SMATIKA : STIKI Informatika Jurnal
Accredited Sinta 4 Ministry of Higher Education, Science and Technology Republic of Indonesia SK No. 79/E/KPT/2023
E-ISSN: 2580-6939 || P-ISSN: 2087-0256

Applying Rapid Application Development to Develop and Evaluate a Laravel Filament-Based Point of Sale System for MSMEs

Farid Syafi Razzaq[1*], Andriyan Rizki Jatmiko[2]

[1,2]Universitas Merdeka Malang, Faculty of Information Technology, Information Systems, Jalan Terusan Dieng No. 62-64, Klojen, Kota Malang, Jawa Timur,65146 Indonesia

Keyword

Point of sales; laravel framwork; laravel filament

****Corresponding Author:***
andriyan.jatmiko@unmer.ac.id

Abstract

Digital transformation is increasingly essential for improving operational efficiency and data accuracy in Micro, Small, and Medium Enterprises (MSMEs). However, MSMEs often face a dual challenge: the need for rapid system implementation and the limited technical literacy of system users, which creates a gap between complex system requirements and practical usability. This study applies and evaluates the effectiveness of the Rapid Application Development (RAD) methodology in developing a web-based Point of Sale (POS) system tailored to MSME operational characteristics. The research adopts an applied, design-oriented approach, emphasizing iterative prototyping and continuous user involvement to reduce adoption barriers. Rather than focusing on feature completeness, the study examines how RAD supports system usability and user acceptance among non-technical users. The proposed system was evaluated using the System Usability Scale (SUS) involving users with different operational roles. The results indicate that the iterative nature of RAD effectively bridges the gap between system complexity and user capability, as reflected by an average SUS score of 76.66, categorized as "Good". These findings provide empirical evidence that RAD is a suitable development approach for MSME information systems, particularly in contexts requiring rapid deployment and high usability, and contribute to applied information systems research by highlighting the role of user-centered iteration in improving system acceptance.

1. Introduction

Digital transformation has become a critical factor in improving operational efficiency, data accuracy, and competitiveness in Micro, Small, and Medium Enterprises (MSMEs)[1][2][3]. The adoption of information systems, particularly Point of Sale (POS) systems, enables MSMEs to automate transaction recording, inventory control, and financial reporting, thereby reducing manual errors and supporting better decision-making processes[4][5][6]. Recent applied studies also report that the implementation of POS systems contributes to improved transaction accuracy, inventory monitoring, and overall operational efficiency in MSMEs [7]. However, many MSMEs in Indonesia still rely on manual documentation practices, which often result in data inconsistencies, delayed reporting, and limited real-time visibility of business operations[5][6]. In addition to operational issues, system usability has been identified as a critical factor influencing user acceptance and sustained system usage in small-scale business environments, particularly among non-technical users[8] .

Previous studies on POS system development for MSMEs have primarily focused on system functionality, feature completeness, and technical implementation aspects[9]. Several applied studies published in national accredited journals also confirm that POS system implementation plays a significant role in improving transaction accuracy and business reporting in MSMEs[10]. While these studies demonstrate the practical benefits of POS systems, they often provide limited discussion regarding the suitability of system development methodologies for MSME environments, where users typically have limited technical literacy and require rapid system adoption [3][11]. In addition, usability evaluation is frequently treated as a complementary component rather than a central research focus, despite its importance in ensuring system acceptance among non-technical users[12][13].

Rapid Application Development (RAD) has been widely recognized as an iterative development methodology that emphasizes user involvement, rapid prototyping, and continuous feedback, making it potentially suitable for MSME contexts that demand fast deployment and flexible system refinement[14][15] Comparative studies on software development methodologies indicate that agile-based approaches, including RAD, are more effective than traditional sequential models in environments characterized by evolving requirements and limited user technical expertise[14][15] Nevertheless, empirical evidence examining the effectiveness of RAD in improving system usability and user acceptance within MSME environments remains limited. Most existing studies apply RAD as a development procedure without explicitly evaluating its impact on usability outcomes and adoption challenges faced by MSME users.

Based on these limitations, a research gap can be identified in the lack of applied studies that evaluate the effectiveness of iterative development methodologies, such as RAD, in bridging the gap between complex information system requirements and the practical capabilities of MSME users. Specifically, there is insufficient empirical evidence on how RAD influences the usability and acceptance of POS systems developed for MSMEs with non-technical operators.

To address this gap, this study formulates the following research problem: How effective is the Rapid Application Development (RAD) methodology in supporting the development of a usable and acceptable Point of Sale (POS) system for MSMEs with non-technical users? Accordingly, the objective of this research is to evaluate the effectiveness of the RAD methodology in developing a web-based POS system for MSMEs by analyzing system usability and user acceptance using the System Usability Scale (SUS)[12] Through this approach, the study aims to contribute empirical evidence to applied information systems research and provide insights into the role of user-centered, iterative development in improving technology adoption within MSME environments.

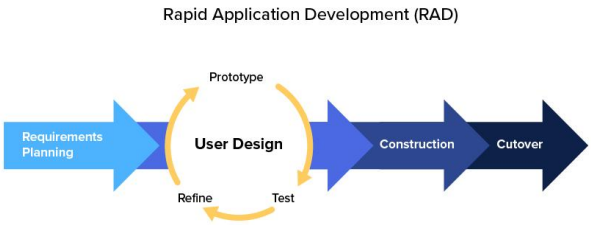
2. Research Method

This study employs an applied research approach using the Rapid Application Development (RAD) methodology to develop and evaluate a web-based Point of Sale (POS) system for Zila Collection, a Micro, Small, and Medium Enterprise (MSME). The application of information systems is widely recognized as an effective strategy to improve operational efficiency and data accuracy in MSMEs [4][5][16]. Recent studies also indicate that the adoption of integrated information systems supports better transaction control and managerial decision-making in small-scale business environments. RAD was selected because it emphasizes rapid development cycles, iterative prototyping, and continuous user involvement, making it suitable for MSME environments that require fast system deployment and adaptive refinement[14][15]. However, this study adopts a case-specific approach focusing on a single MSME (Zila Collection), which constitutes a methodological limitation, as the findings are primarily contextual and may not be directly generalizable to all MSME environments.

In this research, RAD is applied not only as a system development approach but also as a methodological framework to evaluate its effectiveness in supporting system usability and user acceptance among non-technical users. Similar applications of the RAD methodology in MSME-oriented information systems research have been reported in nationally accredited journals, demonstrating its suitability for user-driven

system development[17]. Previous studies highlight that iterative and user-centered development approaches can reduce system adoption barriers and improve user satisfaction in information systems[8]. The RAD model consists of four main stages: Requirements Planning, User Design, Construction, and Cutover, as illustrated in Figure 1.

Figure 1. Rapid Application Development (RAD) Model



2.1 Requirements Planning

The Requirements Planning stage focuses on identifying system needs and operational problems through interviews and observations with the business owner. Manual transaction recording has been reported as a common challenge in MSMEs, often resulting in data inconsistencies and reporting delays [6][7]. Similar operational problems related to fragmented data management and delayed reporting have also been identified across various MSME sectors, indicating that these issues are not case-specific but structurally common. These functional and non-functional requirements are not only used as system specifications but also serve as evaluation references to examine how effectively the RAD methodology supports usability, accuracy, and operational efficiency during system development.

2.2 User Design

The User Design stage translates identified requirements into preliminary system prototypes that are reviewed directly by users. The use of interface prototypes allows users to visualize workflows and provide immediate feedback regarding layout, navigation structure, and feature placement. This approach aligns with user-centered design practices, which have been shown to improve system usability and user acceptance, particularly among users with limited technical literacy[8]. Previous studies also confirm that iterative UI/UX prototyping supports early identification of usability issues and reduces cognitive load for non-technical users in web-based business applications[18]. Based on user feedback, several design adjustments were implemented, including the simplification of transaction workflows, clearer menu categorization, and improved placement of frequently used features to reduce operational complexity for daily users.

2.3 Construction

The Construction stage involves system implementation based on validated prototypes and iterative refinements. Framework-based development, such as using Laravel and its supporting components, has been reported to facilitate structured and maintainable web application development[9][19]. In addition, Laravel-based development supports rapid implementation and scalability when applied in MSME-oriented information systems[9]. However, in this study, the construction stage is evaluated not only from a technical perspective but also in terms of how iterative development supports alignment between system functionality and user expectations. These design and implementation decisions were driven by the need to address initial MSME operational issues, such as stock inconsistency and delayed reporting, by ensuring integrated transaction processing, real-time inventory updates, and structured data management.

2.4 Cutover

The Cutover stage includes system testing, deployment, and user training in the actual operational environment of Zila Collection. System evaluation was conducted using the System Usability Scale (SUS), a standardized instrument widely used to assess perceived ease of use and user satisfaction in information systems[12][20]. SUS has been applied extensively in previous studies to evaluate the usability of web-based systems and provides reliable quantitative measures for comparative analysis, particularly in small-scale organizational contexts[12].

3. Result and Discussions

2.1 System Design Results

The Use Case Diagram, as shown in Figure 3.1, illustrates the interaction between system users and the POS system based on predefined roles and access permissions. The system involves three main actors: Administrator, Cashier, and Owner. Each actor is granted different access rights according to operational responsibilities, ensuring appropriate system control and functional separation. The diagram provides an overview of the system's functional scope and supports effective access management within the POS application[21].

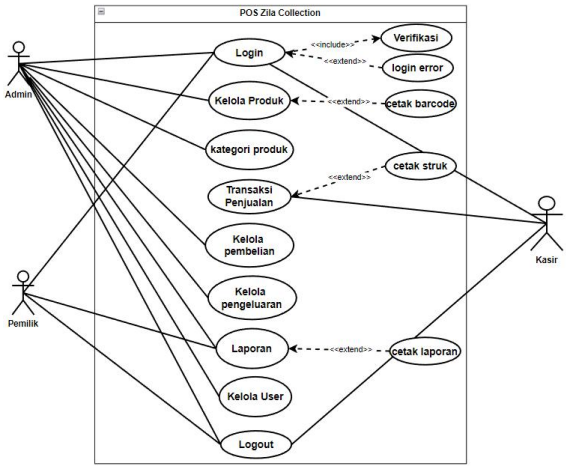


Figure 2. Use Case Diagram of POS System

The Entity Relationship Diagram (ERD), as shown in Figure 3.2, illustrates the logical data structure of the POS system and how data entities are related to support core business operations. The ERD provides an overview of data organization that ensures data consistency and supports transaction processing, inventory management, and financial recording[22]. This design serves as the foundation for reliable data handling and reporting within the system. System design typically employs standard modeling techniques such as Use Case Diagrams and Entity Relationship Diagrams (ERD) to ensure structural and functional integrity[23].

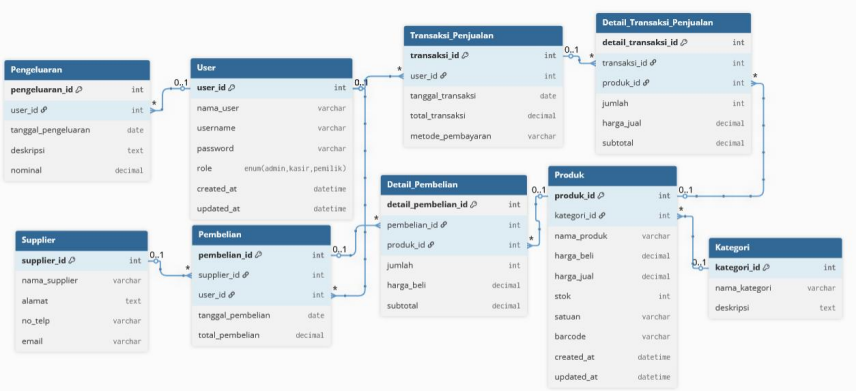


Figure 3. Entity Relationship Diagram (ERD)

2.2 System Implementation Results

The implementation of the POS system for Zila Collection demonstrates how the developed system supports daily business operations through integrated transaction processing, inventory management, and financial recording. The system is designed to reduce manual recording activities and improve data consistency across operational modules.

Figure 3.3 illustrates the main dashboard interface, which provides a real-time overview of business activities. The dashboard presents key operational and financial indicators, including total sales, cash inflows, cash outflows, and the current balance. Summary information related to best-selling products and stock status is also displayed to support quick monitoring and decision-making.

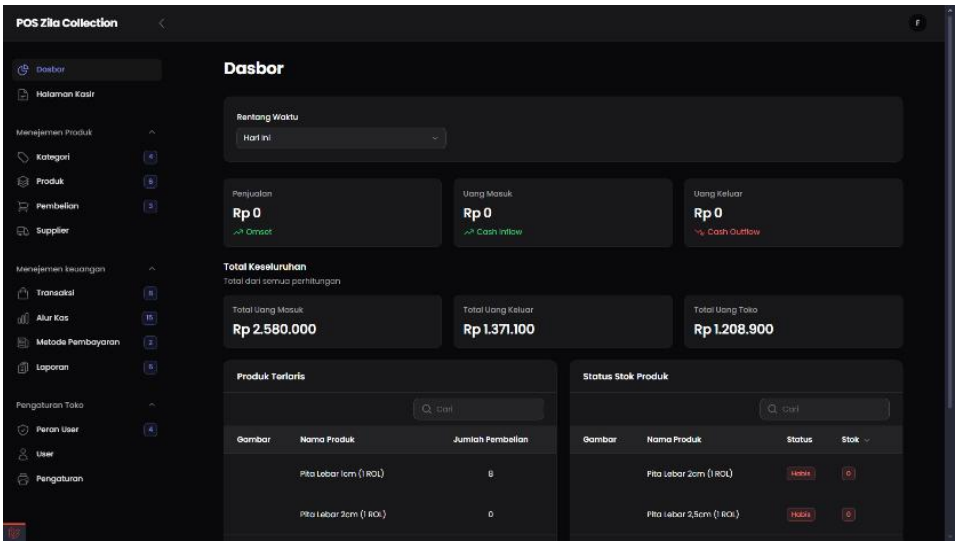


Figure 4. Dashboard Interface of the POS System

The transaction processing functionality supports daily sales activities through the cashier interface, as shown in Figure 3.4. Each completed transaction is automatically synchronized with other system components, ensuring consistency between sales records, inventory data, and financial information.

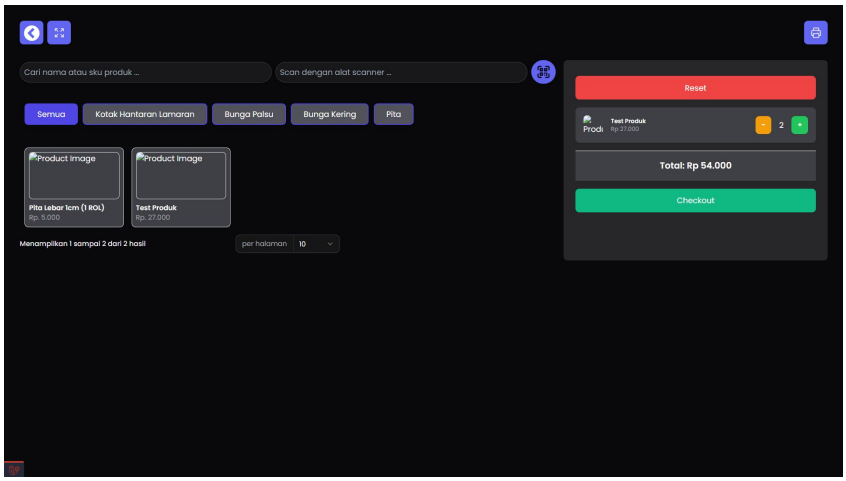


Figure 5. POS Transaction Interface

Inventory and purchasing management features allow users to manage product data and record procurement activities from suppliers. Incoming stock from purchasing transactions is automatically reflected in inventory records, supporting accurate stock control and ensuring that inventory information aligns with actual business conditions.

Financial recording and reporting features support structured documentation of income and expenses through the cash flow and reporting modules. Users can monitor financial movements and generate reports related to sales, purchases, inventory, and expenses. These reports can be accessed and exported for further analysis, supporting operational evaluation and financial decision-making.

2.3 Discussion and Testing

System usability evaluation was conducted using the System Usability Scale (SUS) to assess users' perceived ease of use and acceptance of the developed POS system. SUS was selected due to its reliability and suitability for evaluating systems used by non-technical users in operational environments[12]. However, usability evaluation results can be influenced by methodological choices and evaluation context, which should be considered when interpreting SUS scores[24]. The evaluation involved three system users consisting of the business owner, administrator, and cashier. Each respondent completed the SUS questionnaire after using the system in routine operational activities. The questionnaire consists of ten statements measured using a five-point Likert scale.

Table 1. System Usability Scale (SUS) Questionnaire Results

No	SUS Questions	Owner	Admin	Cashier
1	I think that I would like to use this system frequently.	5	4	5
2	I found the system unnecessarily complex.	2	1	1
3	I thought the system was easy to use.	4	5	4
4	I think that I would like to use this system frequently.	1	2	2
5	I found the system unnecessarily complex.	4	4	5
6	I thought the system was easy to use.	2	1	2
7	I would imagine that most people would learn to use this system very quickly.	5	5	4
8	I found the system very cumbersome to use.	1	2	2
9	I felt very confident using the system.	5	5	4
10	I needed to learn a lot of things before I could get going with this system.	2	1	1

Based on the standard SUS scoring procedure, the obtained SUS scores were 77.5 for the owner, 77.5 for the administrator, and 75 for the cashier, resulting in an average SUS score of 76.66. According to established SUS interpretation guidelines, a score above 68 indicates acceptable usability, while scores between 70 and 80 are categorized as "Good" usability[12]. These results indicate that the developed POS system is easy to use and well accepted by users. The obtained SUS score is consistent with findings reported in prior studies that evaluated the usability of web-based information systems in small-scale organizational and MSME contexts. Previous studies applying the System Usability Scale (SUS) have commonly reported usability scores within the "Good" range when iterative development approaches and user-centered design practices were employed, particularly for systems intended for non-technical users[12][25].

This comparison suggests that the application of the Rapid Application Development (RAD) methodology contributes positively to system usability by enabling continuous user involvement and iterative refinement, thereby reducing usability barriers and supporting effective system adoption within the MSME environment.

Overall, the findings demonstrate that the application of the Rapid Application Development (RAD) methodology not only facilitates rapid system development but also plays a strategic role in enhancing usability outcomes in MSME-oriented information systems through continuous user involvement and iterative refinement.

4. Conclusions and Future Works

This study provides empirical evidence on the application of the Rapid Application Development (RAD) methodology in developing a web-based Point of Sale (POS) system for a Micro, Small, and Medium Enterprise (MSME) environment. Rather than focusing solely on system implementation, this research evaluates how iterative development and continuous user involvement contribute to system usability and user acceptance among non-technical users.

The usability evaluation using the System Usability Scale (SUS) resulted in an average score of 76.66, which falls within the "Good" usability category. This finding indicates that the developed POS system is easy to learn, efficient to operate, and well accepted by users in daily business operations. The result suggests that the RAD methodology effectively supports the alignment between system functionality and user expectations in MSME contexts, where rapid adoption and ease of use are critical.

Despite these positive results, several limitations should be acknowledged. The usability evaluation involved a limited number of respondents, which may affect the generalizability of the findings[25]. In addition, system performance evaluation was conducted under typical MSME operational conditions, and stress testing under high transaction loads was not included in this study.

Future research may extend this work by involving a larger and more diverse group of users to further validate the usability findings and assess the general applicability of RAD in different MSME settings. Additional studies may also explore the integration of mobile platforms, advanced analytical features, and security enhancements, as well as comparative evaluations with other development methodologies to strengthen the understanding of RAD's effectiveness in applied information systems research.

5. References

[1] S. Z. Zamani, "Small and Medium Enterprises (SMEs) facing an evolving technological era: a systematic literature review on the adoption of technologies in SMEs," *Eur. J. Innov. Manag.*, vol. 25, no. 6, pp. 735–757, Dec. 2022, doi: 10.1108/EJIM-07-2021-0360.

[2] A. L. Kilay, B. H. Simamora, and D. P. Putra, "The Influence of E-Payment and E-Commerce Services on Supply Chain Performance: Implications of Open Innovation and Solutions for the Digitalization of Micro, Small, and Medium Enterprises (MSMEs) in Indonesia," *J. Open Innov. Technol. Mark. Complex.*,

vol. 8, no. 3, p. 119, Sep. 2022, doi: 10.3390/joitmc8030119.

[3] J. A. Cunningham, N. Damij, D. Modic, and F. Olan, "MSME technology adoption, entrepreneurial mindset and value creation: a configurational approach," *J. Technol. Transf.*, vol. 48, no. 5, pp. 1574–1598, Oct. 2023, doi: 10.1007/s10961-023-10022-0.

[4] I. Arthalia Wulandari, Pujianto, Suyud Widodo, and Rizal Muntaha, "BANGUN WEBSITE E-COMMERCE GUNA MENINGKATKAN PENDAPATAN UKM FIRDAUS PRATAMA INDONESIA," *J. Ilm. Sist. Inf.*, vol. 3, no. 1, pp. 28–37, Mar. 2024, doi: 10.24127/jisi.v3i1.5682.

[5] T. H. Hasibuan, "Sistem Informasi Penjualan Dalam Peningkatan Layanan Digital Berbasis Web," *J. Ilm. Tek. Inform. dan Komun.*, vol. 3, no. 2, pp. 250–257, Jul. 2023, doi: 10.55606/juitik.v2i2.661.

[6] R. Yosli, "Meningkatkan Kapasitas Hosting, Mengelola Content Management System Untuk Kenyamanan Memakai Website Berbayar," *Jav. J. Vokasi Inform.*, pp. 31–37, Jun. 2021, doi: 10.24036/javit.v1i2.6.

[7] I. D. Prayudha, M. A. Irwansyah, and H. Anra, "Rancang Bangun Aplikasi Point of Sale (POS App) Berbasis Progressive Web App untuk Usaha Mikro Kecil dan Menengah," *J. Sist. dan Teknol. Inf.*, vol. 12, no. 2, p. 330, Apr. 2024, doi: 10.26418/justin.v12i2.76824.

[8] F. Nawir and S. A. Hendrawan, "The Impact of Website Usability and Mobile Optimization on Customer Satisfaction and Sales Conversion Rates in E-commerce Businesses in Indonesia," *Eastasouth J. Inf. Syst. Comput. Sci.*, vol. 2, no. 01, pp. 15–30, Aug. 2024, doi: 10.58812/esiscs.v2i01.324.

[9] F. Sinlae, E. Irwanda, Z. Maulana, and V. Eka Syahputra, "Penggunaan Framework Laravel dalam Membangun Aplikasi Website Berbasis PHP," *J. Siber Multi Disiplin*, vol. 2, no. 2, pp. 119–132, Jul. 2024, doi: 10.38035/jsmd.v2i2.186.

[10] L. Zaitunnisaa and R. W. Arifin, "Sistem Informasi Point Of Sales Berbasis Web Pada Toko Usaha Mandiri," *Inf. Syst. Educ. Prof. J. Inf. Syst.*, vol. 5, no. 2, p. 141, Jun. 2021, doi: 10.51211/isbi.v5i2.1553.

[11] I. Riadi, A. Yudhana, and A. Elvina, "Analysis Impact of Rapid Application Development Method on Development Cycle and User Satisfaction: A Case Study on Web-Based Registration Service," *Sci. J. Informatics*, vol. 11, no. 1, pp. 81–94, Feb. 2024, doi: 10.15294/sji.v11i1.49590.

[12] W. Welda, D. M. D. U. Putra, and A. M. Dirgayusari, "Usability Testing Website Dengan Menggunakan Metode System Usability Scale (Sus)s," *Int. J. Nat. Sci. Eng.*, vol. 4, no. 3, pp. 152–161, Nov. 2020, doi: 10.23887/ijnse.v4i2.28864.

[13] B. Maqbool and S. Herold, "Potential effectiveness and efficiency issues in usability evaluation within digital health: A systematic literature review," *J. Syst. Softw.*, vol. 208, p. 111881, Feb. 2024, doi: 10.1016/j.jss.2023.111881.

[14] Z. Ghinafikar, M. M. Mu'thy, and M. A. Yaqin, "Perbandingan Metode Agile dan Waterfall Berdasarkan Analisis Waktu Pengembangan Sistem," *J. Manaj. Teknol. Inform.*, vol. 3, no. 1, pp. 26–44, Apr. 2025, doi: 10.70038/jentik.v3i1.149.

[15] T. Wahyudi and M. Andarwati, "Sistem informasi manajemen berbasis website menggunakan metode RAD pada komunitas seni Standupindo," *J. Inf. Syst. Appl. Dev.*, vol. 2, no. 1, pp. 51–59, Jun. 2024, doi: 10.26905/jisad.v2i1.11046.

[16] and M. K. A. R. N. Renaningtias, N. Daratha, "Pengembangan Potensi Usaha Mikro Kecil dan Menengah (UMKM) melalui Pemanfaatan Teknologi Informasi dengan Pelatihan Sistem Pembayaran Digital,"".

[17] F. N. Hasan and E. Nurlelah, "Rancang Bangun Sistem Point Of Sale (POS) Berbasis Web Untuk Optimalisasi Transaksi Pada Toko Bangunan," *Swabumi*, vol. 13, no. 1, pp. 84–94, Jun. 2025, doi: 10.31294/swabumi.v13i1.25765.

[18] N. Kimseng, D. A. Kurnia, I. Vuthy, R. W. Arifin, and D. Setiyadi, "UI/UX Development Using Figma

based on Inclusive Design," *JINAV J. Inf. Vis.*, vol. 4, no. 2, pp. 227–234, Jan. 2024, doi: 10.35877/454RI.jinav2257.

[19] S. Wijanarko, "Implementasi Filament Form Builder Dalam Sistem Informasi Berbasis Laravel," *J. Tek. Inform. STMIK Antar Bangsa*, vol. 11, no. 1, pp. 14–17, Feb. 2025, doi: 10.51998/jti.v11i01.619.

[20] A. Antika and E. Yulianingsih, "Analisa Sistem e-learning Pada Universitas PGRI Palembang Dengan Metode System Usability Scale (SUS)," *SMATIKA J.*, vol. 13, no. 01, pp. 53–61, Jun. 2023, doi: 10.32664/smatika.v13i01.721.

[21] M. Arif, C. W. Mohammad, and M. Sadiq, "UML and NFR-framework based method for the analysis of the requirements of an information system," *Int. J. Inf. Technol.*, vol. 15, no. 1, pp. 411–422, Jan. 2023, doi: 10.1007/s41870-022-01112-7.

[22] "No Title", doi: 10.22441/collabits.v1i2.27252.

[23] A. Hendini, "Pemodelan UML Sistem Informasi Monitoring Penjualan dan Stok Barang (Studi Kasus: Toko Sembako Madura)".

[24] L. Shao, C. Zheng, Y. Zhang, G. Xie, X. Hao, and X. Zheng, "Research on Permanent Magnet Synchronous Motor Sensorless Control System Based on Integral Backstepping Controller and Enhanced Linear Extended State Observer," *Appl. Sci.*, vol. 13, no. 3, p. 1680, Jan. 2023, doi: 10.3390/app13031680.

[25] N. Clark, M. Dabkowski, P. J. Driscoll, D. Kennedy, I. Kloo, and H. Shi, "Empirical Decision Rules for Improving the Uncertainty Reporting of Small Sample System Usability Scale Scores," *Int. J. Human–Computer Interact.*, vol. 37, no. 13, pp. 1191–1206, Aug. 2021, doi: 10.1080/10447318.2020.1870831.