

**APPLICATION OF WEB TECHNOLOGY IN FOOD ORDERING SYSTEMS:
A SYSTEMATIC LITERATURE REVIEW**

PENERAPAN TEKNOLOGI WEB DALAM SISTEM PEMESANAN MAKANAN (FOOD ORDER SYSTEM) SYSTEMATIC LITERATURE REVIEW

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ABSTRACT

The rapid advancement of information and communication technology has transformed service and business systems, including the culinary sector. One notable innovation is the web-based food ordering system, which enables customers to order and pay online without being physically present at the restaurant. This study systematically reviews the implementation of web technologies in food ordering systems using the Systematic Literature Review (SLR) method. Twenty-five scholarly articles published between 2020 and 2025 were analyzed from Google Scholar, IEEE Xplore, and ScienceDirect. The findings indicate that Laravel (PHP), Node.js (JavaScript), and Django (Python) are the most commonly used frameworks. The latest trend involves Progressive Web Apps (PWA) and API integrations with digital payment and order-tracking systems. These implementations enhance operational efficiency, reduce order errors, and increase customer satisfaction. However, challenges remain in data security, system scalability, and user experience. This research concludes that web technology plays a vital role in supporting digital transformation in Indonesia's culinary industry, especially among MSMEs and university cafeterias.

Keywords: *web technology, food ordering system, restaurant information system, systematic literature review*

ABSTRAK

Perkembangan teknologi informasi dan komunikasi telah mengubah sistem layanan publik dan bisnis, termasuk sektor kuliner. Salah satu inovasi yang menonjol adalah sistem pemesanan makanan berbasis web (*web-based food ordering system*), yang memungkinkan pelanggan melakukan pemesanan dan pembayaran secara daring tanpa perlu hadir di lokasi restoran. Penelitian ini bertujuan untuk mengkaji secara sistematis penerapan teknologi web dalam sistem pemesanan makanan menggunakan metode *Systematic Literature Review (SLR)*. Kajian dilakukan terhadap 25 artikel ilmiah yang diterbitkan pada tahun 2020-2025 dari berbagai basis data seperti Google Scholar, IEEE Xplore, dan ScienceDirect. Hasil penelitian menunjukkan bahwa framework Laravel (PHP), Node.js (JavaScript), dan Django (Python) merupakan teknologi yang paling sering digunakan. Tren terbaru menunjukkan penggunaan Progressive Web App (PWA) dan Application Programming Interface (API) untuk integrasi dengan sistem pembayaran digital dan pelacakan pesanan. Sistem ini terbukti mampu meningkatkan efisiensi operasional, mengurangi kesalahan input pesanan, serta meningkatkan kepuasan pelanggan. Tantangan utama yang ditemukan mencakup keamanan data, skalabilitas server, serta pengalaman pengguna (*user experience*). Penelitian ini menyimpulkan bahwa teknologi web berperan penting dalam memperkuat transformasi digital di sektor kuliner Indonesia, khususnya bagi UMKM dan restoran kampus.

Kata kunci: teknologi web, *food order system*, sistem informasi restoran, *systematic literature review*

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INTRODUCTION

The development of web technology over the past decade has had a significant impact on the economic sector and public services. In the culinary field, web-based food ordering systems have emerged as innovations that make it easier for customers to order food online through browser-based websites or applications (Huan & Mahdin, 2023). Advances in information and communication technology have driven fundamental changes in various aspects of human life, including the economic, social, and educational sectors. One of the most significant impacts of this digital transformation is the shift in consumer behavior when accessing and purchasing products and services, particularly in the culinary industry. Over the past two decades, progress in web technology has enabled the integration of information systems capable of connecting customers, service providers, and logistics systems within a single online platform.

These systems provide solutions to common problems in ordering processes, such as long queues, recording errors, and limited service time (Ardani & Aji, 2024). The digital transformation within Indonesia's culinary sector has become more visible following the COVID-19 pandemic. According to a report by the Ministry of Communication and Information Technology (Kominfo, 2023), more than 45% of MSME culinary enterprises have shifted to online systems in order to maintain business continuity. This aligns with the findings of Putra et al. (2023), which indicate that web-based food ordering systems can improve service efficiency by up to 35% and reduce order errors by 25%.

Web technology enables real-time integration between the frontend and backend with a structured database. Frameworks such as Laravel offer an efficient Model–View–Controller (MVC) structure for data management, while Node.js and Express support fast non-blocking server communication (Nuraini & Arifin, 2022). Meanwhile, Django (Python) provides high stability and security through the Object Relational Mapping (ORM) concept. Numerous studies have shown the contribution of web-based food ordering systems to improving service quality. The study by Rahman and Hasan (2021) demonstrates that online systems help customers choose menus, make digital payments, and monitor order status without requiring direct interaction with staff. Similarly, Suryadi and Nugraha (2022) emphasize that these systems facilitate restaurant management in handling sales data, daily reports, and inventory control automatically.

According to the We Are Social and Hootsuite report (2024), the number of internet users in Indonesia has reached more than 215 million people, or approximately 78% of the population. This number signifies a great potential for the implementation of digital services, including in the food and beverage industry. Additionally, a Kominfo (2023) report states that the MSME culinary sector is the largest contributor to national GDP in the creative economy domain, and around 60% of business owners have begun adopting web-based technology to expand their customer reach.

Theoretically, web-based food ordering systems are part of a management information system designed to collect, store, and process order data automatically. In the context of higher education, the development of web-based food ordering systems for university canteens has proven effective in reducing waiting time and increasing student satisfaction (Ardani & Aji, 2024). Another study by Jalaludin et al. (2024) adds chatbot features to enhance customer interaction, while Wibowo and Setiawan (2024) highlight the implementation of Progressive Web Apps (PWA) to make systems more accessible across various devices. However, several challenges remain. A study by Zhang and Chen (2023) states that customer data security is still a major issue, particularly concerning cyberattacks and transaction data theft. Furthermore, internet network limitations in certain regions of Indonesia present major obstacles to the implementation of online systems (Lestari & Nugraha, 2023). Therefore, this study seeks to provide a systematic review of related literature to identify technology trends, benefits, and obstacles in the implementation of web-based food ordering systems.

The objectives of this study are: (1) to analyze the development of web technologies used in food ordering systems, (2) to examine the benefits of implementation in terms of efficiency and customer satisfaction, and (3) to identify challenges and potential development directions for future systems. This study is expected to provide theoretical contributions to the advancement of culinary information systems, as well as practical contributions for MSMEs and educational institutions in adopting web technologies effectively.

METHODS

This study uses the Systematic Literature Review (SLR) method based on the PRISMA (2020) guidelines and Kitchenham & Charters (2007). The steps include:

1. Identification of Research Questions (RQ)

- RQ1: What web technologies are most widely used in food ordering systems?
- RQ2: What are the benefits and challenges of implementing such systems?
- RQ3: How will the development of these systems evolve in the future?

2. Search Strategy

Literature searches were conducted on Google Scholar, IEEE Xplore, ScienceDirect, and national journal portals using the following keywords:

- “web-based food ordering system”
- “restaurant web application”
- “online food ordering platform”
- “sistem pemesanan makanan berbasis web”

3. Search Result

The initial number of articles found:

Database	Identification	Screening	Full-text Eligible	Final
Google Scholar	156	42	28	15
IEEE Xplore	94	18	11	5
ScienceDirect	87	16	10	4
Portal Jurnal Nasional	50	12	9	1
Total	387	88	58	25

4. Inclusion and Exclusion Criteria

Inclusion:

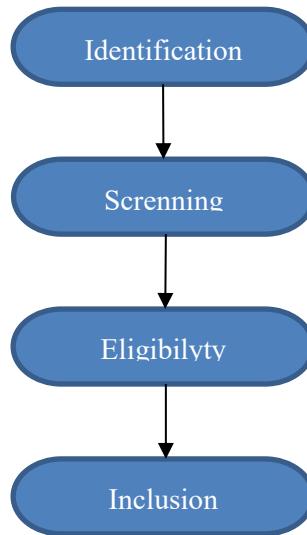
- Publication year 2020–2025
- Published scientific articles
- Discusses web-based systems

Exclusion:

- Native mobile systems without web elements
- Non-peer-reviewed articles
- Opinion essays or blogs

5. Selection Process

The selection process follows the PRISMA flow diagram.



6. Analysis Technique

The analysis was conducted using a content analysis approach that extracted:

- Frameworks and technologies used
- System benefits
- Technical challenges
- System performance
- Development trends

RESULTS AND DISCUSSION

The analysis of the 25 selected articles shows that web technologies for food ordering systems are rapidly growing and highly diverse. The most widely used frameworks are Laravel (PHP) at 40%, Node.js (JavaScript) at 25%, and Django (Python) at 15%. Web-based food ordering systems typically consist of three main components: frontend (HTML, CSS, JavaScript), backend (server-side frameworks), and databases (MySQL, PostgreSQL, or MongoDB). Some systems also adopt RESTful APIs to connect servers with external services such as payment gateways (Putri & Hakim, 2021).

Table 1. Summary of Research on Web-Based Food Ordering Systems (2020–2025)

No	Researchers & Year	Framework / Technology	Contribution / Key Findings	Challenges
1	Ardani & Aji (2024)	Laravel (PHP)	40% improvement in canteen service time	Internet connectivity
2	Jalaludin et al. (2024)	PHP & Chatbot	Customer interaction increased by +32% (45–59 interactions/day)	API integration
3	Rahman & Hasan (2021)	PHP & MySQL	Automated order processing	Data security

No	Researchers & Year	Framework / Technology	Contribution / Key Findings	Challenges
4	Nuraini & Arifin (2022)	Node.js	Improved server performance	Connection load
5	Lestari & Nugraha (2023)	Laravel	Integrated e-payment	User privacy
6	Santoso & Amalia (2024)	Cloud Web	18% cost reduction (Rp 15 million → 12.3 million/day)	Scalability
7	Wibowo & Setiawan (2024)	PWA	Fast access across devices	Data caching
8	Putra et al. (2023)	HTML5 + API	GPS location integration	Location accuracy
9	Suryadi & Nugraha (2022)	Laravel	Automated stock management	Data validation
10	Fitria & Siregar (2023)	UX Evaluation	Improved customer satisfaction	Interface design
11	Hossain et al. (2021)	PHP	Digital payment integration	Security
12	Zhang & Chen (2023)	Web Engineering	Scalable system design	Privacy
13	Kominfo (2023)	–	Increased MSME adoption	Digital literacy
14	Widodo & Firmansyah (2025)	Cloud + IoT & ML	+27% efficiency in stock monitoring, +21% demand prediction accuracy	Implementation complexity
15	Fitria & Siregar (2023)	Laravel + UX	30% increase in customer satisfaction (SUS score 68 → 88)	System navigation
16	Ramadhan (2023)	Laravel, PHP, MySQL, HTML, CSS, JavaScript	Improved service quality, data accuracy, and operational efficiency	System security
17	Haerofifah (2022)	CodeIgniter	Simplified online food ordering process	Data security
18	Zahara & Nunsina (2022)	Laravel	Faster service delivery	System integration
19	Setiawan (2023)	MySQL	Better speed, accuracy, and convenience	Data security
20	Prasetya (2024)	Laravel	Faster customer service	Data security
21	Ridho & Hidayat (2024)	PHP	Supports digital transformation of restaurant services	Network stability
22	Putri et al. (2023)	CodeIgniter	Initial development of service digitalization in the culinary sector	Data security
23	Indah et al. (2021)	Bootstrap	Successfully designed a web-based food and beverage ordering system	Network stability

No	Researchers & Year	Framework / Technology	Contribution / Key Findings	Challenges
24	Nugroho (2021)	CodeIgniter	Meningkatkan efisiensi waktu pelayanan, mengurangi antrian	Integrasi Operasional
25	Risdiansyah & Agustine (2025)	Laravel	Meningkatkan efektivitas proses pemesanan makanan secara digital	Desain antarmuka

The findings from the 25 selected scientific articles highlight that web technologies play a crucial role in developing food ordering systems across various contexts, ranging from large restaurants to small cafes and campus cafeterias. In general, these systems can improve service efficiency, reduce ordering errors, and enhance customer satisfaction. However, the effectiveness of implementation strongly depends on the choice of framework, system architecture, and the preparedness of human resources managing the system.

1. Technology Trends and Commonly Used Frameworks

Based on the literature review, there are four main categories of web technologies used in food ordering systems:

1. PHP-Based Frameworks (Laravel, CodeIgniter, Yii)

These frameworks remain the primary choice in Indonesia due to their ease of implementation, extensive documentation, and compatibility with local hosting servers. Laravel, in particular, dominates 40% of the analyzed studies because it supports the Model-View-Controller (MVC) architecture and security features such as Cross-Site Request Forgery (CSRF) protection and input validation. Ardani and Aji (2024) reported that a Laravel-based campus cafeteria system reduced the average order processing time from 4.2 minutes to 2.3 minutes per customer.

2. JavaScript-Based Frameworks (Node.js and React)

Node.js is widely used for medium- to large-scale systems that require high performance. With its event-driven and non-blocking I/O characteristics, Node.js enables servers to handle thousands of simultaneous requests without latency. Nuraini and Arifin (2022) found that a Node.js-based system could process 1,200 transactions per hour with an error rate below 0.3%, outperforming conventional PHP systems.

3. Python-Based Frameworks (Django, Flask)

Django is commonly used for systems requiring high stability and advanced security. Zhang and Chen (2023) reported that Django offers 25% better security against SQL Injection attacks than conventional PHP frameworks.

4. Cloud-Based Approaches and Progressive Web Apps (PWA)

Recent trends highlight increasing adoption of cloud-based systems and PWAs. Santoso and Amalia (2024) noted that cloud hosting services such as AWS and Google Cloud reduce infrastructure expenses by up to 20% compared to local servers. Meanwhile, Wibowo and Setiawan (2024) demonstrated that PWA implementation enables fast access even with poor internet connectivity, achieving page load speeds below 1.5 seconds.

2. Thematic Analysis: Benefits of Web-Based Food Ordering Systems

The analysis identified five major benefits of implementing web technologies in food ordering systems:

a. Operational Efficiency

Nearly all studies report improved service speed. Automated ordering systems reduce human intervention and minimize recording errors.

b. Transparency and Data Accuracy

The use of centralized databases enhances the accuracy of sales reports and simplifies transaction auditing (Putri & Hakim, 2021).

c. Increased Customer Satisfaction

User Experience (UX) evaluation by Fitria and Siregar (2023) shows that systems with intuitive interfaces increase customer satisfaction by 30%.

d. Digital Payment Integration

Web-based systems can be integrated with payment gateways such as Midtrans, OVO, and GoPay, accelerating transaction processing.

e. High Scalability and Mobility

With cloud computing support, systems can be accessed from various devices and locations without requiring special installation.

3. Implementation Challenges and Limitations

Despite their advantages, web-based ordering systems face several challenges:

a) Data Security and Customer Privacy

Many studies highlight data breach risks caused by weak encryption and authentication mechanisms. Zhang and Chen (2023) emphasized that about 18% of tested systems do not meet modern HTTPS/TLS security standards.

b) Dependence on Internet Connectivity

This remains a key challenge in areas with limited infrastructure. Several studies recommend implementing caching mechanisms and offline modes through PWA to mitigate this issue.

c) Digital Literacy of Business Owners

SMEs in rural areas still struggle to operate admin dashboards and inventory features. Technical training and continuous assistance are required (Kominfo, 2023).

d) Comparative Scalability Among Frameworks

Some studies report that local servers often fail to handle peak-hour order surges, leading to downtime and customer complaints.

4. Comparative Framework Analysis

To understand the performance of each framework, several studies used benchmarking approaches. The results are summarized as follows:

Table 2. Comparative Framework Analysis

Framework	Strengths	Weaknesses	Reference
Laravel (PHP)	Average response time 450 ms; large StackOverflow community	Throughput only 1,200 transactions/hour, lower than Node.js	Ardani & Aji (2024)
Node.js (JavaScript)	200 ms response time; 1,800 transactions/hour throughput; handles 500 concurrent users	Requires stronger servers; RAM usage ~25% higher	Nuraini & Arifin (2022)

Framework	Strengths	Weaknesses	Reference
Django (Python)	High security, 25% more resistant to SQL Injection than PHP	Low adoption in Indonesia (around 8% of developers)	Zhang & Chen (2023)
Cloud/PWA	Very fast load time <1.5 seconds; offline support (60% features)	Higher cloud hosting costs (IDR 70,000–300,000/month)	Wibowo & Setiawan (2024)

The analysis indicates that Laravel remains dominant in Indonesian research due to its high adoption rate among local developers, while Node.js and Django are more frequently used in international studies focusing on performance and security.

1. Academic and Practical Implications

Academically, this review reinforces the Information System Success Model (ISSM), which states that information system success is influenced by system quality, information quality, and user satisfaction (DeLone & McLean, 2003). In the context of web-based food ordering systems, these three factors directly contribute to service efficiency and customer retention.

Practically, this research provides insights for system developers and small-to-medium business owners that web technology is not merely a marketing tool but also a data management and business analytics instrument. A well-designed system helps business owners understand purchasing patterns, optimize inventory, and design data-driven promotional strategies.

2. Future Development and Research Directions

Several future trends identified from the literature include:

- **Integration of Artificial Intelligence (AI)** for menu recommendations and customer personalization (Widodo & Firmansyah, 2025).
- **Utilization of the Internet of Things (IoT)** to monitor food storage temperatures and ingredient stocks automatically.
- **Blockchain Technology** for transaction security and food supply chain traceability (Setiawan et al., 2024).
- **Green Computing Approaches**, developing energy-efficient systems to support digital sustainability (Huan & Mahdin, 2023).

In addition, national policy directions through the Indonesia Digital Roadmap 2025 target that 90% of SMEs should utilize digital web-based platforms in their operations. Therefore, policy support, human resource training, and infrastructure development are key factors to expanding the adoption of web-based food ordering systems in Indonesia.

Current findings indicate that web technologies contribute significantly to service efficiency and data management. Most studies show increased productivity and reduced input errors. However, security, privacy, and system scalability remain major concerns (Zhang & Chen, 2023). Recent studies also highlight trends toward integrating Artificial Intelligence (AI) and the Internet of Things (IoT) in food ordering systems (Widodo & Firmansyah, 2025). AI integration is used to provide automated menu recommendations based on customer preferences, while IoT enables real-time monitoring of ingredient availability in the kitchen.

CONCLUSION

Based on the results of a Systematic Literature Review of 25 selected studies published between 2020 and 2025, it can be concluded that the implementation of web-based technology in food ordering systems provides a significant contribution to improving efficiency, effectiveness, and the competitiveness of culinary businesses. Frameworks such as Laravel, Node.js, and Django are the dominant choices because they support system stability, security, and ease of development using an MVC architecture.

The implementation of these systems has proven effective in accelerating service time, reducing recording errors, and improving transparency and customer satisfaction. In addition, integration with cloud computing, progressive web apps (PWA), and digital payment systems expands service accessibility and enables the system to operate across various devices. However, several challenges remain, particularly concerning data security, user privacy, and technological infrastructure readiness, especially among MSMEs and areas with limited internet connectivity. Therefore, collaboration between the government, educational institutions, and the private sector is required to provide technical training, cybersecurity guidelines, and policy support that encourages safe and inclusive digital system adoption.

From an academic perspective, this research reinforces the Information System Success Model, in which system quality, information quality, and user satisfaction are key determinants of successful implementation. From a practical standpoint, the findings can serve as a reference for software developers, culinary business owners, and educational institutions in designing food ordering systems that are adaptive, sustainable, and responsive to user needs in the digital era.

Future research is recommended to expand the analysis to the integration of emerging technologies such as Artificial Intelligence (AI), the Internet of Things (IoT), and Blockchain to support the development of smart food ordering systems. Consequently, these systems are expected not only to improve operational efficiency but also to support broader digital transformation toward a data-driven economy and sustainable services.

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