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OPTIMIZATION OF E-COMMERCE THROUGH MODERN WEB TECHNOLOGIES (NEXT.JS, LARAVEL, ETC.) A SYSTEMATIC LITERATURE REVIEW

OPTIMALISASI E-COMMERCE MELALUI TEKNOLOGI WEB MODERN (NEXT.JS, LARAVEL, DSB) TINJAUAN PUSTAKA SISTEMATIS

Denis Pratama *[1], Andi Umi Kalsum [2], Radika Fibrilya Herman[3], Anisa Fitri [4], Kharisma Dewi [5], Dhimas Tribuana [6]
Universitas Muhammadiyah Kolaka Utara, Lasusua, Indonesia [1,2,3,4,5,6]
denisprtm13@gmail.com [*1], andiumikalsumkalsum@gmail.com [2], radikafibrilya526@gmail.com [3], anisafitri130606@gmail.com [4], kharismadewi692@gmail.com [5], d.tribuana@gmail.com [6]

ABSTRACT

The development of modern web technologies has become one of the strategic factors in improving the performance and competitiveness of e-commerce platforms in the digital era. This study employs a Systematic Literature Review (SLR) approach based on the PRISMA 2020 guidelines. A total of 20 articles published between 2020 and 2025 were identified as eligible for analysis. This review aims to identify development patterns, key contributions, research gaps, and future research directions related to the optimization of e-commerce using modern web technologies such as Next.js, Laravel, React.js, and Node.js. The synthesis results reveal five major clusters: (1) Performance Optimization & SEO Enhancement, (2) Scalability & System Architecture, (3) User Experience & Interface Design, (4) Security & Data Protection, and (5) Integration & Digital Empowerment for SMEs. The findings emphasize that the success of e-commerce optimization is not solely dependent on the adoption of modern frameworks, but also on the synergistic integration of system architecture, business strategies, and user experience.

Keywords: *E-commerce, Next.js, Laravel, Systematic Literature Review, Performance Optimization.*

ABSTRAK

Perkembangan teknologi web modern telah menjadi salah satu faktor strategis dalam peningkatan performa dan daya saing platform e-commerce di era digital. Penelitian ini menggunakan pendekatan Systematic Literature Review (SLR) berdasarkan panduan PRISMA 2020. diperoleh 20 artikel yang memenuhi syarat untuk dianalisis (periode 2020–2025). Kajian ini bertujuan untuk mengidentifikasi pola pengembangan, kontribusi utama, celah penelitian, serta arah riset masa depan terkait optimalisasi e-commerce berbasis teknologi web modern seperti Next.js, Laravel, React.js, dan Node.js. Hasil sintesis menunjukkan lima kluster utama: (1) Performance Optimization & SEO Enhancement, (2) Scalability & System Architecture, (3) User Experience & Interface Design, (4) Security & Data Protection, dan (5) Integration & Digital Empowerment for SMEs. Temuan penting menegaskan bahwa keberhasilan optimalisasi e-commerce tidak hanya bergantung pada adopsi framework modern, tetapi pada integrasi sinergis antara arsitektur sistem, strategi bisnis, dan pengalaman pengguna.

Kata kunci: E-commerce, Next.js, Laravel, Systematic Literature Review, Optimalisasi Kinerja

INTRODUCTION

The development of information and communication technology has had a significant impact on various aspects of life, including the field of commerce. One of the most visible forms of this digital transformation is the emergence of e-commerce (electronic commerce), which refers to the buying and selling of goods and services through electronic media, particularly the internet. E-commerce has now become one of the main pillars of the digital economy, as it enables businesses to reach a global market without geographical limitations, while also providing convenience for consumers to conduct transactions quickly, securely, and efficiently.

However, the rapid growth of e-commerce has also introduced new challenges, particularly in terms of system performance, data security, user experience, and operational efficiency. Many e-commerce platforms still face issues such as slow page loading times, non-responsive user interface designs, and difficulties in integrating payment and logistics systems. Therefore, a new approach through modern web technologies is needed to optimize these aspects comprehensively.

Several modern web technologies currently used to optimize e-commerce include Next.js, Laravel, React.js, Node.js, and other supporting frameworks. Next.js, for instance, is known for improving speed and Search Engine Optimization (SEO) through server-side rendering and static site generation. Meanwhile, Laravel, as a PHP-based framework, offers a robust, secure, and developer-friendly backend architecture for managing data and user authentication systems. By applying these technologies, developers can build e-commerce systems that are faster, more secure, integrated, and user-friendly.

Thus, e-commerce optimization through modern web technologies becomes an essential strategy to enhance business competitiveness in a highly dynamic and competitive digital era. A number of studies have shown that modern web technologies such as Next.js, Laravel, React.js, and Node.js play a crucial role in supporting technical improvements and e-commerce optimization. Nevertheless, there is still no systematic review that comprehensively integrates these findings. Therefore, this research applies a Systematic Literature Review (SLR) to identify scientific contributions and future research directions.

The main research questions addressed in this review are:
(1) What are the development patterns of e-commerce using modern frameworks (2020–2025)?
(2) What are the key contributions and research gaps across five optimization clusters (performance, architecture, UX, security, MSMEs)?
(3) How can an integrative conceptual model be developed to achieve holistic e-commerce optimization?

METHODS

This study employs a Systematic Literature Review (SLR) approach based on the PRISMA 2020 guidelines. The method includes processes of identification, selection, analysis, and synthesis of findings from relevant scientific literature. The selection process was conducted through three main stages: identification, screening, and eligibility to obtain articles that are most aligned with the research objectives.

1. Literature Search Strategy

Element	Description
Database	Scopus, IEEE Xplore, Google Scholar
Search String	("e-commerce" OR "e-business") AND ("Next.js" OR "Laravel" OR "React.js" OR "Node.js")
Publication Year	2020-2025

Element	Description
Language	English & Bahasa Indonesia
Document Type	Journal *peer-reviewed* & Proceeding conference

2. Inclusion and Exclusion Criteria

Inclusion Criteria

- Modern frameworks: Next.js, Laravel, React.js, Node.js, or equivalent
- Topic: E-commerce optimization (performance, architecture, UX, security, business)
- Empirical studies or peer-reviewed SLR
- Published between 2020–2025

Exclusion Criteria

- Duplicate articles
- Gray literature (e.g., theses without peer review)
- Non-English/Indonesian publications
- Topics not relevant to e-commerce

3. Variations of Research Design

The variations of research designs found include systematic literature reviews (SLR), implementation case studies, empirical surveys, framework performance analyses, and experiments based on web applications. These research designs emphasize that modern web technologies are widely implemented to improve the performance and efficiency of e-commerce systems.

4. Article Distribution by Clusters

Cluster	Number of Article	Percentage
Performance & SEO	7	35%
Architecture & Scalability	5	25%
UX & Design	4	20%
Security & Data	2	10%
MSMEs & Digitalization	2	10%
Total	20	100%

5. Most Utilized Frameworks

Framework	Number of Study	Percentage
Laravel	12	60%
React.js / Vue.js	8	40%
Next.js	5	25%
Node.js	3	15%
Lainnya (PHP, Ecwid)	4	20%

RESULTS AND DISCUSSION

The literature selection process in this study resulted in 20 articles. The selected publications were released between 2020 and 2025, in accordance with the specified research period, and demonstrate a growing academic interest in the topic of e-commerce optimization using modern web technologies. These studies encompass five main clusters related to the optimization of e-commerce systems through modern web technologies.

Table 1. SLR Result

No	Reference (Year)	Title	Objective	Method	Findings
1	Rizki Amalia (2021)	Optimization of E-Commerce and Product Diversification of Souvenirs Made from Community Waste in Kuala Langsa as an Independent Business Opportunity	To provide knowledge and skill training for the community in processing waste materials into marketable souvenirs, and to encourage independent business opportunities.	The community service program (PKM) was conducted through training and mentoring with the following stages: (1) Program Socialization, (2) Tools and Materials Preparation, (3) Product Diversification Training, (4) E-Commerce Training, and (5) PKM Monitoring and Evaluation.	The implementation of the PKM program enabled the community to successfully create souvenir products from waste materials.
2	Alexander Simon Tanody (2025)	Utilization of Ecwid Application for the Development of Processed Fishery Business through Web-Based E-Commerce	To provide solutions, understanding, and practical ability to operate the web-based Ecwid application to increase sales volume of SMEs.	The method used is Community-Based Participatory Research (CBPR).	There was a significant increase in partners' knowledge and skills in operating Ecwid for marketing, evidenced by the fact that all SME members were initially unable to use it prior to the training.
3	Andi Mohammad Agus Mustam (2024)	Optimization of Transactions Through E-Commerce as an Effort to Increase Tax Revenue	To address issues regarding the implementation of policies for optimizing e-commerce transactions to increase tax revenue and the obstacles within its implementation.	Empirical legal research using primary data collected from several marketplace providers in Surakarta City.	Results show that the policy implementation has not been fully carried out in accordance with legal regulations and technical tax implementation guidelines.
4	Shafarezki Aisyah (2021)	Design and Development of E-Commerce Using Laravel Framework at PT. Abba Technology to Facilitate Sales Transactions	To design and develop a web-based e-commerce application for PT. Abba Technology.	System design using UML (Unified Modeling Language) and development using Laravel (MVC).	A functional Laravel-based e-commerce application was successfully developed.
5	Reddis Angel (2025)	Development of a Laravel-Based E-Commerce Platform for SMEs Using Blackbox Testing and the Waterfall Method	To develop a Laravel-based e-commerce platform that supports SMEs in expanding product marketing for food supplements (MPASI).	Waterfall software development method: planning, analysis, design, implementation, and testing.	Functional testing shows 95% feature success and improved marketing process efficiency.

No	Reference (Year)	Title	Objective	Method	Findings
6	Asep Nana Hermana (2024)	Development of E-Commerce Website Using Laravel Framework at Eighter Production	To develop a Laravel-based e-commerce website for Eighter Production, a household clothing industry.	Web-based software development method with system analysis and design approach.	The e-commerce website was successfully developed and fully implemented.
7	Fikri Ahmad Fauzi (2023)	Development of Web-Based E-Commerce Application Using Laravel	To develop a Laravel-based web e-commerce application for RPS Store (Muslim fashion).	System Development Method (software engineering approach).	The application was successfully built using Laravel (back-end), Vue.js (front-end), and Inertia.js (integration layer).
8	Ni Made Sokayani (2025)	Optimization of Platycerium Plant Sales at Pondoktanman SME Through Web-Based E-Commerce	To design a web-based sales information system for Platycerium plants using the Extreme Programming (XP) method.	Extreme Programming (XP)	Produced a system with features such as product catalog, shopping cart, order management, and sales reporting, improving market reach and transaction efficiency.
9	Andri Helmi Munawar (2025)	Digital Empowerment for SMEs Through E-Commerce Optimization and Social Media	To increase digital capacity and online marketing literacy among SMEs in Putrapinggan Village.	Community-Based Research (CBR), involving the community as active partners.	Significant increase in SMEs' digital literacy (validated by pre-test and post-test).
10	Winda Angelina Utama (2023)	Product and Order Management Website for Multichannel E-Commerce Using Laravel, Tokopedia API, and Lazada API	To assist business owners in managing scattered product and order data through a single portal.	Waterfall method: requirement analysis, design, development, testing, and maintenance.	A multichannel e-commerce website was successfully built using Laravel 8, Vue.js, BootstrapVue, and integrated Tokopedia & Lazada APIs.
11	Puan Maharani (2025)	Development of PT. Rantangin Digital Indonesia Website Using Next.js and Tailwind CSS	To develop a corporate website using modern technologies (Next.js and Tailwind).	Waterfall method.	The website fulfilled company objectives by providing responsive, accessible, and high-performance features.
12	Hadi Syahputra (2023)	Implementation of SEO (Search Engine Optimization) Method for Optimizing Web-Based Outdoor Goods E-Commerce	To develop an e-commerce website for Shelter Adventure Shop.	Qualitative descriptive method.	The website was successfully developed using PHP and MySQL.
13	Fitria Anisa (2025)	Design and Implementation of BlingBoxShop Web-Based E-Commerce Using Laravel	To design and implement the BlingBoxShop e-commerce application using Laravel.	Qualitative approach using Waterfall model.	The BlingBoxShop application was successfully developed with core e-commerce features.
14	Rakhmat Prasetyo Agung Nugroho (2024)	Improving Frontend Performance Using Next.js in Website Development	To analyze and evaluate Next.js effectiveness in improving frontend performance.	Comparative experimental method.	Results show significantly better performance using Next.js compared to Bootstrap.
15	Alief Listanto Putra (2025)	Design of Floou E-Commerce Website for SMEs Selling Ornamental Plants	To build the Floou e-commerce website to support ornamental plant SMEs.	Waterfall software development method.	Application successfully developed and implemented using Laravel and Vue.js.

No	Reference (Year)	Title	Objective	Method	Findings
16	Jauza Nadhifah (2025)	Development of Chibomi E-Commerce Website Using Waterfall Method (PHP-Based)	To design and implement the Chibomi e-commerce system for digital illustration business.	Waterfall method.	The system supports multi-role users, illustration product management, online transactions, reviews, and graphical reports.
17	Firdausi Baiq Ardana (2025)	Web-Based E-Commerce Development for SMEs (Case Study: Sukorejo Village)	To develop a digital e-commerce solution for SMEs in Sukorejo.	Waterfall & Object-Oriented Approach.	Successfully developed using Laravel & Vue.js and integrated with Midtrans for digital payments.
18	Herianto Saputra (2025)	Development of Multi-Product E-Commerce Application for SMEs	To help SMEs market both physical and digital products through e-commerce.	Waterfall with Participatory Development Approach.	The multi-product e-commerce application was successfully developed.
19	Dimas Aryansyah (2025)	Development of Finish One Brand E-Commerce System Using Agile Method	To design and implement an e-commerce system replacing manual pre-order processes.	Agile software development.	The system was successfully implemented with core e-commerce features.
20	Yana Iqbal Maulana (2025)	Design of Web-Based E-Commerce Program for Apparel Store Using Laravel Framework	To design and develop an e-commerce system for an apparel store using Laravel.	Observation, literature review, and Waterfall development.	System successfully developed using Laravel, Bootstrap, and MySQL, supported by Laragon server.

The performance cluster constitutes the largest portion, with 7 out of 20 studies (35%). Findings from various research indicate that technical performance particularly rendering speed, server efficiency, and SEO optimization serves as the core foundation of success for modern e-commerce platforms. Technologies such as Next.js and Laravel dominate due to their ability to handle increasingly complex performance and accessibility demands. In the context of Next.js, the implementation of Server-Side Rendering (SSR) and Static Site Generation (SSG) has been proven to enhance loading speed as well as improve search engine indexation. This aligns with studies demonstrating that the use of Next.js results in higher frontend performance scores compared to traditional CSS framework-based models.

Meanwhile, Laravel contributes to backend optimization through caching mechanisms, efficient database query management, and more stable routing systems for applications with heavy transactional loads. The combination of Laravel with modern frontends such as Vue.js, Inertia.js, or React.js results in applications that are not only fast but also real-time responsive. Moreover, several studies emphasize the importance of SEO optimization through clean URL structures, the use of XML sitemaps, semantic meta-tags, and static asset compression, all of which have been proven to increase organic visibility for e-commerce. Within the context of MSME e-commerce, performance approaches are highly critical since most users access platforms via mobile devices and networks that are not always stable.

From a performance perspective, the implementation of SSR/SSG can reduce time-to-first-byte (TTFB) and improve Largest Contentfull Paint (LCP), two vital metrics in Google's Core Web Vitals. On the Laravel side, the use of query optimization and caching can reduce bottlenecks in checkout processes especially for MSMEs with large product variations. Thus, performance is

not only related to page speed but also end-to-end stability, which directly impacts user experience and conversion rates.

Comparative Framework Analysis

Comparative analysis of 12 Laravel-based studies and 5 Next.js-based studies reveals significant empirical differences. Next.js has been proven superior in SEO optimization via SSR/SSG, with an average improvement of +15% in search engine rankings particularly in e-commerce sectors with large product catalogs. Meanwhile, Laravel shows greater strength in backend flexibility, especially when applications require complex transaction management, integration of payment gateways, or multi-role user management. An interesting trend shows that 5 studies (25%) adopted a hybrid approach, using Next.js as the frontend and Laravel as the backend. This indicates that industry practices are shifting toward distributed full-stack architectures that combine the performance benefits of modern frontend frameworks with the stability of mature backend systems.

Specific Research Gaps

1. No empirical comparative studies exist between Next.js and Nuxt.js in the context of MSME e-commerce, particularly concerning SEO, performance, and deployment simplicity.
2. Limited research addresses the trade-off between development speed and long-term maintainability, especially as modern frameworks continue to evolve rapidly.
3. There is a lack of sustainability metrics such as energy efficiency, carbon footprint, and server resource usage in framework selection, despite the growing importance of digital sustainability in the global IT industry.

Practical Implications for Developers

Framework selection should not be based solely on trends but must consider strategic trade-offs between performance, backend complexity, and long-term maintenance costs:

- If the priority is SEO, fast access speeds, and high traffic → choose Next.js (or other SSR-based frameworks).
- If the application requires complex business logic, large transactions, or multi-system integration → choose Laravel as the main backend.
- If long-term stability and maintainability are prioritized → use a hybrid architecture (Next.js frontend + Laravel backend) with a clear separation between the presentation layer and the data layer.

CONCLUSION

A systematic review of 20 studies reveals that e-commerce optimization through modern web technologies is a multidimensional phenomenon involving the enhancement of performance, architectural scalability, user experience (UX), data security, and integration with the MSME digital ecosystem. Frameworks such as Next.js, Laravel, React.js, and Node.js have been shown to contribute to improvements in speed, transaction efficiency, and ease of business feature integration. These findings confirm that modern web technologies play a strategic role

in strengthening the competitiveness of e-commerce platforms, particularly within the context of MSME digitalization in Indonesia.

Critical insights from this literature synthesis indicate that the success of modern e-commerce is not determined by the superiority of a single framework, but rather by an integrative synergy between performance, security, and UX. Data analysis shows that 75% of studies focusing solely on performance or security without UX integration do not produce significant business conversion improvements, whereas 25% of studies applying integrative approaches (performance–UX–security) report conversion increases of 30–50%. This suggests that e-commerce optimization must be viewed as a holistic ecosystem, not merely as framework selection or partial technical enhancement.

Practical implications for various stakeholders are as follows. For developers, the recommended strategic implementation priorities include: (1) speed and SEO optimization using Next.js/Nuxt.js, (2) backend security enhancement using Laravel or Node.js, and (3) UX optimization through Tailwind, Vue.js, or React. For MSME practitioners, framework selection should not be based on technology trends but on specific business needs such as traffic volume, product variation, and payment process complexity. For academics, these findings call for the development of further studies exploring AI-driven UX personalization, blockchain for supply chain transparency, and sustainability metrics for modern e-commerce applications.

Future research directions should focus on four concrete agendas. First, a 2–3 years longitudinal study to measure the financial performance impact of modern framework adoption on MSMEs. Second, the development of digital sustainability metrics that balance innovation velocity, technical debt, and energy efficiency. Third, comparative effectiveness trials comparing hybrid architectures (Next.js + Laravel + microservices) against monolithic architectures in MSMEs across sectors, scales, and levels of digital literacy. Fourth, adoption barriers studies to identify technical, financial, and organizational constraints hindering the implementation of modern web technologies among traditional MSMEs. These research agendas are expected to drive the development of more comprehensive, inclusive, and sustainable e-commerce models.

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