Mobile Application Development Analysis for Cafe Reservations and Delivery Order

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ABSTRACT

Owning a cafe is one of a business that is currently trending in Indonesia, especially in Pekanbaru. Technology development today makes the competition between cafe owners increasingly tight. As a result, several problems arise when cafe managers want to advance their cafe in the field of digital business that is more efficient, fast, and sophisticated to reach more customers. One of the problems is that customers want to make delivery orders online easily and quickly. Several online food services have solved this problem, but the increasingly expensive delivery costs have made many customers reluctant to use them. On the other hand, another problem arises when a cafe customer wants to make a reservation to dine in. The limited space available and the difficulty of cafe employees organizing tables have a negative effect on customer satisfaction to want to come to the cafe. So, to solve some of these problems, a mobile application was developed that can help customers to make ordering food and drinks easier to deliver and place reservations online. The development of this mobile application is based on Android. Based on the survey results in the case study Jeber Cafe Pekanbaru, where Android mobile device users dominate the customers. After the software development is complete, an evaluation is carried out using UAT and a survey which results in a statement that the developed Mobile Application can be used properly and is beneficial for all stakeholders.

Keywords: cafe, online delivery order, online reservations, mobile application
1. INTRODUCTION

The cafe business is a fast-growing business, also promising at this time. The number of cafes in Pekanbaru makes the competition more competitive. Technology development today makes the competition between cafe owners increasingly tight for digital food services to reach customers and provide them with high-quality services [1]. As a result, several problems arise when cafe managers want to advance their cafe in the field of digital business that is more efficient, fast, and sophisticated to reach more customers. One of the problems is that customers want to make delivery orders online easily and quickly. The use of technology in the delivery order feature is believed to be a fast, efficient, and up-to-date business marketing channel. The delivery order itself is offered in two ways. The first way is a call center by telephone. With this feature, customers can order food or drinks at the cafe without coming and only need to wait for the food and drinks to be delivered to the customer's destination address.

Beyond the traditional approach of using call centers for telephone orders, cafes have embraced a second method—leveraging online food order services for delivery. This method is a potent revenue booster, presenting cafes with the opportunity to tap into a broader customer base. However, like any system involving third-party services, it is not without its drawbacks. Cafe managers are confronted with the necessity of paying fees to these external services for access, introducing an additional cost element into their operational expenses. Moreover, a profit-sharing model often comes into play, where a portion of the revenue generated through these services is relinquished to the third party [2]. From the customer's standpoint, the escalating delivery costs associated with these services have led to a degree of hesitancy among patrons, as the convenience of delivery may come at a premium.

Amidst these challenges, cafe managers, driven by a fervent desire to enhance services and mitigate dependency on external platforms, have conceived a novel solution—a reservation service. This service is tailored for individuals seeking to dine or engage in various activities directly at the cafe without the uncertainty of available space. Traditionally, customers would call the cafe's phone number to secure a reservation, and the details would be manually recorded on paper. While effective to some extent, this conventional system is not without its vulnerabilities.

One notable weakness lies in the high risk of duplication inherent in manual paper-based processes. The reliance on handwritten records increases the likelihood of errors and confusion, potentially leading to overlapping reservations or overlooked customer preferences. Furthermore, the antiquated paper-based reservation system exposes cafes to the risk of data loss. If not meticulously managed, crucial reservation data may be misplaced, rendering it inaccessible when needed for reference or future bookings [3].

Recognizing the limitations of the conventional reservation system, the cafe industry is poised for a transformative shift. The envisioned change involves the integration of innovative technologies and digital platforms to streamline and enhance the reservation process. By embracing digital solutions, cafes can not only eliminate the risks associated with paper-based systems but also offer customers a more seamless and efficient reservation experience, while the utilization of third-party delivery services has expanded the reach and income potential for cafes, it comes with inherent challenges such as added costs and customer reluctance. In response, the introduction of a reservation service represents a strategic move by cafe managers to diversify offerings and reduce dependence on external platforms. However, the limitations of the conventional reservation system necessitate a transition to digital solutions, ensuring accuracy, efficiency, and enhanced customer satisfaction in the evolving landscape of cafe operations.

In the realm of cafe operations, a significant challenge emerges when customers seek to make reservations for dining in. The constraints of limited space coupled with the intricate task of organizing tables often lead to suboptimal customer experiences. The resultant dissatisfaction may dissuade potential patrons from choosing the cafe as their preferred destination.

To address these challenges and elevate the overall cafe experience, cafe owners find themselves in need of a tailored system designed to optimize their business processes. At the core of this need is the imperative to
implement a system that not only caters to current requirements but also enhances customer convenience, expedites order placement, and efficiently organizes operations to minimize delivery costs. The burgeoning market for food delivery applications, particularly those compatible with smartphones, is indicative of a growing trend that aligns with the evolving lifestyles of consumers [4, 5].

Recognizing the prevalence of mobile device usage in Pekanbaru, the focal point of this research case study, the approach to system development is strategically directed towards the creation of mobile-based applications. The rationale is to align with the prevailing technological landscape and cater to the preferences of the target demographic. A mobile application is meticulously crafted to facilitate seamless food and beverage orders for delivery and streamline the process of placing reservations online. Notably, the development is tailored for the Android platform, a strategic decision driven by survey results conducted at Jeber Cafe in Pekanbaru. The survey revealed a dominance of Android mobile devices among the cafe's clientele.

The envisioned mobile application emerges as a comprehensive solution, designed not only to meet the immediate needs of customers but also to catalyze innovation that adds tangible value to the cafe's business. The anticipated value addition extends beyond customer satisfaction, with a primary focus on enhancing the cafe's income streams and optimizing the intricacies of its buying and selling processes. The dual functionality of facilitating delivery orders and online reservations is poised to revolutionize the cafe's operational dynamics.

As the mobile application takes shape, its multifaceted impact becomes evident. The streamlined order placement process ensures that customers can navigate the menu, select items, and place orders with ease and efficiency. This not only enhances the customer experience but also contributes to increased order frequency and customer loyalty. The online reservation feature addresses the spatial constraints faced by cafes, allowing customers to secure a spot at their preferred time without the risk of limited availability. This anticipatory approach to table management contributes significantly to customer satisfaction and serves as a unique selling point for the cafe.

Moreover, the choice to focus on Android development is validated by the survey results, aligning the application with the prevailing preferences of the target audience. The Android-based mobile application becomes a user-friendly and accessible tool for a majority of customers, ensuring widespread adoption and engagement.

The mobile application’s potential impact extends beyond immediate customer interactions. It has the transformative power to optimize the cafe’s internal processes, providing administrators with a centralized dashboard for menu management, order tracking, and reservation oversight. The digital transition mitigates the risks associated with conventional paper-based systems, eliminating duplication errors and data loss. This shift towards digitalization not only enhances operational efficiency but also positions the cafe as a technologically adept and forward-thinking establishment.

Meanwhile, the development of a mobile-based application for Jeber Cafe in Pekanbaru represents a strategic response to the challenges inherent in the cafe industry. By leveraging technology to streamline order placement, enhance reservation processes, and address spatial constraints, the application is poised to be a transformative force. The decision to focus on Android development aligns with the preferences of the target demographic, ensuring widespread accessibility and adoption. Beyond immediate customer interactions, the application has the potential to revolutionize internal processes, optimizing menu management and order tracking. As the cafe industry continues to evolve, such innovations serve as a testament to the commitment of cafe owners to deliver exceptional experiences, drive revenue growth, and stay ahead in an increasingly competitive landscape.
2. PREVIOUS RESEARCH

Reservation comes from the verb reserve, which means to order and provide a place. In this case, the notion of the reservation is a transaction involving the provision of places and special services for other facilities for passengers who will travel using aircraft services. Terminologically, the word café comes from the French—coffee, which means coffee [6].

In Indonesia, the word café then simplified back to cafe [7]. The literal meaning refers to (drink) coffee, better known as a place to enjoy coffee with various other non-alcoholic drinks such as soft drinks and snacks in Indonesia. "Café is an establishment providing food and refreshment for consumption and the premises to general public" [8]. Café in two terms: a place where people can buy drinks and simple meals; also a place where we can buy drinks and snacks, and a "small shop (the store that sells sweets, food, newspaper, and others) usually stay open later than other shop or store"; where cafe refers more to a tavern or stalls that sells not only drinks and food but also newspapers, books and is open until late at night. Based on the above understanding, cafes have characteristics such as a comfortable place to enjoy various food and drinks and a comfortable atmosphere for gathering.

In order to analyze and develop an android mobile application for a culinary online ordering case study, this study analyzes several problems that several previous researchers have solved. The first research was conducted by Qadhafi et al. [10] by creating a delivery order application that can be run if the user has internet access and was built using a J2ME method. Also, Yuliana et al. [11] developed a delivery order application using the Composite Performance Index (CPI). This method will later assist users in determining appropriate food menu recommendations based on ratings, bestsellers, and the highest and lowest prices. Kapoor & Vij [12] also state that Online food delivery is expanding choice and convenience. It allows customers to order from various restaurants with a single tap on their smartphone. Delivering food services is rapidly changing as new online platforms race to capture the market's customers. Although, there are essential concerns about customer satisfaction and customers' intention to reuse mobile apps [1].

So based on some of this research, it is necessary to develop specific mobile applications to be used by cafe owners to reach more customers and increase satisfaction from these customers, especially today's customers who are very dependent on smartphone technology.

3. METHODS

In order to solve the problems found with the best solution that will be offered, a framework is carried out with the methodology described as follows.

![Figure 1. Research methodology](image)

The methodology begins with a crucial phase of problem identification within the user's business processes. In selecting "Jeber Café" in Pekanbaru as the focal point for the case study, a deliberate decision was made to facilitate a comprehensive understanding of the challenges and opportunities within a real-world cafe scenario. To gather insights, the researchers conducted interviews aimed at discerning the nuances of food and beverage delivery processes, reservation systems, and overall operational analyses. These interviews culminated in the extraction of valuable functional requirements, forming the foundation for subsequent system development.

Functional requirements, delineating what the system must accomplish, serve as the blueprint for the modeling phase. The modeling process is instrumental in crafting a visual representation of the system's anticipated flow. This step enhances developer comprehension,
fostering a clear trajectory for subsequent stages of development. In tandem with requirements, an extensive review of pertinent literature from other researchers supplements the foundational knowledge, providing valuable insights and best practices to inform the development journey.

Moving from conceptualization to practicality, the design phase unfolds. Here, the researchers translate the identified functional features into a tangible mobile application. The design is an intricate process, aligning the conceptual expectations with technical feasibility. Multiple models are sculpted, each embodying specific aspects of the desired features, establishing a cohesive framework for the forthcoming development phase.

Implementation follows the design, necessitating a keen understanding of the identified functional requirements. The primary features, such as the delivery order and reservation functionalities, are meticulously coded into the system. This stage emphasizes user interaction, ensuring a seamless process for customers placing orders and making reservations. Additionally, the system empowers administrators to manage menus, incorporating features like menu addition, editing, and viewing. The dynamic nature of the cafe’s operational aspects, including real-time notifications for status changes and location tracking via Google Maps technology, is integrated to enhance overall functionality.

Post-implementation, the system undergoes rigorous evaluation, a pivotal phase in ensuring its efficacy. Functional Tests, User Acceptance Tests, and Surveys are conducted to validate the system's performance. Functional Tests scrutinize the system against predefined functional requirements, affirming its alignment with the intended functionality. User Acceptance Tests gauge the application’s user-friendliness, ensuring that it resonates positively with both cafe owners and customers. Concurrently, surveys are administered to Jeber Cafe customers, soliciting their perspectives on the application’s utility and user experience.

The culmination of these evaluation tests aims to validate the entirety of the development phases. The insights garnered from these assessments contribute to a comprehensive understanding of the system’s suitability and its impact on facilitating improved business practices for cafe owners and enhanced convenience for customers. It becomes a litmus test for the success of the mobile application, determining its readiness for practical deployment.

In conclusion, the methodological journey traverses a systematic progression from problem identification to practical application. By selecting a real-world cafe as a case study, conducting comprehensive interviews, defining functional requirements, modeling system flows, reviewing relevant literature, designing application features, implementing coding, and finally subjecting the system to rigorous evaluation, this methodology ensures a holistic and meticulous approach to mobile application development. The goal is to offer a robust, user-friendly solution that not only addresses identified challenges in cafe business processes but also enhances the overall experience for both cafe owners and customers. The iterative nature of this methodology, informed by user feedback and evaluation results, underscores its adaptability and commitment to continuous improvement, ensuring the developed mobile application remains relevant and effective in the ever-evolving landscape of cafe operations.

4. RESULTS AND DISCUSSION

Based on the author's implementation, a result can be given in the form of android-based delivery order and place reservation application. The display itself can be seen as shown below, which is a login page.

![Figure 2. Sign in page](image-url)
Figure 2 depicts the user interface for the sign-in page, serving as the initial point of interaction when a customer seeks access to the system. This essential gateway ensures the security and personalized engagement of each user. The sign-in process presupposes the existence of a pre-established account; successful sign-in verifies the customer’s identity and grants them access to the system’s functionalities.

For users without an existing account, a deliberate and user-friendly prompt encourages them to initiate the registration process. Positioned strategically below the login button, a clearly labeled registration option awaits their click. By clicking this button, potential users are seamlessly directed to a registration portal where they can furnish requisite details to establish their account. This streamlined approach not only accommodates first-time users but also underscores the system’s commitment to accessibility and user convenience.

The design of the sign-in page is crafted with a dual purpose — to authenticate existing users efficiently and to seamlessly guide new users through the registration process. The clarity of the interface, coupled with the intuitive placement of the registration option, fosters a user-centric experience. As a pivotal entry point to the system, this sign-in page reflects the application’s commitment to providing a secure, user-friendly, and inclusive environment for individuals at various stages of engagement with the platform.

Upon the successful sign-in of an administrator, the system seamlessly redirects them to the dedicated dashboard, as illustrated in Figure 3. This dashboard serves as the centralized control hub for administrators, empowering them with a comprehensive suite of tools for efficient management. At the heart of this interface lies the menu management functionality, allowing administrators to oversee, curate, and update the offerings available to customers. The dynamic nature of the dashboard facilitates real-time adjustments, ensuring the menu is always reflective of the cafe’s current offerings.

Menu management involves not only the categorization of food items but also the inclusion of essential details such as food names, accompanying visuals, and pricing information. The system further incorporates an edit feature, providing administrators with the flexibility to rectify any inaccuracies or modify menu items as needed. This responsive functionality streamlines the process of keeping the menu current, aligning it with the cafe’s evolving culinary offerings.

Beyond menu management, administrators wield the authority to edit the status of orders placed by customers. This pivotal feature enables swift responses to changing circumstances, such as order cancellations or adjustments. A notification system is integrated to alert administrators when customers initiate changes to the status of their orders. This proactive notification mechanism ensures administrators stay informed in real-time, fostering timely responses and maintaining a seamless operational workflow.

In essence, the admin dashboard serves as a dynamic control center, offering a comprehensive toolkit for effective cafe management. By consolidating critical functions like menu oversight and order status management, the dashboard not only enhances operational efficiency but also empowers administrators to deliver a responsive and personalized experience to customers. The integration of real-time notifications further reinforces the system’s commitment to facilitating agile and informed decision-making in response to customer interactions and evolving operational needs.
Similar to the admin experience, the customer journey unfolds seamlessly after successful registration and login. Upon logging in, customers are promptly directed to the dedicated dashboard, a central hub encapsulated in Figure 4. This customer-centric interface is meticulously designed to provide an intuitive and user-friendly platform where patrons can effortlessly navigate and engage with the application’s primary features.

Within the customer dashboard, two principal functionalities take center stage: the ability to place delivery orders and make online reservations. These core features cater to the diverse needs of customers, offering a convenient and flexible platform for culinary experiences. The delivery order feature facilitates the swift and hassle-free placement of food and beverage orders, ensuring a seamless process from selection to delivery. Simultaneously, the online reservation functionality empowers customers to plan ahead by securing a spot at the café, enhancing the overall dining experience.

A key component of the customer dashboard is the real-time order status display, affording customers transparency into the progress of their orders. This feature becomes invaluable, providing customers with immediate insights into the preparation and delivery stages of their selected items. The incorporation of this status tracking mechanism adds an extra layer of convenience and assurance, contributing to an enhanced customer experience.

In essence, the customer dashboard stands as a gateway to the application’s main functionalities, delivering an all-encompassing experience. By seamlessly integrating delivery orders, online reservations, and real-time order status updates, the dashboard caters to the diverse needs and preferences of customers. This user-centric design not only enhances accessibility but also positions the application as a reliable and convenient tool for customers seeking culinary delights and dining experiences with utmost ease.

Figure 4. Dashboard customer page

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Figure 5. Menu page

5. ANALYSIS OF TESTING RESULTS FOR MOBILE APPLICATION DEVELOPMENT

Upon selecting a café within the application, the user seamlessly transitions to the subsequent page, designated as the menu page. This pivotal section not only unveils a comprehensive array of menu details but also facilitates the selection of desired quantities. Accompanying these choices is the provision for additional notes, enabling users to convey specific instructions or preferences. Concurrently, users are prompted to input the delivery address, crucial information that ensures the accurate dispatch of their orders to the intended destination.

The culmination of the application's development necessitates rigorous evaluation, a task achieved through the implementation of
Blackbox Testing. This testing methodology meticulously examines the functional requirements of the system, scrutinizing its operations without delving into the internal workings of the application. The insights derived from this testing approach contribute to a nuanced understanding of the application's performance and adherence to specified criteria.

Through Blackbox Testing, various facets of the application's functionality are scrutinized. For instance, the seamless progression from café selection to the menu page is evaluated for efficiency and user-friendliness. The system's adept handling of menu details, including options and quantities, is scrutinized to ensure a smooth and intuitive user experience. Additionally, the accuracy of the note-taking feature and the effectiveness of the address input mechanism are scrutinized to ascertain their seamless integration into the overall ordering process.

The outcomes of the Blackbox Testing endeavor yield valuable insights into the application's performance. The functional requirements, pivotal to the application's efficacy, are thoroughly assessed to affirm their seamless execution. The user's journey from café selection to order placement is meticulously reviewed, ensuring a coherent and intuitive flow throughout. The menu page, a focal point of user interaction, is assessed for its responsiveness, clarity, and functionality. The note-taking feature, intended to accommodate user preferences or special instructions, undergoes scrutiny to guarantee its precision and utility. Simultaneously, the address input mechanism is examined for accuracy, with a focus on its integration within the ordering process.

The conclusive findings of the Blackbox Testing serve as a robust foundation for informed decision-making. The application's functionality, validated through this comprehensive evaluation, attests to its readiness for practical deployment. The user-centric design and efficient handling of key elements, as evidenced by the testing results, underscore the application's user-friendliness and operational excellence.

Looking ahead, the data gleaned from the testing phase informs iterative improvements and refinements. Recommendations for enhancements, if warranted, may include optimizing the menu page layout for enhanced visual appeal and intuitiveness. Fine-tuning the notetaking and address input features based on user feedback could further elevate the application's usability. This iterative approach to development, anchored in user experience and functional efficiency, ensures that the application remains adaptive and responsive to the evolving preferences and expectations of its user base.

In conclusion, the strategic integration of Blackbox Testing into the development lifecycle proves instrumental in ensuring the application's robust functionality and user satisfaction. The meticulous scrutiny of functional requirements, coupled with a keen focus on user interactions, positions the application as a reliable and user-friendly solution for online café orders. Continuous refinement, informed by testing insights, reinforces the application's capacity to meet and exceed user expectations, setting the stage for its successful deployment in the dynamic landscape of digital café services.

Table 1. Functional requirements test status

<table>
<thead>
<tr>
<th>No</th>
<th>Functional</th>
<th>Status</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>The system can log in and register.</td>
<td>Success</td>
</tr>
<tr>
<td>2</td>
<td>The system can register.</td>
<td>Success</td>
</tr>
<tr>
<td></td>
<td>The system can help admins display the home page for admins and customers.</td>
<td>Success</td>
</tr>
<tr>
<td>3</td>
<td>display the home page for admins and customers.</td>
<td>Success</td>
</tr>
<tr>
<td>4</td>
<td>The system can help admins manage menus, such as adding and editing.</td>
<td>Success</td>
</tr>
<tr>
<td>5</td>
<td>The system can help admins edit order status for delivery orders</td>
<td>Success</td>
</tr>
<tr>
<td>6</td>
<td>The system can help admins edit order status for place reservations</td>
<td>Success</td>
</tr>
<tr>
<td>7</td>
<td>The system can help the admin change the café's status when it is complete.</td>
<td>Success</td>
</tr>
<tr>
<td>8</td>
<td>The system can help customers make delivery orders.</td>
<td>Success</td>
</tr>
<tr>
<td>9</td>
<td>The system can help customers make online reservations.</td>
<td>Success</td>
</tr>
<tr>
<td>10</td>
<td>The system can help customers see the status of orders.</td>
<td>Success</td>
</tr>
<tr>
<td>11</td>
<td>The system can help customers edit profiles.</td>
<td>Success</td>
</tr>
</tbody>
</table>
Table 1 presents a comprehensive overview of the system's functional requirements, highlighting their seamless execution and usability. The successful implementation of all system features ensures its efficacy in facilitating online reservations and delivery orders for users.

To ensure the system's alignment with the cafe owner's expectations, User Acceptance Testing (UAT) was conducted, designating the cafe owner as the primary user in the mobile application's development. The UAT results unequivocally affirm the acceptability and feasibility of all functionalities and features, providing a solid foundation for subsequent testing phases with actual customers.

In parallel, an extensive survey targeting cafe customers was executed to gauge perceptions of the mobile application's utility in placing online delivery orders and reservations. This survey engaged approximately 50 respondents, whose collective feedback underscored the mobile application's substantial functional value and high user satisfaction. Consequently, the mobile application emerges as an asset poised for widespread adoption within the community.

The culmination of this mobile application's development prompts a nuanced examination of its merits and demerits. Among its merits, customers benefit from a fee structure devoid of additional charges, including shipping costs, when placing delivery orders. Moreover, the application introduces novel features such as streamlined reservation processes, enhancing the overall user experience. However, it is imperative to acknowledge certain drawbacks, notably the limited array of payment methods available, confined primarily to Cash on Delivery (COD). Furthermore, the absence of real-time order tracking during transit represents a notable shortcoming. Finally, it's crucial to recognize that while the application offers significant utility, its feature set remains somewhat constrained.

In conclusion, the robust performance of the system's functional requirements, coupled with positive UAT results and favorable customer survey feedback, positions this mobile application as a viable and valuable solution for online reservations and delivery orders within the cafe community. Despite some identified limitations, the application's overall advantages contribute significantly to its potential success and widespread adoption. As technology continues to evolve, addressing these limitations and further enhancing the application's features can propel it to even greater heights in meeting the dynamic needs of both cafe owners and customers alike.

**CONCLUSION**

The extensive tests and analyses conducted unequivocally affirm the robust functionality of this research, establishing its immediate applicability for both café proprietors and their clientele. The system's validation as valuable and feasible underscores its operational effectiveness. Anticipating future advancements, proposed recommendations emphasize the expansion of application features, with a primary focus on broadening payment methods to include digital wallets. This strategic diversification seeks to augment customer convenience by providing a wider array of payment options. Additionally, a crucial proposal involves integrating real-time order tracking into the application, empowering customers to monitor their orders seamlessly and gain instantaneous insights into their order's location. Such forward-thinking enhancements serve to solidify the research's potential for ongoing refinement, enhancing its pertinence in addressing the dynamic requirements of café owners and customers alike. As the application evolves, these proactive measures ensure continuous improvement and increased resonance, affirming its capacity to adapt to the evolving landscape of the café industry and meet the diverse needs of its stakeholders.

**REFERENCES**


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