouchers are available. The payment methods provided consist of cash on delivery (COD) and online payment. The appearance of the voucher and payment method page is shown in Figure 9.

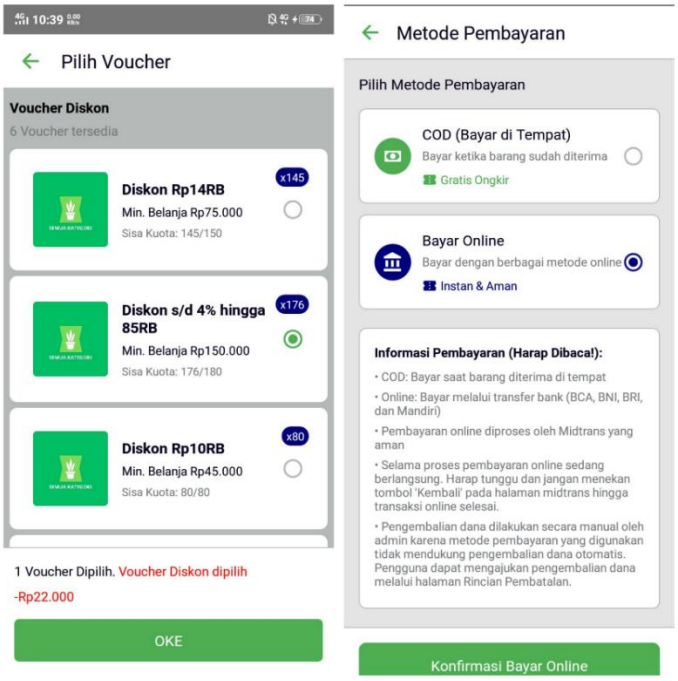

Figure 9. Voucher and Payment Method Page

Midtrans Payment Page

The Midtrans payment page is used to process online payments thru virtual accounts from several banks, such as BCA, Mandiri, BNI, and BRI. This page will be displayed when the user selects the online payment method. The appearance of the payment page is shown in Figure 10.

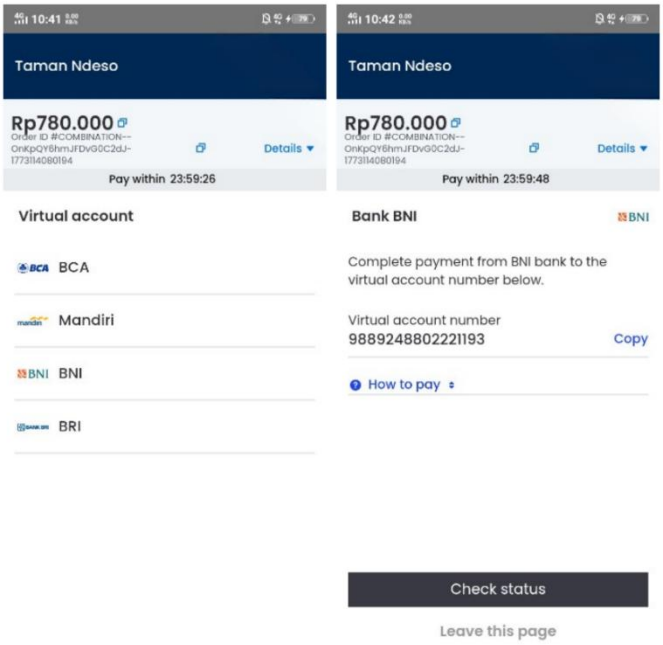

Figure 10. Midtrans Payment Page

Order Page

The order page displays a list of transactions that the user has made. Thru this page, users can monitor the status of orders for ornamental plant purchases, garden service services, or combination orders. This page is equipped with three main categories: Plants, Services, and P&S, making it easier for users to track orders based on the type of transaction. Additionally, after the order is completed, users can provide ratings and reviews for the services received in the Completed Orders menu. The appearance of the orders page is shown in Figure 11.

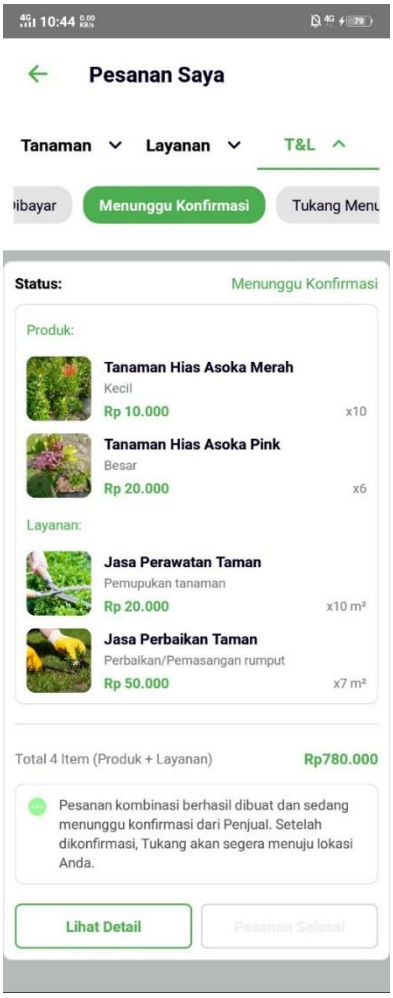

Figure 11. Order Page

System Testing Results

System testing is conducted using the Black Box Testing method to ensure that each feature in the application operates according to the specified functional requirements. The testing is carried out by testing each main function of the application without examining the program code structure. The results of the system testing are presented in Table 1.

Table 1. Results of Black Box Testing

No.	Application Feature	Testing Scenario	Testing Result	Conclusion
1.	Home Page	The system displays a list of recommended products and services, including photos, names, prices, ratings, sales and order values, as well as options for various categories.	Successful	Valid
2.	Detail Page	The system displays detailed information about products and services comprehensively, including name, price, description, rating and reviews, as well as ordering options.	Successful	Valid
3.	Cart Page	The system displays a list of selected ornamental plants and garden service items chosen by the user.	Successful	Valid
4.	Checkout Page	The system displays the transaction confirmation process.	Successful	Valid
5.	Voucher and Payment Method Page	The system displays voucher options and payment methods.	Successful	Valid
6.	Midtrans Payment Page	The system processes online payments thru the Midtrans system.	Successful	Valid
7.	Order Page	The system displays the user's order status.	Successful	Valid

Based on the test results shown in Table 1, all the main features of the application can run well according to the predetermined test scenarios. This indicates that the developed application has met functional requirements and is capable of effectively supporting the transaction process.

DISCUSSION

The research results show that the objective of developing a mobile application capable of integrating ornamental plant sales services and gardening services has been achieved. The resulting application is capable of supporting the transaction and service ordering processes in a structured, effective, and efficient manner within a single integrated platform. This integration allows users to purchase ornamental plant products while simultaneously ordering garden services without having to use separate systems.

The findings of this study are in line with the research by Aashiq et al. (2023), which states that the implementation of mobile applications in the gardening business can enhance service accessibility and the efficiency of interactions between customers and service providers. However, this research provides further development by integrating product and service sales into one system, thereby not only enhancing accessibility but also simplifying the overall transaction process.

In addition, the results of this study are also supported by Putra and Aliyah (2023) as well as Simanjuntak et al. (2018), which show that the use of mobile applications in garden service services can enhance the ease of the service ordering process. On the other hand, the research by Sarulsetia (2025) and Sinulingga and Hardianto (2024) explains that the digitization of ornamental plant sales can enhance data management efficiency and the delivery of product information to customers. Rasmila et al. (2022) also showed that mobile-based plant marketplace applications can expand marketing reach and provide easy access to information for users.

Unlike previous research, which generally focused on a single aspect, whether the sale of ornamental plants or garden services, this study integrates both services into a single mobile platform. This integration becomes the main contribution of the research because it addresses the previously identified research gap, namely the absence of a system that combines both services into a single application. Thus, this research not only adopts concepts from previous studies but also develops a new approach in the form of a more comprehensive integrated system. From the implementation perspective, the integration of services into a single platform has a positive impact on the efficiency of transaction processes. Users do not need to switch platforms to purchase products and order services, making the process more practical and time-efficient. Additionally, the integrated system also simplifies transaction data management, both for users and service providers, thereby enhancing the overall effectiveness of information management.

In addition, practically, the results of this research provide a digital solution that can enhance the efficiency of transaction management and ease of access to services for users. Academically, this research contributes to the development of a mobile application based on service integration, which can serve as a reference for future studies.

CONCLUSIONS AND RECOMMENDATIONS

Based on the research results, the development of a mobile-based gardening service and ornamental plant sales application using the Agile method successfully produced an application capable of integrating ornamental plant sales services and gardening services into one platform. The developed application provides various main features that support the transaction process in a structured, effective, and integrated manner. The results of testing using the Black Box Testing method show that all the main features of the application can operate according to the specified functional requirements. This indicates that the application is capable of supporting the process of ordering products and services

more effectively and efficiently. Overall, this research contributes in the form of developing an integrated mobile application that can enhance the efficiency of transaction processes and ease of access to services for users within a single digital platform. Thus, the integration of services into a single mobile platform proves to be an effective approach in improving transaction efficiency and ease of access to services compared to separate systems.

As a recommendation, the next development of the application could include a communication or chat feature between users and service providers, allowing for more effective and real-time interaction, service consultation, and information delivery related to products and services thru the application.

FURTHER STUDY

This research has several limitations, including system testing that is still limited to functional aspects using the Black Box Testing method without involving testing of user experience or overall system performance. The developed application also does not yet accommodate interactive communication features between users and service providers. Based on these limitations, future research can develop real-time communication features such as chat to enhance user interaction, as well as conduct additional testing such as usability testing and performance testing to obtain a more comprehensive system evaluation.

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