
Design and Development of an Integrated Ordering and Sales Analysis System at Kaluna Living

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Keyword

Ordering System; Micro-Enterprise; Custom Order Workflow; Sales Analytics Dashboard; Prototyping SDLC; System Usability Scale (SUS).

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Abstract

This study presents the design and development of an integrated ordering and sales analysis system for Kaluna Living, a micro-enterprise specializing in handcrafted ceramic home goods. Prior to the system development, business operations relied on manual workflows for recording orders, processing custom product requests, and preparing monthly sales reports. These procedures resulted in slow transaction handling, higher risk of inconsistent data, and limited business visibility. The system was developed using the SDLC Prototyping model to enable iterative refinement through continuous user feedback. To evaluate usability, the System Usability Scale (SUS) was applied to representative user roles (customer, admin, and owner). The evaluation yielded an average SUS score of 81.66, which falls into the Excellent (Above Average) usability category, indicating that the system is perceived as easy to use, consistent, and learnable. The system supports centralized ordering workflows, custom request handling with image upload, and sales insight visualization that summarizes monthly revenue and order volume. The findings suggest that iterative prototyping contributes to usability improvements by refining navigation flow, clarifying form structures, and supporting streamlined operational workflows. This research contributes to applied system development for micro-enterprises by demonstrating how integrated digital ordering and analytics can improve operational efficiency and decision support in handcrafted product businesses.

1. Introduction

The rapid advancement of information technology has encouraged micro and small enterprises to adopt digital systems in order to improve operational efficiency and strengthen business sustainability[1][2]. Nevertheless, many micro-enterprises continue to rely on manual procedures for managing customer orders, handling custom product requests, and generating monthly sales reports[3]. These manual workflows often result in fragmented data storage, delays in transaction processing, and reduced ability to monitor business performance in a timely and accurate manner[4].

Kaluna Living is a micro-enterprise producing handcrafted ceramic home décor products. The business operates through multiple channels for receiving orders and custom requests, including direct messaging and informal documentation[5]. Based on observation and interviews with the owner and administrative staff, several operational problems were identified [6][7]:

1. the absence of a centralized ordering system causing product, customer, and transaction data to be scattered.
2. Unstructured handling of custom orders without standardized documentation or image upload support[8].
3. Manual checkout and payment confirmation processes.
4. Monthly sales reporting that is time-consuming and prone to error[9].
5. The lack of a customer portal to track order history and custom submissions.
6. The absence of an integrated dashboard for administrators and owners to manage operational and analytical tasks. These conditions collectively limit the business's ability to maintain data consistency and make data-driven decisions.

This study addresses the problem of fragmented order workflows and limited sales analytics in handcrafted micro-enterprise operations[10]. The guiding research question is formulated as follows: How can an integrated ordering and sales analysis system be designed and developed using an iterative prototyping approach to improve operational efficiency and usability in a handcrafted micro-enterprise?[11].

Previous studies on ordering systems commonly focus on standard product purchasing workflows but often fail to address the operational complexity of micro-enterprises that rely heavily on custom orders, informal communication, and manual reporting practices. Many systems do not integrate custom request documentation (e.g., structured description and image references) with standardized order management, nor do they provide embedded sales insight dashboards tailored for small-business decision making [12]. In addition, prior research frequently emphasizes technical implementation rather than evaluating how iterative development influences system usability and adoption for multi-role users (customer, admin, and owner) [13][14]. Therefore, there remains a research gap in developing an integrated system that combines custom-order workflows and sales analytics while being refined through prototyping and validated through usability evaluation within a micro-enterprise context.

The objectives of this study are to design and implement an integrated web-based ordering system that supports both product ordering and custom order workflows at Kaluna Living, develop a sales insight dashboard that summarizes monthly order volume and revenue to support decision making, apply the SDLC Prototyping model to iteratively refine the system based on user evaluation, and measure the usability of the developed system using the System Usability Scale (SUS)[15][16].

This research contributes both academically and practically. Academically, it demonstrates applied design-oriented system development research by showing how iterative prototyping influences usability outcomes in micro-enterprise ordering systems[17]. Practically, the developed system provides Kaluna Living with a unified platform for centralized ordering, structured custom product request handling, and monthly sales insight visualization, enabling more consistent data management, improved operational efficiency, and better business monitoring.

2. Research Method

2.1 Research Design

This study is classified as applied system development research (design-oriented research), which focuses on designing and evaluating an information system to solve a specific operational problem within a real organizational setting[18][19]. The research emphasizes not only system implementation but also iterative refinement and usability evaluation to generate research insight regarding the effectiveness of the chosen development approach.

2.2 Justification for Prototyping Model

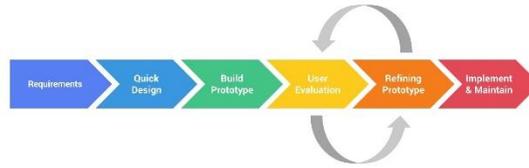


Figure 1. SDLC Prototyping

The SDLC Prototyping model was selected because the operational requirements of Kaluna Living involve complex workflows across three user roles (customer, admin, and owner) and include dynamic processes such as custom order requests that vary significantly across customers[20][21]. Compared to other SDLC models such as Waterfall (which assumes stable requirements), prototyping is more suitable for contexts where requirements may evolve and require frequent clarification through user interaction. The iterative nature of prototyping enables early validation of interface design, workflow logic, and role-based usability, ensuring the resulting system aligns with user expectations and operational realities[22]. This approach is relevant in micro-enterprise contexts where system users have limited exposure to formal information systems and usability is critical to adoption[23].

2.3 Case Study Scope and Limitation

This research is conducted using a single business case (Kaluna Living). While this allows deep contextual analysis and targeted system development, it also introduces a methodological limitation related to generalizability. The findings are primarily applicable to similar micro-enterprises in handcrafted product industries and may require adaptation before being implemented in businesses with different operational structures.

2.4 Prototyping Stages

The prototyping model consists of six stages: Requirements, Quick Design, Build Prototype, User Evaluation, Refining Prototype, and Implementation & Maintenance. To reduce technical-report orientation, only the most critical design representations were retained, while the analysis focuses on how design decisions address operational problems and how refinement improves usability.

2.4.1 Requirements Identification

Requirements were obtained through interviews and observations involving the owner and admin. These requirements directly correspond to the identified operational problems[14]:

- a. Centralized ordering system.
- b. Structured custom order submission with image upload.
- c. Integrated checkout/payment.
- d. Order history tracking.
- e. Sales insight dashboard.

2.4.2 Quick Design and Rationale

The system design emphasizes a unified workflow that integrates standard orders and custom orders into a shared database structure. Design decisions were informed by operational challenges: fragmented data storage was addressed through centralized order tables, while custom request ambiguity was reduced by requiring standardized customer biodata, structured description fields, and optional image attachments.

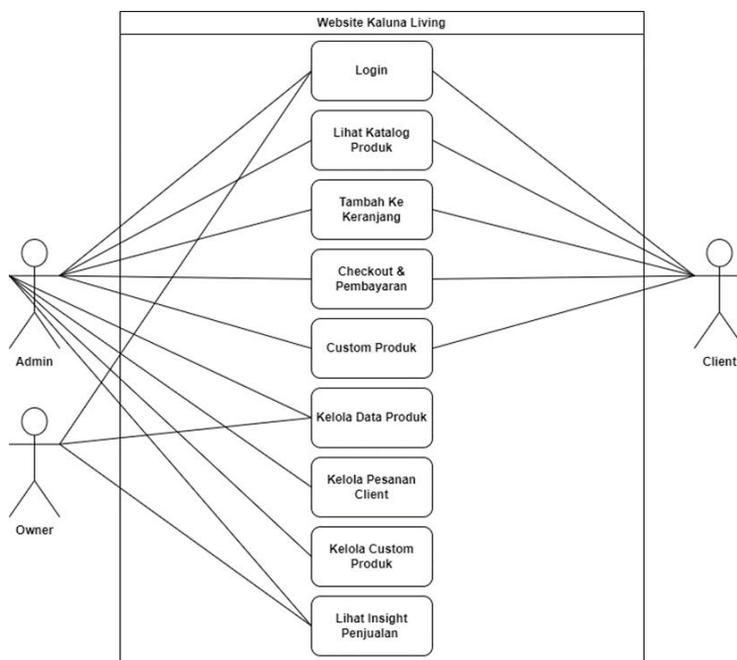


Figure 2. Use Case Diagram

The Use Case Diagram illustrates the interactions between three main actors Client, Admin, and Owner and the Kaluna Living web based system. All actors are required to log in to the system in order to access features according to their respective roles and permissions. The Client acts as the primary user who performs ordering activities. These activities include viewing the product catalog, adding products to the shopping cart, completing the checkout and payment process, and submitting custom product requests. The Admin is responsible for managing the operational aspects of the system. This includes managing product data, processing and managing client orders, and handling custom product requests submitted by clients. The Owner plays a supervisory and strategic role. The Owner is not involved in daily operational activities but has access to the sales insight feature to monitor business performance, such as order volume and revenue trends. Overall, this Use Case Diagram provides a comprehensive overview of the system’s functionality and clearly defines the responsibilities and access boundaries of each actor within the Kaluna Living platform.

The Entity Relationship Diagram (ERD) represents the database structure of the Kaluna Living system by organizing operational and analytical data across user roles (Client, Admin, and Owner) and core business entities, including products, orders, custom projects, payments, and sales insights. Each entity is defined with a primary key, while relationships are established through foreign keys to ensure data integrity and traceability throughout ordering and reporting processes.

Within the ordering workflow, a client may generate multiple orders, each of which can contain several order detail records that store product, quantity, and pricing information. Products may appear across different order records, enabling accurate tracking of sales distribution. Payment information is linked to each order and records transaction details such as method, amount, status, and payment references, supporting structured transaction management. The system also accommodates custom product requests, where clients may submit multiple custom projects that are processed and managed by administrators.

Administrative roles are reflected in the database structure by associating administrators with product, order, custom project, and sales insight records. Sales insight data are stored per reporting period and linked to the owner and administrator roles, enabling monitoring of business performance over time. Overall, the ERD defines an integrated data model that supports centralized order management, structured custom workflows, and reliable generation of sales analytics within a single system.

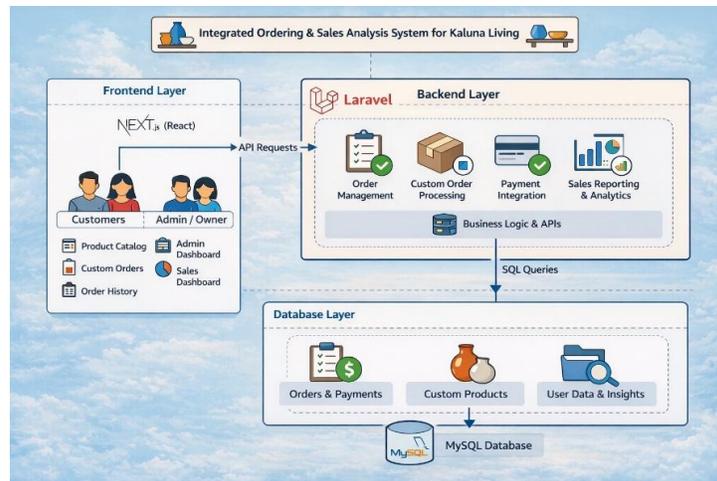


Figure 4. System Architecture

The Kaluna Living system uses a three-tier architecture consisting of a frontend, backend, and database layer. The frontend is built with Next.js (React) and provides user interfaces for customers, admins, and owners to perform ordering activities, manage operations, and monitor sales performance. All user interactions are sent to the backend through API requests.

The backend is developed using the Laravel framework and is responsible for handling business logic, including order management, custom order processing, payment integration, and sales analytics. The backend communicates with the MySQL database using SQL queries to store and retrieve data related to users, products, orders, payments, and sales insights.

This architecture ensures a clear separation of concerns, secure data processing, and scalability to support the operational and analytical needs of the Kaluna Living system.

2.4.3 Prototype Development

The prototype was developed using Next.js for the front-end interface, Laravel for back-end services and API processing, and MySQL as the database management system. Development initially prioritized the core ordering workflow, including product browsing, checkout, payment, and reporting, before extending to administrative and analytical functionalities. Early prototype versions were intentionally kept minimal to facilitate rapid user feedback and iterative usability evaluation, allowing design refinements to be made efficiently throughout the development process.

2.4.4 User Evaluation (SUS)

System usability was evaluated using the System Usability Scale (SUS) because it is widely applied, reliable, and suitable for multi-role systems. Users tested key workflows based on their roles and completed the standard SUS questionnaire.

2.4.5 Prototype Refinement and Impact on Usability

Refinement was carried out based on evaluation feedback, particularly targeting navigation clarity, form structure, and interaction consistency. The iterative prototyping process improved system usability by reducing user confusion during checkout and custom submission, improving button labeling, reorganizing dashboard menus, and clarifying error messages.

2.4.6 Implementation & Maintenance

The final version integrates all modules and ensures role-based access, data integrity, and stable workflow execution. Maintenance includes continued monitoring, minor UI improvements, and feature enhancement based on evolving business needs.

3. Result and Discussions

3.1 System Implementation Summary

The developed system integrates ordering, custom request handling, transaction processing, and sales analytics into a single platform accessible by three user roles: customers, admin, and owner. This integration addresses the previously identified issue of fragmented order workflows by centralizing product, customer, and transaction data within a unified system environment.

From the customer perspective, the system supports product browsing, order placement, custom request submission with reference image uploads, checkout, payment processing, and order history tracking. These features provide a structured alternative to informal and manual ordering practices, improving clarity and traceability throughout the ordering process. From the administrative perspective, the system enables centralized management of products, orders, and custom requests, allowing administrators to verify transactions and update order statuses in a consistent manner. For the owner role, the system provides access to an insight dashboard that summarizes monthly revenue and order volume, supporting higher-level monitoring of business performance.

Rather than emphasizing interface completeness, the implementation focuses on how integrated workflows support operational efficiency and usability across user roles. Therefore, interface screenshots are limited to key views that represent the core system capabilities:

1. Ordering workflow.
2. Custom order workflow.
3. Sales dashboard visualization.

This approach prioritizes system functionality and research interpretation over detailed user interface illustration, aligning the implementation results with the study's research objectives..

- Custom Order

The screenshot shows a web form titled "Formulir Custom Order" on the Kaluna Living website. The form is divided into two main sections: "Data Diri" and "Detail Custom Order".

Data Diri

- Nama Lengkap:** A text input field with a placeholder "Masukkan nama lengkap".
- Email:** A text input field with a placeholder "nama@email.com".
- Nomor Telepon:** A text input field with a placeholder "08xx-xxxx-xxxx".

Detail Custom Order

- Judul Pesanan Custom:** A text input field with a placeholder "Contoh: Piring Set untuk Pernikahan".
- Deskripsi Detail:** A text area with a placeholder "Jelaskan detail pesanan Anda: warna (contoh: soft pink), bentuk (contoh: bulat dengan tepi bergelombang), ukuran (contoh: diameter 25cm), tekstur (contoh: glossy/matte),".

Figure 5. Custom Order

The Custom Order page allows customers to submit personalized product requests by providing their personal information and specific order details. The form includes fields for name, email, phone number,

custom order title, detailed description, and optional reference images. This page supports a structured submission process, enabling the admin to review and process custom product requests efficiently.

The Owner Dashboard provides a visual overview of business performance by displaying key sales insights. It includes a pie chart illustrating the sales distribution across product categories and a list of the top five best-selling products complete with revenue values. This dashboard helps the owner quickly identify category contributions, track product popularity, and evaluate overall sales trends to support strategic decision-making.

3.2 System Usability Scale

Usability evaluation was conducted using SUS involving three representative roles: customer, admin, and owner. The average SUS score obtained was 81.66, classified as Excellent (Above Average) usability. This indicates the system is perceived as consistent, learnable, and comfortable to use. Owner evaluates the insight dashboard and decision-support features. Admin evaluates product management, order processing, and custom order workflows. Customers evaluate product browsing, cart usage, checkout, and custom order submission.

Their participation provides a comprehensive assessment of usability across all system functionalities. Feedback from these three user roles ensures that the system is intuitive, easy to navigate, and meets operational needs from multiple perspectives.

Table 1. System Usability Scale Result

Number	Question	Customer	Admin	Owner
1	I feel that I would rely on this system regularly in the future.	5	5	5
2	I think the system feels difficult or overly complex to operate.	1	2	2
3	I find the interaction with this system straightforward and intuitive.	5	5	5
4	I would require assistance from others to understand how to use this system.	2	2	2
5	The system's features seem well-organized and function cohesively.	5	5	5
6	I notice several inconsistencies or irregularities while using the system.	1	1	1
7	I believe most users will be able to learn this system without much difficulty.	5	5	5
8	Using this system feels confusing to me.	1	1	1
9	I feel comfortable and confident while navigating through the system.	5	5	5
10	I think I need to learn many things before I can fully use this system.	2	2	2

Calculate Customer

$$SUS\ Score = 32 \times 2.5 \tag{1}$$

Owner SUS score = 80

Calculate Admin

$$SUS\ Score = 33 \times 2.5 \tag{2}$$

Admin SUS score = 82.5

Calculate Owner

$$SUS\ Score = 33 \times 2.5 \quad (3)$$

Admin SUS score = 82.5

Average System SUS

$$\frac{80+82.5+82.5}{3} = 81.66 \quad (4)$$

The high SUS score can be interpreted through several contributing system factors:

The System Usability Scale (SUS) evaluation resulted in an average score of 81.66, indicating that the developed system achieves an excellent level of usability and is perceived as easy to learn, consistent, and comfortable to use by its users. This high usability score can be attributed to several design and implementation factors, including the integration of structured ordering workflows, clear and consistent form layouts, and the separation of system functions based on user roles (customer, admin, and owner). These design choices reduce ambiguity, minimize cognitive load, and support efficient task completion across different user activities.

The findings indicate that the iterative prototyping approach effectively contributed to usability improvement by enabling continuous refinement of navigation flow, interface clarity, and feedback mechanisms such as order history and status visibility. However, despite the positive usability outcome, this evaluation has limitations related to the small number of respondents involved in the SUS assessment, which may reduce statistical robustness and limit the generalizability of the results. Future studies should involve a larger and more diverse user sample to strengthen the validity of usability findings.

3.3 Discussion in Relation to Prior Studies

Findings align with prior research indicating that integrated ordering systems improve operational efficiency and reduce reporting complexity in small business environments [8][9]. Unlike many ordering systems that focus only on standard product transactions, this study integrates custom order workflows and supports documentation via image uploads. Similar studies highlight that dashboards improve decision-making capabilities by providing summarized business indicators. This system extends that contribution by embedding sales insight visualization directly into the ordering platform and refining it iteratively through prototyping, leading to strong usability outcomes.

3.4 Research Limitations

This study has several limitations. First, the usability evaluation involved a limited number of respondents (one representative from each role), which restricts statistical robustness and generalization. Second, the system was developed using a single business case, meaning findings may not apply directly to enterprises with different workflows, market scale, or product types. Future research should involve broader user sampling and comparative implementation across multiple micro-enterprises to strengthen external validity.

4. Conclusions and Future Works

This research demonstrates the design and development of an integrated ordering and sales analysis system for Kaluna Living using the SDLC Prototyping model. The study contributes to applied system development research by showing that iterative prototyping can improve usability and system alignment with operational workflows in a handcrafted micro-enterprise context. The developed system centralizes ordering and custom request data, supports structured checkout and payment processes, and provides sales insights through monthly revenue and order volume visualization.

Based on SUS evaluation, the system achieved an average score of 81.66 (Excellent), indicating that users perceive the system as easy to learn, consistent, and comfortable to operate across customer, admin, and owner roles. This outcome suggests that prototyping-based refinement improves usability through repeated feedback cycles that enhance navigation clarity, form structure, and workflow transparency.

However, the research is limited by two methodological aspects:

1. Usability evaluation was conducted with a small number of respondents, reducing statistical confidence.
2. The system was developed based on a single business case, limiting generalizability. These constraints should be addressed in future research through expanded testing with larger participant samples and multi-case deployments.

Future research may explore comparative studies between prototyping and other SDLC approaches (e.g., Agile or incremental models) to measure differences in usability and development efficiency, broader adoption studies across multiple micro-enterprises to validate generalizability, and advanced analytics enhancements such as predictive sales forecasting, customer behavior clustering, or automated inventory recommendations to extend the system's decision-support contribution beyond descriptive dashboards.

5. References

- [1] M. Dikri Abdillah, "Digital Transformation in Indonesian MSMEs: Adoption, Impact, and Future Directions," *Eastasouth Proceeding Of Economics and Business*, p. 64, 2023.
- [2] J. Lemhannas, R. I. Jlri, B. Utomo, and Y. Y. Setiyono, "Leveraging Digital Technology in Micro SMEs to Enhance Indonesia ' s Economic Prosperity," vol. 12, no. 3, pp. 391–402, 2024, doi: 10.55960/jlri.v12i3.985.
- [3] T. TH. Tambunan and I. Busnetti, "Recent Evidence on the Digitalization Process in Indonesia's Micro and Small Enterprises," *International Journal of Current Science Research and Review*, vol. 07, no. 08, 2024, doi: 10.47191/ijcsrr/v7-i8-18.
- [4] A. Kallmuenzer, A. Mikhaylov, M. Chelaru, and W. Czakon, "Adoption and performance outcome of digitalization in small and medium-sized enterprises," *Review of Managerial Science*, vol. 19, no. 7, pp. 2011–2038, 2025, doi: 10.1007/s11846-024-00744-2.
- [5] A. Vicens-Sans, X. Pascari, F. Molino, A. J. Ramos, and S. Marín, "Near infrared hyperspectral imaging as a sorting tool for deoxynivalenol reduction in wheat batches," *Food Research International*, vol. 178, no. January, p. 113984, 2024, doi: 10.1016/j.foodres.2024.113984.
- [6] M. Marolt, G. Lenart, and M. Kljaji, "Exploring Digital Transformation Journey Among Micro , Small- , and Medium-Sized Enterprises," pp. 1–23, 2025.
- [7] G. Perspective, "Copyright © by SIAM . Unauthorized reproduction of this article is prohibited .," *Society*, vol. 48, no. 1, pp. 162–186, 2009.
- [8] B. Pratama Putra, D. Cahya Assyura, D. Nugroho, and A. Prasetyo, "Penerapan Aplikasi Pemesanan Pada Usaha Mikro Kecil Menengah (Ukm) Dalam Memudahkan Transaksi," *Jurnal Khatulistiwa Informatika*, vol. 12, no. 1, pp. 38–45, 2024, doi: 10.31294/jki.v12i1.16952.
- [9] A. Salim, H. Hasan, and A. Halim, "Inovasi Pembukuan Digital Umkm Dengan Integrasi Appsheet Dan Google Spreadsheet," *JATI (Jurnal Mahasiswa Teknik Informatika)*, vol. 9, no. 2, pp. 2497–2505, 2025, doi: 10.36040/jati.v9i2.13115.
- [10] T. Andreas, D. Pratama, J. Wiratama, and F. A. Halim, "The Development of web-based Cashier and Inventory Information Systems using Prototyping Model on Micro , Small , and Medium Enterprise (MSMEs) in Indonesia," vol. 8, no. 1, pp. 80–89, 2023, doi: 10.33633/joins.v8i1.7983.

- [11] R. Meilariza, Z. Mirah Delima, and . Z., "Digitalization of Micro, Small, and Medium Enterprises (MSMEs) in Indonesia," *KnE Social Sciences*, vol. 2024, pp. 245–257, 2024, doi: 10.18502/kss.v9i17.16334.
- [12] F. A. Tridalestari and I. D. Setyawan, "Analisis Literatur Sistem Pemesanan Jasa dan Produk Percetakan di Indonesia: Studi Sistematis terhadap Tren dan Gap Penelitian".
- [13] T. Darmanto and T. Willay, "Multidisciplinary Sciences and Arts Implementation of Prototyping and System Usability Scale In The Point of Sales Information System at CV Kharisma Lestari International Journal of," vol. 4, no. 4, pp. 309–322, 2025.
- [14] L. Studiyanti, N. Azmi, D. Saraswati, U. Trisakti, and W. Jakarta, "Usability Evaluation and Design of Student Information System Prototype to Increase Student ' s Satisfaction (Case Study : X University)," vol. 18, no. 4, pp. 676–684, 2019.
- [15] D. A. Putri, "Application Usability Testing on E-Wallet by Using the System Usability Scale Method," *Smatika Jurnal*, vol. 12, no. 01, pp. 114–122, 2022.
- [16] A. Antika and E. Yulianingsih, "Analisa Sistem e-learning Pada Universitas PGRI Palembang Dengan Metode System Usability Scale (SUS)," *Smatika Jurnal*, vol. 13, no. 01, pp. 53–61, 2023, doi: 10.32664/smatika.v13i01.721.
- [17] S. Gilardoni, "Comunicazione, mediazione e argomentazione in classe CLIL Termini e definizioni nel discorso didattico," *La linguistica educativa tra ricerca e sperimentazione Scritti in onore di Carmel Mary Coonan*, pp. 105–122, 2023, doi: 10.30687/978-88-6969-683-1/010.
- [18] E. Bjarnason, F. Lang, and A. Mjöberg, *An empirically based model of software prototyping : a mapping study and a multi - case study*, no. 0123456789. Springer US, 2023. doi: 10.1007/s10664-023-10331-w.
- [19] S. Y. R. Esearch, B. A. R. Hevner, S. T. March, J. Park, and S. Ram, "D ESIGN S CIENCE IN I NFORMATION," vol. 28, no. 1, pp. 75–105, 2004.
- [20] D. Lazuardi, S. Tinggi, I. Ekonomi, and E. Prasetya, "EXPLORING THE CHALLENGES AND OPPORTUNITIES OF E-COMMERCE ADOPTION IN RURAL-BASED MICRO , SMALL , AND MEDIUM ENTERPRISES (MSMES)," vol. 6, no. 1, pp. 1675–1684, 2025.
- [21] A. Susanto, "System Development Method with The Prototype Method," vol. 8, no. 07, pp. 141–144, 2019.
- [22] D. Purnomo, "Model Prototyping," *JIMP-Jurnal Informatika Merdeka Pasuruan*, vol. 2, no. 2, pp. 54–61, 2017.
- [23] E. R. Subhiyakto and Y. P. Astuti, "UI / UX Design Prototype for Enhancing User Experience using User-Centered Method," vol. 10, no. 4, pp. 537–548, 2023, doi: 10.15294/sji.v10i4.47528.