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From Click to Buy: Enhancing User Experience on The Whoosh Mobile App for High-Speed Rail Booking

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Abstract

The Jakarta-Bandung High-Speed Railway has revolutionized transportation in Indonesia, offering a modern and efficient travel experience. To encourage the utilization of this service, enhancing the user experience (UX) of online ticket booking applications, such as Whoosh, is crucial. The scope of this study is limited to the core functionalities of account registration, login, and booking, up until the issuance of the electronic ticket. This study evaluates user satisfaction through qualitative analysis of user reviews from the Google Play Store and Apple App Store and quantitative analysis of user ratings and download numbers. Using the Customer Satisfaction Index (CSI) methodology, the study identifies a CSI score of 24.85%, which indicates significant dissatisfaction among users. The primary issues include failures during login and registration processes, unclear navigation during booking, the lack of an invoice or receipt printing feature, and the absence of a support center throughout the application. To address these pain points, textual recommendations are proposed, including the implementation of one-tap login, a Help Center feature, enhanced carriage selection visibility, and a "Send Receipt" button on the payment page. These improvements aim to simplify interactions, provide intuitive navigation, and enhance support systems, ultimately promoting greater user satisfaction and adoption of high-speed rail services. This research contributes actionable insights for improving digital ticketing solutions and highlights the importance of continuous user feedback to drive further enhancements.

I. INTRODUCTION

The usage of mobile-based applications to support a variety of everyday tasks, including those in the transportation industry, has increased as a result of the digital age. Applications for buying tickets are among the services that have attracted a lot of interest since they are convenient for consumers and can be used strategically to increase client loyalty. In this regard, the success of an application is greatly influenced by the user experience (UX). Studies pertaining to the TIX ID and MyTrain programs have shown that a well-designed user experience (UX) guarantees easy navigation, unambiguous access to information, and a productive booking procedure [1][2].

The Jakarta-Bandung High-Speed Rail service, known as Whoosh, represents a pioneering achievement as Southeast Asia's first high-speed rail. Operating at speeds of up to 350 km/h, this service connects Jakarta and Bandung in just around 30 minutes, offering passengers a fast, comfortable, and efficient travel experience [3]. Supporting its operation, the Whoosh application provides essential ticketing services, such as online ticket purchases, changes, and refunds, designed to enhance convenience and streamline travel planning for passengers [4]. Despite its potential, the application has faced challenges in meeting user expectations, necessitating a detailed evaluation to identify and address usability gaps.

Research on user-centered design (UCD) approaches in transportation booking systems highlights the importance of considering user requirements during development. Key requirements include ease of navigation, intuitive interfaces, transparent pricing, secure payment options, and accessible customer service [5]. In

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sustainable mobility applications like Noabike, positive user experiences, coupled with intuitive access and efficient service features, have proven essential in enhancing customer retention and loyalty [6]. These considerations align with methodologies like the Customer Satisfaction Index (CSI), which evaluates user satisfaction by identifying gaps between expectations and performance across application features. For instance, in the evaluation of the Indonesia Airports application, CSI was instrumental in determining key improvement priorities, such as application responsiveness and feature availability, to meet user expectations effectively [7].

This study evaluates the Whoosh application's user experience in the ticket booking process, identifying key issues in its functionality and interface. Using CSI analysis combined with qualitative insights from user reviews and quantitative data from app ratings, the findings offer recommendations for design improvements. These include enhancements such as simplifying navigation, improving register and login processes, and adding support features like a help center. While specific designs are not included, the recommendations aim to provide actionable guidance for improving user satisfaction and supporting the broader adoption of high-speed rail services in Indonesia.

II. LITERATURE REVIEW

The Jakarta-Bandung High-Speed Rail spans 142.3 kilometers and connects four stations, marking a significant milestone as the first high-speed rail in Southeast Asia. By integrating internet and mobile technologies, the Whoosh application provides essential ticketing functionalities, including booking, changes, and refunds, while also enabling features like electronic payments. These innovations aim to enhance service efficiency, reduce costs, and improve customer satisfaction by providing seamless, user-friendly ticketing solutions [4]. This aligns with the broader characteristics of online ticket booking systems, which leverage digital technology to streamline processes from transactions to post-booking services. Such systems eliminate the need for physical tickets, offering greater flexibility for users to manage schedules, book tickets, and access real-time travel updates from remote locations. Their increasing popularity is driven by features such as seat selection, digital payments, and ease of access, making them indispensable for modern transportation [8].

User Experience (UX) refers to the overall experience perceived by users when interacting with a product or system, including digital applications. UX encompasses various aspects, such as usability, comfort, efficiency, and user satisfaction in achieving specific goals. Effective UX design aims to minimize barriers in user interactions with the interface, thereby enhancing efficiency and user satisfaction. For instance, research on the SteamOS operating system demonstrated that good usability, including interface element visibility and design consistency, can meet users' needs and expectations [9].

A study on the RedBus application, a popular mobile platform for bus ticket booking, emphasizes the significance of improving User Experience (UX) to enhance customer satisfaction. The redesign of the RedBus app, guided by the Design Thinking method, resulted in a 44% increase in effectiveness, a 63% improvement in user satisfaction, and a more intuitive interface. This highlights the critical role of UX in increasing user motivation and fostering continued app usage, with the findings offering valuable insights for enhancing mobile booking platforms [10]. Similarly, a study on online travel agent applications Traveloka and Tiket.com highlights the significance of UX in shaping user satisfaction. Using the User Experience Questionnaire (UEQ) method, six key aspects—attractiveness, efficiency, clarity, dependability, stimulation, and novelty—were evaluated. Results showed that Traveloka outperformed Tiket.com in efficiency and attractiveness, but both scored low on novelty, indicating room for innovation. These findings emphasize the importance of intuitive interfaces and enhanced user engagement to improve overall user experience [11]. Both studies underline the vital role of UX design in boosting user satisfaction and engagement, demonstrating the need for ongoing innovation and improvements in mobile application interfaces.

The Customer Satisfaction Index (CSI) is a method widely used to evaluate user satisfaction by comparing user expectations with the actual performance of a product or service across various dimensions. When it comes to mobile applications, CSI offers information on an application's overall quality, responsiveness, and usability, pointing out areas that require work to improve the user experience [7]. In the case study of the Indonesia Airports mobile application, CSI was employed to assess user satisfaction with key features such as navigation, reliability, and information accessibility. The analysis revealed critical issues, including unclear navigation and delays in system responsiveness, which negatively impacted user satisfaction. Based on these findings, recommendations were made to simplify navigation, improve system reliability, and ensure clearer communication within the application. These improvements are vital in meeting user expectations and ensuring a seamless and efficient booking process, which is directly relevant to applications in the transportation industry [7].

Additionally, a study analyzing the BSI Mobile Banking application found a CSI score of 0.8259, indicating very high customer satisfaction. The research evaluated service dimensions such as ease of use, web design, reliability, responsiveness, and privacy, emphasizing the need to address service gaps in critical areas like product information accessibility and operational availability. Maintaining high-performance attributes, such as responsiveness in customer assistance, was also highlighted. These insights underline the value of CSI in providing actionable recommendations to improve service quality and user satisfaction in digital applications [12].

In another study, [13] applied the CSI methodology to evaluate customer satisfaction with telemarketing call center services at PT XYZ. This research assessed satisfaction by analyzing responses from 1,722 participants who answered a structured survey regarding service quality. The study concluded with a CSI score of 81%, indicating that customers were highly satisfied with the quality of services provided. This example demonstrates the effectiveness of the CSI method in identifying service quality levels and offering insights for improvement.

The study on the benefits of online train ticket reservation apps using the Technology Acceptance Model (TAM) offers valuable insights into understanding how perceived ease of use (PEU) and perceived usefulness (PU) influence user satisfaction and the intention to adopt digital ticketing solutions [14]. These findings emphasize the importance of addressing user perceptions of ease of use and usefulness in enhancing customer satisfaction.

III. METHODS

This study employs both qualitative and quantitative approaches to evaluate user satisfaction with the Whoosh mobile app. The qualitative approach involves the analysis of user reviews from the Google Play Store and Apple App Store that focus on specific app features, including registration, login, ticket booking, and payment. Meanwhile, the quantitative approach utilizes user ratings as indicators of satisfaction to provide measurable insights into the app's performance. The methodology is structured into five primary stages, which are problem identification, literature review, data collection, data categorization and cleansing, data analysis, and design recommendations, as illustrated in figure 1 below.

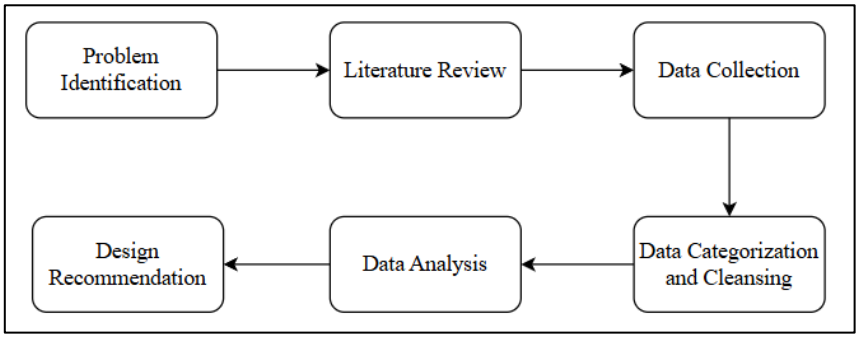

Fig. 1 Research Methodology

A. Problem Identification

This study identifies the need to evaluate user satisfaction with the Whoosh mobile app to understand its performance in meeting customer expectations. The research focuses on assessing the effectiveness of the app in providing a seamless booking experience, which is crucial for the continued adoption of high-speed rail services. By using the Customer Satisfaction Index (CSI) methodology, this study aims to highlight areas for improvement and contribute to enhancing the overall user experience.

B. Literature Review

In this phase, relevant information is gathered from various sources, including journals, books, and other scholarly references related to the research topic. The literature review aims to explore existing studies and theories on user experience (UX) and customer satisfaction in mobile applications, particularly in the context of transportation services. After collecting this information, the key issues and gaps in the current knowledge are identified, which help define the research objectives and scope, as well as set clear boundaries for the study.

C. Data Collection

User review data were collected from the Google Play Store and Apple App Store using Python on the Google Colab platform. The data covers a six-month period to ensure that the feedback is relevant and reflects recent user experiences.

Python was selected due to its flexibility and extensive libraries for web scraping, such as google-play-scraper and app-store-scraper. These libraries facilitate the extraction of structured data, such as user reviews, ratings, and timestamps, directly from app store platforms. Web scraping is widely recognized as an efficient method for converting unstructured web data into structured datasets, enabling a faster and more accurate analysis compared to manual methods. By leveraging Python's capabilities, this study ensured that the data collected was comprehensive and ready for further processing [15] [16].

D. Data Categorization and Cleansing

After the data was collected, the reviews were categorized into four primary functionalities, which are registration, login, booking, and payment. This categorization was based on the core functionalities of the booking process and was identified by analyzing keywords within the user reviews. An additional category labeled "Others" was initially created to include reviews that did not directly align with these core functionalities. During the data cleansing stage, the "Others" category was removed to ensure the dataset remained focused and relevant, leaving only reviews that corresponded to the core functionalities for further analysis.

E. Data Analysis

The data analysis employed the Customer Satisfaction Index (CSI) methodology to measure user satisfaction quantitatively. The data analysis utilized the Customer Satisfaction Index (CSI) methodology to quantitatively assess user satisfaction with the Whoosh application. Evaluating customer satisfaction is essential to determining how effectively a system or application meets user expectations. By incorporating the importance of specific product attributes, the CSI methodology provides a systematic approach to measuring overall customer happiness. This framework not only quantifies satisfaction levels but also helps identify key areas for improvement, ensuring that enhancements are aligned with user needs and priorities.

TABLE 1
CSI STRUCTURE

Attribute	Importance (I)	Satisfaction (P)	Score (S)
	Scale 1-5	Scale 1-5	(S) = (I) X (P)
Total Score	Total (I) = Y		Total (S) = T

Table 1 illustrates the structure of the Customer Satisfaction Index (CSI) method. The calculation begins by averaging the values in the importance column (I) to derive the total importance value, Y. Next, the values in the score column (S), obtained by multiplying importance (I) and satisfaction (P), are used to determine the total score, T. These values are then applied to formula 1 below to define the CSI, which is calculated as 100% multiplied by the ratio of T to 5Y. The value of 5 in 5Y represents the maximum scale value [11].

$$\text{CSI} = \frac{T}{5(Y)} \text{ x } 100\% \quad (1)$$

Explanation:

T: The total score for user satisfaction
Y: The total value of the importance.
5: The maximum value on the Likert scale (1 to 5).
CSI: Customer Satisfaction Index, expressed as a percentage (%).

Once the CSI value is calculated, the level of customer satisfaction can be determined. The evaluation criteria are based on visitor satisfaction survey guidelines, which classify satisfaction into specific levels as shown in Table 2 below [11].

TABLE 2
TABLE OF SATISFACTION LEVEL CRITERIA

No	CSI Score (%)	Satisfaction Level
1	81% - 100%	Very Satisfied
2	66% - 80.99%	Satisfied
3	51% - 65.99%	Neutral
4	35% - 50.99%	Dissatisfied
5	0% - 34.99%	Very Dissatisfied

These levels provide a clear framework for interpreting the CSI score, enabling the identification of areas requiring improvement to enhance customer satisfaction effectively.

F. Design Recommendation

In the final stage of the research methodology, actionable recommendations are provided based on the analysis of user satisfaction and usability issues identified during the data analysis phase. These recommendations aim to enhance the user experience (UX) by addressing the key pain points observed in the Whoosh mobile application. The goal of this stage is to offer practical guidance for developers to improve the app's interface and functionality, ultimately increasing user satisfaction and promoting wider adoption of the high-speed rail service.

IV. RESULTS

A. Data Collection

In this study, data collection focused on gathering user reviews related to the Whoosh mobile app from two major platforms, specifically the Google Play Store and the Apple App Store. These platforms provide a rich source of user feedback, which is essential for analyzing customer satisfaction and identifying pain points in the app's functionality. The data was collected using the Python programming language on the Google Colab platform. Google Colab is a powerful cloud-based tool that allows users to write and execute Python code in an interactive environment. Python is particularly suitable for web scraping tasks, and in this case, it was used to extract user reviews from the Google Play Store and Apple App Store. Below are the detailed steps taken to collect the necessary data for this study:

1. Setting up the environment
   To begin, the necessary Python libraries were installed within the Google Colab environment. Specifically, google-play-scraper and app_store_scraper were used for extracting user reviews from the respective app stores. Google-play-scraper allows for efficient retrieval of app reviews from the Google Play Store, while app_store_scraper is a Python library designed for scraping app reviews from the Apple App Store. Additionally, pandas was used to structure and manipulate the collected data into a DataFrame for easy analysis.
2. Importing the libraries
   After the libraries were successfully installed, they were imported into the Colab environment for use. Google-play-scraper was used to gather reviews from the Google Play Store, while app_store_scraper was employed to extract reviews from the Apple App Store. Pandas was used to organize the reviews into a tabular format, which facilitated further processing and analysis.
3. Scraping data from Google Play Store
   The google-play-scraper library was employed to retrieve user reviews for the Whoosh app from the Google Play Store. By specifying the app's package name, the library was able to scrape the latest reviews based on criteria such as language and country. The reviews were collected systematically, and relevant data, such as user ratings and review text, were extracted. These reviews were then structured into a pandas DataFrame for easy access and subsequent analysis.
4. Scraping data from the Apple App Store
   For the Apple App Store, app_store_scraper was used to retrieve the reviews for the Whoosh app. This library allows scraping of the app store page for the specified app, extracting reviews, ratings, and other relevant details. The reviews were retrieved in real time, and the collected data was stored in a pandas DataFrame for further processing.
5. Data Storage and Exporting
   After the reviews were collected, they were stored in CSV format for further analysis. The reviews from the Google Play Store and Apple App Store were saved in separate CSV files using pandas. This organization allowed for easy access to the data, which could later be cleaned, categorized, and analyzed.
6. Data Integration
   After exporting the data, the reviews from the Google Play Store and Apple App Store were combined into a single file using Microsoft Excel. A new column, source, was added to distinguish the origin of each review, with values of either "Google Play Store" or "Apple App Store". This integration step facilitated the creation of a unified dataset, which was essential for comprehensive analysis.

Example data collected is shown in Table 3 below. The data consists of several key columns, including user_name, date, rating, review, and source, which represent user reviews of the Whoosh app from both the Google Play Store and the Apple App Store. A total of 248 reviews were collected, comprising 89 reviews from the Apple App Store and 159 reviews from the Google Play Store.

TABLE 3
SAMPLE DATA COLLECTED FROM USER REVIEWS

user_name	date	rating	review	source
Sutan Akbar	9/16/2024 20:53	1	Jelek banget ini Aplikasi, udah 3x bolak balik naik woosh pake email dan nomor whatsapp yg sama pas donlot aplikasi gagal terus registrasi / login nya.. Muter2 aja terus kesitu..	google play store
Nazwin	9/16/2024 2:34	1	Aplikasi jelek, selalu lag	google play store
zkyyh	5/10/2024	1	Udah ada yang review ga bisa login dan ga dibenerin juga? Gimana sih bikin sistemnya?	app store
Whoosutang	8/14/2024	1	udah masukin username dan pw eh klik loginnya gabisa di pencet2, yah maklum apps pemerintah	app store

B. Data Categorization and Cleansing

After data collection and integration, the next step involved categorizing and cleansing the reviews to organize the data for further analysis. Categorization was performed using Python in the Google Colab platform, where each review was assigned to a specific category based on the presence of relevant keywords in the review column. The categories and their associated keywords are as follows:

1. Login: Login, masuk, password, log
2. Registration: Registrasi, daftar, pendaftaran, akun, create, account, register, verification, verifikasi
3. Booking: Pemesanan, booking, reservasi, order, ticket, pesan, pilih
4. Payment: Pembayaran, bayar, payment, transaksi, invoice
5. Other: Reviews that do not match any of the above categories

Using this categorization approach, the reviews were systematically grouped, focusing on core functionalities of the Whoosh app. Based on this process, a total of 126 reviews were categorized under Login, indicating that this was the most frequently mentioned functionality. This was followed by Registration, with 35 reviews, and Other, which included 69 reviews that did not directly relate to the app's core features. Reviews about Booking and Payment were less common, with 15 and 3 reviews respectively. The distribution of reviews across categories is illustrated in Figure 2, which presents a bar chart showing the number of reviews for each category.

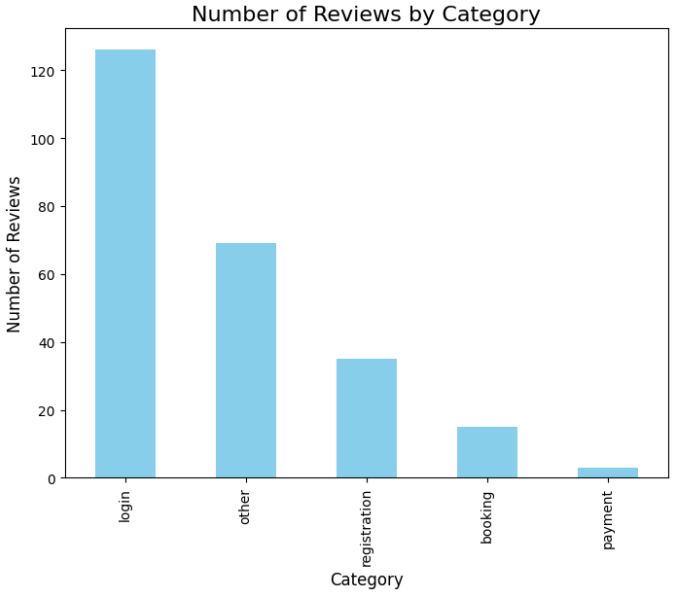

Fig. 2 Distribution of User Reviews Across Categories

After categorization, the next step was data cleansing to ensure that the dataset was focused and relevant for analysis. During this stage, reviews categorized as Other were excluded, as they did not relate to the ticket booking process feature. This process reduced the dataset from the original 248 reviews to a refined dataset of 179 reviews.

The cleansed dataset retained reviews categorized under Login, Registration, Booking, and Payment, as these categories were directly associated with the ticket booking process. Example data from the cleansed dataset can be seen in Table 4 below.

TABLE 4
EXAMPLE DATA FROM THE CLEANSED DATASET

user_name	date	rating	review	source	category
nadmagdalena	6/24/2024	1	Kapan mau dibenerinnya ya apps ini?. Sebagai pengguna iphone susah sekali untuk login di apps whoosh ini. Sejak whoosh ada hingga hari ini, ya begini aja gak ada perubahan apps nya.	app store	login
Hadi 0509	9/5/2024 15:39	1	Can't even create or register an account, at all. SO WEIRD AND IDIOT app, for one of a strategic national program.	google play store	registration
Adithya Rachman	4/14/2024 4:14	1	Apps aneh...beli online di apps ini...pilih di jendela..dapet di gang...	google play store	booking
setia sianturi	6/2/2024 1:12	1	ga ada struk pembayaran	google play store	payment

C. Data Analysis

The data analysis utilized the Customer Satisfaction Index (CSI) methodology to quantitatively assess user satisfaction with the Whoosh application. CSI serves as an effective tool to measure satisfaction by comparing user expectations with actual application performance across various dimensions.

Table 1 above provides the structure of the CSI method, which calculates satisfaction based on importance (I) and satisfaction scores (P). In this study, importance values were assigned equally across all categories—registration, login, booking, and payment—due to their critical role in completing a booking. Satisfaction scores were derived as the average rating from user reviews collected on the Google Play Store and Apple App Store. The values from the CSI structure variables are input into Table 5 to enable the calculation of the CSI score.

TABLE 5
CALCULATION OF (CSI) VALUES FOR THE WHOOSH APPLICATION

Attribute	Importance (I)	Satisfaction (P)	Total Score (S = I x P)
Registration	5	1.20	6.00
Login	5	1.10	5.50
Booking	5	1.67	8.35
Payment	5	1.00	5.00
Total	20		24.85

The CSI was then calculated using formula 1 above, resulting in the following calculation:

$$\text{CSI} = \left(\frac{24.85}{5 \text{ x } 20}\right) \text{x } 100\% = \frac{24.85}{100} \text{ x } 100\% = 24.85\%$$

With a CSI of 24.85%, the results indicate that user not satisfied with the app, reflecting significant challenges in the application's user experience. These findings underline the need for targeted improvements to enhance the overall usability and satisfaction of the Whoosh application.

V. DISCUSSION

The results of the Customer Satisfaction Index (CSI) testing reveal a score of 24.85%, indicating significant user dissatisfaction with the Whoosh application. This low score highlights critical issues in all key functionalities, including registration, login, booking, and payment. Addressing these pain points requires focused improvements to enhance the user experience and overall satisfaction with the application.

Issues with the login and registration functionalities include verification failures, poorly organized input fields, and limited options for users to access or create their accounts. To address these, we recommend implementing one-tap login options, such as Google, Facebook, and Apple ID. One-tap login enables users to authenticate quickly and securely with minimal effort, leveraging their existing credentials from third-party platforms. This feature enhances accessibility and significantly reduces the barriers associated with traditional login and registration methods. Additionally, integrating a Help Center feature on both the login and registration screens ensures users encountering difficulties can access immediate support, minimizing frustration and improving the overall user experience.

The registration process should also be redesigned with a clearer structure, organizing data input into sections such as personal information, contact information, and other relevant details. Improved visual hierarchy, enhanced color contrast, and intuitive iconography can further simplify these processes, making them more user-friendly and accessible.

Users reported difficulties navigating the booking process, including unclear steps and insufficient guidance. To address this, we recommend adding a progress tracker to clarify each stage of the booking process and providing clear error feedback for incomplete fields. Additionally, enhanced carriage selection visibility should be implemented by using a visually distinct layout that clearly marks available and occupied seats, with color-coded indicators and interactive previews. These improvements aim to make the booking process more intuitive, reducing confusion and enhancing user satisfaction.

The payment page can be improved by adding a Help Center button, offering users immediate assistance if they encounter any issues during payment. Additionally, once the payment is successfully verified, the inclusion of a 'Send Receipt' button ensures that users can receive confirmation of their transaction via email or other preferred methods, enhancing clarity and providing a sense of security. These improvements aim to address common issues users face during the payment process and improve overall satisfaction.

VI. CONCLUSIONS

This study reveals significant user dissatisfaction with the Whoosh mobile app, primarily due to issues with the registration/login process, unclear navigation during booking, the absence of a Help Center feature across all key functionalities, and users are unable to obtain payment receipts. Based on these findings, we propose actionable recommendations to improve the user experience, including simplifying the registration/login steps, improving navigation, adding a Help Center feature throughout the app, and implementing a 'Send Receipt' button once a payment is successfully completed. These changes are expected to enhance usability, increase user satisfaction, and encourage greater adoption of the Whoosh app.

The recommendations provided in this study can serve as a foundation for further design improvements. It is recommended that the Whoosh app developers implement these changes, starting with the development of prototypes to test these modifications. User testing should follow to assess the effectiveness of the proposed improvements. Furthermore, ongoing monitoring and iterative updates based on user feedback will be essential to continuously enhance the app's performance. Future research could evaluate the long-term impact of these updates on user satisfaction and app performance, helping to refine user experience strategies for high-speed rail booking systems.

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