TABLE II. EXTRACTED UI/UX ISSUES

Problem Category	Problem	User Context	Source
Accessibility	Content is difficult to perceive visually due to low contrast, fixed or small text size.	Low Vision Users, Color Blind Users, Elderly	(Nour, 2022), (Alayed, 2025), (Naeem et al., 2022)
Accessibility	Difficult and inefficient navigation for assistive technology users.	Screen Reader Users	(Nour, 2022), (Alayed, 2025)
Accessibility	Interface elements are not clearly identified or labeled for screen readers.	Screen Reader Users	(Nour, 2022), (Alayed, 2025), (Nadela and Yulianti, 2022)
Accessibility	Difficulty understanding basic interactions and gestures.	Elderly, Screen Reader Users	(Barber et al., 2025), (Kurnia Ningrum et al., 2023)
Accessibility	Usability issues with biometric (fingerprint) authentication.	Elderly	(Barber et al., 2025)
Accessibility	Difficult face verification process.	Screen Reader Users, Low Vision Users	(Kurnia Ningrum et al., 2023)
Accessibility	Existing digital banking applications have too many unnecessary images and cannot be read well by a screen reader.	Screen Reader Users	(Nadela and Yulianti, 2022)
Accessibility	Most inspected banking applications fail to meet crucial accessibility design considerations for users with low literacy.	Low Literacy Users	(Melo et al., 2024)
Accessibility	Voice-based interaction features are largely absent or not properly functional.	Low Literacy Users, Low Vision Users, People with Motor Impairments	(Melo et al., 2024), (Naeem et al., 2022)
Accessibility	Mobile banking applications are often too complex and do not support local languages.	General, Elderly, Low Literacy Users	(Shridhar et al., 2025), (Naeem et al., 2022), (Wahab et al., 2021)
Accessibility	Complex user interfaces (UI) and poor design pose challenges for the elderly.	Elderly	(Saha and Chavan, 2025)
Accessibility	Users are confused by technical terms such as "digital signature," "verification," and "authentication."	General, Low Literacy Users	(Darwaish and Qadir, 2022), (Mohammed et al., 2023)
Accessibility	Textual interfaces are not easily understood, especially by elderly and low-literacy users.	Elderly, Low Literacy Users	(Wahab et al., 2021), (Ubam et al., 2021)
Information Architecture & Navigation	Navigation dead ends.	Elderly	(Isa et al., 2022)
Performance & Reliability	Concerns about application stability, such as software errors, system errors, and connectivity problems.	Elderly	(Maguire, 2024)
Performance & Reliability	Slow performance, poor responsiveness, and large application size.	General	(Nour, 2022), (Orehovački et al., 2022), (Naeem et al., 2022)
Performance & Reliability	Bugs, functionality issues, and critical failures, often occurring after updates.	General	(Edwina & Mauritsius, 2024), (Alhejji et al., 2022)
Performance & Reliability	Transaction failures.	General	(Edwina & Mauritsius, 2024)
Performance & Reliability	Complaints about the application being slow to respond and experiencing login issues.	General	(Andrian et al., 2022)
Performance & Reliability	The quality and functionality of the application on the Android platform are significantly worse compared to the iOS version.	General	(Palos-Sanchez et al., 2025)
Performance & Reliability	Slow fund transfer times that are often inconsistent with the estimated time.	General	(Palos-Sanchez et al., 2025)
Performance & Reliability	The verification process during registration frequently fails.	General	(Karmagatri et al, 2023)
Performance & Reliability	Unstable and unreliable infrastructure causes users to experience difficulties in accessing banking services.	General	(Karmagatri et al, 2023)
Performance & Reliability	Poor system performance makes banking activities impractical and prone to errors or system failures.	General	(Karmagatri et al, 2023)
Trust & Security	Excessive and irrelevant permission requests.	General	(Haggag et al., 2025)
Trust & Security	Non-transparent privacy policy and permission explanations.	General	(Haggag et al., 2025)
Trust & Security	Application is incompatible with VPNs.	General	(Haggag et al., 2025)
Trust & Security	Sensitive information is exposed during app switching.	General	(Haggag et al., 2025)
Trust & Security	Insecure password policies.	General	(Haggag et al., 2025)
Trust & Security	Lack of real-time fraud alert notifications.	General	(Haggag et al., 2025)
Trust & Security	Traditional authentication methods such as passwords and email verification are considered problematic.	General	(Banga and Pillai, 2021)
Trust & Security	The lack of "security tips" within the mobile banking interface leads to a perception of it being less secure.	Elderly	(Maguire, 2024)
Usability	Digital banking applications are considered technologically complex, with difficult interfaces, confusing navigation, long transaction flows, and overwhelming options.	Elderly, General, Screen Reader Users, Low Literacy Users	(Isa et al., 2022), (Jena, 2023), (Naeem et al., 2022), (Wahab et al., 2021), (Ubam et al., 2021)
Usability	Anxiety and fear of making mistakes due to insufficient error recovery and a lack of prevention mechanisms.	Elderly, General	(Jena, 2023), (Jin and Fan, 2022), (Han and Ko, 2025)
Usability	The process for starting video customer service is fragmented and inefficient.	General	(Hsiao & Tang, 2024)
Usability	Difficult interaction on mobile view due to small touch targets and non-responsive content.	General, Elderly	(Nour, 2022)

TABLE II. EXTRACTED UI/UX ISSUES

Problem Category	Problem	User Context	Source
Usability	Absence of essential usability features, or features are hard to find.	General	(Nour, 2022), (Hentati and Jallouli, 2025), (Jin and Fan, 2022), (Nadela and Yulianti, 2022)
Usability	All-or-nothing' permission control.	General	(Haggag et al., 2025)
Usability	Cognitive barriers such as diminished memory, leading to high memory load.	Elderly	(Jin and Fan, 2022)
Usability	Inconsistent design and terminology across the application.	General, Elderly	(Zhu et al., 2022), (Isa et al., 2022)
Usability	Login and authentication system failures.	General	(Edwina & Mauritsius, 2024)
Usability	Disruption and difficulty keeping up due to frequent application updates.	General, Elderly	(Edwina & Mauritsius, 2024), (Anwar et al., 2024), (Orehovački et al., 2022)
Usability	Feeling unable to use the application independently or find solutions to problems.	Elderly	(Jena, 2023)
Usability	Existing applications have too many steps to perform a simple transaction.	General	(Nadela and Yulianti, 2022)
Usability	Inadequate feedback and navigation guidance in user interfaces can lead to user anxiety.	General	(Huang et al., 2024)
Usability	The customer service function in the application is inaccurate and inefficient.	General	(Zhu et al., 2022)
Usability	The application lacks features related to the personalization of services.	General	(Orehovački et al., 2022)
Usability	The registration and activation process is suboptimal, requiring offline visits and external browsers.	General	(Pratama and Novani, 2021)
Usability	Users experience significant difficulties in logging in, especially after a long time of inactivity.	General	(Darwaish and Qadir, 2022)
Usability	The process of unlinking a device from a bank account is considered complicated by users.	General	(Andrian et al., 2022)
Usability	Users experience technical issues when logging in or transacting, and face restrictive policies.	General	(Palos-Sanchez et al., 2025)
Usability	The absence of important support features like a chat function and difficulty finding contact information.	General	(Palos-Sanchez et al., 2025)
Usability	The account setup process is slow, frequently crashes, and gets stuck during identity verification.	General	(Palos-Sanchez et al., 2025)
Usability	The initial account verification process is slow.	General	(Palos-Sanchez et al., 2025)
Usability	The registration process is considered impractical and complicated.	General	(Karmagatri et al, 2023)
Usability	Users often experience difficulties during the account login process.	General	(Karmagatri et al, 2023)
Usability	Application updates are a source of user complaints, particularly because they often require users to log in again.	General	(Karmagatri et al, 2023)
Usability	Users have difficulty understanding the tasks and actions required to complete a desired activity.	General	(Wahab et al., 2021)
Usability	The task of transferring funds between accounts is significantly more difficult for specific user groups.	Low Literacy Users, Elderly	(Mohammed et al., 2023), (Ubam et al., 2021)
Usability	Low-literacy users have difficulties understanding fundamental interface elements like hierarchical structures, soft keys, and scroll bars.	Low Literacy Users	(Mohammed et al., 2023)
Usability	The application lacks a live chat feature for direct communication with customer service.	General	(Elysa et al., 2023)
Usability	The application does not provide functionality for users to download their transaction history.	General	(Elysa et al., 2023)
Visual Design & Content	Inadequate or unclear information presentation.	Elderly, General	(Maguire, 2024), (Isa et al., 2022)
Visual Design & Content	Privacy policy is difficult to read and understand.	General	(Haggag et al., 2025)
Visual Design & Content	Ambiguous affordance of interface elements.	Elderly	(Jin and Fan, 2022)
Visual Design & Content	The difference between mobile and desktop devices has a major impact on application development and can hinder user experience.	General	(Banga and Pillai, 2021)
Visual Design & Content	Users tend to ignore long descriptive texts in step indicators.	General	(Huang et al., 2024)
Visual Design & Content	The display of ad banners at the bottom of the application is perceived as spam and disrupts the user experience.	General	(Palos-Sanchez et al., 2025)
Visual Design & Content	Information displayed in the mobile banking app is considered insufficient and not detailed enough compared to the online banking (desktop) version.	Elderly	(Maguire, 2024)
Visual Design & Content	The small screen size of mobile phones hinders clear information visibility for elderly users.	Elderly	(Maguire, 2024)
Visual Design & Content	The amount of information displayed in online banking (desktop) is considered overwhelming (information overload) by some elderly users.	Elderly	(Maguire, 2024)
Visual Design & Content	Text-heavy user interfaces (UIs) are perceived as daunting and are often avoided by low-literacy users.	Low Literacy Users	(Mohammed et al., 2023)

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Problem Category	Problem	User Context	Source
Visual Design & Content	The application is considered uninspired, monotonous, and conventional.	General	(Elysa et al., 2023)

TABLE III. EXTRACTED SOLUTION / RECOMMENDATION

Solution Category	Proposed Solution	Addressed Problem	How	Proven	Source
Accessibility Enhancement	Avoid the use of face verification.	Difficult face verification process.	Do not use facial recognition as a method for verification.	Yes	(Kurnia Ningrum et al., 2023)
Accessibility Enhancement	Avoid the use of swipe gestures.	Use of inaccessible swipe gestures.	Design interfaces that do not rely on swipe gestures for core functionality.	Yes	(Kurnia Ningrum et al., 2023)
Accessibility Enhancement	Implement a Voice User Interface (VUI) to simplify interaction.	Difficulty with visual interfaces; long processes.	Allows users to give voice commands to execute key features, reducing manual navigation.	Yes	(Nadela and Yulianti, 2022)
Accessibility Enhancement	Increase the text size throughout the application.	Text is difficult to read.		No	(Hentati and Jallouli, 2025)
Accessibility Enhancement	Integrate a voice assistant with a low words-per-minute (WPM) rate to improve audibility and comprehension for elderly users.	Difficulty for older adults in understanding voice assistants that speak too quickly.	By adjusting the text-to-speech engine to a slower, more deliberate pace.	No	(Panda and Law, 2024)
Accessibility Enhancement	Provide accessible, flexible, and user-friendly authentication methods, such as biometrics.	Inconvenient OTP methods; Complex passwords.	Offer simpler options like biometrics (fingerprint/face recognition).	No	(Anwar et al., 2024), (Isa et al., 2022)
Accessibility Enhancement	Provide an option to bypass repetitive content.	Difficult and inefficient navigation for assistive technology users.	Provide a link or mechanism to skip blocks of repeated content.	No	(Alayed, 2025)
Accessibility Enhancement	Provide in-app font size control.	Content is difficult to perceive visually.	Allow users to change the text size directly from the application's settings.	No	(Alayed, 2025)
Accessibility Enhancement	Provide more options for users to adjust the app (e.g., text size & color) to their visual requirements.	Text is unreadable for users with low vision.	By giving users in-app controls to customize display settings.	No	(Naeem et al., 2022)
Accessibility Enhancement	Provide non-visual interaction options such as voice commands for users with disabilities.	Difficulty interacting for users with physical impairments.	By implementing voice-based option selection and audio formats.	No	(Naeem et al., 2022)
Accessibility Enhancement	Provide options to translate in-app text into local languages.	Application is difficult to understand for non-English speakers.		No	(Naeem et al., 2022)
Accessibility Enhancement	Provide simplified and accessible technology features, such as voice assistants.	Physical and cognitive barriers due to aging.	Implement features like larger text, simplified interfaces, voice-activated commands.	No	(Jin and Fan, 2022)
Accessibility Enhancement	To design a senior-friendly interface by using large buttons, a simple background, and large, bold text.	Visual and interaction difficulties for elderly users.		No	(Ubam et al., 2021)
Accessibility Enhancement	Use large font sizes to improve legibility for elderly users.	Poor legibility of small text.		No	(Panda and Law, 2024)
Accessibility Enhancement	Use multi-modal (audio) feedback for confirmation.	Unnoticed critical input errors.	After a user types an amount, the system provides audio feedback to confirm the value.	No	(Barber et al., 2025)
Design & Research Methodology	Improve service quality by considering recommendations from disability experts and elderly users.	App design is not supportive for disabled and elderly users.	By involving experts and target users in the development cycle.	No	(Naeem et al., 2022)
Design & Research Methodology	Integrate age-friendly design elements.	Usability barriers for older adults.	By applying design principles focused on visual clarity, ease of interaction, and error prevention.	No	(Han and Ko, 2025)
Design & Research Methodology	Involve users with disabilities in the design and testing process.	Basic accessibility issues in final products.	Conduct testing with users with disabilities from the early design phase.	No	(Alayed, 2025)
Design & Research Methodology	To conduct regular innovative updates to the application to overcome the impression of being monotonous.	Application is considered uninspired and monotonous.	By refreshing the appearance or adding new features periodically.	No	(Elysa et al., 2023)
Design & Research Methodology	To design a mobile interface that is easy to operate and facilitates navigation, especially for elderly users.	Difficulty with navigation for elderly users.		No	(Wahab et al., 2021)
Design & Research Methodology	To design an interface that accommodates different user preferences (e.g., animation vs. content-based).	Different preferences among age groups.	By incorporating both animated styles and content-focused styles.	No	(Wahab et al., 2021)
Design & Research Methodology	Use a specific set of "Design and Evaluation Considerations" as a heuristic guide.	Lack of accessibility for low literacy users.	By applying 33 specific considerations covering visual and audio data input/output.	No	(Melo et al., 2024)
Design & Research Methodology	Using Machine Learning to simplify UI design and provide multilingual support.	Complex interface and language barriers.	ML can be used to improve UI design and interpret data instantly for multilingual support.	No	(Shridhar et al., 2025)
Performance & Reliability Optimization	Ensure system stability through rigorous pre-release testing of updates.	Critical issues after application updates.	Thoroughly examine and test new updates to ensure they are free from errors.	No	(Edwina & Mauritsius, 2024), (Alhejji et al., 2022)
Trust & Security Fortification	Implement an AI-based financial assistant with real-time voice alerts for fraud.	Elderly ignoring passive text/visual alerts.	An assistant actively warns the user with voice if a transaction is identified as potential fraud.	No	(Saha and Chavan, 2025)
Trust & Security Fortification	Implement secure and usable biometric authentication.	Memorability issues (passwords) and security.		No	(Darwaish and Qadir, 2022)
Trust & Security Fortification	Integrate a remote assistance feature from a trusted person.	Reducing perceived risks for elderly users.	The system allows a helper to provide guidance without seeing sensitive financial details.	Yes	(Maguire, 2024)
Trust & Security Fortification	Limit the number of requested permissions.	Excessive and irrelevant permission requests.	Review and limit permissions to only what is mandatory for app functionality.	No	(Haggag et al., 2025)
Trust & Security Fortification	Provide a restricted view for proxy accounts.	Balancing the need for assistance with privacy.	The proxy can view information to provide guidance, but transaction features are disabled.	No	(Barber et al., 2025)
Trust & Security Fortification	Provide clear, contextual permission explanations.	Non-transparent permission explanations.	Display brief, easy-to-understand explanations directly within the app when a permission is requested.	No	(Haggag et al., 2025)
Trust & Security Fortification	Provide clearer information about risks and support.	Increasing user confidence.		No	(Maguire, 2024)
Trust & Security Fortification	Provide proxy accounts with an approval workflow.	Unsafe credential sharing practices.	A helper prepares a transaction in a proxy portal, and the older adult gives final approval.	No	(Barber et al., 2025)
Trust & Security Fortification	Use behavioral biometrics for continuous authentication.	Traditional authentication methods are problematic.	The system runs invisibly in the background, analyzing user patterns to continuously verify identity.	No	(Banga and Pillai, 2021)

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Solution Category	Proposed Solution	Addressed Problem	How	Proven	Source
Usability Improvement	Combine multi-screen instructions into a single interface.	Fragmented and inefficient user flows.	Consolidate instructions from multiple screens into one to streamline a process.	Yes	(Hsiao & Tang, 2024)
Usability Improvement	Communicate application updates clearly.	Difficulty keeping up with constant updates.	Provide clear explanations about what is new in an update.	No	(Anwar et al., 2024)
Usability Improvement	Implement a live chat function.	Lack of effective in-app customer support.	Enable a real-time chat feature within the app for direct interaction.	No	(Alhejji et al., 2022)
Usability Improvement	Implement principles of responsive and touch-friendly design.	Difficult interaction on mobile view.	Use scalable elements and design buttons with adequate size and spacing.	No	(Nour, 2022)
Usability Improvement	Integrate identity verification via video call directly within the application.	Verification process requires visiting a bank branch.		No	(Pratama and Novani, 2021)
Usability Improvement	Offer alternative functions if a permission is denied.	Loss of functionality when users deny permission.	If a user denies location access for ATMs, show a general map where they can search manually.	No	(Haggag et al., 2025)
Usability Improvement	Provide a 'Senior Mode' in the application.	Complex interfaces for older adults.	Offer a simplified version of the application that includes only essential features.	No	(Anwar et al., 2024)
Usability Improvement	Provide in-app interactive training.	Lack of user confidence and understanding.	Provide short tutorial videos or a training mode.	No	(Barber et al., 2025)
Usability Improvement	Provide opt-in permission options.	All-or-nothing' permission control.	Allow the app to function without non-essential permissions, giving users a choice.	No	(Haggag et al., 2025)
Usability Improvement	Provide step-by-step walkthroughs for complex tasks.	Users getting lost during multi-step transactions.	The interface displays a progress indicator showing the user which step they are on.	No	(Barber et al., 2025)
Usability Improvement	Reduce manual input by using technology such as OCR.	High manual input burden.	Use features such as optical character recognition (OCR) to scan information.	No	(Zhu et al., 2022)
Usability Improvement	Simplify the homepage and overall interface.	Technologically complex and overwhelming interfaces.	Group features, use simple language, and reduce visual elements per screen.	No	(Hentati and Jallouli, 2025), (Jin and Fan, 2022)
Usability Improvement	Simplify the transaction flow.	Transaction flow is too long and complicated.	Provide a shorter, more direct path for users to achieve their transactional goals.	Yes	(Kurnia Ningrum et al., 2023)
Usability Improvement	To add a live chat feature directly within the application.	Limited channels to contact customer service.	By placing a 'chat us' icon on the home page leading to a chat room.	No	(Elysa et al., 2023)
Usability Improvement	To add functionality that allows users to download their transaction history.	Inability for users to save or export their transaction records.	By providing a 'Download' button on the transaction history page.	No	(Elysa et al., 2023)
Usability Improvement	Use a multi-layered interface design.	Difficulty in learning and using the application.	Provide a simplified interface for initial learning, and then progressively increase complexity.	No	(Jin and Fan, 2022)
Usability Improvement	Use a step indicator in processes with more than three stages.	User anxiety due to uncertainty in multi-step processes.	Display a visual representation showing the total number of steps, the current step, and remaining steps.	No	(Huang et al., 2024)
Usability Improvement	Use AI to provide hyper-personalized and contextual responses.	Lack of personalization.	By analyzing user data in real-time with ML and using NLP to generate precise responses.	Yes	(Rajasekaran and Selvam, 2025)
Usability Improvement	Use one-time permissions for specific cases.	User concern about continuous app access.	Query the user for permission each time a feature is used instead of asking for permanent access.	No	(Haggag et al., 2025)
Usability Improvement	When a system error occurs, the chatbot should provide a "system apology" to reassure the user.	User anxiety from system errors.	The chatbot detects a system-side error and displays a message taking responsibility.	No	(Panda and Law, 2024)
Visual Design & Content Refinement	Review the button design strategy to ensure they are clear and not too small.	Difficulty in navigation due to small or unclear touch targets.		No	(Hentati and Jallouli, 2025)
Visual Design & Content Refinement	Simplify the text of privacy policies.	Privacy policy is difficult to read.	Reduce legal jargon and shorten the policy to make it more accessible.	Yes	(Haggag et al., 2025)
Visual Design & Content Refinement	Use a minimalist visual design or one that is similar to existing apps to improve comprehension and efficiency for older adults.	Potential confusion or cognitive overload from unfamiliar or overly complex visual designs.		No	(Panda and Law, 2024)
Visual Design & Content Refinement	Use familiar, labeled, and concrete icons.	Ambiguous affordance of interface elements.	Use icons that are meaningful, familiar, accompanied by text labels, and depict real-world objects.	No	(Jin and Fan, 2022)
Visual Design & Content Refinement	Use realistic contextual images.	Lack of professionalism and user trust.	Use AI to generate realistic images for illustrations, replacing generic icons.	Yes	(Hsiao & Tang, 2024)