
Analysis and Design of a Point of Sales (POS) System at Elite Seven Café & Billiard Kisaran

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Abstract:

Efficient sales transaction management is essential for culinary and entertainment businesses such as cafés and billiard venues to ensure fast, accurate, and efficient customer service. However, many businesses still use manual recording systems, which often cause various problems such as delayed recording, transaction calculation errors, and difficulties in preparing sales reports. The development of information technology through a mobile-based Point of Sales (POS) system can serve as a solution because it is able to record transactions automatically, integrate data, and facilitate sales monitoring. Elite Seven Café & Billiard Kisaran still uses manual recording due to employees' limited understanding of mobile-based Point of Sales (POS) systems. Therefore, this study aims to implement a mobile-based POS system to improve transaction recording efficiency, service speed, and business performance at Elite Seven Café & Billiard Kisaran. This research uses the System Development Life Cycle (SDLC) method with the Waterfall model to implement the mobile-based Point of Sale (POS) system at the business. Data were collected through observation, interviews, and documentation. The system development process includes requirements analysis, system design, implementation, and testing stages. The system implementation results are evaluated to determine their ability to improve transaction efficiency, speed up service, and simplify sales reporting. Based on the results of the study, the implementation of the mobile-based Point of Sales (POS) system at Elite Seven Café & Billiard Kisaran improves the operational performance of the business. This system replaces the less efficient and error-prone manual process. The use of the POS system increases service speed, transaction accuracy, and simplifies data and report management. In addition, employees are able to work more effectively, thereby supporting operational efficiency and enabling more accurate decision-making for the business owner.

Keywords: Point of Sales, Business Performance, Mobile, Waterfall, System Development Life Cycle

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1. Introduction

The rapid development of information technology has transformed business operations, particularly in the culinary and entertainment sectors. Digital technologies are increasingly used to improve transaction processing, service delivery, data management, and managerial decision-making. In the restaurant industry, digital transformation has changed both front-of-house and back-of-house activities by integrating various operational processes into information systems (Alt, 2021). Restaurant information technology can also support more effective management of sales, customer services, and operational information (Ansel & Dyer, 1999). Therefore, the ability to adopt appropriate information systems has become increasingly important for businesses seeking to improve operational efficiency and service quality.

Sales transaction management is one of the key operational activities that requires accurate and timely information. This is particularly important for businesses such as cafés and entertainment venues, where multiple transactions involving customer orders, payments, products, and services occur simultaneously. When these activities are managed manually, transaction processing may become time-consuming and susceptible to human error. Manual recording can also make it difficult to retrieve historical transaction information and generate timely sales reports. In contrast, digital information systems provide businesses with opportunities to organize operational data systematically and transform transaction records into useful information for managerial purposes (Ardiansyah & Nugraha, 2022).

One technology widely associated with transaction management is the Point of Sales (POS) system. POS has evolved beyond its conventional function as a payment-processing tool and increasingly serves as an integrated information system supporting restaurant operations. POS technology can facilitate order processing, sales recording, payment management, and the collection of operational data. Manion and Demicco (2005) demonstrated that POS technology in restaurants can support service operations by improving the processing of customer orders and transactions. Similarly, Mandabach et al. (2003) highlighted the important role of POS systems in supporting restaurant management and operational activities.

The implementation of POS systems is particularly relevant to the digitalization of small restaurants and cafés. Velasco et al. (2026) emphasized that POS system development can serve as a digitalization strategy for small restaurants by improving transaction management and providing structured business information. In the food sector, POS systems also generate transaction data that can be utilized to understand business activities and support operational evaluation (Alnafissa et al., 2025). Thus, POS systems should not merely be viewed as cashier applications but as digital infrastructures capable of integrating transaction-related activities within a business.

The value of POS-generated data also extends to managerial decision-making. Restaurant businesses increasingly generate substantial operational data from customer transactions, orders, menu selections, and service activities. Roy et al. (2022) explain that restaurant analytics can utilize such data to support decisions

concerning operations, customer management, menu management, and other business activities. Consequently, systematic transaction recording provides managers with better access to information for monitoring business conditions and evaluating operational performance. Digital POS systems can therefore reduce dependence on fragmented manual records while improving the availability and accessibility of business information.

Despite these advantages, the adoption of integrated transaction systems remains uneven, particularly among small and medium-sized businesses. Some businesses continue to rely on manual procedures because their existing operational processes have not yet been transformed into integrated digital systems. This creates a gap between the potential benefits of information technology and its actual utilization in daily business activities. Previous POS development studies have demonstrated that information systems can be designed to accommodate different operational requirements. For example, Naufal et al. (2022) developed a multi-outlet POS information system to facilitate transaction management, while Damara et al. (2024) designed a POS system for a café environment. These studies demonstrate the flexibility of POS systems in addressing specific organizational and operational needs.

Developing an appropriate POS system, however, requires a systematic analysis of business processes and user requirements before implementation. A system should be designed according to actual operational conditions rather than simply adopting generic POS functionalities. The System Development Life Cycle (SDLC) provides a structured approach to information system development through sequential stages of requirements identification, analysis, design, implementation, and evaluation. The Waterfall model remains applicable when system requirements can be identified systematically at the beginning of development. Ningsih and Nurfauziah (2023) indicate that the Waterfall model provides a sequential development process that distinguishes it from more iterative approaches such as prototyping. The model has also been applied to the design of web-based information systems (Angin & Susilo, 2022) and other transaction-oriented information systems (Alviyan & Badrul, 2026).

Elite Seven Café & Billiard Kisaran represents a business environment in which culinary services and billiard entertainment activities operate within the same service process. Based on preliminary observations, customer orders and sales transactions at Elite Seven Café & Billiard Kisaran are still recorded manually using paper, while an integrated POS system has not yet been implemented. This process requires employees to manually record customer orders, calculate transactions, and compile sales reports. Consequently, transaction data retrieval and report preparation require additional time and are potentially susceptible to recording and calculation errors.

The operational characteristics of Elite Seven Café & Billiard Kisaran also create requirements that differ from those of a conventional café. The business must manage not only food and beverage transactions but also billiard table bookings and usage, customer orders, payments, and sales reporting within an interconnected process. Although previous studies have addressed POS systems for restaurants, cafés, and multi-outlet businesses (Damara et al., 2024; Manion & Demicco, 2005; Naufal et al., 2022; Velasco et al., 2026), the integration of billiard table booking and café

transaction management within a single POS system remains relatively less explored. This operational characteristic creates a specific system requirement and constitutes the practical gap addressed in this study.

Therefore, this study aims to analyze the existing business processes and design an integrated Point of Sales (POS) system for Elite Seven Café & Billiard Kisaran. The proposed system is designed to support billiard table booking, food and beverage ordering, transaction processing, payment recording, and sales report generation within an integrated information system. The system design is expected to minimize manual recording, improve transaction data accuracy, facilitate information retrieval, and provide more structured operational information for business management.

The outcomes of this study include business process analysis, system requirements, system models, database design, and user interface prototypes that can serve as the foundation for future system implementation. By integrating café transaction management and billiard table services into a unified POS design, this study provides a system model specifically adapted to the operational characteristics of a café and billiard business.

2. Theoretical Background

Point of Sales System

A Point of Sales (POS) system is an information system designed to record, process, and manage sales transactions at the point where transactions occur. In modern business environments, POS systems are no longer limited to cash register functions but have developed into integrated information systems that support transaction processing, order management, sales recording, and operational data management. Mandabach et al. (2003) explain that POS systems have an important role in restaurant management because transaction information generated through the system can support various operational activities and managerial processes.

In the foodservice industry, POS systems facilitate the systematic recording and processing of customer transactions. Stein (2005) highlights the application of POS technology in foodservice operations, demonstrating its role in managing transaction-related information. Similarly, Velasco et al. (2026) emphasize that POS systems can serve as an important digitalization strategy for small restaurants by transforming conventional transaction processes into structured digital processes. Therefore, POS implementation can reduce dependence on manual transaction recording and provide more organized information for business operations.

POS systems also generate valuable transactional data that can support business monitoring and decision-making. Alnafissa et al. (2025) demonstrate the importance of POS-generated transaction data in the food sector, while Roy et al. (2022) explain that restaurant transaction and operational data can be utilized for analytics and managerial decision-making. Thus, an integrated POS system can support not only transaction processing but also the availability of structured data for evaluating restaurant and café operations.

Mobile-Based Point of Sales

A mobile-based Point of Sales system extends conventional POS functionality by enabling transaction processing through portable devices such as smartphones and tablets. Mobile POS provides greater flexibility because employees can record customer orders and transaction information directly at the point of service without relying exclusively on a fixed cashier terminal. This approach is particularly relevant to cafés and restaurants where employees frequently interact directly with customers at different tables or service areas.

Manion and Demicco (2005) examined handheld wireless POS systems in the restaurant industry and demonstrated the potential of portable POS technology to support restaurant service operations. Handheld POS systems enable employees to process customer orders through mobile devices, allowing information to be transmitted more efficiently within restaurant operations. Such technology can reduce the gap between customer ordering and transaction recording while supporting faster information processing.

The implementation of mobile and digital POS systems also reflects the broader transformation of restaurant operations. Alt (2021) explains that digital transformation has increasingly affected both front-of-house and back-of-house restaurant activities. Integrating mobile transaction processing with restaurant information systems can therefore provide greater accessibility and flexibility in managing customer orders and sales transactions. For a café and billiard business, mobile POS functionality can be particularly useful because employees need to manage transactions across different service areas, including café tables and billiard tables.

POS Systems in Café and Restaurant Operations

Cafés and restaurants have operational characteristics that require the coordination of multiple activities, including customer ordering, product selection, payment processing, and sales reporting. Information technology can facilitate the integration of these activities and improve access to operational information. Ansel and Dyer (1999) emphasize that information technology has an important role in restaurant operations and can provide a framework for integrating information into restaurant management processes.

More recent developments demonstrate that digital technologies have expanded the role of information systems in restaurant management. Restaurant-generated data can be utilized to support operational decisions related to ordering, menu management, customer management, and other service activities (Roy et al., 2022). POS systems represent one of the primary sources of such operational data because customer transactions are systematically recorded through the system.

The implementation of POS technology is also relevant for small restaurant and café businesses seeking to transition from manual to digital processes. Velasco et al. (2026) proposed POS system design as a digitalization strategy for small restaurants, emphasizing the potential of such systems to improve transaction management and

data availability. Similarly, Damara et al. (2024) designed a POS information system for Cafe Calandra using the Laravel framework, demonstrating that POS systems can be adapted to the specific operational requirements of café businesses. These findings support the development of customized POS solutions rather than relying solely on generic transaction systems.

System Development Using the Waterfall Model

The development of an information system requires a structured methodology to ensure that the resulting system corresponds to user requirements and existing business processes. One commonly applied approach is the System Development Life Cycle (SDLC), particularly the Waterfall model. The Waterfall model organizes system development into sequential stages, where the output of one stage provides the foundation for the subsequent stage.

Ningsih and Nurfauziah (2023) compared the Waterfall and Prototype models in information system development and explained that the Waterfall approach follows a systematic and sequential development process. This characteristic makes the model appropriate when system requirements and business processes can be identified clearly during the initial stages of development. Angin and Susilo (2022) also applied a structured system analysis and design approach in developing a web-based information system, demonstrating the importance of systematically identifying user requirements and translating them into system designs.

The Waterfall model has also been implemented in the development of transaction- and service-oriented information systems. Alviyan and Badrul (2026), for example, applied the Waterfall model in designing an information system for a music studio rental business. This context has similarities with billiard operations because both involve managing the use or rental of service facilities over a particular period. Therefore, the Waterfall model is considered appropriate for designing the POS system at Elite Seven Café & Billiard Kisaran, where system requirements such as billiard table booking, food and beverage ordering, payment processing, and transaction reporting can be identified and modeled systematically.

Previous Studies

Several previous studies have demonstrated the application of POS systems in restaurant, café, and other transaction-oriented business environments. Manion and Demicco (2005) investigated handheld wireless POS systems in the restaurant industry and highlighted the role of portable POS technology in supporting restaurant transaction and service processes. The study provides an important foundation for understanding how mobile POS technology can facilitate transaction processing directly within the customer service area.

Naufal et al. (2022) developed a multi-outlet Point of Sale information system using the Laravel framework at Koperasi ITSNU Pekalongan. The system was designed to support transaction management across multiple outlets and demonstrates how POS applications can integrate transaction information into a centralized information

system. This study indicates that POS functionality can be customized according to the organizational structure and operational requirements of a business.

Damara et al. (2024) developed a Point of Sales information system for Cafe Calandra using the Laravel framework. The study is particularly relevant because it focuses on the café business environment, where transaction management involves customer orders and sales activities. The development demonstrates the applicability of web-based POS systems for supporting café operations and provides a reference for designing transaction systems based on specific business requirements.

Velasco et al. (2026) designed and proposed a POS system as a digitalization strategy for small restaurants. Their study emphasizes that POS implementation can support the transition from conventional operational procedures to more structured digital processes. This research is particularly relevant to the present study because Elite Seven Café & Billiard Kisaran currently relies on manual transaction recording and therefore requires a system capable of integrating its operational processes.

Furthermore, Alviyan and Badrul (2026) applied the Waterfall model to design an information system for a music studio rental business. Although the business context differs from a café and billiard establishment, the study provides relevant insights into the management of facility rental and service transactions. This characteristic is applicable to billiard table management, where table availability, usage duration, and payment information must be systematically recorded.

Despite these developments, previous studies have predominantly focused on conventional café or restaurant transactions, multi-outlet sales, or facility rental as separate business processes. Limited attention has been given to POS system designs that simultaneously integrate billiard table booking and usage, food and beverage ordering, payment transactions, and sales reporting within a single system. Elite Seven Café & Billiard Kisaran has distinct operational characteristics because its business combines culinary services with time-based billiard table services. Therefore, the present study addresses this practical gap by analyzing and designing an integrated POS system specifically adapted to these combined operational requirements.

3. Methodology

This study uses the System Development Life Cycle (SDLC) method with the Waterfall model as the system development approach. The SDLC stages include planning, analysis, design, implementation, testing, and maintenance. In addition, this study also applies the Unified Modeling Language (UML), such as Use Case Diagram, Activity Diagram, and Class Diagram, to visualize, design, and document the Point of Sale (POS) system. This research is descriptive in nature, with data collection techniques including observation, interviews, and literature review to identify system requirements. The research was conducted at Elite Seven Café & Billiard Kisaran over a period of approximately four months, covering preparation, data collection, system design, and report writing stages. The research procedures include identifying

problems in the current manual system, collecting data through observation and interviews, analyzing system requirements, designing the system using UML, and developing a prototype interface as a representation of the proposed system. The tools and materials used in this study consist of hardware such as a laptop and network devices, as well as software including Windows, Visual Paradigm Online, Microsoft Word, and a web browser. The data used includes sales transaction data, menu and pricing data, and sales reports. Data analysis is conducted through analysis of the current system, system requirements analysis, system design analysis, and prototype analysis to produce a POS system design that meets the operational needs of the business.

4. Empirical Findings/Result

Basic Planning: At the basic planning stage, a research schedule is prepared, which includes problem identification, data collection, system requirements analysis, system design, prototype development, and preparation of the research report. This planning is carried out to ensure that each research stage runs in a structured manner and in accordance with the predetermined timeline.

Requirements Analysis: Requirements analysis is conducted to identify user needs for the system to be designed. This stage is carried out through observation, interviews, and documentation to obtain information about business processes, user requirements, and problems occurring in the current system.

Conceptual Design: This study applies the System Development Life Cycle (SDLC) using the Waterfall model, which provides a structured and sequential approach to system development. The conceptual design stage focuses on identifying system requirements, business processes, actors, and information needs for the mobile-based Point of Sales (POS) system at Elite Seven Café & Billiard Kisaran. An Object-Oriented Analysis and Design (OOAD) approach is used, with system modeling developed through Unified Modeling Language (UML), including Use Case Diagrams, Activity Diagrams, and Class Diagrams, created using Visual Paradigm Online.

Research Planning: This research is directed toward designing a mobile POS system for Elite Seven Café & Billiard Kisaran that integrates table booking, food and beverage ordering, payment transactions, and operational reporting into a single system. As a form of visualization, this study also produces a prototype interface that illustrates the system's appearance and functionality before the implementation stage.

Requirements Analysis: The requirements analysis stage identifies user needs for the mobile-based POS system through observation, interviews, and documentation. Observation shows that ordering, transaction recording, and reporting are still done manually, leading to inefficiency and errors. Interviews with the owner and employees reveal key issues such as unintegrated transaction data, difficulties in report preparation, and limited access to real-time sales information. Documentation is used

to collect transaction records and related operational data, consisting of primary data from direct field activities and secondary data from literature sources such as journals and books related to POS systems.

Conceptual Design

Use Case Diagram: The Use Case Diagram is used to illustrate the interaction between users and the mobile-based Point of Sales system implemented at Elite Seven Café & Billiard Kisaran.



Figure 1. Use Case Diagram

Based on the Use Case Diagram, the proposed Mobile POS system for Elite Seven Café & Billiard involves four main actors: Admin, Waiters, Cashier, and Owner, each with specific access rights according to their operational responsibilities. The Admin manages system data, including users, menus, pricing, and billiard tables; Waiters handle customer orders and order confirmations; Cashiers manage table bookings, transaction processing, payment handling, and receipt printing; while the Owner accesses sales, transaction, and revenue reports for business monitoring and decision-making. The use case diagram clearly defines the functional requirements of the system and ensures that each user can perform tasks according to their assigned roles and permissions.

Activity Diagram: Activity Diagram is used to illustrate the main activities and the relationships between activities in a process. This diagram can also be used to show the workflow of a system or business process. It should be noted that an activity diagram focuses on the activities performed by the system, not on the actions performed by actors. Several activity diagrams applied in the system are shown in the following figure.

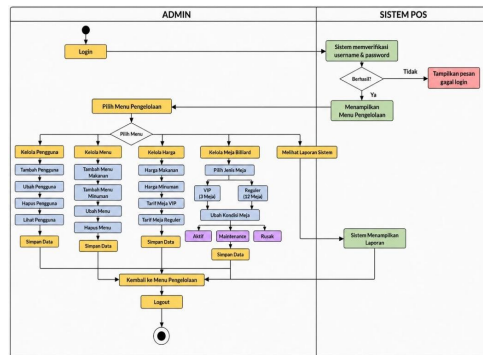


Figure 2. Activity Diagram of Admin (Managing Product Data)

The Admin Activity Diagram illustrates the workflow performed by the administrator in managing the Mobile POS system. The process begins with login authentication, followed by access to various management functions, including user management, menu management, pricing management, and billiard table management. The Admin can add, edit, delete, and view system data, while all changes are automatically stored in the database. In addition, the Admin can monitor operational activities through system reports before logging out of the system. This workflow ensures effective management of system data and supports smooth business operations.

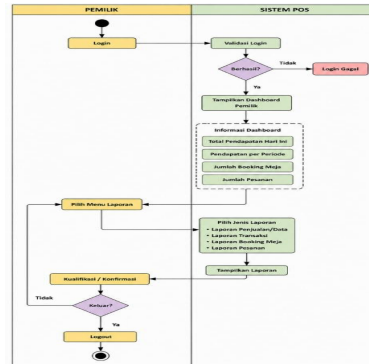


Figure 3. Activity Diagram of Owner (Viewing Sales Reports)

The Owner Activity Diagram illustrates the process of accessing and reviewing business reports through the Mobile POS system. The workflow begins with the owner logging into the system and accessing the dashboard, which provides information on revenue, table bookings, and customer orders. The owner can select and view various reports, such as sales reports, booking reports, and order reports, to monitor business performance and support decision-making. After reviewing the required information, the owner may access additional reports or log out, completing the process. This workflow enables efficient monitoring and evaluation of business operations through a centralized reporting system.

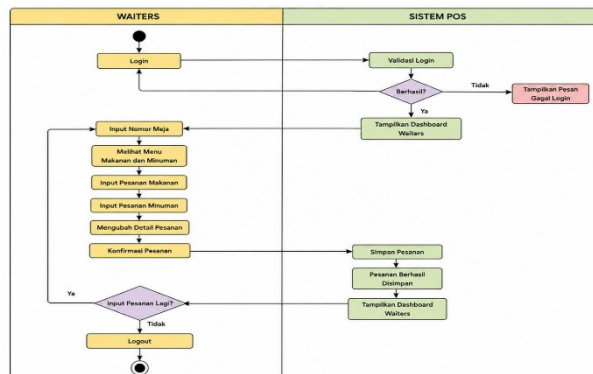


Figure 4. Activity Diagram of Waiters (Processing Orders)

The Waiters Activity Diagram illustrates the workflow for managing customer orders within the Mobile POS system. The process begins with the waiters logging into the system, selecting the customer's table, and accessing the available food and beverage menu. Waiters then record customer orders, make modifications when necessary, and confirm the order once all details are correct. After confirmation, the system stores the order data for subsequent transaction processing. Finally, the waiters log out of the system. This workflow helps ensure accurate order recording, efficient service, and seamless integration with the transaction process.

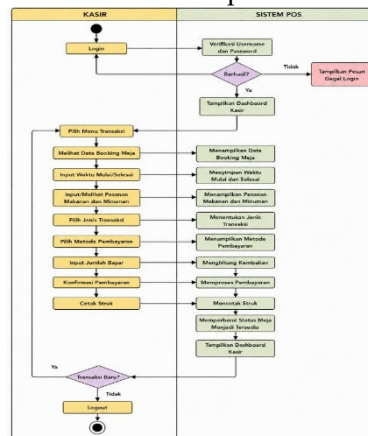


Figure 5. Activity Diagram of Cashier (Payment)

The Cashier activity diagram describes the workflow of processing customer transactions in the POS system. It begins with login authentication, followed by access to booking and order data. The cashier then records billiard usage time, after which the system automatically calculates playing duration and table fees. The cashier selects the appropriate transaction type (billiard, café, or combined), and the system generates the total payment by combining all charges. Next, the cashier processes payment using methods such as cash, QRIS, or bank transfer, prints the receipt, and updates table status to available. Finally, the system saves the transaction data and the cashier logs out, ensuring proper transaction recording and operational efficiency.

Class Diagram: A class diagram illustrates classes, including their behavior and state, along with the relationships between classes. The class diagram for Elite Seven Café & Billiard is shown in the following figure:

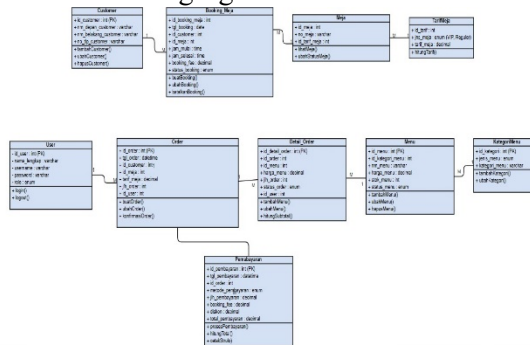


Figure 6. Mobile-Based POS Class Diagram of Elite Seven Café & Billiard

The Class Diagram in Figure 3.7 of the Mobile-Based POS System for Elite Seven Café & Billiard is used to describe the structure of the Point of Sale (POS) system, which consists of classes, attributes, methods, and relationships between classes. This class diagram includes the classes Customer, Booking_Table, Table, TableRate, User, Order, OrderDetail, Menu, MenuCategory, and Payment. Each class has its own function in managing customer data, table bookings, menu ordering, and payments. The relationships between classes show the data connections used to support integrated operational processes at Elite Seven Café & Billiard Kisaran.

System Interface Design: This section explains the design of the proposed Mobile Point of Sales (POS) system interface for Elite Seven Café & Billiard. The interface design is prepared to provide an overview of the system's features, functions, and usage flow that can be accessed by each user according to their access rights.

Login Interface

POS Mobile Elite Seven

Username:

Password:

Figure 7. Login Interface

The login page is the first page displayed when the Elite Seven Café & Billiard Mobile POS application is launched. This page is used to perform user authentication to ensure that only authorized users can access and use the features available in the system. To access the system, users are required to enter a valid username and password. After a successful login process, the system will display the main page according to the user's access rights. The system's access roles consist of Admin,

Cashier, Waiters, and Owner. Each user will receive a different dashboard view and features according to their duties and authority within the system.

Admin Interface



Figure 8. Admin Interface

The Admin Dashboard serves as the main interface for users with administrator access in the Elite Seven Café & Billiard Mobile POS system. It functions as a central hub that connects the Admin to key management features, including user, menu, price, and billiard table management. Through this dashboard, the Admin can add, update, and delete user and menu data, adjust pricing for food, beverages, and table rates, as well as monitor and update billiard table statuses using color indicators. This interface ensures efficient system control and supports smooth operational management of the business.

Waitress Interface

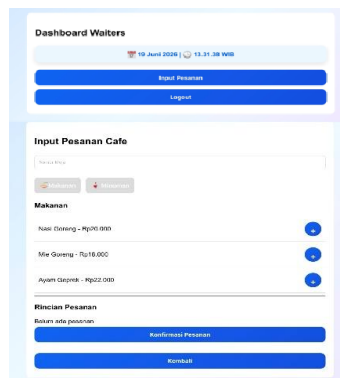


Figure 9. Waitress Interface

The Waiters Dashboard is the main interface for users with Waiters access after logging into the system. It provides an order entry feature that allows waiters to manage customer orders, including viewing menus, recording orders, making adjustments, and confirming them. Through the Order Entry page, waiters input the customer's table number and select ordered food and beverages. Once all data is

correct, the order is confirmed and saved into the system for further processing, ensuring accurate and efficient order management.

Cashier Interface

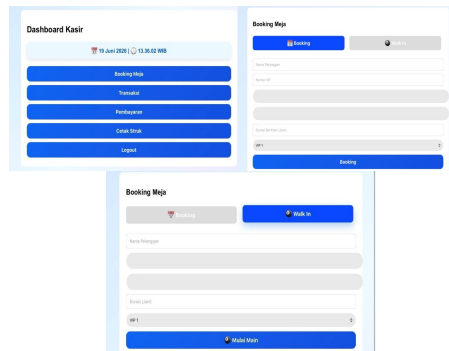


Figure 10. Cashier Interface

The Cashier Dashboard is the main interface accessed after a cashier logs into the system. It provides key operational menus such as table booking, transactions, payments, receipt printing, and logout, enabling complete management of customer transactions. Through the Table Booking page, the cashier records billiard reservations by entering customer details, selecting date and time, determining usage duration, and choosing available tables. The system supports both advance bookings and walk-in customers, while also displaying table status using color indicators such as available, booked, occupied, maintenance, and out of service to support efficient operational control.

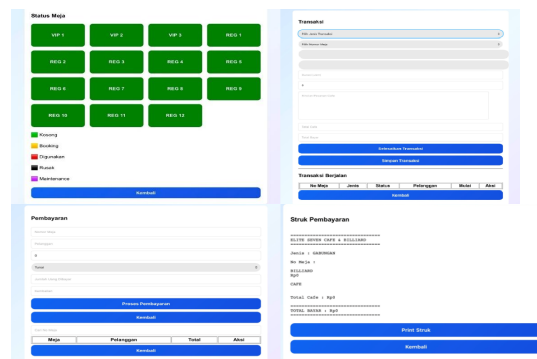


Figure 11. Second Cashier Interface

The Transaction Page allows the cashier to manage the calculation of customer charges through three types of transactions: billiard, café, and combined transactions. Billiard transactions calculate rental fees based on play duration, while café transactions display and calculate food and beverage orders entered by waiters. Combined transactions merge both costs into a single total payment. The page also includes an active transactions section showing ongoing orders with key details such as table number and status. Afterward, the Payment Page is used to process completed transactions by displaying billing details, supporting search by table number, and

automatically calculating change based on the amount paid. Finally, the Payment Receipt Page provides a printable proof of transaction containing complete payment details, ensuring accurate documentation and record keeping.

Owner Interface

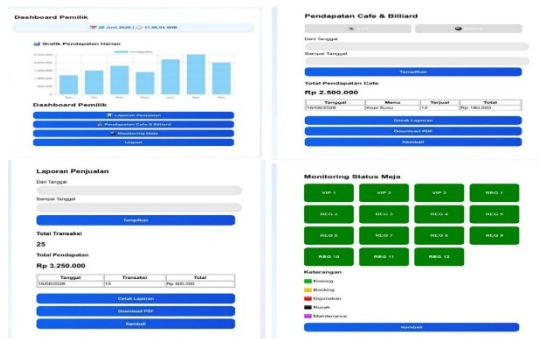


Figure 12. Owner Interface

The Owner Dashboard provides access to key business monitoring features in the POS system, including sales reports, café and billiard revenue, and table status monitoring. Through this system, the owner can view daily revenue trends using a bar chart, analyze sales performance within a selected period, and access detailed transaction data with options to print or download reports in PDF format. The system also allows revenue breakdowns by café and billiard categories, helping in financial analysis. Additionally, table status monitoring displays the condition and availability of all billiard tables using color indicators, enabling the owner to track operations efficiently without modifying system data.

Current System Analysis: The current system analysis shows that operational activities at Elite Seven Café & Billiard are still performed manually, including menu management, customer order recording, payment transactions, and sales reporting. This manual process causes several issues such as recording errors, inaccurate calculations, risk of data loss, and delays in report generation. In addition, billiard table usage recording and payment processing are still done conventionally, making the system inefficient and prone to human error.

System Requirements Analysis: The system requirements analysis includes hardware, software, and user requirements needed to develop the Mobile POS system. Hardware requirements include a desktop computer, Android tablet, thermal printer, and internet connection. Software requirements include Windows 10 or later, Visual Studio Code, MariaDB as the database management system, and Apache as the web server. These requirements are designed to support the development and operation of an integrated and efficient POS system.

5. Discussion

This research produces a Mobile Point of Sales (POS) system design for Elite Seven Café & Billiard based on identified user requirements and existing operational processes. The proposed system is designed to integrate several previously fragmented activities, including user management, food and beverage menu management, billiard table management, table booking, customer ordering, payment transactions, and sales reporting. The integration of these functions is important because POS systems have developed beyond conventional cashier applications into information systems capable of supporting broader restaurant operational and managerial activities (Mandabach et al., 2003). The proposed design is therefore intended not only to digitalize transaction recording but also to establish an integrated information flow across the main operational activities of Elite Seven Café & Billiard.

The findings of the system analysis indicate that the previous manual process creates limitations in transaction recording, data retrieval, and report preparation. The proposed Mobile POS design addresses these limitations by allowing transaction data to be recorded and stored systematically in an integrated database. This finding is consistent with Velasco et al. (2026), who emphasize that POS system implementation can serve as a digitalization strategy for small restaurants by transforming conventional operational processes into structured digital processes. Similarly, Damara et al. (2024) demonstrate the applicability of POS information systems in a café environment, particularly for supporting transaction management and organizing sales information. Thus, the proposed system at Elite Seven Café & Billiard represents a transition from fragmented manual recording toward a more integrated digital transaction environment.

One important characteristic of the proposed system is its mobile-based design. Waiters can use mobile devices to record customer orders directly from the service area without having to rely on paper-based order records or repeatedly communicate transaction details to a fixed cashier station. This design is consistent with Manion and Demicco (2005), who identified handheld wireless POS technology as a relevant solution for restaurant environments because it supports transaction processing directly within service operations. Mobile accessibility is particularly relevant at Elite Seven Café & Billiard because employees must serve customers across both café and billiard areas. Consequently, the mobility provided by the proposed system can shorten the information flow between order placement, transaction recording, and payment processing.

The proposed design also differentiates system access according to four main user roles: admin, waiter, cashier, and owner. Each user is provided with functions that correspond to their responsibilities. The waiter focuses on customer orders and service-related activities, the cashier manages payment transactions, the admin maintains operational master data, and the owner accesses reports and business information. Such role-based separation provides a clearer organizational structure for system utilization and reduces unnecessary access to functions outside each user's

responsibility. This supports the broader concept that restaurant information technology should be aligned with operational and managerial requirements rather than functioning merely as a transaction-recording mechanism (Ansel & Dyer, 1999).

Another important feature is the integration of food and beverage transactions with billiard table management. Unlike conventional café POS systems that primarily focus on product ordering and payment, Elite Seven Café & Billiard requires the system to manage both product-based and service-based transactions. Billiard table data, availability, booking information, and customer usage must be connected with customer orders and payment transactions. This characteristic makes the proposed system different from conventional café POS designs. Previous research has demonstrated that POS systems can be customized according to specific business requirements, including café operations (Damara et al., 2024) and multi-outlet transaction management (Naufal et al., 2022). In addition, Alviyan and Badrul (2026) demonstrate how an information system can be designed to manage facility rental activities systematically. The present study extends these ideas by combining café transactions and time-based billiard table services within a single POS system design.

The integration of payment and transaction data is also expected to improve the quality and availability of operational information. Every transaction processed through the proposed system can be stored in a structured database, allowing transaction histories and sales information to be retrieved more efficiently than through manual records. POS-generated data have value beyond transaction processing because they can become a source of information for business monitoring and evaluation. Alnafissa et al. (2025) demonstrate the importance of POS transaction data in analyzing activities within the food sector. Furthermore, Roy et al. (2022) argue that restaurant-generated data can support analytics and managerial decision-making related to menu management, customer activities, and restaurant operations. Therefore, the reporting function designed in this study has the potential to provide the owner with more systematic information for monitoring business activities.

From a system development perspective, the use of a structured design approach allows operational requirements to be translated into system components before implementation. The system is modeled using Unified Modeling Language (UML) to represent user interactions, activity flows, and relationships among system components. The database structure is subsequently designed to connect users, menus, billiard tables, bookings, orders, payments, and reports. This structured approach is consistent with the sequential nature of system development discussed by Ningsih and Nurfauziah (2023), in which clearly identified requirements provide an important foundation for subsequent system development stages. Similar structured approaches have also been applied to web-based information system design (Angin & Susilo, 2022).

The proposed system also reflects the broader digital transformation occurring within the restaurant industry. Alt (2021) explains that digital transformation affects both front-of-house and back-of-house restaurant activities and increasingly connects customer-facing processes with internal operational systems. In the context of Elite

Seven Café & Billiard, mobile ordering represents the front-of-house component, while transaction management, database storage, payment processing, and reporting support back-of-house activities. Integrating these processes into a single POS design can therefore create a more connected operational environment and reduce dependence on manual information transfer.

The results also have practical implications for business management. The owner can obtain more structured transaction and sales information, while employees can perform their respective operational functions through clearly defined system access. When implemented, this design has the potential to reduce duplicate recording, minimize transaction-recording errors, simplify data retrieval, and accelerate report preparation. This is consistent with the role of digital information systems in improving the organization and accessibility of business information (Ardiansyah & Nugraha, 2022). Moreover, systematic transaction data can provide a foundation for future restaurant analytics and data-driven management practices (Roy et al., 2022).

The main contribution of this research lies in the design of an integrated Mobile POS system that accommodates the combined operational characteristics of a café and billiard entertainment business. Previous studies have primarily examined restaurant POS systems (Manion & Demicco, 2005; Velasco et al., 2026), café POS applications (Damara et al., 2024), multi-outlet POS systems (Naufal et al., 2022), or facility rental information systems (Alviyan & Badrul, 2026) as separate contexts. In contrast, the proposed design integrates **billiard table booking and usage, food and beverage ordering, transaction processing, payment management, and reporting within a single mobile-based information system**. This integration represents the practical contribution of the study because the system design is specifically adapted to the operational requirements of Elite Seven Café & Billiard Kisaran.

Nevertheless, the results of this study remain at the analysis and system design stage. Therefore, the expected improvements in transaction speed, recording accuracy, service efficiency, and reporting effectiveness have not yet been empirically evaluated through full system implementation. Future research should proceed to application development and conduct functional testing, usability evaluation, and user acceptance assessment involving admins, waiters, cashiers, owners, and, where relevant, customers. Further development may also incorporate inventory management, automatic calculation of billiard usage duration and fees, digital payment integration, customer relationship management, and analytical dashboards. Such developments would extend the POS system from an operational transaction tool into a more comprehensive digital platform for supporting managerial decision-making at Elite Seven Café & Billiard Kisaran.

6. Conclusions

This study concludes that operational processes at Elite Seven Café & Billiard Kisaran are still carried out manually, making them inefficient, especially in order recording, table booking, payment processing, and reporting. Therefore, a integrated Point of

Sale (POS) system is designed to support all these processes, using Unified Modeling Language (UML) such as Use Case Diagram, Activity Diagram, and Class Diagram. The research results include system design, database relationships, and interface prototypes that can be used as a reference for application development. It is also recommended that the system be further developed into a fully functional application, enhanced with features such as inventory, customer management, and digital payments, and tested and evaluated before full implementation.

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