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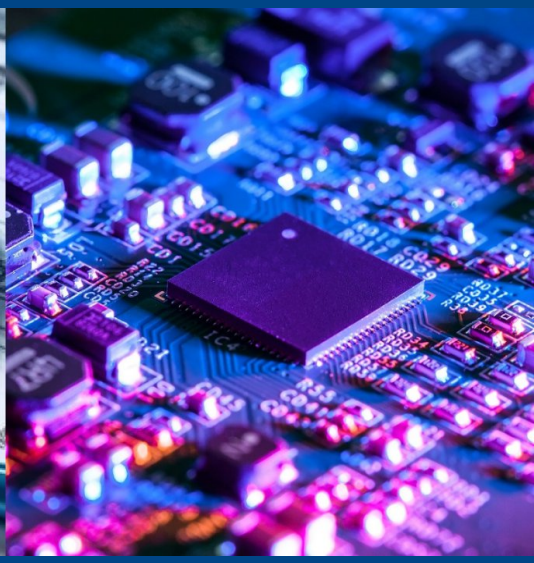

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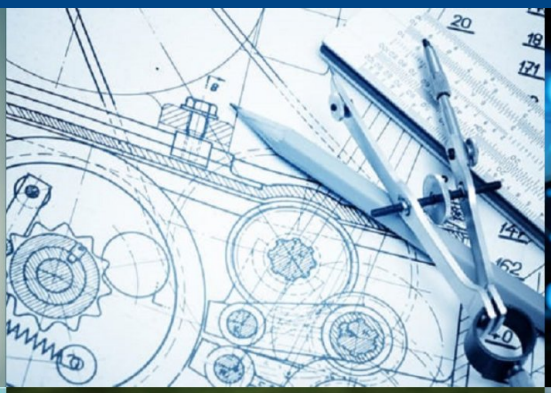

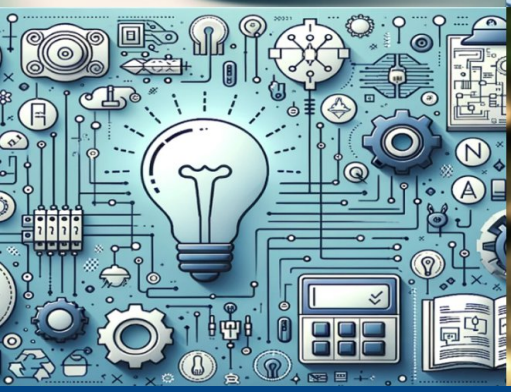

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HERHUB – A Unified Digital Platform for Womens

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ABSTRACT: Most digital platforms provide services such as online shopping, service booking, and delivery through separate applications, resulting in fragmented user experiences. This paper proposes HERhub, a unified digital service platform designed specifically for women users. The system integrates multiple features including all-in-one listings, group shopping, administrative control, and women-only service providers within a single web-based environment. The platform is developed using HTML, CSS, and JavaScript for the frontend, Python (Flask framework) for backend processing, and MySQL for database management. The proposed system improves service accessibility and provides a secure, centralized digital ecosystem for women users, addressing a critical gap in gender- inclusive technology solutions.

KEYWORDS*:* Unified Platform, Women-Centric Application, Group Shopping, Flask Framework, MySQL Database, Service Integration, Web Application.

I. INTRODUCTION

The rapid growth of digital platforms has transformed how people access products and services. Modern users rely on multiple applications for online shopping, service booking, and collaborative purchasing, leading to a highly fragmented digital experience.

Individual applications operate independently, requiring users to switch between platforms to complete daily tasks. This fragmentation introduces unnecessary complexity and reduces user satisfaction, creating a significant barrier to seamless service access.

Many existing applications focus on specific service categories such as product purchasing, logistics optimization, or service booking. While these solutions improve efficiency in their respective domains, they do not provide a unified platform capable of integrating multiple services into a single ecosystem. The absence of cross-service integration limits their overall utility for users with diverse digital service needs.

Women users in particular require platforms that provide both accessibility and safety while accessing digital services. Research indicates that women face unique challenges in digital environments, including concerns about safety, privacy, and access to gender-specific services. The absence of women- focused filtering mechanisms and centralized service environments highlights the need for a specialized platform that addresses these distinct requirements.

To address this limitation, this paper proposes HERhub, a unified digital platform designed specifically for women users. The system integrates product listings, collaborative group shopping, administrative management, and women-only service providers into a single web-based application. The proposed system aims to reduce platform fragmentation and enhance digital service accessibility for women users by providing a secure, centralized, and inclusive digital ecosystem.

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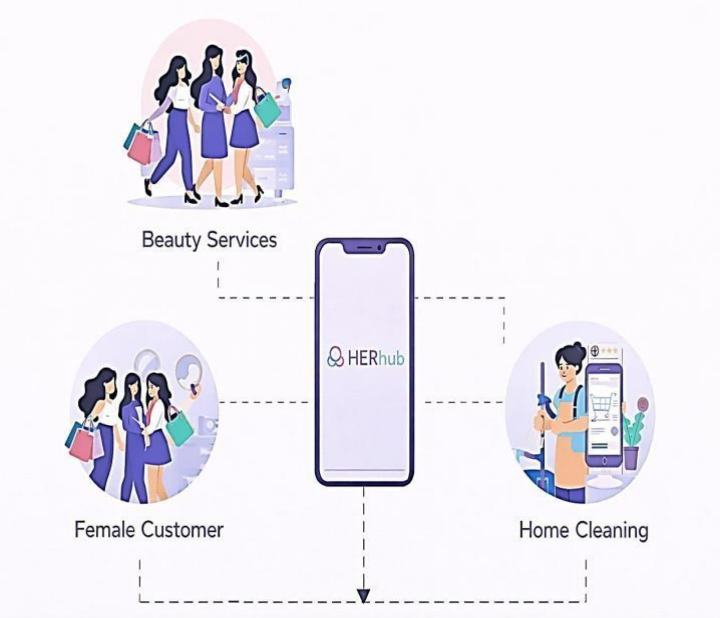

Fig. 1: HERhub Unified Platform Overview

II. RELATED WORKS

Several research works have explored digital service platforms and optimization techniques in specific domains. A review of these works highlights the gaps that HERhub aims to address.

Roslan and Haron [1] proposed SmartCart, a collaborative shopping mobile application developed using the Mobile Application Development Life Cycle. The system supports group purchasing and barcode-based product identification. SmartCart demonstrated the viability of collaborative purchasing models in mobile environments. However, it remains limited to the shopping domain and does not provide integrated multi-service functionality or gender-specific features.

Navarro-Villatoro et al. [2] focused on improving the efficiency of online grocery delivery using advanced GPSbased routing methods. Their work enhances delivery accuracy and logistics performance through intelligent route optimization algorithms. While the system significantly improves delivery- side operations, it does not support multiservice integration or provide gender-specific filtering mechanisms for end users.

Bhavani et al. [3] introduced Rapid Service, a mobile application designed for bike and car service booking. The system connects users with nearby service providers and simplifies service scheduling through a streamlined booking interface. However, it operates within a single service category and lacks centralized service management capabilities that would support a broader digital ecosystem.

Huq et al. [4] proposed a Quality-of-Service aware worker selection method for food delivery systems. Their approach improves delivery performance through optimized task allocation and dynamic worker assignment based on service quality metrics. While effective within its domain, the system does not address integrated service ecosystems or incorporate any women-centric design considerations.

A comparative analysis reveals that none of these platforms provide a comprehensive, women-focused multi-service solution. HERhub bridges this gap with a centralized, womenfocused digital platform.

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III. EXISTING SYSTEM

Most existing digital platforms operate within isolated domains such as e-commerce, food delivery, or service booking. These systems typically require users to install and manage multiple applications for different services, leading to a fragmented and inefficient digital experience. The proliferation of single-purpose applications has created an ecosystem where users must maintain numerous accounts and remember multiple login credentials.

The limitations of existing systems include fragmented user experiences, repeated authentication processes, and the absenceof centralized service management. Users are required to navigate between different interfaces, each with distinct design patterns and workflows, increasing cognitive load and reducing overall efficiency. Furthermore, many platforms do not provide gender-specific filtering or safetyfocused features for women users, leaving a significant portion of the user base underserved.

Data privacy inconsistencies further compound these challenges, as each application maintains separate security protocols exposing users to varying levels of risk.
These challenges clearly highlight the need for an integrated digital ecosystem capable of managing multiple services within a single, secure platform.

IV. PROPOSED SYSTEM

HERhub is designed as a unified service platform that integrates multiple modules into a centralized web application. The system provides a secure and user-friendly environment specifically designed for women users, addressing the limitations identified in existing platforms. The proposed platform consists of four major modules, each targeting a distinct aspect of the user's digital service needs.

A. Administrative Module

The Administrative Module provides platform administrators with comprehensive tools to manage users, service providers, and product listings. It enables real-time system monitoring, content moderation, and ensures proper maintenance of platform data. Administrators can review provider credentials, approve or reject registrations, manage product categories, and generate analytical reports on platform usage. This module forms the governance backbone of the HERhub ecosystem.

B. All-in-One Listings Module

The All-in-One Listings Module provides a centralized interface where users can browse available products and services from multiple categories within a single platform. It simplifies service discovery through intuitive search and filtering mechanisms, improving accessibility within the platform. Users can compare offerings, read reviews, and access detailed service information without navigating away from the primary interface, significantly reducing the time required to locate and engage with desired services.

C. Group Shopping Module

The Group Shopping Module enables collaborative purchasing where multiple users can participate in group buying activities. Users can create or join purchase groups, share shopping lists, and coordinate collective orders to benefit from bulk pricing or shared delivery costs. This module encourages shared purchasing experiences and enhances social engagement within the platform. The collaborative model fosters community building among women users while simultaneously reducing individual purchasing costs.

D. Women-Only Providers Module

The Women-Only Providers Module filters and displays services offered exclusively by verified women service providers. All providers in this module undergo a verification process to confirm their identity and credentials before listing their services. This feature improves safety and trust for women users accessing services and actively encourages gender- inclusive entrepreneurship and employment on the platform. Users can access beauty services, home management, tutoring, and other categories exclusively offered by verified women professionals.

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V. SYSTEM ARCHITECTURE

The below figure illustrates the architecture diagram of the proposed HERhub platform.The architecture of the proposed HERhub platform follows a layered design consisting of three main components: Client Layer, Application Layer, and Database Layer. This three-tier architecture promotes clean separation of concerns between the user interface, business logic, and data management layers. The design improves system scalability, maintainability, and security while enabling independent evolution of each architectural tier.

A. Client Layer

The Client Layer represents the user interface through which women users interact with the system. It includes the web interface developed using HTML5, CSS3, and JavaScript. The frontend implements responsive design principles to ensure consistent user experience across devices, from desktop computers to smartphones. Through this interface, users can register, log in, browse products, view services, and participate in group shopping activities. The client layer sends user requests to the application server via RESTful API calls and dynamically renders the responses received from the system.

B. Application Layer

The Application Layer is responsible for processing user requests and implementing the core business logic of the HERhub platform. The backend is developed using Python with the Flask framework, which provides lightweight and efficient handling of routing, authentication, session management, and service orchestration. This layer contains several modules including User Authentication, Products, Cart, Services, Checkout, Order, Profile, Admin, Group Shopping, and Women-Only Services modules. Each module handles specific business processes while communicating through well-defined internal interfaces.

C. Database Layer

The Database Layer stores all data required for the system's operation. The platform uses MySQL to manage user details, product information, service bookings, cart data, order records, and provider credentials. The relational database model ensures data integrity through foreign key constraints and normalizedtable structures. The application server communicates with the database through parameterized queries to prevent SQL injection attacks and ensure secure data access. Database connection pooling is implemented to optimize performance under concurrent user load.

ARCHITECTURE DIAGRAM :

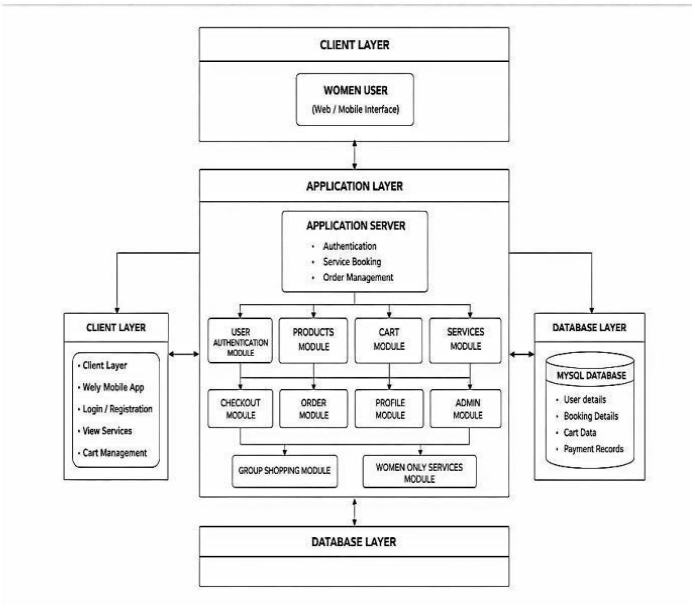

Fig. 2: System Architecture of HERhub Platform

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VI. IMPLEMENTATION DETAILS

The HERhub platform is implemented using a carefully selected stack of industry-standard web development tools and frameworks. Each technology was chosen based on criteria including development efficiency, performance characteristics, community support, and alignment with the project's security and scalability requirements

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Frontend Technologies: HTML5 provides the structural foundation of the user interface, ensuring semantic markup and accessibility compliance. CSS3 handles visual styling and responsive layout adaptation across different screen sizes and devices. JavaScript enables client-side interactivity, form validation, and dynamic content updates without full page reloads.

Backend Framework: Python with the Flask microframework serves as the backend engine. Flask's lightweight architecture and extensive ecosystem of extensions make it well-suited for building modular web applications. FlaskLogin manages user session handling, while FlaskSQLAlchemy provides an object-relational mapping layer for database interactions.

Database Management: MySQL serves as the primary relational database management system. The database schema is designed with normalized tables for users, products, services, orders, cart items, and provider profiles. XAMPP is used during development to host the MySQL server locally.

TABLE I

System Implementation Parameters

Parameter	Description
Backend	Python (Flask Framework)
Database	MySQL Server
Frontend	HTML5, CSS3, JavaScript
Authentication	Session-based Login
Deployment	Cloud-Ready Architecture
Development Tools	VS Code, XAMPP, Web Browser

VII. SECURITY ANALYSIS

Security is a foundational aspect of the HERhub platform design, given that the system manages sensitive personal information, financial transaction data, and provider credentials. A multi-layered security approach is implemented to ensure comprehensive protection across all system components.

User credentials are protected through industry-standard password hashing using the bcrypt algorithm, which applies a computationally expensive one-way transformation to passwords before storage. This ensures that even in the event of a database breach, plaintext passwords cannot be recovered. Salt values are automatically incorporated by bcrypt to prevent rainbow table attacks.

Session management is implemented using Flask's secure session mechanism, which uses cryptographically signed cookies to maintain authenticated user state. Session tokens are rotated upon privilege escalation events such as login and role changes. Configurable session expiration timers automatically terminate inactive sessions to reduce the risk of session hijacking.

Server-side input validation is applied to all user-submitted data before processing or storage. Parameterized database queries prevent SQL injection vulnerabilities. Cross-Site Request Forgery (CSRF) protection is implemented through token validation on all state-changing operations

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VIII. RESULTS AND DISCUSSION

The HERhub platform was developed and tested across all defined functional modules. System testing was conducted to validate the correctness of individual module implementations, while integration testing verified the seamless interaction between components across the three-tier architecture.

A. User Registration and Authentication

The user registration and login module was successfully implemented with secure credential handling. New users can create accounts by providing personal details and secure passwords. The authentication workflow correctly validates credentials against stored hashed values and establishes secure sessions upon successful login. Role-based access control appropriately restricts administrative functions to authorized admin accounts while providing standard users with access to shopping and service features.

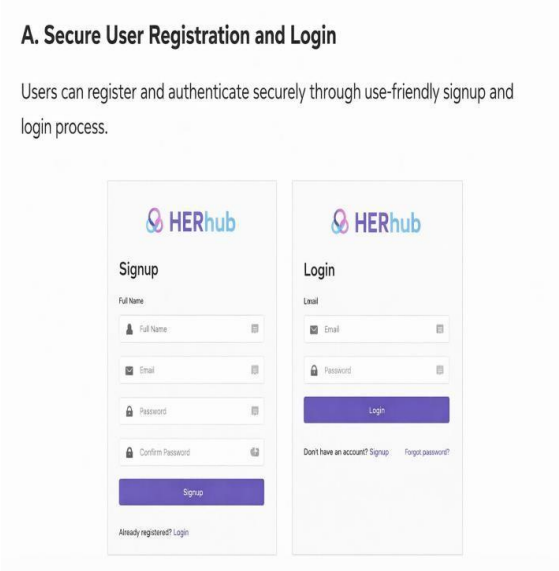

Fig. 3: User Registration and Authentication Interface

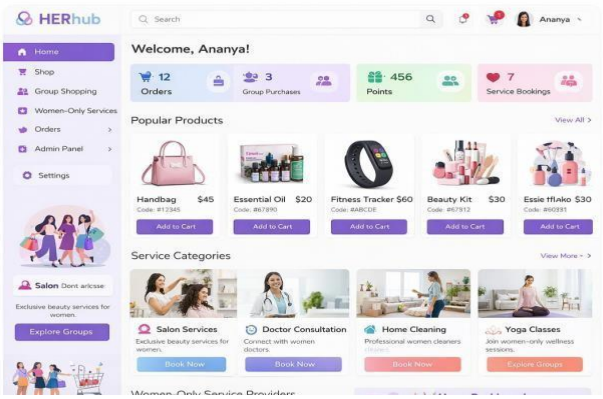

Fig. 4: Login Page Interface

Product and Service Listings

The all-in-one listings module displays products and services retrieved dynamically from the MySQL database. Search and filter functionality allows users to narrow results by category, price range, and provider type. The interface renders consistently across tested browsers including Google Chrome, Mozilla Firefox, and Microsoft Edge. Product detail pages display comprehensive information including descriptions, pricing, and seller ratings.

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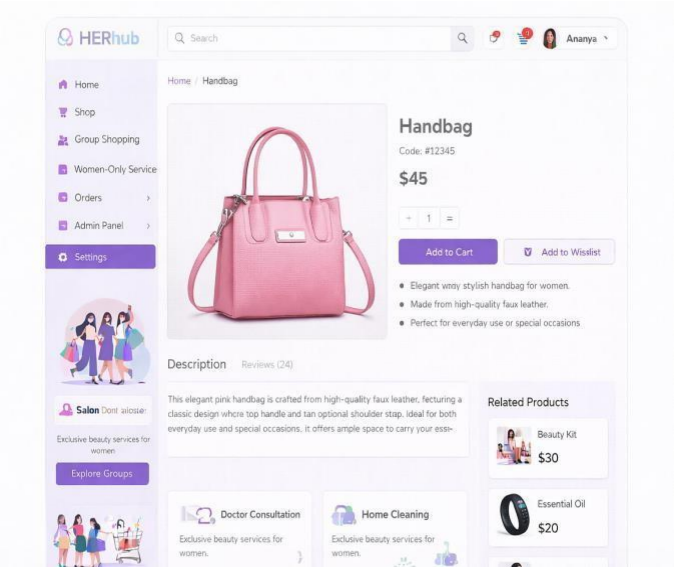

Fig. 5: All-in-One Product and Service Listings

The group shopping module enables users to successfully create purchase groups, invite other registered users, and manage collaborative shopping carts. Group leaders can finalize purchases on behalf of all group members, with individual order records created for each participant. The module correctly handles concurrent user interactions within the same group without data inconsistency issues.

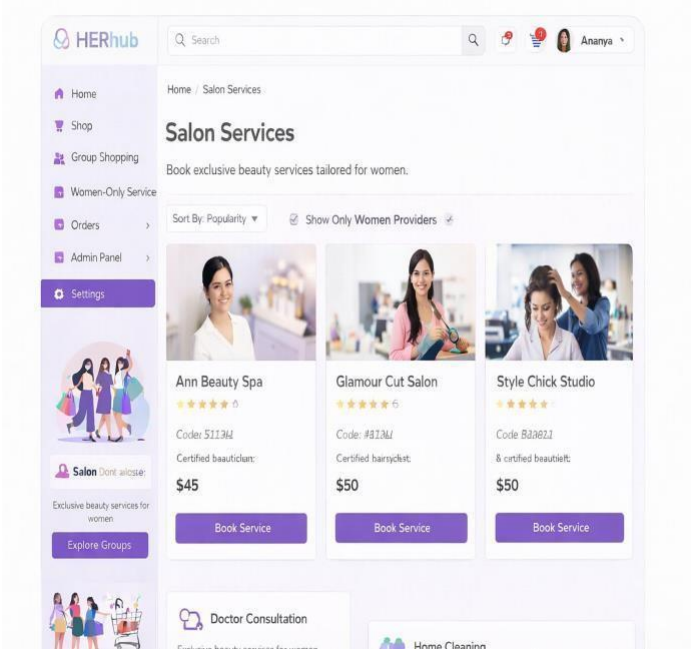

Fig. 6: Service Listings and Search Filter View Group Shopping Functionality

Women-Only Services

The women-only providers module correctly filters and displays only verified women service providers from the

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database. The provider verification workflow allows admin users to review and approve provider registration requests before their services become visible to regular users. Approved providers can manage their service listings, set availability schedules, and respond to booking requests through the provider dashboard. Figure 1 and Figure 2 show the system interface and architecture diagrams respectivelyapplications. Intelligent recommendation systems leveraging collaborative filtering and usage pattern analysis will personalize theservice discovery experience for individual users. Additionally, real-time notification systems and AIpowered customer support features are planned to further enhance the overall platform experience.

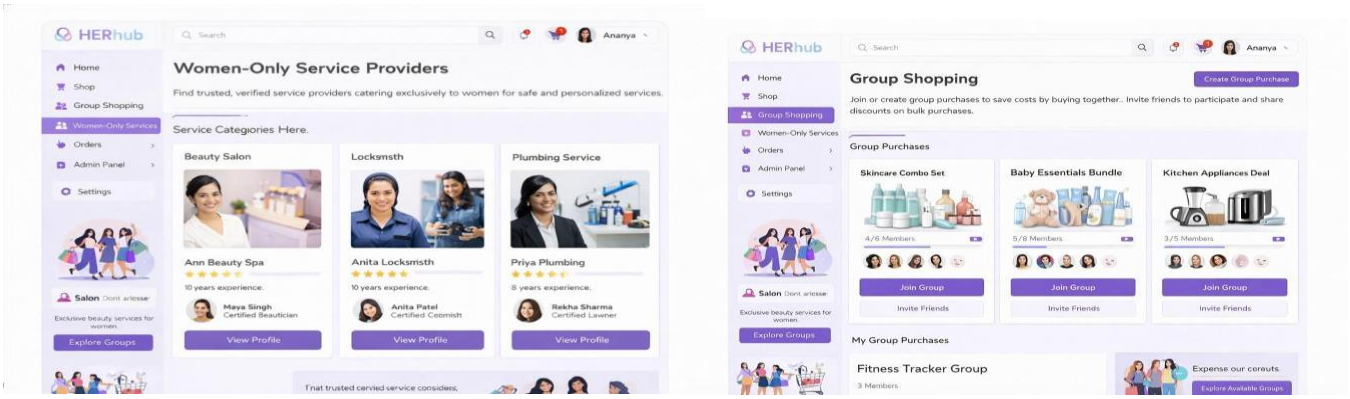

Fig. 7: Group Shopping Module Interface

IX. CONCLUSION

This paper presented HERhub, a unified digital service platform designed specifically for women users. The proposed system successfully integrates multiple service modules including all-in-one product and service listings, collaborative group shopping, women-only verified service providers, and administrative management tools into a centralized web application. By consolidating these capabilities within a single platform, HERhub significantly reduces dependency on multiple standalone applications and addresses the fragmented digital service experience that currently characterizes the market.The three-tier architecture (HTML, CSS, JavaScript, Python Flask, MySQL) provides a scalable foundation for continued development. Security mechanisms including password hashing, session management, and CSRF protection ensure sensitive user data is handled appropriately.The women-only service provider module represents a distinctive contribution to gender-inclusive technology design. By creating a verified ecosystem of women professionals across service categories, HERhub not only improves user safety but also promotes economic opportunities for women entrepreneurs and service providers. This dual benefit of enhanced user trust and provider empowerment positions HERhub as a socially meaningful technological contribution.Future work will focus on several enhancements to extend the platform's capabilities and reach. Mobile application development for iOS and Android platforms will broaden accessibility for users who primarily rely on smartphones. Payment gateway integration will enable seamless in-platform transactions, eliminating the need for external payment

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4. pp. 1589–1596.
5. F. Huq, N. Sultana, and M. A. Razzaque, "Quality of Service Aware Order Allocation for Inter-Regional Online Food Delivery Systems," in Proc. ICACT, IEEE, 2023, pp. 358–364. *Fig. 8: Women- Only Verified Service Providers Dashboard*

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