

The Role of QR Code-Based Ordering Systems in Enhancing Service Quality and Operational Efficiency at Mie Gacoan

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ABSTRACT

This study examines the role of QR Code-based ordering systems in improving service quality and operational efficiency in Food and Beverage (F&B) Micro, Small, and Medium Enterprises (MSMEs), using Mie Gacoan as a case study. The research employs a qualitative approach through a systematic literature review of six relevant studies published between 2022 and 2025. The findings indicate that QR Code-based ordering systems reduce customer waiting times, minimize order recording errors, and enhance employee productivity by streamlining the ordering process. In terms of service quality, the technology supports key SERVQUAL dimensions, including responsiveness, reliability, and tangibles, while improving overall customer experience. Furthermore, the system contributes to more efficient operational workflows and better resource utilization. Despite these benefits, challenges such as varying levels of digital literacy and initial technology investment remain important considerations. This study provides insights into the potential of digital ordering systems to support service and operational improvements in F&B MSMEs.

INTRODUCTION

The global Food and Beverage (F&B) industry is currently undergoing a significant transformation due to changes in post-pandemic consumer behavior. Consumers now prefer self-service and contactless service as part of their new dining preferences. This shift aligns with the Industry 4.0 era, where digitalization has become a crucial strategic aspect for increasing competitiveness and ensuring business sustainability. According to Pratama et al. (2025), current advancements in information technology are an important factor for institutions or companies to achieve their goals optimally through more effective management. Therefore, implementing digital technology in services is no longer optional; it has become a primary necessity for business owners.

This transformation also creates new expectations from customers. Speed, accuracy, and service efficiency have become the main priorities in creating a positive customer experience. However, in technology-based services, customer experience is not only determined by efficiency. It is also shaped by how customers evaluate the ease, comfort, and interaction during the ordering and service process. Rasyid et al. (2022) state that smart ordering systems are designed to make dining transactions more effective and provide greater comfort for visitors. Thus, the use of digital technology needs to be understood not just from a functional side, but also from a user experience perspective.

F&B business owners, especially MSMEs (Micro, Small, and Medium Enterprises) with high transaction volumes, often face operational bottlenecks in the ordering and payment areas. This condition is usually marked by long queues, limited staff, and an increased risk of order recording errors. Rusito & Putri (2024) reveal that in conventional systems, problems often occur when customers have to wait in long lines to order. This can hinder employee performance and

reduce service quality. This issue not only affects operational efficiency but also shapes customer perception of service quality, which ultimately influences their loyalty and satisfaction.

In Indonesia, Mie Gacoan is an example of a rapidly growing F&B MSME with a high number of visitors. Its popularity as an affordable noodle bar leads to high transaction volumes, especially during peak hours. This creates a complex operational dynamic. Without an adequate system, manual processes such as waiters having to search for or call out customer's names to deliver food can make the service flow disorganized (Rasyid et al., 2022). The risk of human error in recording orders and long waiting times can potentially lower service quality and create a negative customer experience.

As a solution, the implementation of QR code-based self-ordering systems is becoming widely adopted. According to Rusito & Putri (2024), using a QR Code to access digital menus allows customers to scan the code, view the menu, and order independently without waiting for a waiter or standing in long lines. In addition, Erlangga et al. (2025) add that integrating this technology can streamline the restaurant staff's workflow because orders are processed automatically through a structured system.

Although the use of QR codes is increasingly common, research examining this phenomenon in high-density business units like Mie Gacoan is still limited, especially using a qualitative approach. Most previous studies, such as those by Rusito & Putri (2024) or Erlangga et al. (2025) have focused more on system development (Research and Development). Therefore, this research is important to analyze the role of QR code-based self-ordering systems in improving operational efficiency and service quality from the perspective of user experience, perception, and interaction dynamics in the field.

Furthermore, the QR Code Point of Sale (POS) system not only offers ordering convenience but also opens up new opportunities in operational management and marketing. For example, digitally recorded transaction data can be used for customer preference analysis, more accurate inventory management, and personalized loyalty programs. This is highly relevant for MSMEs like Mie Gacoan that operate with high volumes, where a deep understanding of consumption patterns can be the key to optimizing raw material supplies and designing more targeted promotional strategies. Tantri (2024) highlights how F&B digitalization through QR Menus can provide an integrated mini-website catalog, making it easier to collect customer data for further analysis.

From a customer experience perspective, adopting a QR Code POS system significantly increases satisfaction by reducing wait times and improving order accuracy. Customers can browse the menu more freely, customize their orders, and make payments without excessive physical interaction. This provides a greater sense of control and comfort, especially for the younger generation who are accustomed to digital technology. This phenomenon aligns with the predicted 2025 Indonesian consumer behavior trends, which show a strong preference for fast, practical, and convenient services driven by digitalization.

However, implementing this system also comes with its own challenges. The initial investment for technological infrastructure, such as hardware and software, as well as employee training, can be a barrier for some MSMEs. Additionally, not all customer segments have the same level of digital literacy, so an adaptation or assistance strategy is needed to ensure all customers can use this system optimally. It is important for business owners to consider this aspect so that the transition to a digital system runs smoothly and does not create new obstacles for certain customers.

Therefore, this research is expected to make a significant contribution to understanding the implementation and impact of QR code-based self-ordering systems in high-density F&B MSMEs. Focusing on the Mie Gacoan case study will provide a concrete picture of how this

technology interacts with operational dynamics and customer experiences in the field. The results of this study are relevant not only for academics but also for F&B industry practitioners in formulating effective and sustainable digitalization strategies in this modern era.

LITERATURE REVIEW

QR Code-Based Ordering

QR code-based ordering is a part of information technology development in digital service systems. A QR Code (Quick Response Code) is a two-dimensional code that can store various types of information and can be accessed quickly using mobile devices. In information systems theory, this technology is considered an interactive digital medium that supports instant information exchange between the system and the user. This concept aligns with the Technology Acceptance Model (TAM), which explains that ease of use and usefulness are the main factors in a user's acceptance of technology. Research shows that perceived ease of use and perceived usefulness significantly influence users' intentions to adopt QR code-based technology in digital services (Faisal et al., 2024).

Furthermore, QR code-based ordering can also be explained through the theory of service digitalization, which is the process of transforming traditional services into digital-based ones. In this theory, technology serves to improve the accessibility, speed, and flexibility of a service. QR codes are a form of self-service system implementation, where users can perform activities independently. Studies show that QR codes can provide information quickly and accurately. They also improve user interaction with digital systems, which ultimately encourages changes in consumer behavior toward using modern services (Rotsios et al., 2022).

Service Quality

Service quality is a key concept in service management that refers to a service's ability to meet or exceed customer expectations. One of the most widely used theories is the SERVQUAL model, which measures service quality based on five dimensions: tangibles, reliability, responsiveness, assurance, and empathy. This model emphasizes that service quality is determined by the gap between customer expectations and their perception of the service received. Recent research shows that the five SERVQUAL dimensions significantly affect customer satisfaction levels in various service sectors (Rahmatia et al., 2025).

With technological advancements, the concept of service quality has evolved into e-service quality, which emphasizes the quality of digital-based services. In this theory, quality is not only evaluated based on direct interactions but also on the system quality, information quality, and operational quality of digital services. Research indicates that aspects such as system reliability, access speed, and information accuracy are important factors in shaping the perception of digital service quality and user satisfaction (Alves et al., 2025).

Operational Efficiency

Operational efficiency is a management concept related to an organization's ability to use resources optimally to produce maximum output. This concept emphasizes reducing waste, saving costs, and increasing productivity in operational processes. In operations management theory, efficiency is often measured through processing time, production costs, and the level of resource utilization. Research shows that implementing technology-based systems can improve efficiency by speeding up processes and reducing operational barriers (Ahmed et al., 2025).

In modern approaches, operational efficiency is also explained through the concepts of lean management and process optimization. Lean management focuses on eliminating non-value-added activities, while process optimization aims to improve workflow effectiveness. Studies

show that integrating technology into operational processes can increase service speed, reduce errors, and support faster and more accurate decision-making (Eren, 2022).

METHOD

This study employs a qualitative approach using a literature review method. This method was chosen because the research aims to analyze the role of a QR Code-based ordering system in improving operational efficiency and service quality in F&B SMEs without conducting primary data collection in the field. A literature review enables researchers to understand concepts, theories, and findings from previous studies relevant to the topic under investigation. According to Fadli (2021), a literature review is conducted by collecting and reconstructing various sources, such as books, scientific journals, articles, and previous research related to the research topic. In addition, qualitative research methods are used to gain an in-depth understanding of social phenomena through descriptive data analysis. Therefore, the literature review method is considered appropriate for analyzing the implementation of QR Code-based ordering systems in enhancing operational efficiency and service quality in F&B SMEs in Indonesia.

The focus of this study is to analyze the role of QR Code-based ordering systems in improving operational efficiency and service quality in F&B SMEs, with a case study of Mie Gacoan. The selection of Mie Gacoan as the case study is based on several aspects, including the reduction of customer queues, faster ordering processes, lower risk of human error in order recording, improved employee work effectiveness, and customer experiences when using the digital ordering system. Furthermore, this study examines how the implementation of QR Code technology can create a faster, more practical, and contactless service experience in response to changes in consumer behavior in the post-pandemic digital era.

The data used in this study are secondary data obtained from various relevant literature sources. These sources include scientific journals, scholarly articles, research reports, and publications related to service digitalization, QR Code systems, service quality, and operational efficiency in the F&B industry. The literature selected for this study primarily consists of publications from 2021 onward to ensure that the information reflects current technological developments and consumer behavior trends. In addition, previous studies discussing the implementation of self-ordering systems in restaurants and SMEs are used to strengthen the theoretical foundation and analysis of the research. Snyder (2019) states that a literature review is used to identify, evaluate, and synthesize previous studies systematically, enabling researchers to gain a more comprehensive understanding of a research phenomenon.

The data collection process was conducted by gathering, reading, understanding, and reviewing various literature sources related to the research topic. The collected literature was then selected based on specific criteria, analyzed, and synthesized. The results of this process are presented in the form of a conceptual summary that systematically describes the findings from the reviewed literature.

Therefore, the literature review method used in this study is expected to provide a comprehensive understanding of the role of QR Code-based ordering systems in improving operational efficiency and service quality in F&B SMEs. Through the processes of collecting, selecting, analyzing, and synthesizing relevant literature sources, this study aims to generate a systematic conceptual understanding and support the achievement of the research objectives without the use of primary field data.

RESULT AND DISSCUSION

The literature reviewed in this study was identified through searches on Google Scholar, Consensus, and Mendeley, covering publications from 2021 to 2026. The search process employed the keywords QR Code-Based Ordering System, Service Quality, and Operational Efficiency. After screening the studies based on topic relevance and methodological quality, six national and international articles were selected for analysis.

Code	Title	Author (Year)	Method	Result
M1	Design of a Web-Based Food and Beverage Ordering System Using QR Code (Case Study: Kedai Lazida Banjarnegara)	Luviana & Purwanto (2025)	This study applies a prototyping method to design and develop a QR code-based ordering system using observation, interviews, and literature review.	The system successfully digitalizes the ordering process, making it faster, more accurate, and more efficient while improving service quality and customer experience.
M2	Implementation of a QR Code-Based Food Ordering System for Micro, Small, and Medium Enterprises	Manurung & Sipahutar (2024)	This study uses a system development approach by designing and implementing a QR code-based ordering system supported by data collection through observation and literature study.	The system helps MSMEs improve service efficiency, simplify the ordering process, and enhance customer convenience through digital ordering.
M3	Implementation of QR Code Menu Technology to Improve Employee Performance Efficiency and Operations at Giota Seafood	Sentoso & Junestin (2024)	This study uses observation, interviews, questionnaires, and documentation to evaluate the implementation of a QR code menu system.	The implementation significantly improves work efficiency, reduces employee workload and stress, and enhances service speed and customer satisfaction.
M4	Development of a Web-Based Food Ordering Application Using QR Code for Cafe Service Efficiency	Syahri et al. (2025)	This study uses the Waterfall method, including analysis, system design, implementation, and black-box testing.	The system reduces ordering time, minimizes errors, and improves service efficiency and real-time order management in cafes.

M5	Utilizing Digital Menu and Ordering Systems to Improve Service Quality: A Digital Transformation Case in Food & Beverage	Lukita & Muslikhah (2025)	This study uses a qualitative case study approach with data collected through interviews, observation, and document analysis using triangulation.	Digital menu and QR code ordering systems improve service quality by increasing efficiency, reducing errors, shortening waiting time, and enhancing customer satisfaction.
M6	Implementation of Menu Recommendation and Self-Order on Restaurant E-Menu Using Collaborative Filtering.	Aziz et al. (2022)	This research develops an Android-based e-menu system using User-Based Collaborative Filtering to calculate similarity between user ratings.	The application improves service quality by providing relevant menu recommendations and accelerating the ordering and payment process through QR code technology.

DISCUSSION

QR Code-Based Ordering Systems and Operational Efficiency at Mie Gacoan

The synthesis of reviewed literature consistently demonstrates that QR Code-based ordering systems produce significant improvements in operational efficiency across various F&B settings. Luviana & Purwanto (2025) found that digitalization of the ordering process through QR Code technology accelerates transaction flow, reduces human error, and minimizes the need for manual coordination between waiters and kitchen staff. These findings are particularly relevant to the operational context of Mie Gacoan, which operates with high transaction volumes during peak hours and relies on speed as a key competitive advantage.

Supporting this, Manurung & Sipahutar (2024) demonstrated that QR Code-based systems in MSME settings simplify the ordering process and reduce the workload of service staff, enabling them to focus on higher-value tasks such as food delivery and customer assistance rather than manual order taking. At Mie Gacoan, where queue management has historically been a bottleneck, this shift represents a fundamental restructuring of the service flow. Customers can independently select menu items, customize their orders, and submit them digitally without requiring waiter intervention, effectively eliminating one of the most time-consuming stages in the traditional service model.

From an operational management perspective, Sentoso & Junestin (2024) reported that the adoption of QR Code menu technology significantly reduces employee workload and stress levels, particularly during high-density service periods. The study noted improvements in service speed and a measurable reduction in order recording errors, which directly translates to fewer customer complaints and more efficient use of staff resources. In the context of Mie Gacoan, where the volume of simultaneous orders during peak hours creates considerable pressure on kitchen and service staff, these efficiency gains are operationally critical.

Further corroboration is provided by Syahri et al. (2025), whose development of a web-based QR Code ordering system demonstrated reductions in ordering time, minimized errors, and

improved real-time order management capabilities. The system's ability to process and transmit orders directly to the kitchen in real-time eliminates the communication gaps inherent in traditional paper-based or verbal ordering systems. This finding aligns with lean management principles, particularly the elimination of non-value-added activities such as manual order transcription and verbal relay between front-of-house staff and kitchen teams.

QR Code-Based Ordering Systems and Service Quality Dimensions

Beyond operational efficiency, the reviewed literature reveals a consistent positive relationship between QR Code-based ordering systems and multiple dimensions of service quality as defined by the SERVQUAL model. Lukita & Muslikhah (2025) conducted a qualitative case study on digital menu and ordering system implementation in the F&B sector and found that such systems improve service quality by increasing efficiency, reducing errors, shortening waiting times, and enhancing customer satisfaction. These outcomes map directly onto the SERVQUAL dimensions of responsiveness, reliability, and tangibles, indicating that QR Code adoption has a multidimensional impact on perceived service quality.

The responsiveness dimension is most directly addressed through the speed improvement enabled by self-ordering systems. When customers at Mie Gacoan can immediately submit orders upon arrival without waiting for a waiter, the perceived responsiveness of the service increases substantially. Additionally, the reliability dimension benefits from the reduction of human error in order recording. When orders are digitally transmitted and systematically processed, the accuracy of order fulfillment improves, reducing the frequency of incorrect or missing items, which is a significant driver of customer dissatisfaction in high-volume dining environments.

Aziz et al. (2022) add a further dimension to this discussion by demonstrating how e-menu systems incorporating QR Code technology can be enhanced with recommendation features that personalize the customer experience. This capability extends service quality beyond transactional efficiency and into the domain of customer engagement and personalization. For Mie Gacoan, which serves a predominantly young, digitally literate customer base, such features align well with evolving consumer expectations for convenient, technology-mediated service interactions.

Implementation Challenges and Contextual Considerations

While the evidence strongly supports the benefits of QR Code-based ordering systems, the reviewed literature also identifies several implementation challenges relevant to the Mie Gacoan context. The initial investment in digital infrastructure, including hardware terminals, software licensing, and staff training, represents a financial barrier for many MSMEs. Furthermore, not all customer segments demonstrate the same level of digital literacy, potentially creating service friction for older or less technologically experienced customers.

However, these challenges do not negate the overall positive impact of QR Code system adoption. Rather, they underscore the importance of a phased and customer-centered implementation approach. For Mie Gacoan, maintaining hybrid service options during the transition period and providing on-site assistance for less digitally proficient customers are practical measures that can mitigate adoption barriers while preserving the operational efficiency gains of the digital system. The long-term service quality and efficiency benefits of QR Code adoption substantially outweigh the transitional costs and challenges.

CONCLUSIONS

This study set out to analyze the role of QR Code-based ordering systems in enhancing service quality and operational efficiency in F&B MSMEs, using Mie Gacoan as its primary

reference case. Through a systematic review of six empirical studies published between 2022 and 2025, the research yields three principal conclusions.

First, QR Code-based ordering systems demonstrably improve operational efficiency in high-density F&B environments. The evidence consistently shows reductions in ordering time, minimization of human error in order recording, and more effective distribution of staff responsibilities. For Mie Gacoan, these gains translate directly into faster service cycles, reduced queue lengths, and improved kitchen coordination.

Second, the adoption of QR Code ordering technology positively impacts multiple dimensions of service quality as conceptualized by the SERVQUAL model. The responsiveness dimension benefits most immediately from speed improvements, while the reliability dimension is strengthened through the reduction of order inaccuracies. The tangibles dimension is also enhanced through the modern, user-friendly digital interface that replaces physical menus. Collectively, these improvements contribute to higher levels of customer satisfaction and a more positive overall dining experience.

Third, while implementation challenges including digital literacy gaps among certain customer segments and initial infrastructure costs are real considerations, a phased and customer-centered implementation strategy that includes hybrid service options and on-site digital assistance can effectively manage these barriers while preserving the efficiency and quality benefits of the digital system.

RECOMMENDATIONS

Based on the conclusions drawn from this study, the following recommendations are offered to F&B MSME operators, particularly those operating in high-density environments similar to Mie Gacoan.

First, F&B operators should prioritize the adoption of QR Code-based ordering systems as a strategic operational investment. The evidence from multiple contexts consistently demonstrates that the efficiency and service quality gains justify the initial implementation costs, particularly for businesses experiencing queue management challenges and high error rates in manual ordering.

Second, operators should design their digital service systems with inclusivity in mind. Providing clear in-store signage, brief instructional guides, and staff available to assist less technologically proficient customers will ensure that the adoption of digital systems enhances rather than fragments the customer experience.

Third, future research should extend beyond the literature review methodology employed in this study to include primary data collection through customer surveys, staff interviews, and operational performance metrics at Mie Gacoan and comparable F&B MSMEs. Such empirical research would provide a more granular and context-specific understanding of the impacts documented in the reviewed literature, strengthening the evidence base for digital service adoption in the Indonesian F&B sector.

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