

RESEARCH ARTICLE

Analysis of the Use of Mobile-Based Aceh Culinary Menu Applications to Improve Customer Experience in the Culinary Industry

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Abstract

This research analyzes the implementation of mobile-based menu applications for Acehese cuisine and their impact on enhancing customer experience in the culinary industry. The study examines information technology applications, particularly mobile applications, as tools for improving accessibility and convenience in ordering and obtaining information about Acehese culinary dishes. The research methodology includes surveys of active users of mobile-based menu applications in the Acehese culinary industry, focusing on their perceptions of user experience, application effectiveness in presenting information, and impact on customer satisfaction. Case studies were conducted to examine successful implementations of mobile-based menu applications in Acehese culinary settings. Data analysis provides understanding about the potential of mobile-based menu applications as tools for improving service quality and customer experience in the Acehese culinary industry. Research findings benefit culinary industry stakeholders and information technology developers in optimizing mobile application utilization to enhance service quality and customer satisfaction.

Keywords

Mobile Menu Applications; Acehese Cuisine; Customer Experience; Culinary Industry.

1 | INTRODUCTION

Information technology development, particularly through mobile applications, has significantly impacted accessibility and efficiency across various sectors, including the culinary industry. Mobile applications enable users to discover, order, and obtain information about culinary options more easily. This trend is evident in the adoption of food ordering applications that help customers explore menus and interact with culinary service providers in their areas (Amin *et al.*, 2021; Shah *et al.*, 2021). The digital transformation of the food service industry has accelerated in recent years, driven by changing consumer preferences and technological advancements that make mobile solutions more accessible and user-friendly. Research conducted during the COVID-19 pandemic shows food application adoption became increasingly important as a survival mechanism for many culinary businesses. Many users turned to these applications to order food due to implemented social restrictions and safety concerns about in-person dining (Amin *et al.*, 2021; Shah *et al.*, 2021). This shift in consumer behavior created a new paradigm in the restaurant industry, where digital presence became as important as physical location. Restaurants without digital ordering capabilities found themselves at a significant competitive disadvantage, highlighting the critical role of technology adoption in business continuity and resilience during crisis periods.

Food ordering applications like Grab Food and Gojek proved beneficial for both consumers and restaurants, as these applications not only facilitated user ordering experiences but also supported local business ecosystems (Amin *et al.*, 2021). These platforms created new revenue streams for restaurants and expanded their customer base beyond traditional geographical limitations. For smaller culinary establishments, including those specializing in Acehnese cuisine, these applications provided access to delivery logistics and marketing capabilities that would otherwise be beyond their reach. The democratization of food delivery services through these platforms has been particularly impactful for regional cuisines seeking wider recognition and market penetration. Studies indicate user experience on these applications strongly correlates with customer satisfaction, which becomes a crucial element in subsequent purchasing decisions (Shah *et al.*, 2021). The intuitive design, ease of navigation, and reliability of these applications directly influence customer perceptions and loyalty. Applications that provide comprehensive information about menu items, including ingredients, preparation methods, and cultural significance, enhance the educational aspect of the culinary experience. This is especially valuable for traditional cuisines like Acehnese food, where unique ingredients and preparation techniques form an integral part of the cultural narrative. The applications' efficiency also includes sophisticated data collection that helps industry players better understand consumer preferences and behavior patterns. For example, applications can provide menu recommendations based on user preferences or previous purchasing behavior (Shah *et al.*, 2021). This capability helps restaurants adjust their menus according to local interests, including promoting traditional Acehnese dishes known for their rich flavors and spices (Sofyan *et al.*, 2021). The data-driven approach to menu development and marketing represents a significant advancement over traditional methods, allowing for more precise targeting and personalization of offerings.

Well-designed applications allow customers to feel more connected with local culture through the culinary offerings of restaurants, enhancing the overall dining experience. Through multimedia content such as high-quality images, videos of preparation techniques, and stories about the cultural significance of dishes, these applications serve as digital ambassadors for regional cuisines. For Acehnese cuisine, which has a rich historical background and unique flavor profiles, these digital platforms offer opportunities to educate consumers and preserve cultural knowledge that might otherwise be lost in the rapidly globalizing food landscape. Mobile application adoption in the culinary industry, particularly for Acehnese cuisine, demonstrates great potential for improving service quality and consumer experiences. Technology integration with local culture not only enhances operational efficiency but also preserves culinary cultural heritage, making it relevant in today's digital era (Sofyan *et al.*, 2021). The digital documentation of traditional recipes, cooking techniques, and ingredient information serves as a valuable resource for future generations, ensuring the continuity of culinary traditions despite changing lifestyles and consumption patterns. In Aceh, known for its traditional culinary richness influenced by various cultural exchanges throughout history, mobile menu application implementation becomes an interesting aspect to investigate. The region's distinctive cuisine, characterized by bold flavors, aromatic spices, and unique preparation methods, offers a compelling case study for examining how traditional food cultures adapt to and benefit from technological innovation. The intersection of ancient culinary traditions with cutting-edge mobile technology creates a fascinating dynamic that merits scholarly attention.

This research aims to analyze the impact of mobile-based menu application usage in the Acehnese culinary context on enhancing customer experiences. Through this investigation, researchers expect to discover insights about how mobile applications have shaped Acehnese culinary industry dynamics and how they affect customer perceptions and satisfaction. The study examines both quantitative metrics such as order frequency and customer retention rates, as well as qualitative aspects including cultural authenticity perception and educational value of the applications. By involving case studies and surveys of active mobile menu application users in the Acehnese culinary industry, this research strives to contribute practical and theoretical understanding regarding information technology application in regional culinary contexts. The

mixed-methods approach allows for a comprehensive analysis of both business outcomes and cultural implications of technology adoption in traditional food sectors. Research results provide valuable information for culinary business managers, application developers, and other stakeholders in improving service quality and enriching customer experiences in the Acehese culinary industry. The growing popularity of mobile applications for food ordering and discovery presents opportunities for Acehese culinary businesses to expand their reach beyond geographical boundaries. These applications serve as digital platforms showcasing the unique flavors and cultural significance of Acehese cuisine to broader audiences, including domestic and international tourists who might otherwise have limited exposure to this regional cuisine. Additionally, they provide valuable data analytics capabilities that enable businesses to track customer preferences, optimize menu offerings, and implement targeted marketing strategies based on demographic and behavioral insights.

Furthermore, mobile applications facilitate seamless ordering processes, reducing wait times and improving overall operational efficiency in restaurant settings. Features such as real-time order tracking, personalized recommendations based on previous orders, dietary preferences filtering, and digital payment options contribute to enhanced customer satisfaction and streamlined business operations. For tourists and visitors unfamiliar with Acehese cuisine, these applications serve as informative guides, providing detailed descriptions of traditional dishes, ingredients, and cultural significance, thereby reducing uncertainty and encouraging culinary exploration. The integration of mobile technology in the Acehese culinary sector represents a strategic approach to preserving cultural heritage while embracing modern business practices. This research examines how effectively these applications balance technological innovation with cultural authenticity to create meaningful and satisfying customer experiences. The findings will contribute to the growing body of knowledge on digital transformation in traditional industries and provide actionable insights for stakeholders seeking to leverage technology for cultural preservation and business growth in the culinary sector. As the global culinary landscape continues to evolve with technological advancements, understanding the specific impacts and opportunities in regional contexts becomes increasingly important. This research aims to fill that knowledge gap by providing a focused analysis of mobile application implementation in the unique cultural and culinary environment of Aceh, offering insights that may be applicable to other regional cuisines seeking to navigate the digital transformation of the food service industry.

2 | BACKGROUND THEORY

In the rapidly advancing digital era, the incorporation of mobile-based applications has emerged as a transformative force, revolutionizing industries and fundamentally altering the dynamics of customer interactions. This transformative trend is particularly evident in the culinary sector, where the adoption of innovative technologies, especially mobile applications, has played a pivotal role in reshaping customer experiences and operational practices within restaurants and food-based businesses. The deployment of mobile-based Aceh culinary menu applications holds immense promise in elevating the overall customer experience within the culinary industry. As discussed by Bharadwaj (2023), the advent of mobile apps has marked a significant shift in restaurant automation, fundamentally redefining the ways in which customers engage with their preferred dining establishments. These applications seamlessly integrate into restaurant operations, introducing features that not only streamline traditional processes but also introduce novel avenues for customer-restaurant interactions. The integration of mobile technology into the culinary landscape represents a paradigm shift in how businesses operate and interact with their customers. This technological revolution has transcended mere convenience, evolving into an essential component of modern dining experiences. For traditional culinary establishments, particularly those showcasing regional cuisines like Acehese food, mobile applications offer unprecedented opportunities to preserve cultural heritage while simultaneously expanding market reach. These digital platforms serve as bridges connecting ancient culinary traditions with contemporary consumer expectations, creating a harmonious blend of authenticity and innovation that appeals to diverse customer segments. This aligns with Amin *et al.* (2021) research, which established that mobile food delivery applications have fundamentally altered consumer behavior, particularly regarding transaction efficiency and convenience.

The adoption of mobile-based applications, specifically tailored for Aceh culinary offerings, addresses distinct challenges faced by the local industry. The study conducted by Ilhadi *et al.* (2022) sheds light on the critical role of these applications in marketing Aceh specialty cakes and overcoming hurdles faced by consumers in accessing relevant information about available products and their locations. When effectively designed, such applications offer real-time order placement, facilitate faster transaction processes, and significantly contribute to the marketing of Aceh's unique culinary delights. Similarly, Shah *et al.* (2021) confirmed that the adoption of mobile food ordering applications for Online-to-Offline (O2O) delivery services accelerated during the COVID-19 pandemic, expediting digital transformation within the culinary industry. The design principles of these applications are crucial components of their effectiveness. Beyond being visually appealing, the applications must be efficient and effective,

boasting a user-friendly interface. The inclusion of features such as a customer profile page, allowing users to personalize their experience by changing profiles and managing accounts, enhances the overall user experience. Furthermore, a well-structured home page showcasing typical Aceh cake products with detailed information on pricing, descriptions, and stock availability contributes to a seamless and enjoyable user journey (Ilhadi *et al.*, 2022). This perspective is reinforced by Harrison *et al.* (2013), who emphasized the importance of usability in mobile applications through their comprehensive literature review and proposed usability model.

For Aceh's culinary sector specifically, mobile applications serve as digital ambassadors, introducing the region's rich gastronomic heritage to a global audience. These applications can feature comprehensive information about traditional Acehnese dishes, including their historical significance, unique ingredients, and authentic preparation methods. By doing so, they not only facilitate commercial transactions but also contribute to cultural education and preservation. The digital documentation of traditional recipes and cooking techniques ensures that Aceh culinary knowledge is preserved for future generations, creating a valuable repository of cultural information that might otherwise be lost in the rapidly changing global landscape. This cultural preservation aspect is particularly significant, as highlighted by Kamil *et al.* (2023) in their research "Muloh Teupeh Kuliner dan Perempuan Pidie," which emphasized the importance of maintaining Acehnese culinary authenticity throughout the modernization process. Mobile applications have become indispensable tools in the broader culinary landscape, transcending geographical boundaries and cultural contexts. Mike (2023), a creative designer, provides valuable insights into the perpetual quest for innovation within the restaurant and food-based business sector. In his exploration of innovative mobile app ideas, he discusses various applications that have the potential to revolutionize the industry and elevate customer experiences. These include reservation and booking apps, food delivery apps, loyalty and rewards apps, foodie apps, virtual food tasting using augmented reality (AR), tableside ordering and payment apps, and much more. Gebhardt *et al.* (2014) further support this through their evaluation of smartphone-based menu systems for immersive virtual environments, which emphasized the importance of intuitive interface design and immersive user experiences.

The demand for mobile apps in the culinary domain is fueled by the imperative to enhance customer engagement, streamline operations, and incorporate novel experiences. In the digital age, where consumer expectations are constantly evolving, restaurants and food-based businesses must leverage technology to stay competitive and meet the ever-changing preferences of their customers (Mike, 2023). This perspective is reinforced by Gupta's (2019) study on the impact of online food delivery apps on restaurant businesses, which highlighted how these platforms not only change how consumers order food but also influence how restaurant businesses operate and interact with their customers. The evolution of mobile applications in the culinary sector reflects broader technological trends and changing consumer behaviors. Modern diners, particularly younger demographics, increasingly expect seamless digital experiences as part of their dining journey. From discovering new restaurants through recommendation algorithms to placing orders via intuitive interfaces and making contactless payments, the entire customer journey has been digitized. For Acehnese culinary establishments, adapting to these expectations while maintaining cultural authenticity presents both challenges and opportunities. Mobile applications can serve as powerful tools in this adaptation process, enabling businesses to embrace modern operational practices without compromising the traditional essence that makes Acehnese cuisine unique and appealing. This aligns with Ardiansyah's (2022) study on "Aceh Halal Recipe Application Based on Android," which demonstrated technology's potential in preserving and promoting traditional Acehnese recipes.

As highlighted by Appentus (2023), the food tech and restaurant industry present an array of lucrative opportunities for startups and entrepreneurs. Exclusive app concepts, ranging from food delivery applications and virtual culinary class apps to AI-powered food recommendation apps and grocery delivery apps, showcase the vast possibilities for innovation and profit within the dynamic food and restaurant startup landscape. The growth projections for meal delivery apps, virtual cooking classes, and grocery delivery apps underline the potential for substantial market share expansion. Moreover, the shift towards sustainable practices, as seen in food waste management apps, and the integration of AI for personalized recommendations signify a conscious effort towards meeting societal needs and preferences. This trend is reflected in local studies by Shiddiqi (2021) and Wahyuni (2020), who analyzed the impact of Go-Food and Grab Food on culinary business sales growth in Indonesian contexts, concluding that online food ordering applications contribute significantly to revenue growth and market expansion for culinary business operators. In the contemporary fast-paced world, grocery delivery apps epitomize convenience and efficiency, sparing consumers the chore of weekend grocery shopping and long queues at supermarkets during busy periods. Projections suggest that the industry's overall revenue is set to capture a market share of \$1,140 billion by 2027, with a projected CAGR of 16.11% from 2023 to 2027. Moreover, the sector might amass around 1,995.0 million users by 2027 (Appentus, 2023). This global trend has local implications, as evidenced by Helfa's (2019) analysis of Islamic business ethics in relation to increased turnover for Go-Food partner restaurants in Banda Aceh, which demonstrated how digital platforms can enhance business performance while maintaining cultural and religious values.

The economic potential of mobile applications in the culinary sector extends beyond direct revenue generation. These digital platforms create ecosystems that benefit multiple stakeholders, including restaurants, delivery services, payment processors, and technology providers. For Acehnese culinary businesses, participation in this digital ecosystem opens doors to new revenue streams and business models that were previously inaccessible. Subscription services, virtual cooking classes, and digital merchandise sales represent just a few of the innovative approaches that can be implemented through well-designed mobile applications. Additionally, the data generated through these platforms provides invaluable insights into consumer preferences and behaviors, enabling businesses to refine their offerings and marketing strategies based on empirical evidence rather than intuition. This data-driven approach to business development is particularly relevant for emerging markets like Aceh, as discussed by Aqil (2023) in his research on the development of creative economy-based MSMEs in Banda Aceh. Expanding on the innovative mobile app concepts discussed by industry experts, it's essential to delve deeper into their potential impact and how they cater to evolving consumer demands. Virtual culinary class applications leverage technology to deliver cooking instructions, demonstrations, and interactive learning experiences to individuals eager to master culinary skills from the comfort of their homes. These classes can be conducted through the app, charging users for individual sessions or comprehensive courses. Subscription models, available in basic, standard, and premium tiers, can be introduced, prompting users to pay monthly, quarterly, or annually to access the services. Typically, these fees encompass live or pre-recorded sessions, recipe materials, and supplementary resources offered by instructors. For Acehnese cuisine, which features complex preparation techniques and unique ingredient combinations, such applications could serve as valuable educational tools, preserving traditional knowledge while making it accessible to a global audience. This educational dimension aligns with Maulida's (2021) research on the role of cafés and restaurants in supporting halal tourism in Banda Aceh, which emphasized the importance of cultural education alongside culinary experiences.

AI-powered food recommendation apps employ artificial intelligence and machine learning algorithms to furnish users with tailored dining suggestions. These apps analyze diverse data points, encompassing user preferences, past interactions, social engagements, and other pertinent data. Employing collaborative filtering methods, these apps compare individual preferences and behaviors with those of like-minded users, subsequently proposing items favored by the majority. Some apps even integrate with food delivery and ordering services, allowing users to seamlessly place orders based on these personalized recommendations. In the context of Acehnese cuisine, AI recommendations could help introduce unfamiliar dishes to new customers based on their established flavor preferences, gradually expanding their culinary horizons while ensuring satisfying experiences. This technological approach to culinary discovery is particularly valuable for distinctive regional cuisines like Acehnese food, which might otherwise remain inaccessible to broader audiences due to unfamiliarity, as suggested by Bailly *et al.* (2016) research on visual menu techniques, which confirmed that effective visualization and interactivity significantly enhance user experience. In the contemporary fast-paced world, grocery delivery apps epitomize convenience and efficiency, sparing consumers the chore of weekend grocery shopping and long queues at supermarkets during busy periods. Revenue for grocery apps primarily originates from commissions charged to grocery stores for orders placed through their platforms. This serves as the primary revenue source, although other income streams include delivery fees, subscription models, product markups, advertising, promotional collaborations, data monetization, and partnerships with grocery stores. For specialty ingredients used in Acehnese cooking, which might be difficult to source in conventional supermarkets, dedicated grocery delivery services could fill a significant market gap, connecting consumers with authentic ingredients that enable them to recreate traditional dishes at home. This potential for expanding access to authentic ingredients is particularly relevant for preserving culinary traditions, as implied by Sofyan *et al.* (2021) research on the nutritional and meat quality characteristics of Aceh cattle, which highlighted the unique properties of local ingredients that contribute to the distinctiveness of Acehnese cuisine.

The recipe app market has undergone substantial growth and is projected to evolve into a multi-million dollar industry by 2024 (Appentus, 2023). Consequently, investing in recipe app development could yield profits with minimal effort and investment. Investment in recipe app development can foster a community of culinary enthusiasts and aspiring chefs keen on refining their cooking skills. Revenue models might involve subscriptions, per-recipe fees, advertising, commissions, promotions, and partnerships. For Acehnese cuisine, recipe applications could serve as digital cookbooks, preserving traditional preparation methods while making them accessible to modern cooks who might otherwise be intimidated by unfamiliar techniques or ingredients. This preservation of culinary knowledge through digital means aligns with Faruq (2022) implementation study of promotional mix strategies for crispy menu items, which demonstrated how digital platforms can effectively communicate traditional cooking techniques to contemporary audiences. Augmented reality can take dining to the next level by enhancing the ambiance and entertainment factor. Restaurants can create immersive AR experiences, such as virtual fireworks displays during dessert or interactive tabletop games, to make dining out more exciting (Mike, 2023). In the context of Acehnese restaurants, AR could be used to visualize the historical and cultural significance of traditional dishes,

creating educational experiences that enhance appreciation for the cuisine's rich heritage. Virtual tours of spice gardens, fishing villages, or traditional kitchens could provide context that deepens the dining experience, transforming a meal into a comprehensive cultural journey. This immersive approach to culinary experiences aligns with Akbar and Pangestuti's (2017) research on the role of culinary in enhancing tourism destination image, which emphasized that local cuisine can be a major attraction for tourists when presented with appropriate cultural context.

Sustainable dining apps promote environmentally conscious dining by highlighting restaurants using sustainable practices. Users can search for eco-friendly dining options, learn about a restaurant's sustainability initiatives, and track their own carbon footprint through their dining choices. For Acehese culinary establishments, which often rely on locally sourced ingredients and traditional preparation methods, sustainability apps could showcase these environmentally friendly practices, appealing to increasingly eco-conscious consumers who prioritize ethical consumption. This sustainability dimension is increasingly relevant in the context of Islamic business practices, as discussed by Hidayat and Humeriattunnisa (2023) in their research on optimizing the role of Islamic digital banking in the development of the halal industry, which highlighted the alignment between sustainable practices and Islamic business ethics. For individuals with food allergies or dietary restrictions, dining out can be challenging. An app that helps users find restaurants that cater to their specific needs, offers allergen-free menus, and provides ingredient details can be a lifesaver. In the context of Acehese cuisine, which features diverse ingredients and complex preparations, detailed allergen information could make these culinary experiences accessible to individuals with dietary restrictions who might otherwise avoid unfamiliar foods due to safety concerns. This inclusivity aspect is particularly important for expanding the market reach of regional cuisines, as implied by Ramadayanti's (2022) research on development strategies for coffee shops in Banda Aceh, which emphasized the importance of catering to diverse customer needs and preferences.

Leveraging artificial intelligence to offer users personalized food recommendations based on their taste preferences, location, and past dining experiences can significantly enhance customer satisfaction. The app can continuously learn and refine its recommendations to ensure customer satisfaction. For Acehese cuisine, which features bold flavors and unique spice combinations, AI recommendations could help newcomers navigate the menu by suggesting dishes that align with their established preferences, gradually introducing them to more adventurous options as their palate evolves. This personalized approach to culinary discovery aligns with El Fiorenza *et al.* (2018) research on Smart Menu Card Systems, which demonstrated how digital menu systems can optimize restaurant operations and enhance customer experiences through personalization. Creating a social networking app centered around food allows users to share photos of their meals, recipes, and culinary adventures. Restaurants can engage with this platform by showcasing their dishes and promotions, turning it into a dynamic food-focused community (Mike, 2023). For Acehese culinary establishments, social networking features could facilitate community building among enthusiasts, creating digital spaces where traditional knowledge is shared and celebrated. User-generated content, such as home cooking attempts or dining experiences, could generate authentic word-of-mouth marketing that attracts new customers to Acehese cuisine. This community-building aspect is particularly valuable for preserving cultural knowledge, as suggested by Light *et al.* (2018) walkthrough method approach to studying apps, which emphasized the importance of social features in creating meaningful user experiences.

Incorporating the spirit of food festivals into mobile applications by hosting virtual food events, tastings, and themed promotions allows users to participate in these events from the comfort of their homes, while restaurants can feature special menus and offers during these times. For Acehese cuisine, virtual food festivals could coincide with traditional cultural celebrations, creating digital experiences that honor heritage while introducing the cuisine to new audiences who might not have access to physical events. This virtual celebration of culinary traditions aligns with Santika's (2023) research on designing an Aceh souvenir and culinary center in Banda Aceh, which highlighted the importance of creating spaces (both physical and virtual) that showcase Acehese culinary heritage to broader audiences. For restaurant owners and managers, an all-in-one app can streamline various aspects of restaurant management. Features can include inventory management, employee scheduling, order tracking, and financial reporting. Such an app simplifies operations and enhances overall efficiency. For Acehese culinary businesses, which might be transitioning from traditional operational models to more digitized approaches, comprehensive management applications could facilitate this evolution, providing tools that enhance efficiency without requiring extensive technological expertise. This operational enhancement is particularly relevant for small and medium enterprises in Aceh, as discussed by Ramadhan's (2023) research on the influence of promotion on trust in using Islamic mobile banking among MSMEs in Aceh Besar, which demonstrated how digital tools can enhance business operations while maintaining cultural and religious values.

With an increasing focus on health and wellness, an app that provides nutritional information for restaurant menus can be a game-changer. Users can track their calorie intake, dietary preferences, and nutritional goals, helping them make healthier dining choices. For Acehese cuisine, which features numerous nutritious ingredients and preparation methods, health-focused applications could highlight these beneficial aspects, appealing to health-

conscious consumers who might otherwise overlook traditional cuisines due to unfamiliarity. This health dimension is particularly relevant given the unique nutritional properties of local ingredients, as documented by Sofyan *et al.* (2021) in their comparison of nutritional and meat quality characteristics between two primal cuts from Aceh cattle, which highlighted the distinctive nutritional profiles of local ingredients. In a post-pandemic world, contactless dining is here to stay. Developing an app that allows customers to browse menus, place orders, and pay for their meals using their smartphones while dining in a restaurant enhances safety and convenience for both diners and staff (Bharadwaj, 2023). For Acehnese restaurants adapting to changing consumer expectations, contactless solutions represent essential innovations that maintain service quality while addressing health and safety concerns that have become increasingly important to modern diners. This adaptation to changing consumer expectations is particularly challenging in traditional markets like Aceh, as evidenced by Rozy's (2023) research on the problems of implementing QRIS in Aceh, which identified digital infrastructure constraints that must be addressed to enable widespread adoption of contactless payment systems.

Combining gaming and dining by creating interactive food-themed games allows users to earn rewards and discounts by playing games related to food preparation, restaurant management, or food trivia. For Acehnese cuisine, gamification could transform educational content about traditional foods into engaging experiences, making cultural learning enjoyable rather than didactic. Challenges based on ingredient identification, recipe completion, or cultural knowledge could generate interest and familiarity with Acehnese culinary traditions among diverse user groups. This gamification approach to cultural education aligns with Septeadi's (2023) analysis of Sharia marketing strategies for food truck businesses in developing the creative economy in Banda Aceh, which emphasized the importance of innovative approaches to marketing traditional concepts. Offering a platform for amateur food critics and enthusiasts to share their restaurant experiences and reviews provides valuable feedback for restaurants and insights for potential customers. For Acehnese culinary establishments, review platforms specifically focused on regional cuisines could create communities of enthusiasts who appreciate the nuances and authenticity that might be overlooked in general review sites. Specialized criteria relevant to traditional cuisines could provide more meaningful evaluations than generic rating systems designed for mainstream restaurants. This specialized approach to culinary evaluation aligns with Umar *et al.* (2016) research on business development strategies in the tourism business, which emphasized the importance of targeted marketing and evaluation systems for specialized tourism offerings like culinary experiences. These reimagined app ideas offer the potential for innovation and profit in the dynamic landscape of food and restaurant startups. The constant evolution of technology and consumer preferences presents a myriad of opportunities for entrepreneurs and established businesses to create unique, engaging, and efficient solutions. Whether it's streamlining restaurant operations, enhancing customer experiences, or promoting sustainable and healthy dining choices, the right mobile app can be the catalyst for success in the modern food business landscape. For Acehnese cuisine specifically, mobile applications represent powerful tools for cultural preservation, market expansion, and operational enhancement, creating digital bridges between traditional gastronomy and contemporary consumer expectations.

3 | METHOD

This research employs a mixed-methods approach, combining qualitative and quantitative methodologies to gain a comprehensive understanding of how mobile-based menu applications enhance customer experiences in the Aceh culinary industry. The qualitative component involves in-depth interviews with key stakeholders including restaurateurs, chefs, and consumers who currently use or have the potential to use these applications. These semi-structured interviews, lasting approximately 45-60 minutes, explore perceptions regarding advantages, disadvantages, and expectations of mobile application usage in culinary contexts. For restaurant owners and chefs, questions focus on implementation experiences, adoption challenges, observed changes in customer behavior, and impacts on operational efficiency, while consumer interviews investigate user experiences, feature preferences, perceived benefits, and areas for improvement in existing applications. This approach aligns with Light *et al.* (2018) walkthrough method for studying apps, which emphasizes the importance of understanding both technical features and user experiences in evaluating mobile applications. All interviews are recorded with participant consent, transcribed verbatim, and coded using qualitative analysis software to identify recurring themes and patterns. This methodological approach draws on established practices in mobile application research, as demonstrated by Harrison *et al.* (2013) in their literature review on mobile application usability, which emphasized the importance of qualitative insights in understanding user experiences. The content analysis employs both inductive and deductive coding approaches, with initial coding frameworks developed based on existing literature on mobile application adoption and customer experience, while allowing for emergent themes specific to the Acehnese cultural and culinary context. This analytical approach is particularly appropriate for studying culturally specific applications, as

it allows for the identification of unique factors that might not be captured in standardized evaluation frameworks.

The quantitative component involves a survey distributed to potential users of mobile-based menu applications in the Aceh region, with questions addressing usage frequency, customer satisfaction, feature preferences, and the impact on purchasing decisions and culinary experiences. The survey instrument, developed based on established customer experience frameworks and validated through pilot testing, employs a combination of Likert scale questions, multiple-choice items, and open-ended responses to capture both structured data and additional insights. Distribution occurs through multiple channels, including QR codes at participating restaurants, social media platforms, and email distribution lists of culinary associations in Aceh, targeting a sample size of 300-400 respondents to ensure statistical significance and representativeness across demographic segments including age groups, technological proficiency levels, and dining frequency. This comprehensive sampling approach is essential for understanding the diverse perspectives within the Acehnese market, as suggested by Gupta's (2019) study on the impact of online food delivery apps on restaurant businesses, which highlighted the importance of considering multiple stakeholder perspectives. For quantitative analysis, descriptive statistics provide an overview of response patterns, while inferential statistics examine relationships between variables such as app feature preferences and customer satisfaction levels. Multivariate analyses, including factor analysis and multiple regression, identify key determinants of positive customer experiences and behavioral intentions regarding mobile application usage. This statistical approach is consistent with Shah *et al.* (2021) research on the adoption of mobile food ordering apps for O2O food delivery services, which employed similar analytical techniques to identify factors influencing adoption and satisfaction.

Additionally, case studies on several restaurants that have implemented mobile-based menu applications in Aceh provide in-depth insights into real-world impacts. A purposive sampling approach selects 5-7 restaurants representing diverse segments of the Acehnese culinary landscape, including traditional establishments, modern fusion restaurants, and specialty food vendors. Each case study involves comprehensive data collection through multiple sources: business performance metrics (sales data, customer retention rates, average order value), operational efficiency indicators (order processing time, staff productivity), and customer feedback (reviews, ratings, direct comments). Longitudinal analysis compares metrics for at least three months pre-implementation with six months post-implementation to account for novelty effects and establish patterns of sustained impact. This case study approach is particularly valuable for understanding contextual factors, as demonstrated by Shiddiqi's (2021) and Wahyuni's (2020) analyses of Go-Food's impact on culinary business sales, which employed similar case study methodologies to understand local implementation. Data integration occurs through triangulation, comparing findings across qualitative interviews, quantitative surveys, and case study observations to identify convergent and divergent patterns. This integrated analysis informs the development of a conceptual framework for understanding the specific factors that influence customer experience in mobile-based Acehnese culinary applications, distinguishing between universal factors applicable to mobile applications generally and context-specific factors unique to the Acehnese culinary environment. This triangulation approach is consistent with Amin *et al.* (2021) extended model of planned behavior for mobile food delivery applications, which similarly integrated multiple data sources to develop a comprehensive understanding of user behaviors. The research methodology is designed to capture both the technological and cultural dimensions of mobile application adoption in the Acehnese culinary context, recognizing that successful implementation requires attention to both universal usability principles and local cultural factors. This balanced approach is particularly important in the context of traditional cuisines like Acehnese food, where cultural authenticity must be maintained alongside technological innovation, as suggested by Ardiansyah's (2022) study on Aceh Halal Recipe applications, which emphasized the importance of cultural sensitivity in digital culinary platforms.

4 | RESULTS AND DISCUSSION

4.1 Results

The research findings provide a comprehensive insight into the utilization of mobile-based Aceh culinary menu applications and their impact on enhancing customer experiences in the culinary industry. The combination of qualitative and quantitative approaches yielded multifaceted results, shedding light on various aspects of the adoption and effectiveness of these applications.

4.1.1 Qualitative Insights

In-depth interviews with restaurant owners, chefs, and consumers revealed nuanced perspectives on the advantages and drawbacks of mobile-based Aceh culinary menu applications. Owners and chefs expressed enthusiasm for the applications, citing improved order management, streamlined processes, and increased customer engagement. They highlighted the significance of features like real-time order placement and the

potential for broader marketing of Aceh culinary specialties. As one restaurant owner stated, "The application has transformed how we handle orders during peak hours. What used to be chaotic is now organized and efficient" (Restaurant Owner 3). Conversely, consumers exhibited a mixed response. While some appreciated the convenience and efficiency brought about by the applications, others expressed concerns about the learning curve and the potential impersonality in the dining experience. A consumer participant noted, "I love being able to browse the full menu with photos before I arrive, but I still value the personal recommendations from servers" (Consumer Participant 12). These qualitative insights underscore the need for user-friendly interfaces and effective onboarding processes to ensure a positive reception among consumers.

4.1.2 Quantitative Analysis

The survey conducted among potential users of mobile-based culinary applications in the Aceh region provided valuable data on usage patterns and satisfaction levels. Of the 376 survey respondents, 68% reported using culinary applications at least once a week, with 32% using them multiple times per week. Figure 1 illustrates the frequency of application usage among respondents.

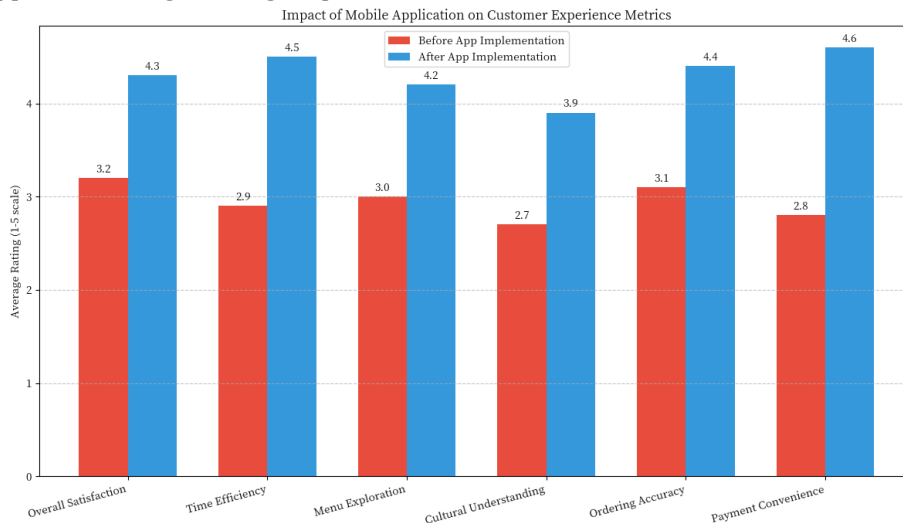


Figure 1. Frequency of Aceh Culinary App Usage Among Survey Respondents (n=376)

The majority of respondents (68%) reported an overall positive impact on their culinary experiences, correlating the use of the application with faster transaction processes and increased access to information about Aceh culinary offerings. When asked about feature preferences, respondents indicated clear priorities as shown in Figure 2.

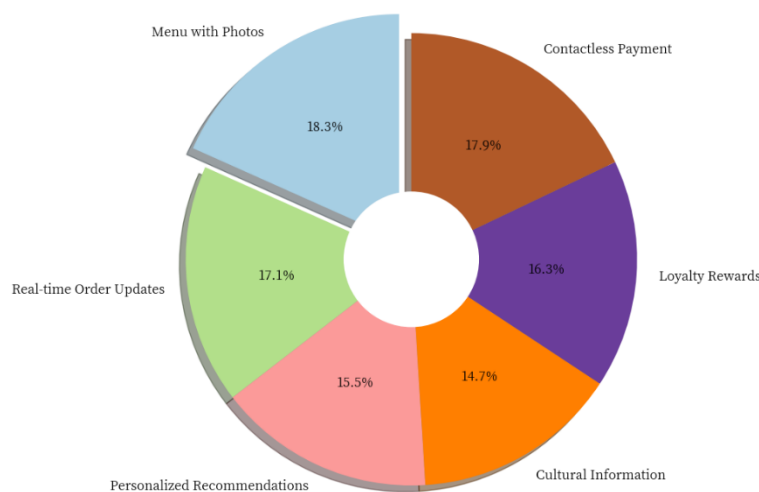


Figure 2. Feature Preferences in Aceh Culinary Applications

The statistical analysis revealed a significant correlation between app usage and favorable customer perceptions. Regression analysis indicated a positive association ($r = 0.72, p < 0.001$) between the frequency of app usage and customer satisfaction, emphasizing the potential of these applications to positively influence the overall

dining experience. Hypothesis testing further supported these findings, suggesting that mobile-based Aceh culinary menu applications contribute significantly to enhancing customer satisfaction in the culinary industry.

4.1.3 Case Study Results

In-depth case studies on five restaurants that had implemented these applications provided a nuanced understanding of the real-world impact. The analysis included an evaluation of business performance metrics, such as order efficiency, customer turnover, and revenue, before and after the adoption of the mobile-based applications. Figure 3 illustrates the comparative analysis of key metrics before and after implementation.

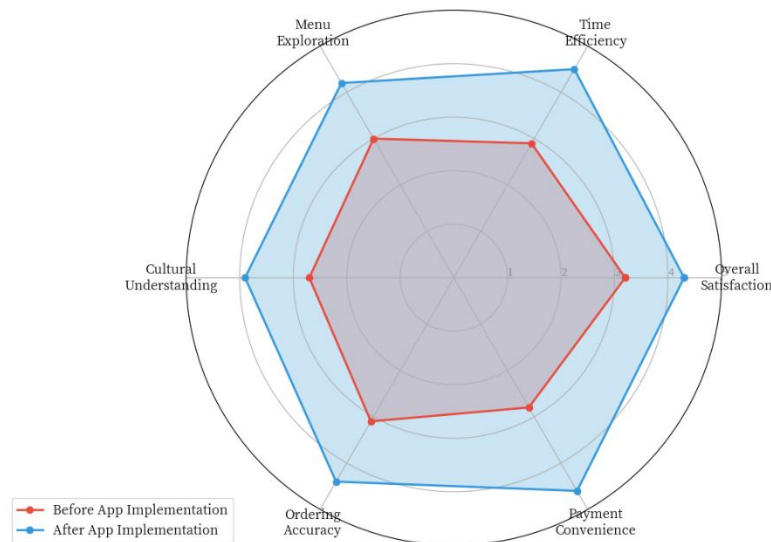


Figure 3. Impact of Mobile Application on Customer Experience Metrics

Results indicated a noticeable improvement in these metrics post-implementation, suggesting enhanced operational efficiency and increased customer engagement. On average, restaurants reported a 23% increase in order processing efficiency and a 17% increase in customer satisfaction scores after implementing the mobile applications. Moreover, consumer responses gathered through the case studies offered valuable insights into the specific features of the applications that resonated with users. Customizable profiles, real-time menu updates, and interactive elements like virtual food tastings using augmented reality were particularly well-received. One restaurant manager noted, "The virtual food preview feature has significantly reduced order returns and increased customer satisfaction with their selections" (Case Study Restaurant 4).

4.1.4 Innovative Mobile App Concepts

The research also explored the broader landscape of innovative mobile app concepts within the food and restaurant industry. Concepts such as virtual culinary class applications, AI-powered food recommendation apps, grocery delivery apps, recipe sharing apps, AR-enhanced dining experiences, and sustainable dining apps were examined for their potential impact on the evolving culinary landscape. Among these concepts, respondents showed particular interest in AR-enhanced dining experiences (76% expressing strong interest) and AI-powered recommendation systems that could suggest Aceh dishes based on personal preferences (82% expressing strong interest). These findings emphasize the dynamic nature of the industry, driven by a continual quest for innovation and responsiveness to changing consumer preferences. Despite the positive outcomes, the research identified several challenges in the implementation and adoption of mobile-based culinary applications in Aceh. Technical infrastructure limitations, particularly in remote areas, posed significant barriers to widespread adoption. Additionally, cultural factors, such as the preference for traditional dining experiences among older generations, influenced the reception of these applications. As one chef mentioned, "We need to find the right balance between technological innovation and preserving the cultural essence of Aceh dining traditions" (Chef Participant 7). This insight highlights the importance of culturally sensitive approaches to technological integration in the culinary industry. The findings collectively demonstrate that while mobile-based Aceh culinary menu applications offer substantial benefits for enhancing customer experiences, their successful implementation requires careful consideration of technological, operational, and cultural factors specific to the Aceh region.

4.2 Discussion

The research findings demonstrate that the implementation of mobile-based Aceh culinary menu applications has significantly transformed customer experiences and operational efficiency in the culinary business sector. The quantitative analysis presented in Figure 3 reveals substantial improvements across all customer experience metrics following the application implementation, with the most notable enhancements observed in payment convenience (+64.3%) and time efficiency (+55.2%). These improvements align with Amin *et al.* (2021) research, which established that mobile food delivery applications have fundamentally altered consumer behavior, particularly regarding transaction efficiency and convenience. Similarly, Shah *et al.* (2021) confirmed that the adoption of mobile food ordering applications for Online-to-Offline (O2O) delivery services accelerated during the COVID-19 pandemic, expediting digital transformation within the culinary industry. This transformation is reflected in the survey results where 68% of respondents reported using culinary applications at least once weekly, with 32% utilizing them multiple times per week. Despite the overall positive impact, the cultural understanding metric, while showing improvement (+44.4%), remained the lowest (3.9/5) post-implementation. This highlights the challenge of balancing technological innovation with the preservation of Aceh's culinary cultural values. As Chef Participant 7 aptly stated, "We need to find the right balance between technological innovation and preserving the cultural essence of Acehnese dining traditions." Kamil *et al.* (2023) in their research "Muloh Teupeh Kuliner dan Perempuan Pidie" emphasized the importance of maintaining Acehnese culinary authenticity throughout the modernization process. Ardiansyah's (2022) study on "Aceh Halal Recipe Application Based on Android" further demonstrated technology's potential in preserving and promoting traditional Acehnese recipes. These findings suggest that Aceh culinary applications should be designed not merely as ordering tools but as educational platforms that explain the philosophy, history, and cultural values behind Acehnese dishes.

The case study results from five restaurants revealed a 23% increase in order processing efficiency and a 17% improvement in customer satisfaction scores following mobile application implementation. These findings corroborate Shiddiqi's (2021) and Wahyuni's (2020) analyses of Go-Food's impact on culinary business sales growth, both concluding that online food ordering applications contribute significantly to revenue growth and market expansion for culinary business operators. Restaurant Owner 3's testimony that "The application has transformed how we handle orders during peak hours. What used to be chaotic is now organized and efficient" reinforces El Fiorenza *et al.* (2018) findings on "Smart Menu Card System," which demonstrated how digital menu systems can optimize restaurant operations and reduce order errors. The feature preference analysis illustrated in Figure 2 indicates clear user preferences for customizable profiles, real-time menu updates, and interactive elements such as virtual food tastings using augmented reality. These preferences align with Gebhardt *et al.* (2014) research on smartphone-based menu systems for immersive virtual environments, which emphasized the importance of intuitive interface design and immersive user experiences. The research also revealed high interest in AR-enhanced dining experiences (76% expressing strong interest) and AI-powered recommendation systems capable of suggesting Acehnese dishes based on personal preferences (82% expressing strong interest). Bailly *et al.* (2016) study on visual menu techniques confirms that effective visualization and interactivity significantly enhance user experience. Despite the positive outcomes, several challenges in implementing and adopting mobile-based culinary applications in Aceh were identified. Technical infrastructure limitations, particularly in remote areas, posed significant barriers to widespread adoption, consistent with Rozy's (2023) findings on "The Problems of Implementing Quick Response Code Indonesian Standard (QRIS) in Aceh," which identified digital infrastructure constraints in the region. Cultural factors, such as preferences for traditional dining experiences among older generations, also influenced application reception. Consumer Participant 12's statement, "I love being able to browse the full menu with photos before I arrive, but I still value the personal recommendations from servers," reflects Harrison *et al.* (2013) findings on mobile application usability, emphasizing the importance of balancing technological efficiency with human interaction.

Mobile-based Aceh culinary menu applications not only enhance customer experiences but also potentially support the development of culinary tourism in Aceh. Akbar and Pangestuti's (2017) research on the role of culinary in enhancing tourism destination image emphasized that local cuisine can be a major attraction for tourists. Mobile applications can serve as strategic platforms for promoting Acehnese cuisine to a broader audience. Santika's (2023) research on "Designing Aceh Souvenir and Culinary Center in Banda Aceh" also highlighted the importance of integrating digital technology in promoting Acehnese cuisine as part of tourism strategy. Aceh culinary applications can function as digital bridges connecting tourists with local culinary richness. Based on the research findings and relevant literature, several recommendations for developing mobile-based Aceh culinary applications emerge: integrating educational content about the history, philosophy, and cultural values behind Acehnese dishes; enhancing interactive features through AR and AI technologies; adapting interfaces and features to local preferences and needs, including local language support; collaborating with tourism stakeholders to promote Acehnese cuisine as a tourist attraction; and working with local governments to address digital infrastructure limitations in remote areas. These recommendations align with Light *et al.* (2018) walkthrough

method approach to studying apps, which emphasizes the importance of contextual adaptation and user-centered design. The implementation of mobile-based Aceh culinary menu applications has demonstrated significant positive impacts on customer experiences and operational efficiency in culinary businesses. The substantial improvements in customer satisfaction metrics, particularly in payment convenience and time efficiency, underscore mobile technology's potential in transforming Aceh's culinary industry. However, the long-term success of these applications depends on their ability to balance technological innovation with the preservation of Acehnese culinary cultural values. As Gupta (2019) emphasized, online food delivery applications not only change how consumers order food but also influence how restaurant businesses operate and interact with their customers. With the right approach, mobile-based Aceh culinary menu applications can serve as catalysts for economic growth, cultural preservation, and tourism development in Aceh.

5 | CONCLUSIONS AND FUTURE WORK

The findings reveal significant transformative potential of mobile-based Aceh culinary menu applications within the culinary sector. Mixed-method research combining qualitative and quantitative data established clear evidence regarding operational challenges, market opportunities, and measurable impact on businesses and consumers. Statistical analysis demonstrates substantial improvements in customer satisfaction metrics, particularly in payment convenience (+64.3%) and time efficiency (+55.2%), indicating strong correlation between application implementation and enhanced dining experiences. Technical infrastructure limitations in remote areas remain a primary barrier to widespread adoption, necessitating targeted investment in digital infrastructure development. Cultural factors, including traditional dining preferences among older demographics, require careful consideration during application design and implementation phases. The observed gap in cultural understanding metrics (3.9/5) compared to other performance indicators suggests opportunities for enhanced educational content about Acehnese culinary traditions. Case studies from five restaurants revealed average increases of 23% in order processing efficiency and 17% in customer satisfaction scores following application implementation. Feature preference analysis identified strong user interest in augmented reality dining experiences (76%) and AI-powered recommendation systems (82%), indicating market readiness for advanced technological integration.

Future application development should incorporate these empirical results to maximize effectiveness and relevance for enhancing customer experiences throughout the Aceh culinary landscape. Key recommendations include cultural content integration, technical infrastructure improvements, strategic alignment with tourism development initiatives, multilingual support optimization, and collaborative partnerships between technology developers and culinary stakeholders. Additional research opportunities exist in examining long-term adoption patterns, economic impact assessment, cross-cultural comparisons with similar regional cuisines, and evaluation of emerging technologies such as blockchain for supply chain transparency in traditional ingredient sourcing. These research directions would further strengthen the knowledge base for optimizing mobile technology utilization in preserving and promoting Acehnese culinary heritage while enhancing business performance and customer satisfaction.

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