Suvidha: An E-commerce website for Local Labourers

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Abstract

Local skilled labourers often lack visibility, suffer from lost opportunities, and have no centralised digital channel to showcase services. Suvidha proposes a targeted e-commerce platform to bridge customers and local labour, supporting multilingual onboarding, easy document upload, worker profiles, bookings, reviews, and a lightweight admin verification flow. This paper presents a complete research-grade exposition: problem framing, literature context, functional and non-functional requirements, user persona and workflows, full system architecture, database schemas, API specifications, UX patterns for low-literacy users, localization strategy, security & privacy approach, testing and evaluation plan, deployment & monitoring design, business and sustainability models, ethical considerations, limitations, and future directions. The design emphasizes accessibility, trust-building (verification + reviews), scalable search & matching, and maintainable engineering choices appropriate for low-resource environments. Implementation artefacts (data models, example APIs, UI guidance) are provided to accelerate prototyping and field trials. The platform supports multilingual onboarding, simplified document upload, worker profile creation, service discovery, booking management, and post-service reviews. A lightweight administrative verification workflow is incorporated to ensure authenticity and quality assurance while remaining scalable for low-resource environments. The system architecture emphasizes modularity, maintainability, and efficient operation under low bandwidth conditions. Special attention is given to user experience design

for low-literacy users through visual cues, guided workflows, and minimal text interaction. Additionally, the paper discusses functional and non-functional requirements, system architecture, database design, security and privacy considerations, localisation strategies, and evaluation methodologies.

Keywords: Local Skilled Labour, Digital Inclusion, Informal Labour Market, E-commerce Platform, Multilingual Onboarding, Service Marketplace, Worker Verification, Low-Literacy User Experience, Booking and Review System, Trust and Transparency, Scalable System Architecture, Low-Bandwidth Design, Security and Privacy, Socio-Economic Development, Sustainable Digital Platforms.

I. INTRODUCTION

1.1. Background

College campuses have become increasingly large and complex, with multiple academic departments, administrative offices, hostels, auditoriums, libraries, and recreational facilities spread across a wide geographical area. For new students, parents during admission season, or visitors attending seminars and events, navigating such campuses can be overwhelming.

The challenge intensifies when a single building accommodates multiple departments, classrooms, or labs, making it difficult to identify the exact destination without external help. Traditional approaches like printed maps static signboards, and manual guidance from staff or peers are often insufficient, outdated, and time-consuming.

AI and creative machines represent a technological Informal and local labour constitute a crucial part of local economies (plumbers, electricians, carpenters, masons, cleaners, tutors, beauticians etc.). Yet many skilled workers remain invisible to larger customer bases due to lack of digital presence or low digital literacy. This results in underemployment, fragmented markets, and missed income opportunities.

Suvidha aims to create a dedicated e-commerce platform for local labour that:

- gives workers an accessible digital storefront,
- enables customers to find trusted, local services easily,
- Includes features tailored for low-literacy users and multilingual needs, and provides an admin-driven verification + review mechanism to build trust.

The core problems and objectives are taken from the uploaded project brief (problem statement and objectives).

1.2. Problem Statement

Lack of visibility: Local skilled individuals often struggle to find visibility and opportunities due to absence of a dedicated platform. Lost job opportunities: The lack of a centralized ecommerce platform leads to missed work and financial strain.

No centralized platform: Customers lack a single, convenient place to explore local labour services . Laborer often depend on middlemen or contractors who take a significant commission, reducing their take-home earnings and control over their work schedules and terms.

Customers face difficulty in finding available, skilled, and trustworthy labour at short notice, with no transparency in pricing, no quality assurance, and no accountability mechanism postservice. Both labourers and customers deal with manual, disorganized processes for scheduling, reminders, negotiations, and cash-based payments, leading to coordination issues and payment delays.

1.3. Motivation

Suvidha comes from real socio-economic problems faced by local labourers and service providers. It is not just a technical project, but a solution to a social gap. Let's break it down in depth:

1. Socio-Economic Context

- In India (and many developing countries), a large portion of the workforce belongs to the unorganised sector — plumbers, electricians, carpenters, cleaners, tailors, beauticians, tutors, etc.
- These workers often rely on word-of-mouth referrals or middlemen to get jobs.

2.Problems Faced by Local Labour

- No digital presence: Most workers are not listed on digital platforms due to low digital literacy.
- Missed opportunities: Customers cannot easily find or trust local workers, so jobs are lost.
- Dependence on agents: Middlemen exploit workers by taking high commissions.
- Language barriers: Many workers are not comfortable with English-based platform.

3. Motivation for Customers

- Customers need a reliable and quick way to find nearby workers for urgent services.
- Lack of a central, trustworthy platform forces them to depend on personal contacts or random searches.
- They want verified, rated, and professional workers with transparent pricing.

1.4. Objectives

The main aim of the Suvidha (E-commerce for local labour) is to ensure navigation apps for local people. The specific goals include:

- Construct a user-friendly platform with minimal friction for low digital literacy users.
- Enable worker registration with guided onboarding and document upload.
- Localise language and present UI in regional languages.
- Document upload assistance with clear, localised instructions for verification documents.
- Provide booking, rating, and profile systems to facilitate transactions and trust.

1.5. Scope Of the Project

The scope of the project defines the boundaries and extent of the proposed system, outlining the functionalities, user groups, and technical aspects that are included in the project. It clarifies what the project aims to achieve and establishes clear limits to avoid ambiguity during development and evaluation.

The scope of the Suvidha project encompasses the design and development of a centralized ecommerce platform that connects local skilled labourers with customers seeking reliable and nearby services. The project focuses on

addressing the lack of digital visibility for workers in the unorganised sector by providing them with an accessible digital platform to showcase their skills and services.

1.6. Advantages of the System

1. Increased Visibility for Local Labourers - The system provides local skilled workers with a digital presence, allowing them to showcase their services to a wider audience beyond word-of-mouth networks, leading to improved employment opportunities.

2. User-Friendly and Inclusive Design - The platform is designed for users with low digital literacy, featuring multilingual support, guided workflows, and icon-based navigation, making it accessible to a diverse user base.

3. Centralised and Reliable Platform - Customers can find, compare, and book local services from a single trusted platform, reducing the effort and uncertainty involved in searching for skilled labour.

4. Trust and Transparency - Worker verification, ratings, and review mechanisms build confidence among customers while encouraging accountability and quality service from workers.

5. Reduced Dependence on Middlemen - The system minimises the role of intermediaries, enabling direct interaction between workers and customers and helping workers retain a larger share of their earnings.

6. Scalable and Maintainable Architecture - The modular system design allows the platform to scale efficiently as user numbers grow while remaining suitable for low-resource and low-bandwidth environments.

7. Secure Data Handling - Security and privacy mechanisms ensure safe storage and transmission of personal and verification data, protecting user information and fostering trust in the platform.

8. Economic and Social Impact - By promoting digital inclusion and stable income opportunities, the system contributes to improved livelihoods for local labourers and supports sustainable socio-economic development.

1.7.Research

This research contributes to the field of digital marketplaces, e-commerce systems, and digital inclusion by proposing and documenting a complete, research-oriented framework for integrating local skilled labour into formal digital ecosystems. Unlike conventional service marketplaces that primarily target digitally literate users, this work focuses on the unique constraints and requirements of workers in the unorganised sector, particularly those with low digital literacy and limited access to technology.

A key contribution of this research is the user-centric design approach for low-literacy environments, incorporating multilingual onboarding, icon-driven interfaces, guided workflows, and assisted document upload mechanisms. These design principles extend existing UX research by demonstrating how accessibility and usability can be practically implemented in real-world labour platforms.

II. LITERATURE REVIEW

The rapid growth of digital platforms has significantly transformed service delivery models across various sectors, including transportation, retail, and household services. Several studies highlight how online marketplaces and e-commerce platforms improve accessibility, efficiency, and transparency by connecting service providers directly with customers. However, much of the existing research focuses on platforms designed for digitally literate users, leaving a gap in addressing the needs of workers in the informal and unorganised labour sector.

Research on the informal labour market indicates that local skilled workers such as plumbers, electricians, carpenters, and cleaners often suffer from limited visibility, unstable income, and dependence on middlemen. Reports by organisations such as the World Bank and NITI Aayog emphasise that the absence of digital access and trust mechanisms prevents these workers from fully benefiting from the digital economy. These studies underline the importance of inclusive digital solutions tailored to socio-economic realities.

III. METHODOLOGY

The development of the Suvidha e-commerce platform for local labour follows a structured and systematic methodology that integrates user-centred design, web technologies, secure data management, and scalable system architecture. The methodology is divided into the following phases:

3.1 System Architecture and Design

The Suvidha platform is designed using a modular and scalable system architecture to ensure reliability, maintainability, and efficient performance in low-resource environments. The architecture consists of a client layer (web application / PWA), a backend service layer, a database layer, and an administrative layer. The client layer provides multilingual and low-literacy-friendly interfaces for workers and customers. The backend exposes secure APIs for authentication, profile management, service discovery, booking, and reviews. A relational database stores core user and transaction data, while cloud object storage is used for documents and images. This layered design enables easy scalability and future enhancements.

3.2 Generation and Deployment

The development process follows standard web engineering practices, where frontend components are generated using responsive web technologies and integrated with backend APIs. Backend services handle business logic, verification workflows, and security enforcement. The system is deployed on a cloud-based infrastructure to ensure availability and scalability. Deployment includes secure configuration of servers, databases, and storage services, along with monitoring and logging tools.

3.3 User Workflow and Interaction

User workflows in Suvidha are designed to be simple, guided, and intuitive. Workers follow a step-by-step onboarding process that includes registration, language selection, profile creation, service listing, and document upload for verification. Customers can browse or search for services based on location, category, and ratings, select suitable workers, and book services through an easy scheduling interface. After service completion, customers can provide ratings and reviews, completing the interaction cycle. Administrators interact with the system through a dedicated dashboard to verify documents, manage users, and resolve disputes.

3.4 Navigation Features and Accessibility

Navigation within the Suvidha platform emphasises accessibility and ease of use for low digital literacy users. The interface uses icon-based menus, minimal text, large buttons, and visual cues to guide users through each step. Multilingual support allows users to interact with the system in their preferred regional language. Accessibility features such as clear visual feedback, confirmation prompts, and error recovery options enhance usability. The platform design ensures smooth navigation even on low-end devices and under limited internet connectivity.

3.5 Testing and Evaluation

Testing and evaluation are conducted to ensure functional correctness, usability, security, and performance of the system. Unit and integration testing validate individual modules and end-to-end workflows such as registration, booking, and review submission. Usability and accessibility testing assess how effectively low-literacy users can interact with the platform. Performance testing evaluates response times and stability under varying network conditions. The system is further evaluated using predefined metrics such as the number of registered workers, booking success rate, verification completion, and user satisfaction, ensuring that the platform meets its technical and social objectives.

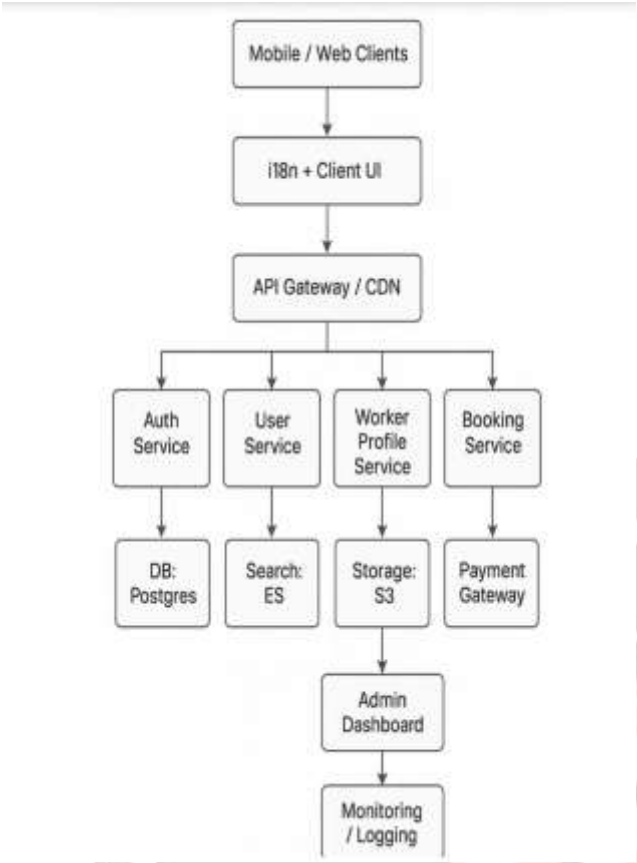
IV. IMPLEMENTATION AND SYSTEM DESIGN

4.1. System Architecture:

The proposed Suvidha (E-Commerce for local labourers) Navigation System architecture is presented in the following.

- Client (PWA + mobile app): Responsive web app (PWA) and optional native wrappers — supports offline caching and push notifications.
- API Gateway / Backend: RESTful APIs or GraphQL exposing services for auth, profiles, search, booking, and payments.
- Database: Relational DB (Postgres) for core data; search engine (Elasticsearch) for full-text and geospatial queries.
- Object Storage: Cloud storage (S3) for images/documents, with virus scanning and encryption.
- Auth & Verification: Phone OTP + email + optional social login; document verification managed by admin and flagged in DB.
- Payment Gateway: Integrate local payment providers supporting UPI, cards, and COD.
- Admin Dashboard: Web interface for verification, disputes, and analytics.

4.2. System Workflow



4.3.Frontend, UX & Accessibility (deep)

Design principles for low-literacy users

- Icon-first UI: Use clear pictograms next to every action (e.g., phone, calendar, ID card).
- Step-by-step onboarding: Show one input at a time with large buttons.
- Audio prompts: Option to hear instructions in chosen local language.
- Minimal text & simple sentences: Avoid technical terms; prefer local language labels.

Localization strategy

- Internationalisation (i18n) framework on frontend (e.g., i18next) and backend (message catalogues). Language packs: English + Hindi + Marathi (or region-specific). All strings in JSON message files. Right-to-left: Not required for Indian languages, but keep the framework flexible.

Document Upload UX

- Guided camera capture: overlay silhouette for ID; show sample images.
- Provide a checkbox to consent to document usage.
- Automatic image compression & preview before upload.
- If the upload fails (connectivity), store locally and retry.

4.4 Security & Privacy:

- Transport security: HTTPS-only, HSTS enforced.
- Auth: JWT with refresh tokens; phone OTP for registration, optional 2FA.
- Data at rest: Encrypt sensitive fields (document S3 objects encrypted server-side).
- Input validation & sanitisation to prevent XSS/SQLi.
- File scanning: virus/malware scan on uploads.
- Least privilege: RBAC for admin functions.

V. RESULTS AND DISCUSSION

5.1.Result

While the project is still at the prototype stage, the expected and preliminary results include:

- Centralised Platform: Both workers and customers now have a single platform where services can be listed, searched, and booked.
- Increased Visibility: Workers gain more exposure beyond word-of-mouth, reaching more customers digitally.
- Ease of Use: Simple UI, multilingual support, and assisted document upload make the system accessible even to low-literacy users.

5.2. Limitations

- This paper does not include empirical field data (user interviews, A/B tests) because none were provided in the original upload. All evaluation proposals are methodological and hypothetical until pilot data is collected.

5.3.Testing & Quality Assurance

1. Test types

- Unit tests: model logic, controllers.
- Integration tests: workflows across services (auth → booking → payment).
- End-to-end tests: simulate full user flows (Cypress for web).
- Accessibility testing: WCAG 2.1 AA compliance checks.
- Load testing: determine throughput limits (JMeter/Locust).

2. Evaluation metrics (KPIs)

- Number of registered workers (and % verified).
- Booking conversion rate (search → booking).
- Average time to first booking for a newly registered worker.
- Job completion rate and dispute rate.
- Customer satisfaction (CSAT) and Net Promoter Score (NPS).

VI. CONCLUSION AND FUTURE SCOPE

6.1. Conclusion

Suvidha is a focused, high-impact concept: an e-commerce platform designed expressly for local labour. The design combines accessibility, trust mechanisms, robust backend architecture, and practical operational considerations to maximise adoption and benefit to workers and customers alike. The artefact in this document provides a complete blueprint for developing a production-grade platform and executing a rigorous evaluation in the field.

6.2.Future Scope

1. Advanced Matching and Recommendations - Future versions can use data analytics or machine learning to improve worker–customer matching based on location, availability, ratings, and service history, ensuring faster and more accurate service discovery.

2. Skill Development and Certification - The platform can integrate training modules and digital certification programs in collaboration with skill development agencies, helping workers enhance their skills and increase credibility through verified badges.

3. Geographical and Language Expansion - Suvidha can be scaled to wider regions by supporting more local languages and cultural contexts, enabling adoption at district, state, or national levels.

4. Offline and Low-Connectivity Support - Features such as SMS-based booking, IVR support, and enhanced offline functionality can be introduced to serve users in areas with limited internet access.

5. Enhanced Security and Fraud Detection - Automated document verification, AI-assisted fraud detection, and improved dispute resolution mechanisms can be implemented to strengthen trust and platform reliability.

6. Financial and Payment Integration - Future enhancements may include advanced digital payment options, earnings analytics, micro-insurance, and access to financial services to support worker financial stability.

VII.REFERENCES

In a research paper, References are the list of sources you used to support your work. They show that:

1. Your project is backed by existing research, not just your own opinion.

2. You acknowledge other authors' contributions (avoiding plagiarism).

3. Readers can look up those works to learn more.

- 👉 In your final paper, each reference should follow a citation style (APA / IEEE / MLA). For example: APA: Smith, J. (2021). Designing marketplaces for informal labour. Journal of Ecommerce Research, 15(3), 45–60.
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