

## Development of a Web-Based Online Reservation Information System for Brayat Sehat Clinic Using the Waterfall Model

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### ABSTRACT


Brayat Sehat Clinic still uses a conventional reservation system that causes various obstacles, such as long queues, uncertain doctor schedules, patient data recording errors, and limited access to information. According to doctors at the clinic, the manual system often results in uneven schedule distribution and unbalanced staff workloads. This research aims to design and build a web-based online reservation system to improve service efficiency and patient comfort. The system development uses the Waterfall method, which consists of requirements analysis, system design using Use Case Diagrams and Entity Relationship Diagrams, implementation, testing, and maintenance phases. The system is built using the PHP programming language and MySQL as the database, with an architecture consisting of integrated front-end, back-end, and database components. Testing was conducted using the black box testing approach on seven main modules to ensure that the system functions according to user requirements. The test results show that the system is able to overcome reservation problems by providing login and registration features, real-time doctor and schedule information, online consultation reservations, dynamic schedule management, and secure user data management. This website is expected to support the clinic's digital transformation by providing 24-hour reservation access and enabling future development of telemedicine features to improve healthcare service quality.

### KEYWORDS

Clinic; Digital; Reservation; Waterfall; Website

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## 1. INTRODUCTION

Reservation is the act of securing a place in advance [1]. In the context of a clinic, reservation refers to the booking process related to time and is often associated with specific services or facilities. A reservation system ensures the availability of time slots and the services provided by particular facilities or sectors. This system helps reduce queues, increase operational efficiency, and simplify administrative tasks.

As technology evolves, reservation systems that were once conducted in person now offer online options. Online reservations can operate 24 hours a day, as there are no limitations on accessing reservation features [2]. In other words, online reservations provide convenience for users by allowing them to access services more efficiently in terms of time and effort. Online reservation systems are supported by the internet, which plays a crucial role in their operation. The internet, as one of the fastest-growing information dissemination technologies today, offers ease in searching for and distributing information quickly according to users' needs [3]. With internet access, information can be retrieved and viewed in real time, enabling users to check service availability, view schedules, and make reservations anytime and anywhere.

A commonly used medium in online reservation systems is a website [4]. Through a website, organizations or service providers can offer more flexible access to users and improve the efficiency and quality of reservation services. Clinic reservations have gradually shifted from conventional systems to digital-based solutions. The existence of a clinic reservation website not only shortens the registration process but also provides 24-hour access for prospective patients and minimizes the risk of administrative errors. It enables patients to register independently from home and optimize their time without the need to visit the registration desk directly [5].

However, this digital transformation has not yet been fully implemented at Brayan Sehat Clinic. The clinic continues to face significant challenges with its conventional reservation process, including long queues caused by registration through phone calls or in-person visits, uncertainty regarding doctors' schedules, and wasted time for patients. The lack of real-time transparency in doctors' schedules results in uneven patient distribution, leading to an unbalanced workload for clinic staff. In addition, patient data management remains conventional, covering medical records and reservation notes, which increases the risk of recording errors, data loss, and administrative delays. These problems are further compounded by the absence of an automatic notification system, resulting in a high rate of patient no-shows or sudden cancellations without prior notice.

These issues reflect a pressing and tangible problem that must be addressed. While the global healthcare industry has shifted toward digitalized services, Brayan Sehat Clinic still relies on conventional systems that have proven to cause operational inefficiencies and patient dissatisfaction. The traditional reservation system leads to the loss of patients' productive time, as they must interrupt their activities to queue or repeatedly contact the clinic, despite the availability of online reservation technology that offers 24-hour access without time constraints. More critically, manual patient data management poses a high risk of recording errors, loss of important medical information, and administrative delays that may affect patient safety. The lack of real-time transparency in doctors' schedules has resulted in uneven patient distribution, creating an unbalanced workload for medical staff and reducing the quality of care. Furthermore, high rates of patient no-shows and last-minute cancellations without prior notice contribute to financial losses and wasted resources—issues that could be mitigated through an automated notification system. In today's digital era, clinics that fail to provide online reservation services risk losing patients to competitors that have adopted digital solutions, making the digital transformation of Brayan Sehat Clinic a strategic necessity rather than an optional improvement.

Therefore, the development of a web-based online reservation system is an urgent solution for Brayan Sehat Clinic. This system is expected not only to provide 24/7 access to reservation services and transparent doctor scheduling but also to support the integration of digital payment features, automated notifications, and online consultations to reduce unnecessary clinic visits. By offering treatment guidelines in text or video format, the system can also enhance patients' health literacy and reduce misunderstandings of medical instructions. Through this digital transformation, Brayan Sehat Clinic is expected to improve service quality, optimize data management, and deliver a more convenient and efficient patient experience.

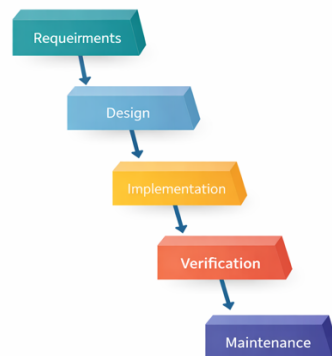
To strengthen problem identification and justify the need for system development, a direct interview was conducted with representatives of Brayan Sehat Clinic on March 15, 2025. The interview revealed that the clinic serves an average of 50–70 patients per day, with waiting times reaching 2–3 hours, particularly during peak hours. Administrative staff reported handling 30–40 reservation-related phone calls per day, which frequently disrupt

services for walk-in patients. The clinic head stated that the patient no-show rate reaches 15–20% without prior notice, resulting in wasted time and resources. On-duty doctors also acknowledged difficulties in managing their practice schedules due to the absence of an integrated system, often leading to schedule overlaps or idle time. Based on these findings, the clinic expressed an urgent need for an online reservation system to optimize service delivery and reduce administrative burdens.

## 2. METHODS

### A. Research Stages

The development of the online reservation website for Brayon Sehat Clinic uses the Waterfall method. The Waterfall method is a system development model in which each phase must be completed before proceeding to the next phase [6]. This method offers a sequential software development flow, starting from requirements gathering, followed by system design, coding, testing, and support [7]. The following illustration presents the stages of the Waterfall method.



**Figure 1** Waterfall Method.

Figure 1 illustrates the stages of the Waterfall method in the development of the online reservation website for Brayon Sehat Clinic, starting from the *Requirement Analysis* phase to *Maintenance*. Each stage is explained in detail to demonstrate how the waterfall approach is applied in this project.

#### a) Requirement Analysis

The requirement analysis phase in the development of Brayon Sehat Clinic's online reservation system using the waterfall methodology is a crucial initial step to define system requirements. The waterfall model outlines a systematic and sequential approach to software development, beginning with user requirement specifications and continuing through planning, modeling, construction, and system delivery to users [8]. This phase identifies key stakeholders such as patients, doctors, and clinic administrators. The application must provide features for patient registration and login, searching for doctors by specialty, and scheduling consultations. Meanwhile, doctors need access to their practice schedules and patient data, while administrators manage doctor information and reservation status.

#### b) Design

The design phase involves structuring processes, data, process flows, and data relationships to optimally meet system requirements based on the results of the requirement analysis. Documentation produced in this phase includes a Data Flow Diagram (DFD) and an Entity Relationship Diagram (ERD) [9]. In the development of Brayon Sehat Clinic's online reservation system, the system architecture is designed to meet all specified functional and non-functional requirements. The design includes high-level design, which defines the overall architecture such as the division between the front-end, back-end, and database, and how these components interact. It also includes low-level design for detailed implementation specifications.

#### c) Implementation

The online reservation system for Brayon Sehat Clinic is developed using the PHP programming language, originally created by Rasmus Lerdorf in 1994 [10]. PHP enables real-time updates of patient data and clinic

schedules, with server-side processing that displays results to the client via the browser, making the system accessible from various devices. The system requires a database to store patient information, doctor schedules, and visit history using a Database Management System (DBMS), which ensures data security, shared access, and consistency [11]. MySQL, an open-source DBMS, is implemented to ensure cost efficiency during development.

d) Testing

Black box testing is conducted on the Brayhan Sehat Clinic's online reservation system to verify its functionality and compliance with user requirements. Black box testing is a behavioral testing method in which the internal structure and logic of the software are unknown to the tester, focusing instead on input and output based on the end-user perspective [12]. Testing focuses on seven modules: Login, New Patient Registration, Reservation, View Doctor Schedules, Patient Reservation History, Clinic Administrator, and Profile Settings. Each module is tested using both normal and invalid scenarios to ensure the system handles a variety of situations properly.

e) Maintenance

The final stage of the waterfall method involves maintaining the completed online reservation website for Brayhan Sehat Clinic. Maintenance allows developers to fix bugs that were not detected in earlier phases [13].

### 3. RESULT

Based on the research conducted at Brayhan Sehat Clinic, several problems were identified in the conventional reservation process, including long queues, uncertainty in doctors' schedules, and limited access to information. To address these issues, the researcher proposed the development of a web-based online reservation system using the Waterfall method. The following are the stages carried out by the researcher in the system development process using the Waterfall approach.

#### A. Requirement Analysis

The Requirement Analysis for the development of the online reservation website at Brayhan Sehat Clinic includes the Use Case Diagram and the Activity Diagram. The following is a detailed explanation of each.

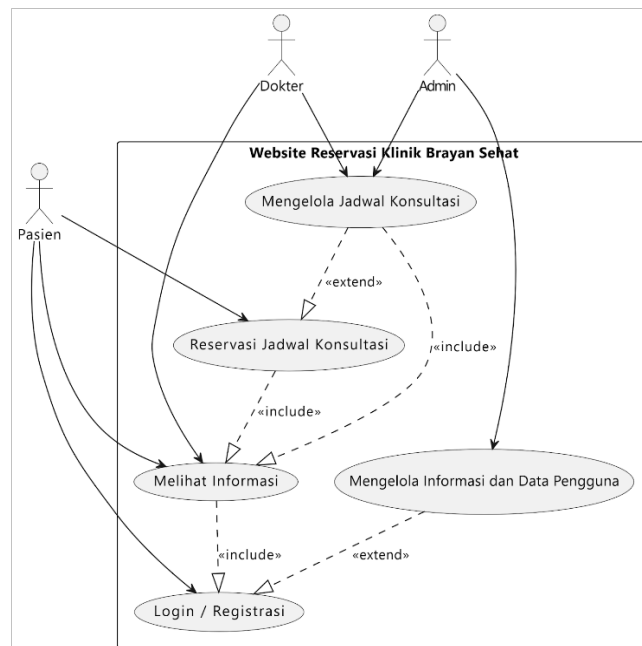


Figure 2 Use Case Diagram

The Use Case Diagram is designed to describe the interactions or functions within the system and identify who is authorized to perform them [14]. The use case diagram for the Brayhan Sehat Clinic's online reservation website features three main actors (Patient, Doctor, and Admin) with five core functions. These require the implementation of a secure authentication system, a calendar-based reservation module, a dynamic schedule management interface, and an Admin dashboard. The "include" and "extend" relationships within the diagram illustrate the complexity of

dependencies, necessitating a modular code structure, role-based access control, and encryption of medical data in compliance with security standards.

## B. Design

In system development, the design phase is the stage where the processes and system requirements are defined [15]. This phase includes the design of the hardware interface, software interface, and communication interface used for the Brayon Sehat Clinic's reservation system.

### 1) Hardware Interface

The system architecture of the Brayon Sehat Clinic's web application utilizes hardware components such as user PCs and mobile phones, which are connected via the internet to cloud hosting infrastructure and a physical server that manages the database. This system provides flexible access, with encrypted data security and automatic backups to ensure data integrity and reliability.

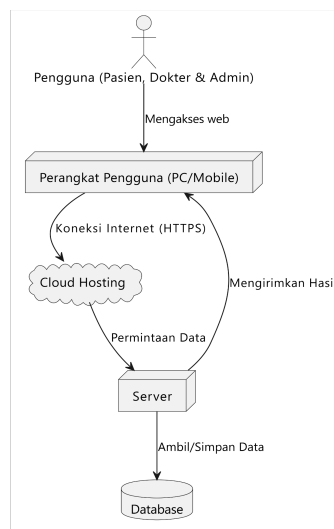


Figure 3 Hardware Interface

### 2) Software Interface

The web software architecture consists of a frontend (Web/Mobile) that communicates with the backend via REST API, a backend that accesses the database using SQL/NoSQL, and authentication services such as OAuth or JWT. The system applies separation of concerns, responsive design, a microservices approach, multi-layered security, and supports integration with third-party services.

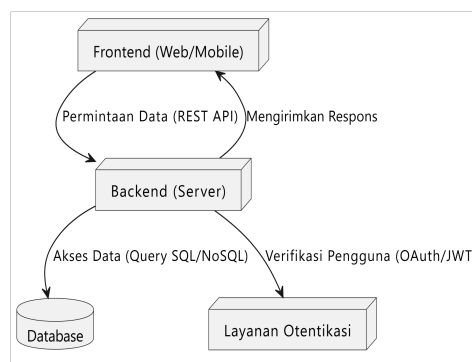


Figure 4 Software Interface

### C. Implementation

The result of this study is a clinic reservation website for Braylan Sehat, which was developed using PHP. The following is a preview of the user interface.

#### 1) Login/Register

The KBS Login Form requires users to enter their email and password, and is equipped with a show/hide password feature as well as a "Login" button for identity verification. Once successfully logged in, users can access the various features available within the system. Meanwhile, the Registration Form collects complete user data, including full name, email, phone number, and password, which will be used for subsequent logins. After all fields are filled and the "Register" button is pressed, a new account is created, and the user can log in using the registered credentials.

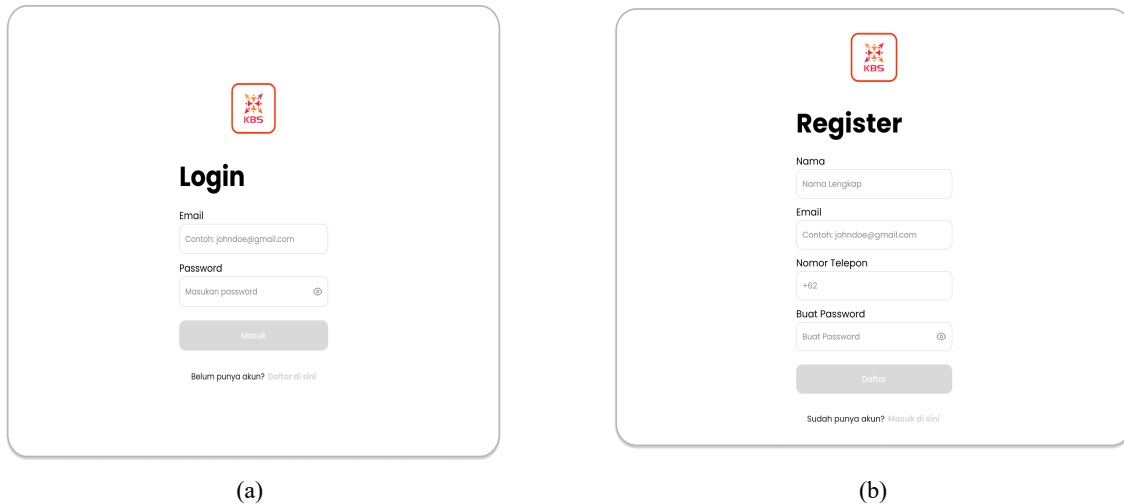


Figure 5 (a) Login Page (b) Register Page

#### 2) Homepage (View Information)

The Braylan Sehat Clinic homepage presents comprehensive information about the clinic, which was established in 2016 in East Purwokerto. The homepage features a hero section displaying the clinic building along with call-to-action buttons for reservations and doctor listings. This page also highlights various key services such as General Practice, ENT, and Neurology, showcases certified doctors, and provides a detailed list of specific services, including dental scaling, cardiac ultrasound, and vaccinations, which can be easily accessed by visitors.

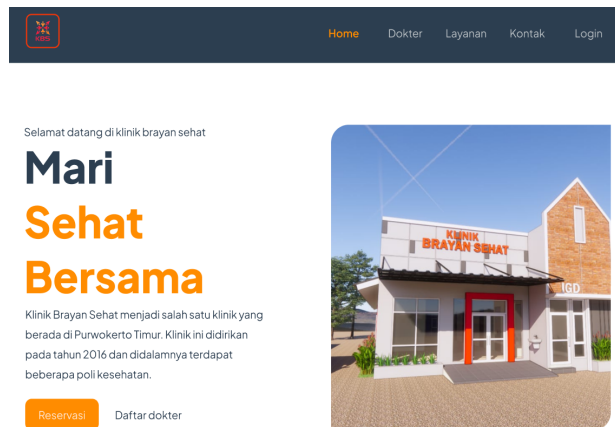


Figure 6 Homepage

### 3) Consultation Schedule Reservation

The Brayhan Sehat Clinic reservation form represents the first step in a three-stage booking process. In this step, patients are required to fill in complete personal information, including full name, address, phone number/WhatsApp, email, gender, and date of birth. After providing all the required information, patients can proceed to the next step by clicking the “Continue” button to complete the reservation process for their clinic visit.

Figure 7 Consultation Schedule Reservation Page

### 4) Managing Consultation Schedules

The consultation schedule page serves as the admin dashboard for managing patient consultation appointments at Brayhan Sehat Clinic. It is equipped with an interactive calendar for date navigation and a search feature to filter schedules. The system displays a daily schedule list that includes the time, patient’s name, type of service, attending doctor, and the status of the consultation, which is marked with color-coded indicators (green for scheduled, yellow for in progress, and red for completed). Each entry also includes edit and delete options for schedule management.

Figure 8 Managing Consultation Schedules Page

## 5) Managing User Data

The user data page functions as the admin dashboard for managing patient information at Brayon Sehat Clinic. It features a comprehensive table containing patient data such as name, email, gender, age, contact information, last visit date, and upcoming appointment. The system includes a filter function based on patient status (All Patients, Active, Scheduled, Archived), a search bar, a button to add new patients, and a delete option for each patient record. It also provides pagination for more efficient data navigation.

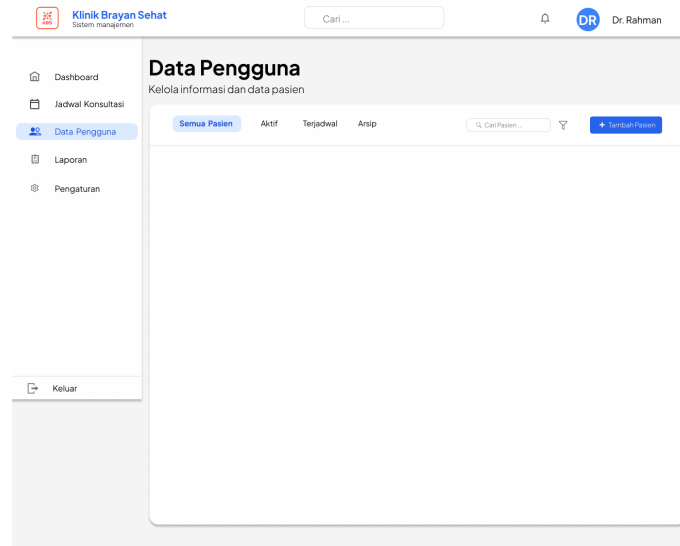


Figure 9 Managing User Data Page

## D. Testing

Black Box Testing was conducted to evaluate the functional correctness of the developed system by examining whether each feature operates according to the specified requirements, without considering the internal code structure. This testing focused on user interactions and system responses to ensure that all functionalities perform as intended. A total of seven test cases were designed to represent the system's core features, including authentication, reservation management, scheduling, and data handling. The test results indicate that all seven test cases were successfully executed, demonstrating that the system functions correctly and meets the defined functional requirements without encountering errors. Table 1 presents the results of the Black Box Testing conducted on the developed system.

Table 1 Blackbox Testing Result.

ID Test	Use Case	Deskripsi Pengujian	Output yang Diharapkan	Status
TC-001	Login / Registrasi (Positif)	Pasien login dengan email dan password yang valid	Masuk ke dashboard pasien	Berhasil
TC-002	Login / Registrasi (Negatif)	Login dengan password dan email salah	Muncul pesan error: Email atau password salah	Berhasil
TC-003	Melihat Informasi (Positif)	Pasien melihat informasi dokter dan jadwal	Daftar dokter dan jadwal tampil	Berhasil
TC-004	Reservasi Jadwal (Positif)	Pasien membuat reservasi pada jadwal yang tersedia	Reservasi berhasil dan tersimpan	Berhasil
TC-005	Reservasi Jadwal (Negatif)	Reservasi pada jadwal yang sudah penuh	Pesan error: Jadwal tidak tersedia	Berhasil
TC-006	Mengelola Jadwal (Positif)	Dokter menambahkan jadwal baru	Jadwal berhasil ditambahkan	Berhasil

ID Test	Use Case	Deskripsi Pengujian	Output yang Diharapkan	Status
TC-007	Mengelola Info & Pengguna (Positif)	Data Admin menambah pengguna baru	Data berhasil ditambahkan	Berhasil
TC-008	Mengelola Info & Pengguna (Negatif)	Data Email pengguna tidak valid	Error: Format email tidak valid	Berhasil

## 4. DISCUSSION

The transformation from a conventional to a digital system offers significant benefits for clinics, such as streamlining the registration process, providing 24/7 access, and minimizing the risk of administrative errors [5]. However, Brayon Sehat Clinic continues to face challenges with its conventional reservation process, including long queues due to registration via phone calls or in-person visits, uncertainty in doctors' schedules, and patients' time being wasted. According to one of the doctors at Brayon Sehat Clinic, "The manual registration system we are still using often leads to errors in recording patient data and causes uneven distribution of doctors' schedules, resulting in an unbalanced workload for the staff." The lack of real-time transparency in doctors' schedules and the manual management of patient data has led to a high risk of documentation errors, loss of medical records, and a high rate of no-shows without prior notice.

## 5. CONCLUSION

In the development of the online reservation system for Brayon Sehat Clinic, it can be concluded that this study successfully identified and addressed the clinic's main issues, namely long queues caused by the conventional reservation system, uncertainty in doctors' schedules leading to patient confusion, limited access to clinic information, and the risk of recording errors and data loss due to manual data management. The use of the Waterfall method in system development proved effective for this project, as the system requirements were clearly defined from the outset. This allowed the development process to proceed in a structured manner through the stages of Requirement Analysis, Design, Implementation, Testing, and Maintenance, each completed sequentially and successfully. The system was implemented using PHP and MySQL, resulting in a user-friendly website featuring key functionalities such as patient registration and login, doctor search by specialty, consultation scheduling, doctor schedule management, and patient data administration. The results of black box testing on the system's seven modules demonstrated that all functions operate according to user requirements, from login processes to reservation data management. This online reservation system provides significant benefits for Brayon Sehat Clinic by offering 24/7 access to services, real-time transparency of doctors' schedules, reduced physical queues, and more efficient administrative data management. This digital transformation is expected to enhance the quality of healthcare services and patient satisfaction, while also opening opportunities for future feature development such as telemedicine and digital payment systems, to further optimize the clinic's overall operations.

## 6. REFERENCE

- [1] B. J. M. Putra, Ardyani Purwatama, dan P. O. D. A. Purnamasari, "Pengembangan Aplikasi Reservasi Salon Keshoo Berbasis Web," *Journal of Electrical, Electronic, Mechanical, Informatic and Social Applied Science*, vol. 2, no. 2, hlm. 24–30, 2023, doi: 10.58991/eemisas.v2i2.42
- [2] Ranti Kivania, Amelia Novianti, dan Ricky Firmansyah, "Analisis Implementasi Peranan Sistem Reservasi Pada Bisnis Di Sektor Industri," *Student Scientific Creativity Journal*, vol. 1, no. 2, hlm. 286–299, 2023, doi: 10.55606/sscj-amik.v1i2.1277
- [3] M. J. Nursiwa, Ardi Ramadhan, Ita Fitriati, dan Amelia Putri, "Website Based Baralau Village Information System Design," *Expert Net: Exploration Journal of Technological Education Trends*, vol. 1, no. 1, hlm. 29–34, 2024, doi: 10.59923/expertnet.v1i1.128
- [4] M. Arafat, "Rancang Bangun Sistem Informasi Pemesanan Online Percetakan Sriwijaya Multi Grafika Berbasis Website," *Intech*, vol. 3, no. 2, hlm. 6–11, 2022, doi: 10.54895/intech.v3i2.1691

- [5] A. A. I. D. Putri, I. W. W. Karsana, dan N. M. Diaris, “Analisis Efektivitas Implementasi Sistem Reservasi Online Pasien Rawat Jalan Pada Poli Jantung Berbasis Web Di Rumah Sakit TK II Udayana,” *Bali Health Published Journal*, vol. 4, no. 2, hlm. 39–47, 2022, doi: 10.47859/bhbj.v4i2.261
- [6] M. Z. Batubara dan M. I. P. Nasution, “Sistem Informasi Online Pengelolaan Dana Sosial Pada Rumah Yatim Sumatera Utara,” *Jurnal Teknologi Dan Sistem Informasi Bisnis*, vol. 5, no. 3, hlm. 164–171, Jul 2023, doi: 10.47233/jteksis.v5i3.819
- [7] K. Wau, “Pengembangan Sistem Informasi Persediaan Gudang Berbasis Website Dengan Metode Waterfall,” *Jurnal Teknik, Komputer, Agroteknologi Dan Sains*, vol. 1, no. 1, hlm. 10–23, 2022, doi: 10.56248/marostek.v1i1.8
- [8] A. Simanjuntak, D. Hasibuan, S. Sitepu, J. Maslan, dan F. I. Komputer, “Implementasi Customer Relationship Management Pada Sistem Reservasi Penginapan Pariban Lau Sidebuk Debuk Berbasis Mobile,” *Jurnal Ilmiah Sistem Informasi*, vol. 1, no. 2, hlm. 1–9, 2021, [Daring]. Tersedia pada: <http://ojs.fikom-methodist.net/index.php/METHOSISFO>
- [9] N. Noviardiana, P. Studi, S. Informasi, U. S. Semarang, K. Semarang, dan S. R. Online, “PENERAPAN METODE WATERFALL DALAM RANCANG BANGUN E- KATALOG BERBASIS WEBSITE,” vol. 7, no. 1, hlm. 214–227, 2025
- [10] Rina Noviana, “Pembuatan Aplikasi Penjualan Berbasis Web Monja Store Menggunakan Php Dan Mysql,” *Jurnal Teknik dan Science*, vol. 1, no. 2, hlm. 112–124, 2022, doi: 10.56127/jts.v1i2.128
- [11] A. Setya Budi *dkk.*, “Pengenalan Dan Penggunaan Dbms (Database Management System) Di Smk Tunas Media Kota Depok,” *Abdi Jurnal Publikasi*, vol. 1, no. 2, hlm. 52–57, 2022, [Daring]. Tersedia pada: <https://jurnal.portalpublikasi.id/index.php/AJP/index>
- [12] A. Praniffa *dkk.*, “Pengujian Black Box Dan White Box Sistem Informasi Parkir Berbasis Web Black Box And White Box Testing Of Web-Based Parking Information System,” *Jurnal Testing Dan Implementasi Sistem Informasi*, vol. 1, no. 1, hlm. 1–16, 2023
- [13] Sapardi, W. Hadikristanto, dan N. T. Kurniadi, “Implementasi Pengembangan Aplikasi Sistem Manajemen Aset Berbasis Web Menggunakan Metode Waterfall Untuk Mengoptimalkan Penggunaan Aset Pada PT. Utama Karya (Persero),” *Jurnal Teknologi Dan Sistem Informasi Bisnis*, vol. 5, no. 4, hlm. 401–408, 2023, doi: 10.47233/jteksis.v5i4.948
- [14] T. Wulandari dan S. Nurmiati, “Rancang Bangun Sistem Pemesanan Wedding Organizer Menggunakan Metode Rad di Shofia Ahmad Wedding,” *Jurnal Rekasaya Informasi*, vol. 11, no. 69, hlm. 79–85, 2022
- [15] M. Badrul, “Penerapan Metode waterfall untuk Perancangan Sistem Informasi Inventory Pada Toko Keramik Bintang Terang,” *PROSISKO: Jurnal Pengembangan Riset dan Observasi Sistem Komputer*, vol. 8, no. 2, hlm. 57–52, 2021, doi: 10.30656/prosisko.v8i2.3852