Journal of Information Systems and Informatics
Vol. 6, No. 2, June 2024 e-ISSN: 2656-4882 p-ISSN: 2656-5935
DOI: 10.51519/journalisi.v6i2.748 Published By DRPM-UBD

The Android-Based Cashier Service Information System Utilizes the Waterfall Method

Khairul Hafidz[1], Ali Ikhwan[2]

[1,2]Information System Department, State Islamic University of North Sumatra, Medan, Indonesia
Email: [1]hafidz1314@gmail.com, [2]aliikhwan@unisu.ac.id

Abstract

The advancement of information technology aimed to enhance efficiency in information management, including rapid and timely processing as well as accuracy of information. Resto Sampali Kitchen encountered difficulties in transaction management as sales and purchases were still manually recorded each day, leading to inefficiency and high risk of errors and fraud. Sales data and other crucial information were also challenging to track and analyze, hindering accurate decision-making. The manual recording method also compromised data integrity and validity. This research aimed to address these issues by constructing an Order and Payment Management Information System integrated within an Android-based Cashier Service, utilizing a qualitative approach and the waterfall system development method. Results from system testing via Blackbox Testing indicated that the system operated in accordance with the anticipated design, enhancing accuracy in transaction management, revenue, and payments, while providing a more satisfying experience for customers and cafe owners.

Keywords: Information System, Cashier, Cafe, Waterfall, Android

1. INTRODUCTION

The advancement of information technology significantly influenced the lives of individuals and groups. The incorporation of information technology aimed to enhance efficiency across multiple dimensions of information management, encompassing the swiftness and punctuality of processing, alongside the precision of obtained information [1]. Both individuals and groups considered information technology a daily necessity for seeking and obtaining the information they needed.

A cafe exemplified a business model that prioritized concept, taste, and service. Its design was simplistic, featuring long wooden tables and benches akin to those commonly found in standard food stalls. The cafe operated from the afternoon until late at night and was consistently filled with patrons, predominantly young people. Tourists and international students also frequently visited. The menu offered a variety of items, ranging from robusta coffee to cappuccino and

Vietnamese coffee. Besides coffee, the cafe also sold various types of tea, milk, and both traditional and modern beverages. To complement the drinks, there were light snacks like French fries, toasted bread/bananas, and heavier meals such as fried rice.

Several cafes had not yet adopted digital cashier systems and still relied on cash drawers or paper-based recording and manual transaction reconciliation. Customers would place their orders by visiting designated counters displaying the menu and filling out order forms provided by the cafes. These forms were used for reconciling sales and served as payment receipts or invoices for customers. Reconciliation was conducted after the cafe closed by inputting all payment evidence. From these entries, the quantity and types of items sold could be determined, as specific templates for reconciliation were available.

The cafe under study still depended on manual cashier systems and paper-based recording for their transactions. The manual reconciliation process posed challenges for cafe owners in recording sales and purchases in detail each day. This resulted in inefficient data management, complicating the analysis of product sales volume, identification of customer trends, and strategic management decision-making. Information and reporting limitations, such as the absence of a digital cashier system, also hindered cafe owners from accurately tracking revenue and expenses, increasing the risk of errors and fraud in recording, thus threatening data integrity and validity. Without an integrated system, cafes struggled to produce comprehensive and accurate sales reports. In the competitive food and beverage industry, cafes need to maintain their competitiveness by improving operational efficiency and providing a better customer experience. Limitations in cashier systems and transaction management can impede cafes from achieving these goals.

The highlighted issue lies in the use of manual cashier systems in the cafes under study. The complex manual recording poses challenges for cafe owners in efficiently managing transaction data. This makes it difficult to gather important information such as sales volume, customer profiles, and other necessary information for management decision-making. Additionally, manual recording increases the risk of errors and fraud in the data recording process. The mentioned issues stem from the need to enhance efficiency in transaction management in cafes, where the use of manual cashier systems has caused various challenges in recording and reconciling transaction data.

In relation to this matter, the researchers referred to several previous studies that addressed similar issues. One of them was a study that discussed the implementation of an e-cashier at Sakura Food with the aim of facilitating business owners in managing payments and sales data reports quickly, accurately, and with minimal errors[2].

p-ISSN: **2656-5935** http://journal-isi.org/index.php/isi e-ISSN: **2656-4882**

Additionally, there was also research that examined Android-based food ordering applications for restaurants and cafes. The aim of this research was to facilitate customers in placing orders, with the hope of reducing order delays and misunderstandings, as well as decreasing the number of order cancellations, thus assisting in managing orders according to the needs of both customers and restaurants[3].

Another study focused on the issue of desktop-based Cashier Information Systems for Chinese restaurants. With the problem faced related to Payments at Sakura Food still being manual without computer technology, using a slow calculator. Errors often occurred in sales recording, and data retrieval was difficult because it was recorded in a ledger. Stock information was not available, causing customer disappointment when stock ran out. The system built helped the reporting process and ordering input by cashiers using food codes, and used the waterfall system development method [4].

In another study, the development of a web-based Cashier Information System for the School Service Unit was conducted with the aim of eliminating the need for manual recording. Not only that, there was also a study on the Web-Based E-Cashier Information System for garment companies, aimed at expediting work, saving time and effort, and facilitating data evaluation and report generation [5].

Another study focused on the use of a cashier application in the cash receipt information system at a coffee shop. This research analyzed the utilization of the cashier application at Kala Kopi, with a focus on employees, owners, and consumers. The study was descriptive and quantitative, utilizing primary data from observations, interviews, and financial documentation, as well as secondary data from cash receipt records. The research findings indicated that the cash receipt system at Kala Kopi was efficient with the "Qasir" application, both for cash and non-cash payments. The cash receipt records matched those received by consumers [6].

Most studies on cashier systems focus on desktop or web-based solutions. However, this study introduced a new innovation by developing a mobile Android-based cashier system designed for three users: customers, cashiers, and kitchen staff. This system helps reduce queues by allowing customers to order through an application at their tables. Payments also become more convenient using QRIS (non-cash) and cash. Kitchen staff can directly view orders through the application, and the order preparation process, from creation to completion, can be monitored by cashiers. Sales reports are also available in daily and monthly summaries.

Based on the constraints faced in managing transactions in cafes, researchers proposed a solution by developing a cashier service application. This application

is designed to facilitate the menu ordering process for customers, enable effective management of purchases by cashiers, and allow kitchen staff to access orders. Thus, the ordering, payment, and order preparation processes can be well-organized. Through the development of this mobile Android application, it is hoped that the tasks of customers, cafe owners, or cashiers, as well as kitchen staff, can be simplified, thereby enhancing the sales experience and providing solutions to the problems encountered in cafe transaction management.

2. METHODS

2.1. Research Methods

The system development method employed in this research was the Waterfall Method as shown in Figure 1. The Waterfall Method represented a systematic and sequential approach to system development, where the development process unfolded linearly from the initial stage to the final stage [7]. The application of the Waterfall Method has been relevant in system development, especially when the system required a short time from the design phase to the implementation phase. This method provided a structured and linear framework that enabled accelerating the system development process by ensuring that each stage was thoroughly executed before moving on to the next stage [8].

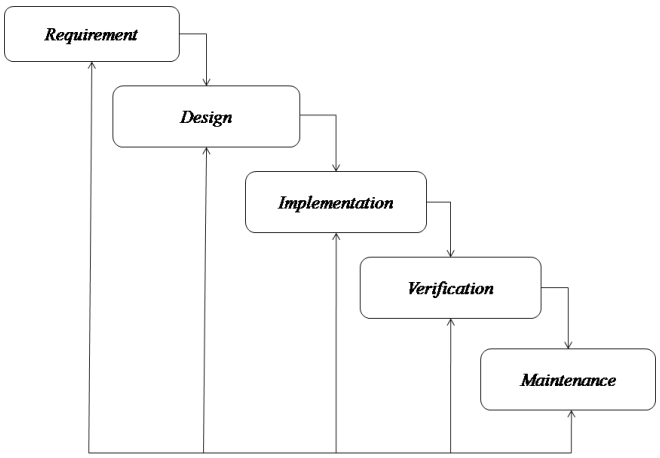

Figure 1. Waterfall Method [10]

The waterfall method used in various research projects has proven effective in building systems. All development stages, from design to implementation, were carried out smoothly, and all menus available in the application could function properly. Therefore, the waterfall method has been proven to yield satisfactory results in a project [9].

p-ISSN: **2656-5935** http://journal-isi.org/index.php/isi e-ISSN: **2656-4882**

Based on this, the Waterfall Method was chosen because it effectively worked in system development, providing a structured and sequential approach. This method proved to be relevant, especially when the system required a short time from the design phase to implementation. With this approach, each development stage could be thoroughly executed before proceeding to the next stage, ensuring smooth process flow and satisfactory outcomes in the system development project. The comprehensive explanation of each stage in the Waterfall Method applied in developing the Android Mobile-based cashier service information system at Resto Sp Kitchen:

1) The first stage in system development, known as the "Requirements" stage, involved identifying issues, proposing solutions, and analyzing system requirements. The modeling process began with an exploration of the overall system needs to be implemented in software form. In system analysis, three fundamental steps were undertaken. Firstly, issue identification, where researchers pinpointed potential problems in previous data collection activities. The next step was proposing solutions to the identified issues. The final step was software requirement analysis, where the needs were analyzed based on the earlier issue identification to develop the system optimally [11]. In the context of this research, the researcher analyzed the requirements of the cashier service information system at Resto Sp Kitchen based on Android Mobile. The research was conducted in June 2022, involving observations and interviews with the owner of Resto Sp Kitchen to identify issues and determine proposed solutions.

   Issues were identified wherein the cafe owner sometimes struggled with manual data recapitulation due to the necessity of recording sales and purchases individually every day, stored in a ledger. Consequently, transaction data was not well managed, leading to missing information regarding product sales, customers, peak times, and other data crucial for managerial decision-making. Income and expenditure data were incomplete, posing risks of human errors and fraud. Manual recording also compromised the integrity and accuracy of data.

   Through the identified issues, the researcher proposed a solution by developing a cashier service application. This application was designed to facilitate the menu ordering process for customers, enable effective management of purchase data by cashiers, and allow kitchen staff to access orders. Thus, the system was well-organized.

2) Design System: In the "Design System" stage, system requirements will be translated into estimable designs before the coding process begins [12]. The researcher utilized Unified Modeling Language (UML), specifically the use case diagram, as a tool to design the system according to the established

requirements. The system design created in this phase served as a guide for developers in the implementation process. In this section, the researcher designed a system through the use case diagram, assigning roles to the administrator, cashier, kitchen staff, and owner, each with specific access rights corresponding to their respective tasks, ensuring that the system functioned and was utilized according to its purpose.

3) Implementation: The "Implementation" stage is where the designed system will be translated into programming languages [13]. This was a concrete step in developing the cashier service information system for Resto Sp Kitchen based on Android Mobile. Developers began coding based on the previously prepared design. In this study, the cashier service information system was built using Java programming language with the utilization of Android Studio. This was done to achieve the tangible form of the application that had been designed earlier.

4) Verification: In the "Verification" stage, the process is carried out to ensure that the built system meets the specified criteria and requirements. This involves testing and evaluating various aspects of the system to verify that it conforms to the standards or requirements established. In this research, BlackBox Testing is used as a form of system testing to ensure that the system meets the predetermined needs and expectations [14].

5) Maintenance: The final phase, "Maintenance," involved installing the system at Resto Sp Kitchen and making adjustments according to the prepared maintenance plan. This ensured that the system remained optimal in its functionality and could be adapted to changing needs.

2.2. Data Collection

The data collection methods employed by the researcher consisted of observation and interviews to gather information.

1) Observation, the observation process involved direct scrutiny of the subject. This method is accurate for collecting data related to the activities of the research object. Through visual observation at Resto Sp Kitchen, the aim of observation was to gather information about the behavior, events, or characteristics of an object without influencing or altering the observed conditions, thus allowing the identification of pure issues found in the research object.

   The researchers found that the ordering system still experienced long queues, and the use of manual ordering systems increased the risk of loss, dampness, and tearing, rendering it ineffective. This impacted the kitchen, where orders

were taken through paper records that were prone to damage and loss, resulting in discrepancies in the order sequence and difficulties in managing the system. Additionally, sales reporting was still carried out manually.

2) Interviews, Interviews are a data collection method involving direct interaction between the researcher and the interviewee aimed at obtaining in-depth information about the interviewee's perspectives on the issues related to the research topic. The researcher conducted interviews with the owner of Resto Sp Kitchen to obtain data related to the issues experienced by the restaurant.

   The data found concerning the issues in the paragraph were as follows: The use of manual cashier systems and paper-based recording, which remained common practices in the cafe. The manual reconciliation process that caused difficulties for cafe owners in recording sales and purchases in detail every day. The lack of efficient data management, making it difficult to analyze product sales volume, identify customer trends, and make strategic management decisions. The limitations in information and reporting caused by the lack of digital cashier systems, which hindered cafe owners from accurately tracking income and expenditure flows. The increased risk of errors and fraud in data recording due to the lack of integrated systems. The difficulty in generating comprehensive and accurate sales reports without integrated systems. The complexity of using manual cashier systems, causing difficulties in efficiently managing transaction data. The challenges in collecting important information such as sales volume, customer profiles, and other information needed for management decision-making. The increased risk of errors and fraud due to manual data recording. The constraints in recording and reconciling transaction data arising from the use of manual cashier systems.

3. RESULTS AND DISCUSSION

3.1. Requirements

The first stage involved identifying existing issues. This encompassed gathering information about the problems occurring within the system under analysis. The researcher identified issues present in the research object, namely the cafe's dependency on manual cashier systems and paper-based recording for their transactions; the manual reconciliation process leading to difficulties in detailed daily sales and purchase recording; inefficiency in transaction data management, making it challenging to analyze product sales volume and identify customer trends; information and reporting limitations due to the absence of a digital cashier system, hindering cafe owners from accurately tracking revenue and expenses; the risk of errors and fraud in data recording resulting from the use of non-integrated systems; challenges in generating comprehensive and accurate sales reports without an integrated system; constraints in transaction data recording and

reconciliation arising from the use of manual cashier systems; and the challenge of achieving operational efficiency and better customer experiences amid competitive food and beverage industry.

After identifying the issues, the next step was proposing solutions to address them. These solutions could involve implementing new technology, changing business processes, or developing a more efficient system. The proposed solution was the development of a cashier service application. This application was designed to streamline the menu ordering process for customers, enable effective purchase management by cashiers, and allow kitchen staff to access orders. Thus, the ordering, payment, and order preparation processes could be well-organized. Through the development of this mobile Android application, it was expected that tasks for customers, cafe owners, or cashiers, as well as kitchen staff, could be simplified, thereby improving the sales experience and providing solutions to the problems encountered in cafe transaction management.

Based on the identified issues, it was evident from the ongoing analysis that the system implemented at Resto Sp Kitchen revealed customers placing orders and making payments through cashiers, resulting in queue buildup. Presently, the cashier system relied on manual transaction input using record books, increasing the risk of errors and data loss. After the cashier recorded orders, they were then forwarded to the kitchen for processing and preparation. However, this method posed risks as order records could be overlooked or lost, potentially providing an unsatisfactory experience for customers.

Previously, the proposed solution involved conducting an analysis of the system requirements, based on the identified issues and proposed solutions. This process entailed determining the necessary features for developing a new system or improving existing ones, as well as specifying the technical and functional requirements that the system must meet. This analysis helped ensure that the proposed solution could effectively and efficiently meet the existing needs.

Referring to the previous analysis of the system implemented at Resto Sp Kitchen, the researcher was motivated to design the proposed system to enhance and modernize restaurant operations, aiming to improve effectiveness and efficiency. The proposed system would commence with the ordering phase by customers. Customers could place orders through an application provided by the restaurant. They were also given the option to make payments via QR codes using the application. If customers chose to pay cash, payment transactions could be made at the cashier, but still by placing orders through the application.

In the proposed cashier system, features would be added to record all successfully completed transactions and provide detailed transaction reports. The kitchen system would receive notifications of incoming orders needing immediate

processing. Upon completion, kitchen staff could confirm that orders were ready through the system, and this confirmation would be recorded and synchronized into the related completed order data. Thus, the system was expected to enhance order management efficiency, minimize errors, and improve the overall customer experience.

3.2. Design System

Designing a system is a crucial part of application development as it reflects the process of shaping the system from planning to implementing key functions crucial for the application's performance. The main objective of system design is to assess whether the system to be built will effectively meet user needs [15].

In the context of this study, the system design was carried out utilizing Unified Modeling Language (UML) diagrams. UML diagrams, including use case diagrams, were utilized to represent interactions between actors (users) and the system, as well as the primary functionalities the application would encompass. This helped researchers to understand in more detail how the application would operate and how interactions between users and the system would occur [16]. Thus, designing the system using UML diagrams was an important step in laying a solid foundation for successful application development [17].

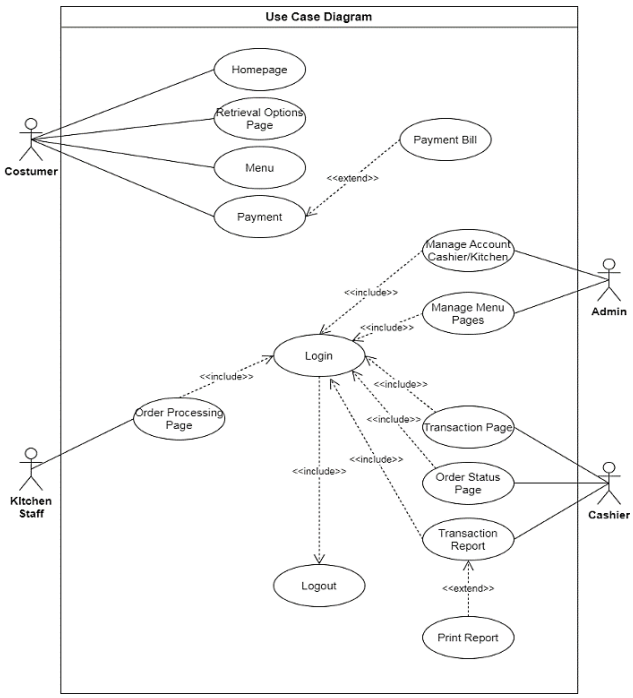

Figure 2. Use case diagram

p-ISSN: **2656-5935** http://journal-isi.org/index.php/isi e-ISSN: **2656-4882**

In the use case diagram depicting the roles of the four actors, it was observed that customers or buyers had the ability to navigate through the homepage, pickup selection page, menu, payment page, and obtain order receipts. Meanwhile, Admin, Kitchen, and Cashier were required to log in first to access their respective privileges. Admin was responsible for managing accounts for Cashier and Kitchen, as well as managing the Menu Page to add, edit, or delete menu items. Cashier had access to the transaction page, order status page, and transaction reports, including the ability to print these reports. Additionally, a kitchen employee could access the order processing page while using the system. Customers did not need to log in and could directly access the menu page from the cafe. After selecting the desired menu items, customers could make transactions using cash or non-cash methods, and payment receipts would be received by the customers.

3.3. Implementation

1) Resto Sp Kitchen Homepage

The display would appear on the application screen when customers, cashiers, and kitchen staff-initiated activities within it. On the Homepage, users would encounter various promotional posters provided by Resto Sp Kitchen as shown in Figure 3. These promotions could include special discounts for specific menus, bundled deals, promotions for special events or themes, or even the introduction of new menus offered by Resto Sp Kitchen. Additionally, this page would feature new and bestselling menus offered by the restaurant.

Figure 3. Homepage

p-ISSN: **2656-5935** http://journal-isi.org/index.php/isi e-ISSN: **2656-4882**

2) Pickup Options Page

This page was specifically prepared for customers visiting the restaurant, providing them with the flexibility to choose whether they wanted to order food to take away or to be served on-site as shown in Figure 4. With this option available, customers were able to tailor their dining experience according to their preferences and the situation at hand. For instance, those who wished to enjoy their meal in the comfortable ambiance of the restaurant could opt for dining in. Meanwhile, for those who preferred to enjoy their food at home or elsewhere, they could order it for takeout. This option allowed customers to customize their dining experience according to their needs and personal preferences.

Figure 4. Pickup Options Page

3) Menu Page

The presentation of Figure 5 was designed to facilitate buyers in selecting from a diverse array of food, beverages, and snacks according to their preferences. Comprehensive and clear price information was included in the image, enabling buyers to easily ascertain the total cost of their orders before making payment. Consequently, buyers could make better decisions regarding the number of orders chosen and the amount of money they had to pay in a more transparent and easily understandable manner.

Journal of Information Systems and Informatics
Vol. 6, No. 2, June 2024
p-ISSN: **2656-5935** http://journal-isi.org/index.php/isi e-ISSN: **2656-4882**

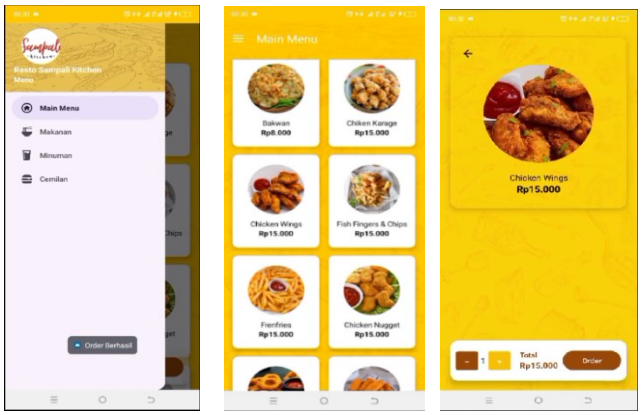

Figure 5. Menu Page

4) Transaction Page

In this transaction page as shown in Figure 6, details of the orders selected by buyers are displayed. After selecting several menus, buyers then click the "Pay" button to continue the process by entering the desired table number. Next, buyers are given the option to make payments through the cashier or via QRIS. If buyers choose payment via QRIS, the restaurant's QRIS will be displayed, from the cashier to the kitchen. Payment can be made through applications such as Dana, Ovo, Gopay, and Shopeepay. Buyers simply scan the QRIS and pay according to the total order amount stated. After successful payment, the buyer's transaction process is considered complete. Orders made will automatically enter the cashier and kitchen systems, ensuring that the orders can be processed and prepared for serving to customers promptly.

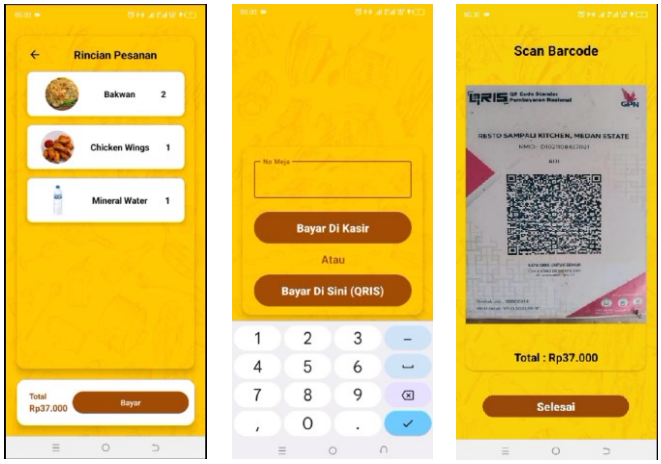

Figure 6. Transaction Page

p-ISSN: **2656-5935** http://journal-isi.org/index.php/isi e-ISSN: **2656-4882**

5) Order Receipts Page

Order Receipts as shown in Figure 7 display served as evidence of orders that were automatically stored on the buyer's device after they completed the payment via QRIS. This meant that once the payment was completed, the details of the orders were immediately recorded on the buyer's device as transaction confirmation. This facilitated the buyers in tracking their orders and having valid digital payment proof.

Resto Sampali Kitchen
Payment Receipt

Table Number : 20
Date : Thursday, 01 February 2024
Type of Payment : Qris

No	Menu Name	Quantity	Price
1	Bakwan	2	Rp. 6.000
2	Chicken Wings	1	Rp. 15.000
3	Mineral Water	1	Rp. 6.000
Total Price			Rp. 27.000

Figure 7. Order Receipts

6) Login Page

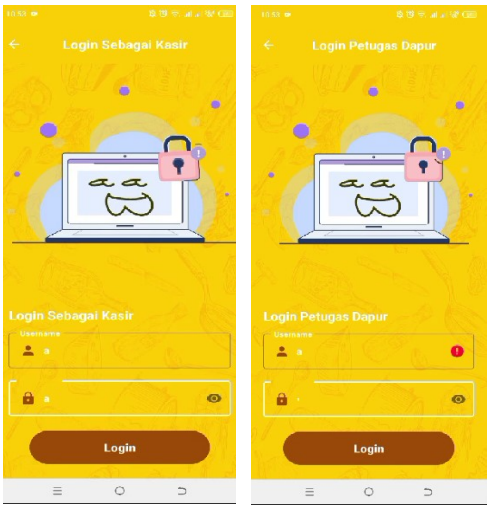

Figure 8. Login Page

Figure 8 display is a dedicated page serving as the initial step for cashiers and kitchen staff before they can access pages with permissions aligned with their respective roles. In other words, before they can begin utilizing specific features related to their tasks within the system, they must first complete the login process through this page. This login process ensures that only legitimate and authorized

users can access certain data and functions within the system. It is a common security measure in many systems to protect internal information and functionality from unauthorized access. Thus, this login page is a crucial starting point in the system's use, ensuring that only authorized users can perform their tasks in a permitted environment.

7) Order Processing Page (Kitchen)

Figure 9 displayed from the menu options page; a designated staff member can select the menu as the kitchen. When the menu is selected, a list of incoming orders will appear, ready to be processed immediately. Thus, the chef can prepare the dish by clicking the process button. The status of this order will be visible in the cashier section, allowing them to monitor which dishes are already prepared and which are not.

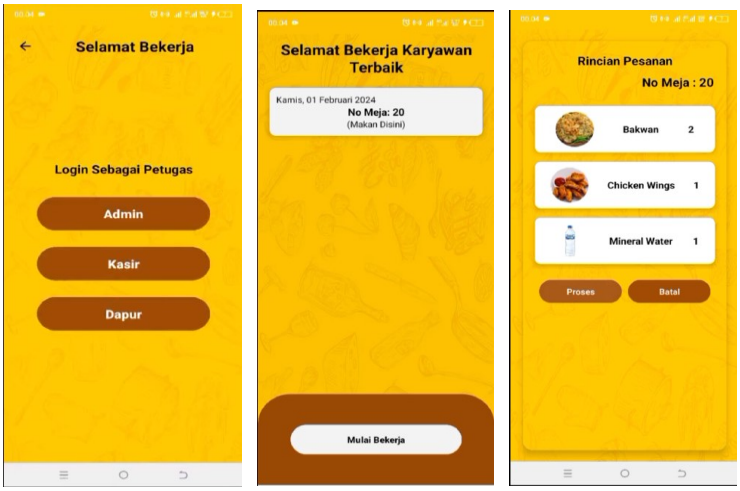

Figure 9. Order Processing Page (Kitchen)

8) Transaction Page (Cashier)

In Figure 10, the cashier will receive incoming orders that need to be processed when customers transact at the cashier. The cashier is responsible for processing transactions successfully. After a successful transaction, the order will automatically enter the kitchen system for immediate processing.

p-ISSN: **2656-5935** http://journal-isi.org/index.php/isi e-ISSN: **2656-4882**

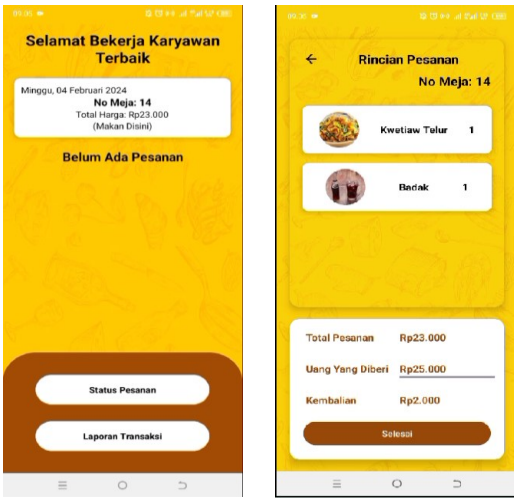

Figure 10. Transaction Page

9) Order Status

Figure 11 shows multiple orders with varied statuses were discernible. Some orders had already attained a "paid" status, denoted by a yellow marker, signifying that they had yet to undergo processing by the kitchen. Subsequently, the order status would transition to "completed" upon the completion of the kitchen system processing.

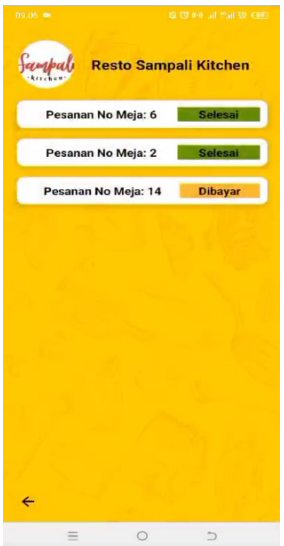

Figure 11. Order Status Page

p-ISSN: **2656-5935** http://journal-isi.org/index.php/isi e-ISSN: **2656-4882**

10) Transaction Report Page

On the specified interface, the system presents detailed transaction reports pertaining to all successfully processed purchases as shown in Figure 12. This report encompasses transactions conducted through two distinct payment methods: direct cash payments via cashier (Cash) and digital payments utilizing the QRIS (Quick Response Code Indonesian Standard) system.

Figure 12. Transaction Report Page

3.4. Verification

The system testing results using blackbox testing, as outlined in the table below, indicated that all pages and commands operated according to the proposed design. The success of this system implementation enables Resto Sampali Kitchen to utilize and deploy it as needed.

Table 1. Blackbox Testing

Testing Scenario	Expected System Outcome	Conclusion
The user accessed the Resto Sp Kitchen Homepage upon first opening the application.	The Resto Sp Kitchen Homepage was displayed by the system.	√
The purchaser accessed the Options Page and opted for the Pickup choice.	The system exhibited the Pickup Options Page and reacted to the user's choice.	√
The purchasing user was provided with a menu page to	The system exhibited the menu page and acknowledged	√

select and place orders for menu items.	the menu selections made by the user.	
The purchaser conducted a transaction on the Transaction Page.	The system exhibited the Transaction Page and reacted to user directives.	√
The cashier and kitchen staff were provided with a login form to access their respective pages of access.	The system exhibited the login page and proceeded by authenticating the usernames and passwords of the cashier and kitchen staff to grant access to their respective pages.	√
The user of the kitchen was presented with the Order Processing Page to verify orders.	The system exhibited the Order Processing Page and acknowledged confirmations from the kitchen employee.	√
The cashier accessed the Transaction Page.	The system exhibited the Transaction Page and acknowledged commands from the cashier.	√
The cashier accessed the Order Status Page.	The system exhibited the Order Status Page.	√
The cashier accessed the Transaction Report Page and was able to print transaction reports.	The system exhibited the Transaction Report Page and acknowledged commands from the cashier.	√

The company conducts regular system maintenance throughout the utilization of this system. System maintenance encompasses various periodic actions to ensure that the system continues to operate smoothly, efficiently, and optimally. This maintenance process is crucial for supporting the company's operational continuity and long-term success.

System maintenance involves key steps such as continuous monitoring of system performance. This monitoring process ensures that all system functions operate correctly and includes the collection of data regarding resource usage, response times, and overall system performance. By consistently monitoring, the company can identify potential issues before they escalate into serious disruptions. In addition to monitoring, the identification and correction of bugs or faults are essential aspects of maintenance. Bugs can arise from various factors, including programming errors, changes in system configuration, or interactions with other software. Once identified, the company promptly undertakes corrective measures to restore the system to proper functionality.

Besides corrections, system maintenance also includes adjustments and enhancements to accommodate changes in the company's needs and technological advancements. These adjustments may involve changes to system configurations or software updates, while enhancements can include the introduction of new features or performance improvements to support increasingly complex operations. This process ensures that the system remains relevant and capable of meeting the company's evolving requirements.

Routine maintenance also serves as a preventive measure to avoid unwanted disruptions or downtime. By performing regular maintenance, the company can mitigate the risk of operational disruptions that could impact productivity and service quality to customers. Additionally, a crucial aspect of maintenance is the assessment of system security. Security maintenance involves regular checks on system security, updating security software, and implementing stringent security policies. This is vital for protecting sensitive data and information from security threats.

Thus, the implementation of regular system maintenance not only ensures that the system functions effectively but also evolve in line with changing business needs and technological advancements. This plays a significant role in maintaining smooth operations, enhancing efficiency, and optimizing system performance to support the company's overall strategic objectives.

4. CONCLUSION

Based on the issues outlined in the Introduction section, including manual payment processes, complex transaction recording, delays in order processing, and errors in menu ordering encountered by the cafe, the development of an Android-based Cashier Information System was deemed an appropriate solution. This system was able to address these challenges by introducing efficiency in transaction management, accuracy in data recording, and minimizing errors and delays in service delivery. The outcomes of the meticulous Black Box Testing conducted on the constructed system closely aligned with the anticipated design. Through the implementation of this Android-based cashier system, it was anticipated that cafe management would become more structured, efficient, and user-friendly for both cafe owners and staff in managing day-to-day transactions. Thus, this conclusion reaffirms that the development of an Android-based Cashier Information System is a strategic step towards enhancing operational efficiency and delivering a better experience for both customers and cafe owners.

REFERENCES

[1] B. B. Faizal and S. Yudha, "Aplikasi Kasir Di Apotik Berbasis Android," *Pros. Semin. Nas. Teknol. Dan Sains*, vol. 2, pp. 65–72, 2023.

[2] M. Y. Sulindawaty, Erlina Laia, "PENERAPAN E-KASIR PADA SAKURA FOOD," *J. Pengabdi. Kpd. Masy. Penusa*, vol. 2, no. 1, pp. 40–44, 2023.

[3] M. T. Rahmawita and A. Wiratama, "Aplikasi Pemesanan Menu Makanan Restoran Dan Cafe Berbasis Android," *J. Ilm. Rekayasa dan Manaj. Sist. Inf.*, vol. 7, no. 1, p. 76, 2021, doi: 10.24014/rmsi.v7i1.11906.

[4] J. Shadiq and R. W. Ratu Lolly, "Sistem Informasi Kasir pada Restoran Siap Saji FoodPanda Berbasis Desktop," *Inf. Manag. Educ. Prof. J. Inf. Manag.*, vol. 5, no. 1, p. 85, 2020, doi: 10.51211/imbi.v5i1.1444.

[5] A. M. I. Pratama and U. Chotijah, "Sistem Informasi Kasir Unit Pelayanan Jasa SMKN 1 Cerme Berbasis Website Dengan Metode Waterfall," *J. Ilm. Ilk. - Ilmu Komput. Inform.*, vol. 5, no. 2, pp. 60–67, 2022, doi: 10.47324/ilkominfo.v5i2.149.

[6] K. Budiharto and S. Andayani, "Analisis Penggunaan Aplikasi Kasir Qasir" Dalam Sistem Informasi Penerimaan Kas di Kala Kopi," *Al-Kharaj J. Ekon. Keuang. Bisnis Syariah*, vol. 5, no. 1, pp. 423–437, 2022, doi: 10.47467/alkharaj.v5i1.1716.

[7] A. Abdul Wahid, "Analisis Metode Waterfall Untuk Pengembangan Sistem Informasi," *J. Ilmu-ilmu Inform. dan Manaj. STMIK*, no. November, pp. 1–5, 2020.

[8] A. A. Kadim, L. Hadjaratie, and M. Muthia, "Implementasi Framework Laravel Dalam Pembuatan Sistem Pencatatan Notula Berbasis Website," *J. Sist. Info. Bisnis*, vol. 13, no. 1, pp. 45–51, 2023, doi: 10.21456/vol13iss1pp45-51.

[9] R. A. Purba and S. Sondang, "Design and Build Monitoring System for Pregnant Mothers and Newborns using the Waterfall Model," *INTENSIF J. Ilm. Penelit. dan Penerapan Teknol. Sist. Inf.*, vol. 6, no. 1, pp. 29–42, 2022, doi: 10.29407/intensif.v6i1.16085.

[10] S. Syahranitazlia, Syahranitazli; Samsudin, "Sistem Informasi Geografis Persenaran Pondok Pesantren Kabupaten Langkat Dan Binjai menggunakan Leaflet," *J. Pendidik. Teknol. Inf.*, vol. 6, no. 1, pp. 2621–1467, 2023.

[11] R. A. Lubis and M. D. Irawan, "Sistem Pakar menggunakan Metode Certainty Factor Mendiagnosa Gizi Buruk Balita berbasis Android," *Edumatic J. Pendidik. Inform.*, vol. 7, no. 2, pp. 505–514, 2023, doi: 10.29408/edumatic.v7i2.24340.

[12] E. S. Damanik and S. Suendri, "Web-Based Village Fund Assistance Distribution Information System Using the Quota Based Method," *SinkrOn*, vol. 8, no. 2, pp. 708–718, 2023, doi: 10.33395/sinkron.v8i2.12208.

[13] N. Oktaviani, I. M. Widiarta, and Nurlaily, "Sistem Informasi Inventaris Barang Berbasis Web Pada Smp Negeri 1 Buer," *J. Inform. Teknol. dan Sains*, vol. 1, no. 2, pp. 160–168, 2019, doi: 10.51401/jinteks.v1i2.422.

[14] M. Z. Batubara and M. I. P. Nasution, "Sistem Informasi Online

Pengelolaan Dana Sosial Pada Rumah Yatim Sumatera Utara," *J. Teknol. Dan Sist. Inf. Bisnis*, vol. 5, no. 3, pp. 164–171, 2023, doi: 10.47233/jteksis.v5i3.819.

[15] R. A. Putri, "Application of Powtoon Animation as a Learning Media Using the Community Based Participatory Action Research (CBPAR) Method," *J-IbM J. IPTEK bagi Masyarakat,* vol. 1, no. 1, pp. 16–22, 2021.

[16] M. Supianti P and A. Ikhwan, "Travel Management Information System Employee Service at the Office of Industry and Trade of Provsu," *SinkrOn*, vol. 8, no. 2, pp. 674–687, 2023, doi: 10.33395/sinkron.v8i2.12213.

[17] A. Ikhwan, R. K. Nugraha, E. A. Syahnur, and R. Ridho, "Perancangan Aplikasi Penilaian Kinerja Driver Menggunakan Kodular Di Pt Perkebunan Nusantara Iii (Persero) Berbasis Mobile," *JOISIE (Journal Inf. Syst. Informatics Eng.*, vol. 7, no. 2, pp. 364–374, 2023.