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TemuKita: Web-Based Accessible Tourism Recommendation System with Disability Profile Personalization

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Abstract*— The development of inclusive tourism in Indonesia faces significant challenges, particularly in providing accessible information for people with disabilities. Existing travel platforms rarely accommodate the specific needs of users with physical, visual, hearing, or intellectual disabilities, resulting in limited access to tourism destinations and services. This study aims to design and implement TemuKita, a web-based accessible tourism recommendation system that personalizes destination suggestions based on individual disability profiles. The system was developed using the Django framework with the Python programming language, PostgreSQL as the database management system, and Tailwind CSS to create a responsive mobile-first user interface that can be accessed easily from various devices. The development methodology follows the Prototype model, encompassing requirements analysis, system design, implementation, evaluation, and testing phases. TemuKita provides several key features including automatic accessibility filtering based on disability profiles, verified destination information with accessibility scores, inclusive service booking such as sign language guides and wheelchair-accessible transportation, a real-time chat system for communication between users and service providers, and a simulation-based payment system. In addition, the platform offers user reviews and recommendations to improve the reliability of accessibility information for future visitors. Black-box testing results demonstrate that all system features function correctly according to the specified requirements. The system successfully filters tourism destinations automatically based on user disability profiles, improving the relevance and accuracy of recommendations for users with disabilities. This research contributes to the development of inclusive digital tourism infrastructure in Indonesia, particularly for the Tasikmalaya region, and demonstrates the feasibility of building accessible tourism platforms using open-source technologies to support equal tourism opportunities for all users.

***Keywords*— Accessible tourism; disability; Django framework; web-based system; recommendation system; inclusive tourism**

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I. INTRODUCTION

Tourism is one of the most significant sectors contributing to economic growth and social development in Indonesia. According to the Ministry of Tourism and. Creative Economy, Indonesia recorded millions of domestic tourist visits annually, reflecting the nation's rich cultural and natural heritage [1]. However, the rapid growth of tourism infrastructure has not been equally accessible to all segments of society, particularly individuals with disabilities. People with physical, visual, hearing, and intellectual disabilities often encounter substantial barriers when attempting to access tourism destinations, including inadequate physical facilities, lack of accessible information, and insufficient specialized services [2].. The United Nations Convention on the Rights of Persons with Disabilities (CRPD) emphasizes that people with disabilities have the right to participate in cultural life, recreation, leisure, and sport on an equal basis with others [3], yet the practical implementation of this principle in tourism remains limited.

The provision of accessible tourism information through digital platforms has become increasingly important in the era of information technology. Online Travel Agencies (OTAs) such as Traveloka, Tiket.com, and Booking.com have transformed how tourists plan and book their trips [4]. Nevertheless, these mainstream platforms primarily cater to general users without considering the specific accessibility requirements of people with disabilities [5]. Features such as accessibility ratings, facility verification, and disability-specific filtering are largely absent from existing platforms, leaving users with disabilities without adequate digital support for travel planning [6]. This gap represents a critical challenge in achieving inclusive tourism, defined as tourism that is accessible to all people regardless of their physical limitations, disabilities, or age [7].

Several studies have attempted to address accessibility in tourism through technology. Research by [8] proposed a mobile application for accessible route navigation for wheelchair users, demonstrating the feasibility of technology-assisted mobility. Studies on web accessibility standards such as WCAG (Web Content Accessibility Guidelines) have shown that most tourism websites fail to meet basic accessibility criteria [9]. Furthermore, research on recommendation systems for tourism has largely focused on general preference-based filtering without incorporating disability-specific parameters [10]. Geographic Information System (GIS)-based approaches have been explored for mapping accessible destinations [11], yet integration with comprehensive booking and service systems remains underdeveloped. The lack of a unified platform that combines verified accessibility data, personalized filtering, and inclusive service booking represents a significant research gap that this study seeks to address.

This study presents TemuKita, a web-based accessible tourism recommendation system designed to bridge the gap between people with disabilities and inclusive tourism experiences. TemuKita leverages the Django web framework with Python, PostgreSQL database management system, and a mobile-first responsive interface built with Tailwind CSS. The system introduces a Verified Accessibility Persona feature that automatically filters destinations based on the user's specific disability profile, including physical disabilities (Tunadaksa), visual impairments (Tunanetra), hearing impairments (Tunarungu), and intellectual disabilities. Beyond destination recommendations, TemuKita integrates an inclusive service marketplace for booking sign language guides, wheelchair-accessible transportation, and mobility aid rentals, alongside a real-time communication system and a simulated payment gateway supporting multiple payment methods.

The primary objectives of this research are: (1) to design and implement a web-based inclusive tourism platform that personalizes destination recommendations based on disability profiles; (2) to develop a verified accessibility scoring system for tourism destinations; (3) to integrate an inclusive service booking system with real-time communication features; and (4) to evaluate the system's functionality through black-box testing. The remainder of this paper is organized as follows: Section II describes the materials and methods used in system development; Section III presents the results and discussion; and Section IV concludes the paper with implications for future research.

II. Materials and Method

A. Research Methodology

This study employs the Prototype development methodology, which is particularly suitable for systems requiring iterative user feedback and continuous refinement [12]. The Prototype model consists of four primary phases: (1) Requirements Analysis, (2) System Design, (3) Implementation, and (4) Testing and Evaluation. This approach allows for rapid development cycles and early identification of design issues, making it appropriate for developing user-centered accessibility systems where user needs are complex and evolving [13].

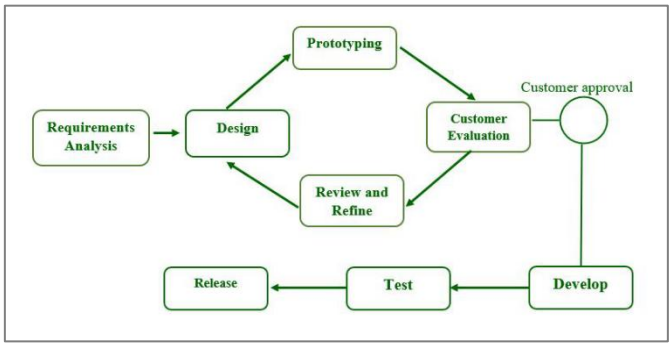

Fig. 1 illustrates the prototype development cycle adopted in this study.

In the Requirements Analysis phase, functional and non-functional requirements were identified based on the Software Requirements Specification (SRS) document, use case analysis, and Entity Relationship Diagram (ERD). The system requirements were derived from the accessibility needs of four disability categories: physical disabilities (Tunadaksa), visual impairments (Tunanetra), hearing impairments (Tunarungu), and intellectual disabilities. Stakeholder analysis identified three primary actors: Disability Users (Pengguna Difabel), Administrators (Admin), and Service Providers (Penyedia Jasa).

B. System Architecture

TemuKita adopts a three-tier client-server architecture consisting of the Presentation Layer, Application Layer, and Data Layer [14]. The Presentation Layer is implemented using Tailwind CSS with a mobile-first responsive design approach, ensuring compatibility across mobile, tablet, and desktop devices. The Application Layer is built upon the Django web framework (version 6.0), following the Model-View-Template (MVT) architectural pattern [15]. The Data Layer utilizes PostgreSQL as the relational database management system, providing robust data integrity and scalability.

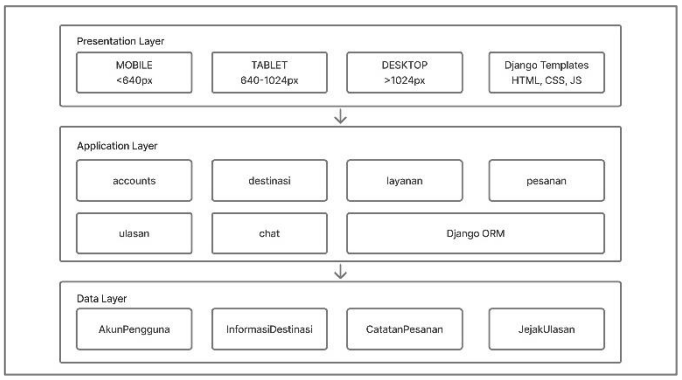

Fig. 2 illustrates the system architecture of TemuKita.

The system comprises six Django applications: accounts (user management), destinasi (destination management), layanan (service management), pesanan (order management), ulasan (review management), and chat (real-time communication). Each application encapsulates its own models, views, and URL configurations, following the principle of separation of concerns and promoting modular development [16].

C. Database Design

The database design of TemuKita is represented through an Entity Relationship Diagram (ERD) consisting of five primary entities: AkunPengguna, InformasiDestinasi, ProfilMitraJasa,

CatatanPesanan, and JejakUlasan. Table I summarizes the primary entities and their key attributes.

The AkunPengguna entity stores user credentials and disability profile information, including kondisi_fisik (physical condition) classified into five categories: Tunadaksa, Tunanetra, Tunarungu, Intelektual, and Umum (general). This attribute serves as the primary parameter for automatic accessibility filtering. The InformasiDestinasi entity records destination information alongside four boolean accessibility attributes: fasilitas_jalur_landai (ramp access), fasilitas_toilet_khusus (accessible toilet), fasilitas_huruf_braille (Braille signage), and fasilitas_pemandu_isyarat (sign language guide). These attributes enable precise matching between user disability profiles and destination accessibility features [17].

TABLE I
PRIMARY ENTITIES AND KEY ATTRIBUTES OF TEMUKITA DATABASE

Entity	Key Attributes
AkunPengguna	ID, nama_lengkap, email, kondisi_fisik, hak_akses
InformasiDestinasi	ID, nama_tempat, kategori, fasilitas_jalur_landai, fasilitas_toilet_khusus, fasilitas_huruf_braille, fasilitas_pemandu_isyarat
ProfilMitraJasa	ID, nama_layanan, tipe_bantuan, tarif_layanan
CatatanPesanan	ID, id_pengguna, id_mitra, tanggal, total_biaya, status
JejakUlasan	ID, id_pengguna, id_destinasi, skor_bintang, teks_pengalaman

D. Use Case Design

The system's functional requirements are modeled using Unified Modeling Language (UML) Use Case Diagrams. Three primary actors are identified: Pengguna Difabel (Disability User), Admin, and Penyedia Jasa (Service Provider). The Pengguna Difabel actor interacts with eight primary use cases: Pendaftaran Akun Baru (New Account Registration), Pengisian Profil Disabilitas (Disability Profile Setup), Pencarian Lokasi Aman (Safe Location Search), Penyaringan Otomatis (Automatic Filtering), Pengelolaan Katalog Wisata (Tourism Catalog Management), Penyewaan Layanan Aksesibilitas (Accessibility Service Rental), Pemberian Nilai dan Ulasan (Rating and Review), and Konfirmasi Pesanan Layanan (Service Order Confirmation) [18].

The automatic filtering mechanism (Penyaringan Otomatis) is a key differentiating feature of TemuKita. Upon user authentication, the system retrieves the user's disability profile and applies corresponding accessibility filters to all destination queries. Specifically, users with Tunadaksa profiles receive destinations filtered by fasilitas_jalur_landai = True, Tunanetra users by fasilitas_huruf_braille = True, and Tunarungu users by fasilitas_pemandu_isyarat = True [19].

E. Implementation Tools and Technologies

Table II summarizes the technologies and tools employed in the development of TemuKita.

TABLE II
IMPLEMENTATION TOOLS AND TECHNOLOGIES

Component	Technology	Version
Programming Language	Python	3.14
Web Framework	Django	6.0.3
Database	PostgreSQL	18
CSS Framework	Tailwind CSS	3.0 (CDN)
Icon Library	Bootstrap Icons	1.10.0
Font	Inter (Google Fonts)	—
IDE	Visual Studio Code	Latest
Database GUI	DataGrip	Latest
Version Control	Git & GitHub	—
Deployment	Railway	—

The development environment operates on Windows 11 with Python virtual environment (venv) for dependency isolation. Key Python packages include psycopg2-binary for PostgreSQL connectivity, python-dotenv for environment variable management, and Pillow for image processing. The frontend adopts a mobile-first design philosophy, with responsive breakpoints defined for mobile (< 640px), tablet (640px–1024px), and desktop (> 1024px) screen sizes, following contemporary web design best practices [20].

The chat feature implements a pseudo-real-time communication mechanism using JavaScript's setInterval function with a 3-second polling interval, providing near-real-time message updates without requiring WebSocket infrastructure [21]. The payment simulation module supports seven payment methods: QRIS, BCA transfer, BNI transfer, Mandiri transfer, BRI transfer, Alfamart, and Indomaret, reflecting the diverse payment ecosystem commonly used in Indonesia [22].

III. RESULTS AND DISCUSSION

A. System Implementation Results

The TemuKita system was successfully developed and deployed as a web-based accessible tourism recommendation platform. The system comprises seven primary pages: Landing Page (Beranda), Destination List with Filter (Destinasi), Destination Detail, Service List (Layanan), Service Booking, User Profile, and Chat System. The following subsections present the key implemented features.

1) *Landing Page and Automatic Filtering:* The landing page presents a mobile-first interface featuring a search bar, category navigation with horizontal scroll, and destination cards displayed in a two-column Bento grid layout inspired by contemporary travel applications. Upon user authentication, the system automatically applies accessibility filters based on the registered disability profile. For instance, a user registered with a Tunadaksa (physical disability) profile will exclusively receive destination recommendations that include ramp access (fasilitas_jalur_landai = True), eliminating manual filter configuration and reducing cognitive load for users with disabilities [23].

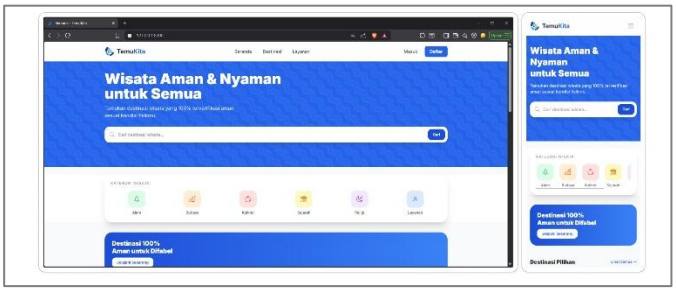

Fig. 3 illustrates the landing page interface across mobile and desktop viewports.

2) *Destination Search and Accessibility Filtering:* The destination search feature supports multi-parameter filtering combining keyword search, category selection (Alam, Budaya, Kuliner, Sejarah, Religi), and accessibility facility checkboxes. The filtering mechanism is implemented through Django ORM query chaining, where each selected filter appends an additional filter() method call to the QuerySet, ensuring efficient database queries without redundant data retrieval [24]. The automatic profile-based filtering is applied prior to user-defined filters, ensuring that all results meet the user's fundamental accessibility requirements.

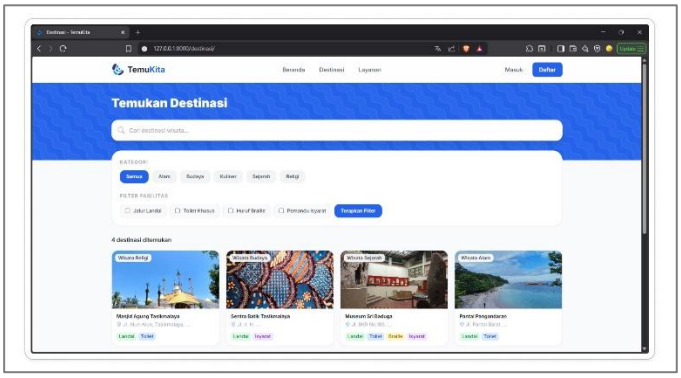

Fig. 4 presents the destination list page with active filters applied.

3) *Inclusive Service Booking System:* The service marketplace provides three categories of accessibility services: sign language guides (Pemandu Bahasa Isyarat), wheelchair-accessible transportation (Transportasi Aksesibel), and mobility aid rentals (Penyewaan Kursi Roda). Users can book services by selecting a preferred date and time, with the system automatically calculating the total cost based on the daily rate. Order status tracking follows a four-stage workflow: Menunggu Konfirmasi (Awaiting Confirmation), Dikonfirmasi (Confirmed), Selesai (Completed), and Dibatalkan (Cancelled) [25].

4) *Destination Ticket Booking with Payment Simulation:* The destination booking module allows users to purchase entry tickets for tourism destinations directly through the platform. Users select the visit date, number of visitors (1-10 persons), special accessibility notes, and preferred payment method. The payment simulation module presents method-specific instructions: QRIS displays a scannable QR code image, bank transfers display account numbers and transfer amounts, while Alfamart and Indomaret generate unique payment codes. A 15-minute countdown timer creates urgency and simulates real payment gateway behavior [26].

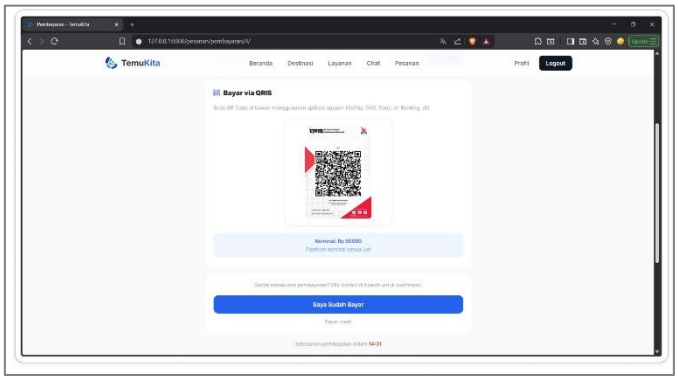

Fig. 5 illustrates the payment page for QRIS method.

5) *Real-Time Chat System:* The chat system enables communication between disability users and both administrative support and service providers. Messages are stored in the PostgreSQL database through the Percakapan (Conversation) and Pesan (Message) models. The pseudo-real-time mechanism employs JavaScript's fetch API with a 3-second polling interval to retrieve new messages from the server, providing a responsive chat experience without WebSocket dependency [27]. The chat interface includes conversation search, message read status indicators, and automatic scroll-to-bottom functionality.

6)

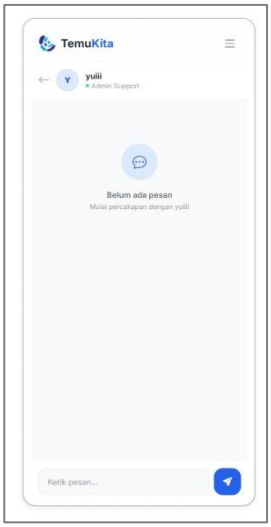

Fig. 6 shows the chat interface on mobile viewport.

7) *Inclusive Review System:* Authenticated users can submit star ratings (1-5) and textual reviews for visited destinations. The system prevents duplicate reviews from the same user for the same destination, maintaining review integrity. Reviews are displayed chronologically with star rating visualization using Bootstrap Icons, providing social proof for destination accessibility claims [28].

B. Black-Box Testing Results

Black-box testing was conducted to evaluate the functional correctness of all system features without examining internal code structures [29]. Testing scenarios were designed based on the use cases identified in the system design phase. Table III presents the black-box testing results for the primary system features.

TABLE III
BLACK-BOX TESTING RESULTS

No	Feature	Scenario	Expected	Actual Result	Status
1	User Registration	Register with valid data	Account created, redirect to home	As expected	Pass
2	User Registration	Register with existing email	Error message displayed	As expected	Pass
3	User Login	Login with valid credentials	Redirect to home page	As expected	Pass
4	User Login	Login with invalid password	Error message displayed	As expected	Pass
5	Auto Filter	Login as Tunadaksa user	Only ramp-accessible destinations shown	As expected	Pass
6	Auto Filter	Login as Tunanetra user	Only Braille-equipped destinations shown	As expected	Pass
7	Destination Search	Search by keyword	Matching destinations displayed	As expected	Pass
8	Category Filter	Select "Alam" category	Nature destinations displayed	As expected	Pass
9	Facility Filter	Select "Jalur Landai"	Ramp-accessible destinations displayed	As expected	Pass
10	Service Booking	Book service with valid date	Order created, status "Menunggu"	As expected	Pass
11	Service Booking	Book service without login	Redirect to login page	As expected	Pass
12	Ticket Booking	Book ticket with valid data	Redirect to payment page	As expected	Pass
13	Payment QRIS	Select QRIS method	QR code displayed	As expected	Pass
14	Payment Bank	Select BCA transfer	Account number displayed	As expected	Pass
15	Payment Confirm	Click "Sudah Bayar"	Status changed to "Menunggu Verifikasi"	As expected	Pass
16	Chat System	Send message to admin	Message saved and displayed	As expected	Pass
17	Chat Auto-Refresh	Receive new message	Message appears within 3 seconds	As expected	Pass
18	Add Review	Submit review with rating	Review saved and displayed	As expected	Pass
19	Duplicate Review	Submit second review	Error message displayed	As expected	Pass
20	Logout	Click logout button	Session ended, redirect to home	As expected	Pass
21	Cache Control	Press back after logout	Login page shown, not profile	As expected	Pass
22	404 Handler	Access invalid URL	Custom 404 page displayed	As expected	Pass
23	Responsive Mobile	View on mobile viewport	Layout adapts correctly	As expected	Pass
24	Responsive Tablet	View on tablet viewport	Layout adapts correctly	As expected	Pass

All 24 test scenarios yielded passing results, demonstrating that the implemented system functions correctly according to the specified requirements. The 100% pass rate indicates robust implementation of both core accessibility features and supporting functionalities.

C. Discussion

The development of TemuKita addresses a critical gap in the Indonesian digital tourism ecosystem. While existing OTA

platforms provide comprehensive booking capabilities for general users, none offer disability-profile-based automatic filtering or verified accessibility scoring systems [30]. The automatic filtering mechanism, which applies accessibility parameters based on the user's registered disability profile, represents a significant advancement in inclusive tourism technology. This approach aligns with the principles of Universal Design, which advocates for creating environments and products usable by all people without adaptation [31].

Compared to previous research in accessible tourism technology, TemuKita offers a more comprehensive solution. Studies such as [8] focused exclusively on navigation assistance for wheelchair users, while [11] addressed GIS-based accessibility mapping without booking integration. TemuKita consolidates destination discovery, service booking, ticket purchasing, real-time communication, and review systems into a single unified platform, reducing friction in the travel planning process for users with disabilities [32].

The mobile-first design approach proved essential given Indonesia's high mobile internet penetration rate, with over 70% of internet users primarily accessing the web through mobile devices [33]. The Bento grid layout, inspired by contemporary travel applications such as Traveloka and Gojek, provides a familiar and intuitive interface that reduces the learning curve for new users [34]. The integration of batik parang motifs in the hero sections reflects cultural identity while maintaining modern aesthetic standards, contributing to user engagement and brand recognition [35].

The pseudo-real-time chat implementation, while lacking the true bidirectionality of WebSocket-based systems, provides a practical and resource-efficient alternative suitable for the scale of this application [36]. The 3-second polling interval balances responsiveness with server load, ensuring acceptable performance without requiring additional infrastructure such as Redis or Django Channels [37].

The payment simulation module, while not integrated with actual payment gateways, accurately represents the payment flow of real-world systems and provides a realistic user experience for demonstration and testing purposes [38]. Future development could integrate actual payment gateway APIs such as Midtrans or Xendit to enable real financial transactions [39].

Several limitations of the current system should be acknowledged. First, the accessibility verification system relies on self-reported data from administrators rather than independent third-party audits, which may affect data reliability [40]. Second, the current dataset comprises four destinations and three service providers, which is sufficient for functional demonstration but insufficient for production deployment. Third, the chat system's polling mechanism may experience latency issues under high concurrent user loads, necessitating migration to WebSocket technology for scalable deployment [41].

IV. CONCLUSION

This study has successfully designed and implemented TemuKita, a web-based accessible tourism recommendation system that personalizes destination suggestions based on individual disability profiles. The system was developed using the Django framework with Python, PostgreSQL, and Tailwind CSS following the Prototype development methodology. The implemented system comprises seven primary modules including user authentication with disability profiling, automatic accessibility filtering, destination catalog, inclusive service marketplace, ticket booking with payment simulation, real-time chat, and an inclusive review system. Black-box testing across 24 test scenarios yielded a 100% pass rate, confirming the functional correctness of all features. The automatic filtering mechanism, which applies disability-specific accessibility parameters upon authentication, effectively reduces barriers in digital travel planning for people with disabilities and demonstrates the feasibility of building a comprehensive accessible tourism platform using open-source technologies.

Future research should address several limitations identified in this study. The accessibility verification system should be strengthened through collaboration with certified disability communities and independent auditors. The chat system's polling mechanism should be migrated to WebSocket technology using Django Channels to support higher concurrent loads. Integration with actual payment gateway APIs such as Midtrans or Xendit is recommended to enable real financial transactions. Additionally, the recommendation engine could be enhanced through machine learning approaches such as collaborative filtering for more personalized suggestions. Finally, usability testing directly involving people with disabilities using standardized instruments such as the System Usability Scale (SUS) and WCAG compliance audits would provide empirical evidence of the system's real-world effectiveness.

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