



**Bridging the Digital Gap:
Encouraging Digital Solutions for Local
Shops in Pakistan**

PROJECT PROPOSAL

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1 Introduction

Small businesses form the backbone of Pakistan’s economy, yet many shop owners still rely on manual methods for managing sales, inventory, and finances. Handwritten records and cash transactions lead to inefficiencies, errors, and financial mismanagement, limiting growth and increasing the risk of fraud. While digital tools such as Point-of-Sale (POS) systems, mobile payments, and automated inventory management have transformed commerce worldwide, their adoption among small retailers in Pakistan remains low due to digital illiteracy, cost concerns, and the perceived complexity of technology.



Figure 1: A Typical Local Bazaar in Pakistan

This research explores **how digital solutions can be effectively integrated into small businesses in Pakistan to improve financial management and operational efficiency**. Our focus is on shopkeepers who lack technical expertise and rely on traditional practices. By studying their work environment, pain points, and perceptions of digital tools, we aim to **understand their barriers to adoption and develop user-friendly, cost-effective solutions that align with their needs**.

Our core contribution lies in designing **localized, accessible digital tools tailored to the unique constraints of small shop owners**. Unlike existing solutions that assume a baseline level of digital literacy, our approach prioritizes **intuitive interfaces, multilingual support, and minimal setup complexity**. The HCI community will gain insights into **how cultural and socioeconomic factors shape technology adoption** and how usability can be improved for non-digital-native users.

A key reference for this study is [Juniarti and Omar, 2021], which highlights how financial constraints, perceived usefulness, and ease of use impact digital adoption in SMEs. This work provides a framework for understanding technology acceptance among small businesses and informs our strategy for overcoming adoption barriers in the Pakistani context.

By addressing these challenges, our study seeks to empower small retailers with practical, digital-first solutions that enhance business efficiency, financial transparency, and customer engagement, ultimately contributing to a more inclusive digital economy.

2 Related Works

The integration of digital technologies into small and medium-sized enterprises (SMEs) in Pakistan has been extensively studied, revealing both significant benefits and notable challenges. A study by [Soomro et al., 2024] highlights that the adoption of digital tools such as social media applications, big data analytics, Internet of Things (IoT) applications, and blockchain significantly enhances both economic and social value creation for SMEs in Pakistan. However, the same study notes that AI-enabled applications did not show a significant impact on value creation within these enterprises.

Despite these potential benefits, SMEs in Pakistan face several challenges in digital transformation. [Khan, 2023] identifies obstacles such as inadequate infrastructure, limited access to financing, and a lack of digital literacy among business owners, which collectively hinder the effective adoption of digital solutions.

Several interventions and initiatives are taken by the Government of Pakistan to address these challenges. Firstly, the State Bank of Pakistan introduced Raast, the country’s first instant payment system. Launched in January 2021, Raast enables end-to-end digital payments among individuals, businesses, and government entities, facilitating real-time settlement of small-value retail payments. This system aims to promote digital financial inclusion by providing a free, fast, and reliable payment infrastructure [State Bank of Pakistan, 2025].

Moreover, the Ministry of Information Technology and Telecommunication (MoITT) launched Digital Pakistan Policy, which focuses on enabling the digitization of key socio-economic sectors. It emphasizes the development of digital infrastructure, promotion of e-governance, and facilitation of innovation and entrepreneurship among SMEs [Ministry of Information Technology and Telecommunication, 2018].

In addition, established under a public-private partnership, National Incubation Centers (NICs) provide a nurturing environment for startups and SMEs. These centers offer resources such as mentorship, training, and access to networks, enabling businesses to integrate digital solutions effectively [Ministry of Information Technology and Telecommunication, 2025].

Furthermore, Ministry of Information Technology and Telecommunication (MoITT) launched Digiskills Training Program. This initiative aims to equip individuals with digital skills necessary for freelancing and entrepreneurship. By offering courses in areas like e-commerce management and digital marketing, the program empowers participants to leverage digital platforms for business growth [DigiSkills.pk, 2025].

Despite significant advancements in digital solutions, small and medium-sized enterprises (SMEs) in Pakistan continue to face several challenges in adopting these technologies. One major obstacle is the lack of digital literacy and inadequate infrastructure, particularly in rural areas, which limits the effective use of digital tools among business owners. Many shopkeepers and entrepreneurs struggle to navigate digital platforms, making it difficult to integrate technology into their daily operations [Paradigm Shift, 2025]. Additionally, financial constraints pose another significant barrier, as limited access to affordable financing prevents SMEs from investing in essential digital solutions. Without sufficient funding, businesses cannot upgrade their systems, adopt digital payment methods, or implement automated inventory management, ultimately hindering their growth and competitiveness in an increasingly digital economy [Sultan and Tabassam, 2023].

Collectively, these studies and initiatives underscore the multifaceted approach required to bridge the digital divide for small businesses in Pakistan. Addressing infrastructural challenges, enhancing digital literacy, and providing supportive policies are essential steps toward encouraging the adoption of digital solutions among local shops, thereby fostering economic growth and inclusivity.

3 Problem Statement

Small shop owners in Pakistan rely on inefficient manual processes due to limited digital literacy, financial constraints, and complex technology adoption. The lack of accessible, localized digital solutions further hinders their transition. This study aims to identify key barriers and propose user-friendly, cost-effective tools to streamline operations and drive business growth.

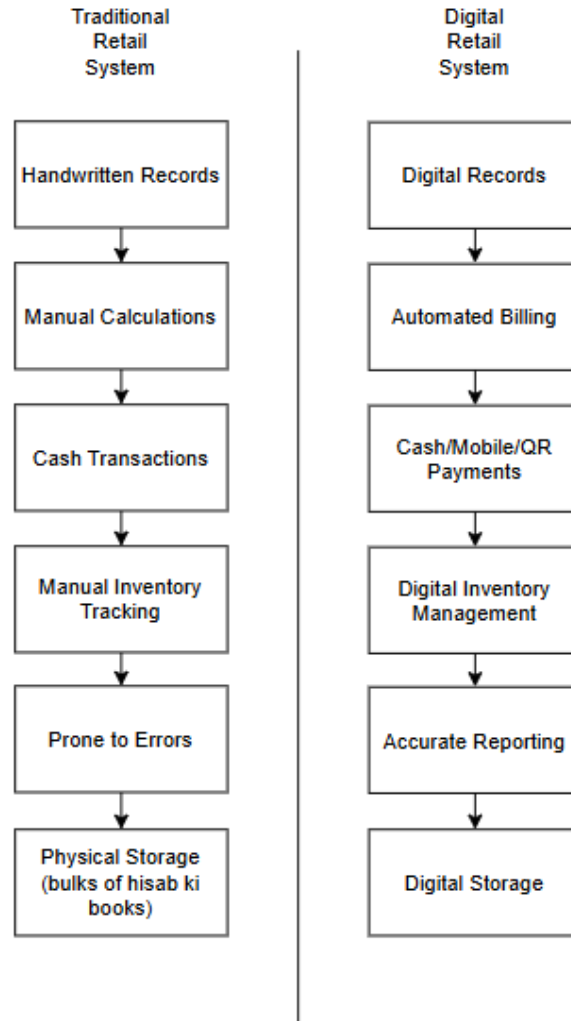


Figure 2: Comparison of Traditional vs. Digital Retail Systems

4 Objectives

1. Simplify Financial & Inventory Management

- Provide an easy-to-use Point-of-Sale (POS) system to automate billing, reduce manual calculations, and track inventory efficiently.
- Introduce basic accounting software to minimize human errors in financial management and simplify tax reporting.

2. Address Digital Literacy & Accessibility Challenges

- Ensure technology solutions are available in local languages and designed for shop owners with limited education or technical skills.
- Develop short training programs to guide shopkeepers in using digital tools effectively, reducing fear of mistakes.

3. Make Digital Solutions Affordable & Practical

- Offer cost-effective, scalable solutions for small businesses with limited budgets.
- Promote government or private sector incentives to support shopkeepers in adopting technology.

4. Overcome Infrastructure Barriers

- Ensure solutions work in low-connectivity environments by enabling offline functionality where possible.
 - Provide localized customer support to help shopkeepers navigate technical issues.
5. **Preserve Traditional Business Practices While Modernizing**
- Design tools that blend traditional bookkeeping with digital efficiency, making the transition smoother.
 - Develop step-by-step adoption strategies that respect the shopkeeper's existing workflow and reduce resistance to change.

5 Methodology & Approach

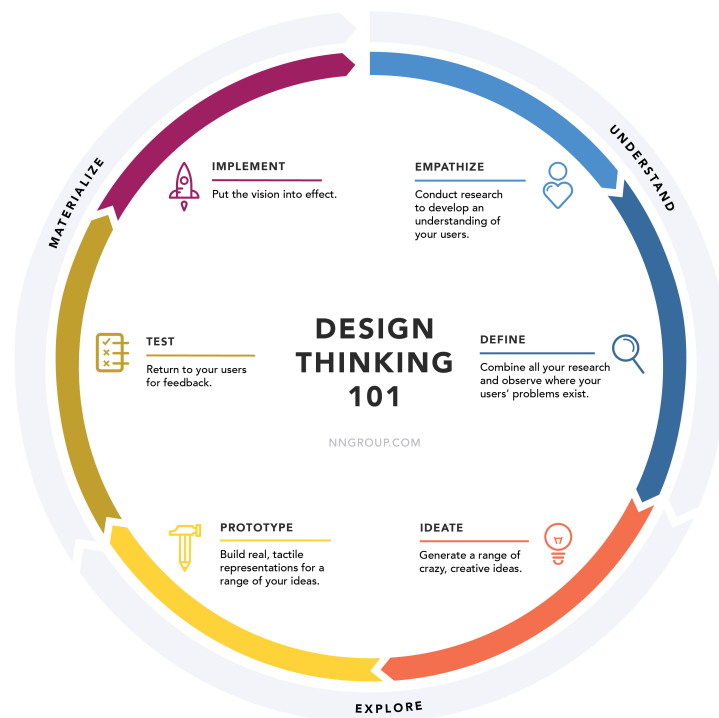


Figure 3: Design Thinking Cycle

1. Understanding the Shop Owners' Challenges (Empathy Phase)

Objective: Identify pain points, barriers, and current business practices of small shop owners.

- Conduct surveys and interviews with shopkeepers to understand their hesitations toward digital adoption.
- Observe traditional business operations to analyze inefficiencies in sales tracking, inventory management, and financial record-keeping.
- Identify key factors preventing adoption, such as lack of technical skills, language barriers, cost concerns, and infrastructure limitations.

2. Problem Definition & Requirement Analysis (Define Phase)

Objective: Define the core challenges and establish functional and non-functional requirements.

- Categorize shopkeepers' concerns into financial, operational, and technological barriers.
- Identify essential features for a simple, low-cost Point-of-Sale (POS) and digital payment system tailored for local businesses.

- Define usability requirements, ensuring tools are available in local languages, require minimal training, and can operate in low-connectivity environments.

3. Solution Ideation & Prototype Development (Ideate & Prototype Phase)

Objective: Design a practical and user-friendly digital solution for small shop owners.

- Develop a prototype of a POS system or mobile payment integration that simplifies billing, inventory tracking, and transactions.
- Ensure that the system supports local language interfaces, easy setup, and offline functionality.
- Gather feedback through shopkeeper focus groups to refine usability and accessibility.

4. Recruitment Plan:

Objective: To identify and engage suitable shop owners who can provide valuable insights for evaluating and refining the digital retail system.

- Target Audience: Shop owners, cashiers, small business owners?
- Recruitment Method: Going to local grocery shops in our neighbourhoods to interview and test with local shop owners.
- Ethical Considerations: Ensuring informed consent, anonymity, and voluntary participation.

5. Pilot Implementation & Testing (Testing Phase)

Objective: Test the feasibility of the digital solution in real business environments.

- Deploy the prototype in selected small shops for a trial period.
- Monitor its impact on sales tracking, inventory management, and ease of financial transactions.
- Collect user feedback on ease of use, efficiency, and willingness to adopt permanently. Feedback should be collected from Shop Owners as well as Customers.

6. Evaluation & Improvement

Objective: Assess the solution's effectiveness and make necessary refinements.

- Analyze key performance indicators (KPIs) such as error reduction in record-keeping, transaction speed, and revenue tracking improvements.
- Identify areas of difficulty or resistance and adjust the solution accordingly.
- Develop a scalable model for wider adoption across different shop types and regions.

6 Proposed Solution

Our proposed solution is a simple and affordable digital system designed to help small shop owners transition from manual to digital operations. It includes a user-friendly Point-of-Sale (POS) system that automates billing, tracks inventory, and generates financial reports while supporting offline functionality and local languages for accessibility. Additionally, training and support will be provided through step-by-step guides, video tutorials, and local workshops to help shopkeepers adopt digital tools with confidence. The system is designed to be affordable and adaptable, ensuring small businesses can implement it without significant financial burden. By streamlining operations and improving financial management, this solution aims to bridge the digital gap and empower shopkeepers with modern tools for business growth.

7 Expected Impact & Benefits

The proposed solution will enhance business efficiency by automating billing and inventory tracking, reducing errors and saving time. It will improve financial management by providing clear sales and expense records, enabling better decision-making. Digital payment integration will reduce reliance on

cash, minimizing risks of theft and fraud while enhancing the customer experience with faster transactions and multiple payment options. Financial inclusion will increase as shopkeepers gain access to digital services, making it easier to manage savings and apply for loans. Training programs will improve digital literacy, ensuring shop owners confidently adopt new tools. Overall, the solution will empower small businesses, boost profitability, and contribute to Pakistan’s digital economic growth.

8 Timeline & Task Division

S.NO	TASK TITLE	February	March	April	May
1	Initial Research & Problem Identification				
2	Project Proposal				
3	Emphathize				
4	Define				
5	Ideation				
6	Prototype Development				
7	Testing				
8	Findings - Research Paper Writing				
9	Final Edits & Submission				
10	Preparing for Conference Submission				

Figure 4: Proposed Project Timeline Gantt Chart

Each group member will equally contribute to all aspects of the project.

9 Conclusion

The digital divide among small shop owners in Pakistan limits their ability to manage finances efficiently, track inventory accurately, and offer convenient payment options. By introducing a simple, affordable, and accessible digital solution, this project aims to empower shopkeepers with modern tools that enhance business operations, improve financial transparency, and drive customer satisfaction. Through automated billing, digital payments, and targeted training programs, small businesses can transition smoothly from manual to digital processes while overcoming barriers such as cost, digital literacy, and infrastructure challenges.

Additionally, this project contributes to Human-Computer Interaction (HCI) research by examining how non-tech-savvy users adopt digital tools, the impact of simplified interfaces, and the role of cultural and economic factors in technology adoption. By designing an intuitive, localized, and cost-effective system, we not only improve business productivity but also advance discussions on user-centric design and digital inclusion.

Successfully implementing these solutions will not only foster individual business growth but also drive Pakistan’s broader digital transformation, ensuring that even the smallest enterprises can thrive in an increasingly technology-driven economy.

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