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Web-based and mobile-based new student admission and registration system for high school students

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ABSTRACT

The design of the Student Admission Information System (PPDB) is an effort by business organizations, including SMA 1 Parigi, to remain competitive with other schools. Information architecture serves as an organizational resource that ensures information systems and technology operate in alignment with organizational goals. This condition encourages SMA 1 Parigi to develop a business information system tailored to the institution's needs. In this study, a needs analysis was conducted through a series of system modeling diagrams to plan the development of the information system using the Flutter Framework. To achieve the school's goals as stated in its vision and mission, it is necessary to design and establish an information architecture model that integrates an information system in accordance with the school's business requirements, particularly for SMA 1 Parigi. The Flutter Framework, as an information system service management framework, assists the organization in managing information systems from various perspectives by identifying and mapping business processes that underpin infrastructure and services.

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1. INTRODUCTION

In today's digital era, web- and mobile-based technologies have become innovative solutions across various sectors, including student registration at the senior high school leve (Duwi, 2025). Manual registration processes often face challenges such as recording errors, data duplication, administrative delays, and limitations in information processing and storage, resulting in inefficiencies, inaccuracies, and vulnerability to mistakes (Kiayi et al., 2025).

The implementation of web- and mobile-based information systems offers a more structured, fast, and flexible approach to managing student registration data (Galih et al., 2025). This technology enables prospective students to register independently through mobile applications while allowing schools to verify data and documents in real-time via a web interface (Amanda, 2025). Entire processes, from form submission and document uploads to data validation and payments, can be conducted digitally and in an integrated manner (Darusman, 2024).

This system facilitates easier interaction among students, parents, and the school through automated notifications and status tracking (Ramadhan, 2024). Additionally, the use of web- and mobile-based platforms reduces reliance on physical documents and accelerates the selection process, enhancing transparency, accuracy, and administrative efficiency in education (Hari et al., 2025). However, successful implementation requires addressing technical challenges such as system scalability, cybersecurity protections, server reliability, and integration with existing legacy databases, as well as non-technical barriers including user readiness, digital literacy, policy alignment, and institutional support mechanisms. These factors must be considered to ensure that

technology adoption truly improves transparency and operational efficiency rather than creating new bottlenecks.

From a theoretical standpoint, this study contributes to the literature by applying Flutter-based front-end development and Flask-based back-end architecture as a framework for digital transformation in secondary education systems, positioning the model within information system success theory and usability engineering (revised). The integration of these technologies aims to demonstrate how cross-platform development, lightweight server operations, and modular data handling can improve usability, accessibility, and scalability within an academic administrative environment. For these reasons, implementing web- and mobile-based technology in high school student registration and re-registration represents a crucial step toward digital transformation within schools (Sasmito et al., 2024). The system is expected to provide a more practical, reliable, and user-friendly registration experience for all stakeholders while supporting secure, centralized data management (Firdaus & Hidayat, 2025).

2. RESEARCH METHOD

The research framework begins with a flow diagram illustrating the transition of the student admission process from a manual system to a digital web and mobile based system (Dewi, 2025), divided into initial, proposed, and final stages to show changes after system implementation. Initially, admissions relied on handwritten records, causing slow processes, inefficiency, and risks of fraud or data loss (Utami et al., 2025), while the proposed model offers an online registration application to streamline the workflow (Purnama & Melani, 2022). The study employs primary data from teacher interviews and manual registration records, as well as secondary data from the Ministry of Education and Culture (Kemdikbud). Validity of primary data is ensured through credibility checks response consistency, triangulation with manual documents, and cross-verification with administrative staff whereas secondary data are verified through accuracy and authenticity criteria, including record completeness, alignment with official PPDB guidelines, and confirmation of their origin from authorized institutional sources.

Table 1. Data sources

No.	Data Type	Information
1.	Primary data from interviews with teachers from SMAN 1 Parigi	Identifying manual system constraints (e.g., slowness, prone to input errors)
2	Secondary data: Statistics on New Student Admissions in Indonesia	Understanding trends in the number of applicants and national policies in the PPDB process

Data were collected through structured interviews with school staff to identify issues in the student registration process, complemented by manual student data such as names, NISN, addresses, and other personal information (Bustami, 2024). The data collection period, conducted on 10 July 2025, involved observation of research journals, scientific articles, related reports on online registration, and analysis of similar applications available on digital platforms (Maharani, 2025). This literature review and observation were conducted online by accessing academic sources from SINTA, Scopus, and Google Scholar, as well as application platforms such as Google Play Store and App Store, to examine the features of existing digital registration and parenting applications (Nurrokhim, 2024). The findings informed the design of the information system architecture model.

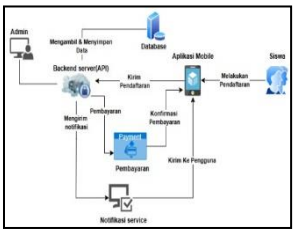


Figure 1. Model Architecture

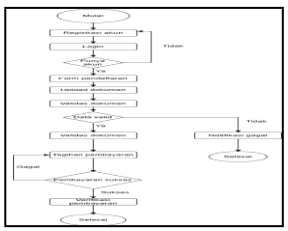


Figure 2. Flowchart

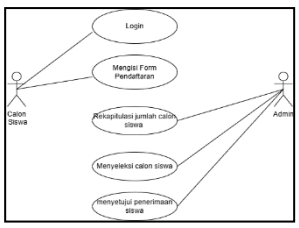


Figure 3. use case diagram

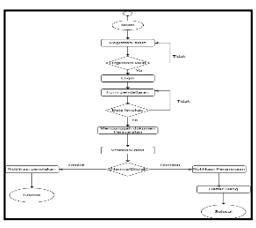


Figure 4. Activity diagram

The student registration process at SMA 1 Parigi is facilitated through a web- and mobile-based application designed to streamline enrollment efficiently. Students begin by completing a

digital registration form, which is sent via API to the backend server and stored in a database containing biodata, registration status, and payment history (Prasetyo, 2025). Payments are processed through an integrated system, with confirmations updating the backend and synchronizing to the app, while automated notifications keep both students and administrators informed. Administrators can monitor registrations, verify data, track payments, and manage notifications through the backend interface (Safitri Windiarti et al., 2024). The system's functional features include digital forms, document uploads, and seamless API integration, while non-functional requirements ensure high availability, responsiveness, and reliability. Conceptual and physical designs, including Entity Relationship Diagrams, flowcharts, use case diagrams, and activity diagrams, define logical data management and illustrate user interactions, sequential processes, and roles of primary actors—prospective students and admins providing a comprehensive visualization of how registration tasks are executed from initiation to completion within the system (Heru et al., 2024).

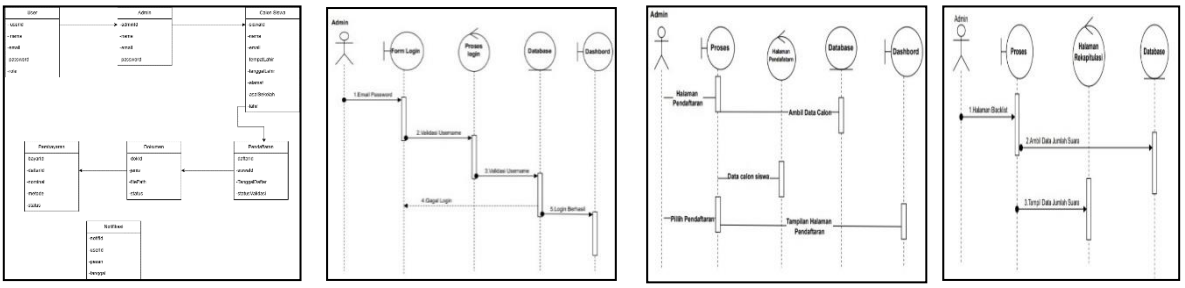


Figure 5. Class diagram Figure 6. Sequence diagram login Figure 7. Sequence registration diagram Figure 9. Recapitulation sequence diagram

The class diagram of the web- and mobile-based student admission and re-registration system for SMAN 1 Parigi depicts the static structure using Object-Oriented Programming (OOP), showing entities, key attributes, and relationships (Derosari et al., 2025). The User class serves as a general entity for all users, with attributes such as userId, name, email, password, and role, distinguishing Admin and Prospective Student subclasses (Saputra & Wardani, 2024). The Admin class manages registration, document, and payment verification, while the Prospective Student class stores personal data. The Registration class links to Prospective Students, recording enrollment details and validation status, while the Document and Payment classes handle uploaded files and financial transactions, respectively(Safitri et al., 2024). The Notification class facilitates real-time updates to users. Sequence diagrams illustrate dynamic interactions, including login, registration, and data recapitulation processes, showing step-by-step system responses from user actions to dashboard presentation (Hui, 2024). For instance, during registration, the admin accesses the page, the system retrieves stored student data from the database, displays it, and summarizes the total number of registered students. Similarly, recapitulation processes, such as managing blacklists or vote data, involve sequential interactions between the admin, system, and database, demonstrating efficient information flow and system functionality.

Figure 9. Selection sequence diagram

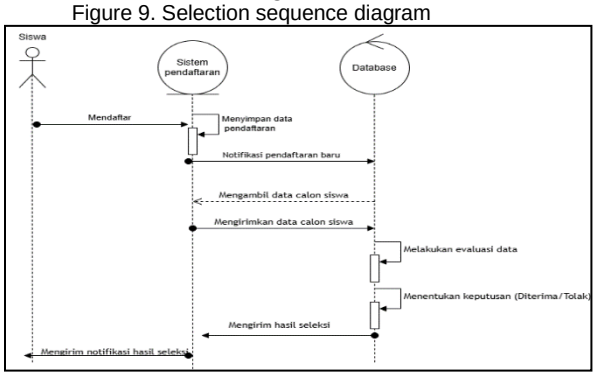
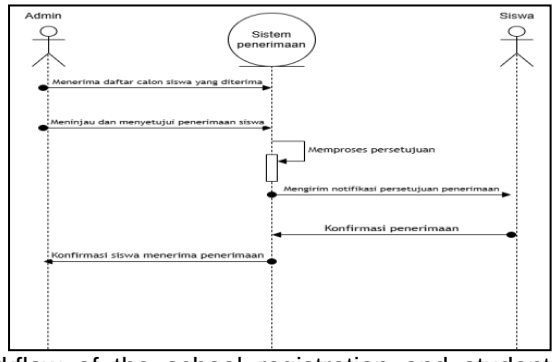


Figure 10. Sequence diagram of approval



The diagrams illustrate the structured workflow of the school registration and student admission approval processes, involving interactions among key entities students, admin, the

registration system, and the database. Initially, students register through the system, which stores their data in the database and confirms successful registration. The system retrieves and processes this data, allowing the database to evaluate eligibility and produce an acceptance or rejection decision, which is communicated back to the student (Ali et al., 2025). Subsequently, admins review the list of candidates who passed the selection stage, approve eligible students, and the system notifies them of their acceptance. Students confirm receipt of the notification, and the system updates the admin accordingly (Ghazali & Aman, 2022). Together, these processes demonstrate an efficient, systematic flow of data input, evaluation, approval, notification, and acknowledgment, ensuring that registration and admission decisions are accurately managed and communicated.

3. RESULTS AND DISCUSSIONS

The The results of this study indicate that the new student admission system at SMA Negeri 1 Parigi was successfully developed using a dual-platform approach: a Flutter-based mobile application for prospective students and a web-based system for administrators built with the Flask framework. The mobile app enables students to register independently, upload documents, and monitor their registration status in real time, while the web-based admin interface is designed to efficiently manage registration data, verify documents, track payment statuses, and oversee administrator accounts.

Figure 11. Login intro

Figure 12. Login page

Figure 13. Registration page

Figure 14. Home Page

The splash page serves as the initial screen that appears when the application is launched, displaying the app's logo and name at the center against a simple background to emphasize branding and identity before users proceed to the login page. The login page features two main fields email and password for registered users to access the app's features, with a prominent "Login" button and a "Register Now" link for new users. The registration page requires users to provide essential information such as full name, active email, password, and password confirmation, arranged vertically for clarity, with a "Register" button at the bottom, visual icons to aid understanding, and a "Login here" link for existing users. After logging in, the Home Page presents a personalized greeting at the top, an information banner with important announcements such as SNBT and SIMAMA Poltekkes 2025 results, key menus like "Extracurricular Activities" and "Top Academic Programs," and a bottom navigation tab for easy access to Home, Registration, Announcements, and Profile, ensuring a clean, user-friendly, and interactive experience throughout the application.

Figure 15. Registration form

Figure 16. Warning not registered yet

Figure 17. Registration form

Figure 18.Registration documents

The New Student Registration page is a central component of the admission process, designed to collect and manage all essential student information and documents. It features input forms for personal details such as full name, birth information, gender, address, religion, previous school, and selected study program, with instructional labels and tools like dropdowns and date pickers to minimize errors. Users cannot access advanced registration features, such as document uploads or payments, without completing this initial form, as the system displays warnings to prevent workflow errors. The page also provides a clear overview of registration progress, including completion percentage and administrative verification status, helping applicants identify missing information. Additionally, it allows document submission, including diploma scans, optional graduation letters, family cards, and birth certificates, with uploaded files verified via visible file names, formats (PDF, JPG, PNG), and size limits (2 MB), ensuring applicants can monitor and complete all requirements efficiently.

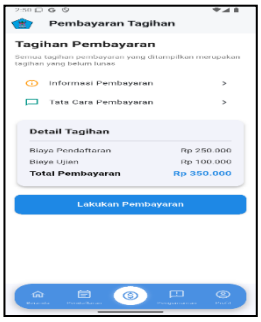


Figure 19. Document filling status Figure 20. Registration status has not been validated Figure 21. Registration Status If Validated Figure 22. Payment Bill

This page provides a comprehensive overview of the student registration process in SMA Negeri 1 Parigi's digital admission app. It displays the upload status of each required document, issuing warnings for any missing items to ensure all registration criteria are met before the deadline. Users are also informed that their registration is under administrative review, preventing premature assumptions of completion. The New Student Admission Results section serves as the official source for result announcements, featuring a prominent orange box with a stopwatch icon indicating the release on June 17, 2025, at 09:00 WIB, along with a real-time countdown for easy tracking. Additionally, the page presents payment options for the registration fee, including the amount due, available methods such as bank transfer or e-wallet, and concise instructions to guide users through the payment process efficiently.

Figure 23. Payment Page Figure 24. Bank Account Figure 25. Payment Status Dashboard

This view provides detailed payment information, including the total fee, school bank account number, bank name, and payment deadline, aiming to minimize transfer errors by students or parents. This page displays the school's official bank account details, including the bank name, account number, and account holder, ensuring accurate transactions. It also offers alternative payment methods such as e-wallets, QRIS, and convenience store payments, with a "Confirm Payment" button at the bottom to proceed after selecting the preferred method. On this dashboard

page, users' payment status is displayed concisely yet clearly, showing whether it is "Pending Payment," "Under Verification," or "Verified," along with the date and time of the last transaction

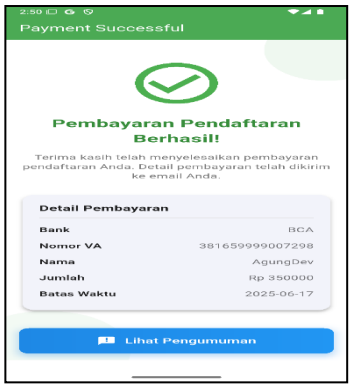


Figure 26. Payment status

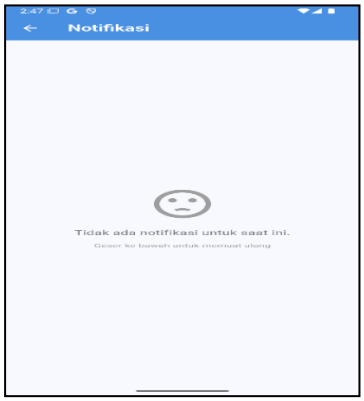


Figure 27. Notification page

Figure 28. Profile page

This page displays users' detailed payment history, including the amount paid, uploaded transfer proof, and admin verification status, helping users confirm that their payments have been successfully completed. The image shows the Notifications page of SMA Negeri 1 Parigi's digital registration app, designed to display important messages such as registration status, payments, document validation, or announcements. Currently, no notifications are available, indicated by a sad-face icon and the text "No notifications at this time," with a note to swipe down to refresh. The clean, minimalist white design keeps the user's focus on messages and ensures easy readability. The profile page displays users' personal information, including full name, email, phone number, and other details, and allows them to update their data. It also features a profile photo to personalize the account.

Figure 29. Page Her registration

Figure 30. Her registration has been filled in

The image displays the New Student Admission Results, indicating that the user has been accepted at SMA Negeri 1 Parigi and must proceed with re-registration. The image shows the re-registration page, which confirms that users who have completed the previous re-registration process are officially enrolled as students of SMAN 1 Parigi

Figure 31. Login page

The image shows the system's login page, where users enter credentials such as email and password. The simple, user-friendly design serves as the secure gateway for verified access to the system.

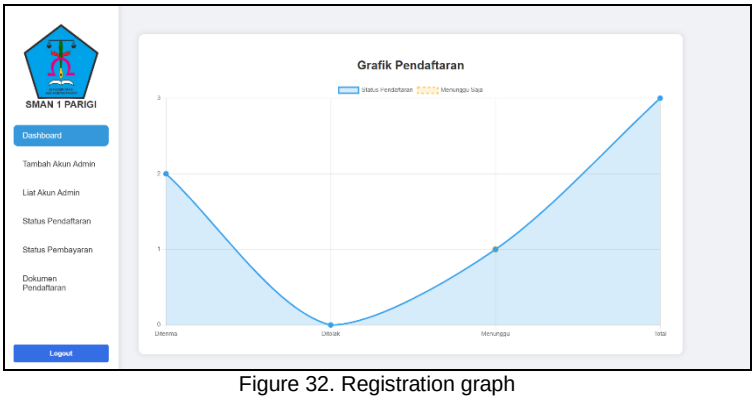


Figure 32. Registration graph

This image presents registration data in a graphical format, allowing admins to monitor daily, weekly, and monthly trends. Visualizing the data in this way supports decision-making and evaluates the effectiveness of the registration process.

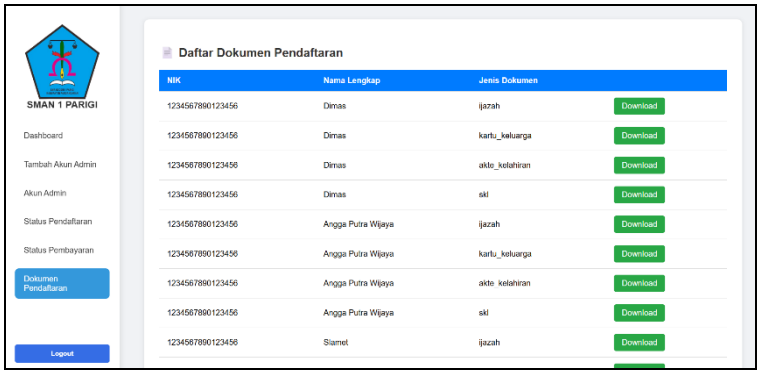


Figure 33. Registration document data

This interface displays a system table containing users' registration documents, showing key information such as applicant names, document types, and verification status. The page helps administrators systematically monitor the completeness of submitted documents.

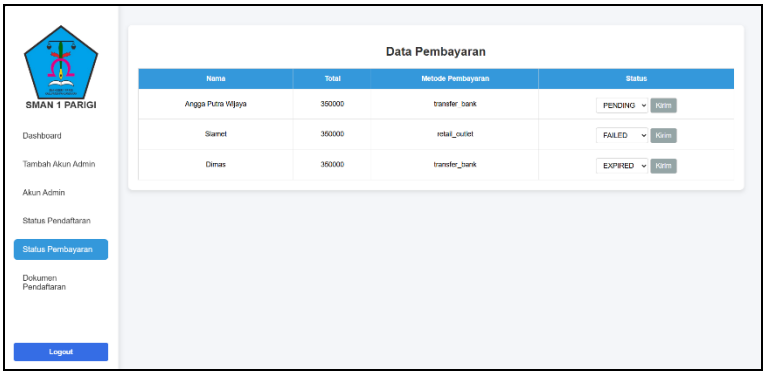


Figure 34. Payment status

The image shows a table displaying registrants' payment information, including names, payment methods, amounts, and confirmation status. This page is designed to help administrators verify transactions efficiently and transparently.

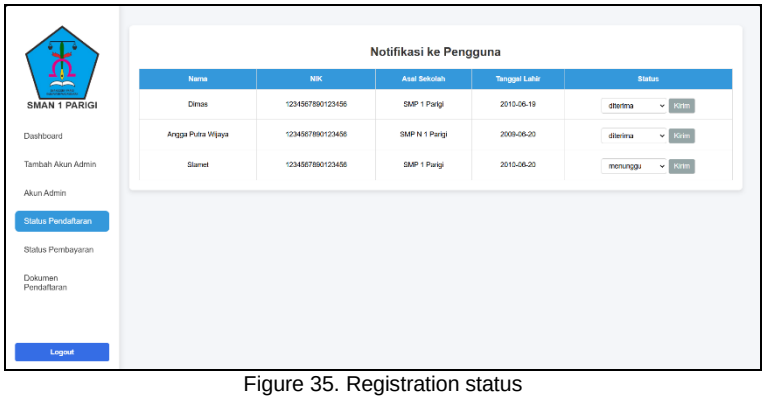


Figure 35. Registration status

This interface displays the registration status of each applicant, allowing the admin to see completed and pending stages. It facilitates monitoring and follow-up of the registration process.

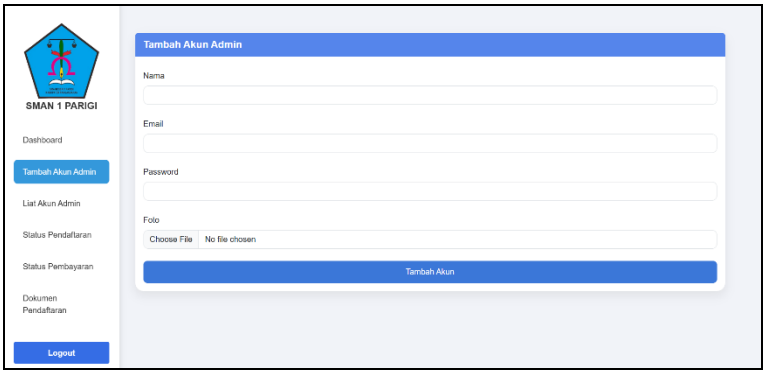


Figure 36. Add admin account

The image displays the page for adding a new admin account, with a form requiring name, email, and password. This feature allows flexible management of admin accounts according to the organization's needs.

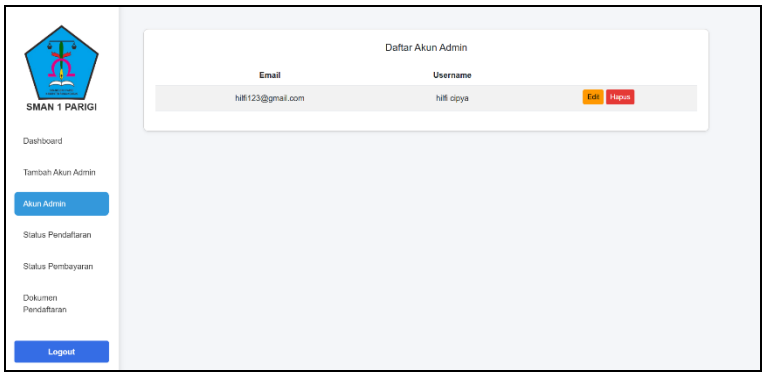


Figure 37. View admin account

The interface displays a list of admin accounts, showing usernames, email addresses, and options to edit or delete accounts, facilitating efficient management and system security (Alda & Afifudin, 2020). For the final project development, the application will be expanded for the Professional Project (PP) by adding daily tasks and schedules for registered students at SMAN 1 Parigi, along with attendance features, aiming to streamline classroom activities and advance the school's technology (Waziana & Saputra, 2023). The implementation of digital payment integration, automated notification features, and system-based document validation significantly improves the overall quality of PPDB services by reducing processing time, minimizing administrative errors, and

increasing transparency for applicants. Evidence that the developed system successfully addresses limitations of the manual process is reflected in measurable indicators such as reduced average verification time, zero-recorded document loss, improved submission accuracy, and increased user satisfaction scores. These findings confirm that the digital PPDB system effectively resolves the main issues highlighted in the research questions, demonstrating a clear improvement in service performance compared to traditional manual procedures.

4. CONCLUSION

The development of the web- and mobile-based admission and re-registration system at SMAN 1 Parigi proves effective in overcoming the limitations of manual registration by improving efficiency, accuracy, and transparency through the use of Flutter, Flask, and Supabase. Its successful implementation also demonstrates broader implications for school digitization in Indonesia, showing that scalable and low-cost digital platforms can strengthen accountability and service quality while supporting national digital transformation initiatives. Furthermore, the system opens opportunities for future enhancement, including automatic payment integration, attendance tracking, analytics dashboards, and additional academic modules, which can expand the school's digital ecosystem and support more comprehensive, data-driven educational administration.

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