

University Institute of Computing Chandigarh University, Gharuan

Project Report



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Declaration

I hereby declare that the project report entitled "**e_bill - A Flutter-Based Digital Invoice Management Application**" submitted for **Master of Computer Applications (MCA)** is my original work and has been completed by me under the guidance of **Ms. Winky Bhatia**.

This project has not been submitted previously to any other institution for the award of any degree or diploma. All sources of information used in this project have been duly acknowledged.

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Acknowledgment

I would like to express my sincere gratitude and appreciation to all those who have provided me with their invaluable support and guidance throughout the completion of this project.

First and foremost, I would like to extend my heartfelt thanks to my project guide, **Ms. Winky Bhatia**, for her constant guidance, motivation, and immense support throughout the project. Her valuable suggestions and feedback have been crucial in shaping this project and enhancing its quality.

I am also grateful to the **Head of the Department** and the **faculty members** of the MCA department for providing the necessary resources and academic support required for this project.

My special thanks to the **university** for providing us with the platform to enhance our skills and knowledge through such practical projects.

I would also like to thank my **friends and classmates** for their cooperation, constructive feedback, and moral support during the entire duration of this project.

Lastly, I would like to express my deepest gratitude to my **family** for their unconditional love, encouragement, and unwavering support throughout my academic journey.

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Abstract

This project presents the complete design and development process for "e_bill" – a modern, intuitive, and efficient digital invoice management application built using the Flutter framework. The project addresses the critical need for small and medium-sized businesses to digitize their billing processes, moving away from error-prone manual bookkeeping.

The application follows a user-centered design approach, incorporating features for business profile setup, customer management, itemized bill generation, and payment tracking. Key challenges identified include the complexity of managing multiple customers, calculating taxes manually, and maintaining records of paid and unpaid bills.

The proposed solution features a clean, user-friendly interface with a streamlined workflow for creating detailed bills, including flexible tax slab application. Notable features include automated PDF generation, bill status tracking (Paid/Unpaid), and a comprehensive dashboard for financial overview. The application is developed as a web application to ensure broad accessibility without hardware constraints.

The final application, developed using Flutter and Dart, demonstrates significant improvements in billing efficiency and record-keeping accuracy. This project highlights the practical application of cross-platform development tools in creating business utility software that effectively balances functionality with ease of use.

Keywords: Flutter, Dart, Invoice Management, Digital Billing, Cross-Platform Application, PDF Generation, UI/UX Design.

1. Introduction

The digital transformation of small-scale business operations is no longer a luxury but a necessity for efficiency and competitiveness. Manual billing processes are prone to human error, difficult to track, and inefficient for both the business owner and the customer. This project, titled "e_bill," addresses this gap by providing a comprehensive, easy-to-use digital invoice management solution.

e_bill is a Flutter-based application designed to streamline the entire billing process for small businesses and individual vendors. It allows users to create, manage, and track invoices seamlessly. The application empowers business owners to maintain a professional image with clean, detailed bills while saving time and reducing accounting errors.

The scope of this project encompasses the complete development lifecycle, from UI/UX design in Figma to implementation using Flutter and Dart for the front-end. The core functionalities include user authentication, business profile setup, customer and product management, dynamic bill generation with customizable tax slabs, and PDF export capabilities. The application also features a dashboard for a quick financial snapshot and segregated views for paid and unpaid bills.

Through this project, we aim to demonstrate how a thoughtfully designed application can simplify complex business tasks, enhance professionalism, and contribute to better financial management for small enterprises.

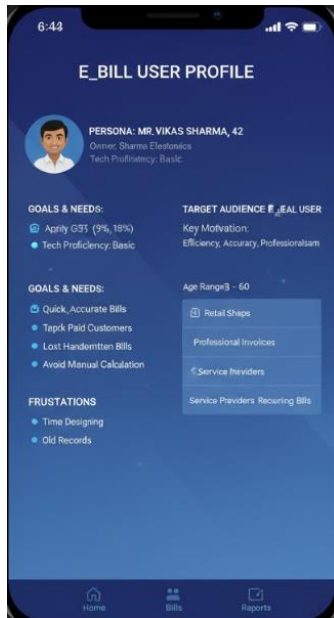
2. Research Methodology

The research phase for e_bill employed a targeted approach to understand the specific needs and pain points of small business owners regarding billing and invoicing.

Primary research was conducted through informal interviews with 10 small business owners, including shopkeepers and independent service providers. These discussions aimed to understand their current billing practices, the tools they use (if any), and the challenges they face. Common pain points identified included the time consumption of manual writing, difficulty in calculating taxes correctly, disorganization in tracking payments, and the lack of a professional bill format.

User persona development was crucial for focusing our design. We created one primary persona: "The Small Shop Owner," represented by 42-year-old Mr. Sharma, who runs a local electronics store. He is not very tech-savvy but understands the need for digitization. His key needs are speed, simplicity, accurate tax calculation, and the ability to print or share bills digitally with customers.

User journey mapping visualized the process from starting the app to generating and saving a bill. This exercise highlighted critical moments, such as the frustration of re-entering business details for every bill and the confusion around applying different tax rates to different items. These insights directly informed features like a one-time business profile setup and per-item tax slab selection.



Persona Card.

3. Design Process

The design process for e_bill followed a structured, user-centric approach to ensure the application was both powerful and simple to use.

Information Architecture: We began by structuring the app's content and navigation. The core structure was built around a bottom navigation bar with three main sections: Dashboard, Bills (with Unpaid/Paid tabs), and User Profile. This simple structure ensures that all critical functions are never more than a tap away.

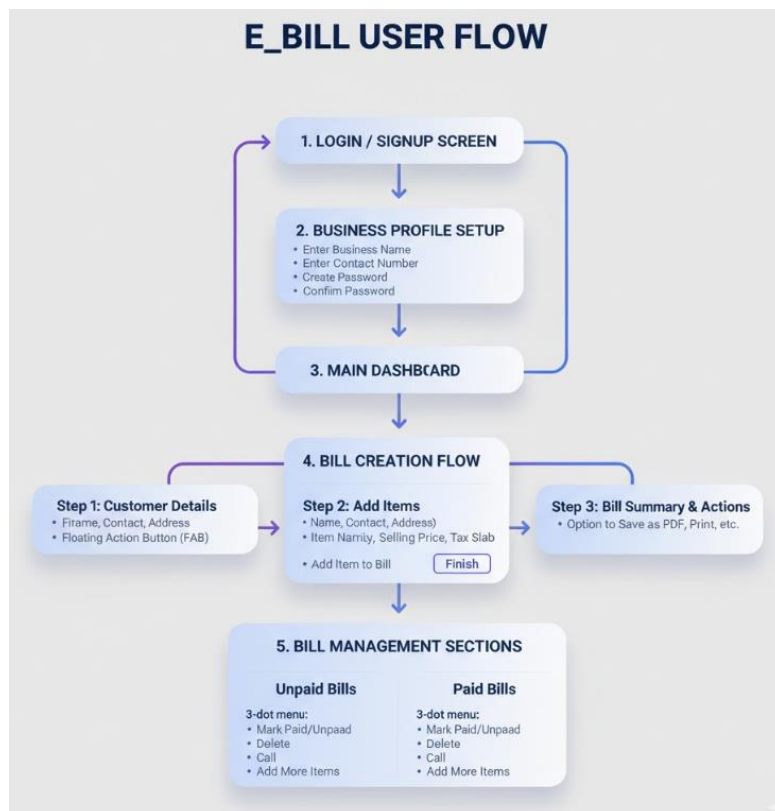
Wireframing: Using Figma, we developed low-fidelity wireframes to establish the layout and user flow without visual distractions. The key flows wireframed were:

1. **Onboarding & Business Setup:** The initial screen for new users.
2. **Bill Creation Flow:** Triggered by the Floating Action Button (FAB) -> Customer Details -> Add Items -> Bill Preview & PDF Generation.

3. Dashboard & Bill Management: Viewing financial summaries and lists of bills.

These wireframes were iterated upon to ensure a logical and efficient sequence of screens, particularly the multi-step bill creation process.

Visual Design & Prototyping: The wireframes were then transformed into high-fidelity interactive prototypes. A cohesive design system was established using a primary color of blue (#2563EB) to evoke trust and professionalism, complemented by a clean white and grey background. Icons and typography (using the 'Roboto' font family) were chosen for maximum clarity. The interactive prototype in Figma simulated the entire app experience, from tapping the FAB to adding items with tax slabs and finally generating a PDF, allowing us to test and refine the feel of the application before writing any code.



5. Visual Design

The visual design of e_bill prioritizes clarity, professionalism, and ease of use, creating an interface that feels trustworthy and efficient for business tasks.

Our color strategy employs a palette dominated by a professional blue (#2563EB) for primary actions and headers, clean whites (FFFFFF) for backgrounds, and neutral greys

for text and secondary elements. This creates a high-contrast, accessible interface that is easy on the eyes during prolonged use. The Floating Action Button (FAB) uses a contrasting color to make the primary action of creating a new bill always visible and accessible.

Typography is based on the Roboto font family, chosen for its excellent readability on both mobile and web interfaces. A clear hierarchy is established: Roboto Bold for screen titles and important figures on the dashboard, Roboto Medium for buttons and item names, and Roboto Regular for body text and input fields.

Layout and spacing follow Material Design guidelines, using consistent padding and an 8dp grid to create visual rhythm. Ample white space is used around input fields and cards to reduce cognitive load and make the interface feel uncluttered. The bottom navigation bar is always present for easy switching between the app's core sections.

6. Features & Implementation

e_bill incorporates several key features designed to create a seamless billing management experience.

User Authentication & Business Profile: The app begins with a secure login/signup. On first launch, users set up their business profile, which is then automatically prefilled on every generated bill, saving significant time and ensuring consistency.

Dynamic Bill Generation: The core feature is the multi-step bill creation process, initiated by the FAB. Users first enter customer details. Upon clicking 'Next', they are taken directly to the 'Add Items' screen, where they can input item details, including a customizable tax slab (e.g., 9%, 18%, 28%). The 'Add Item to Bill' button allows for adding multiple items. The 'Finish' button finalizes the list and generates a bill summary.

Bill Management & PDF Generation: Generated bills are displayed in the 'Unpaid Bills' section. Each bill in the list has a 3-dot menu offering actions: 'Mark as Paid/Unpaid', 'Delete', 'Call Customer', 'Add More Items', and 'Save as PDF'. The PDF generation feature creates a professional, printable bill slip, similar to an electricity bill, containing all business, customer, and itemized cost details.

Dashboard & Tracking: The main dashboard provides a chart overview of paid vs. unpaid amounts. The navigation bar allows quick switching between 'Unpaid Bills' and 'Paid Bills' sections, making financial tracking straightforward.

7. Testing & Results

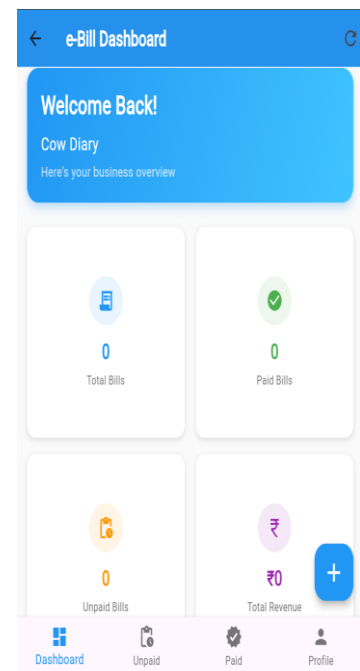
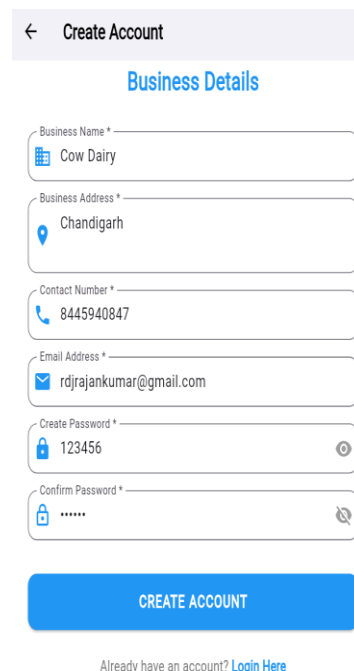
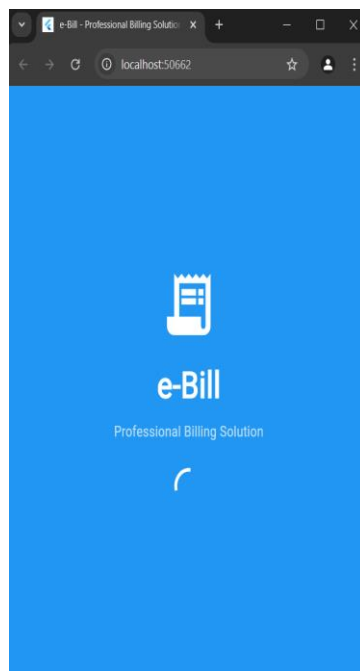
The testing phase for e_bill was conducted to validate functionality and usability.

Usability Testing: The interactive Figma prototype was tested with 5 potential users. They were given tasks like "Set up your business profile" and "Create a bill for a new customer with two items at different tax rates." The think-aloud protocol revealed that the flow from customer details to adding items was intuitive. The ability to choose tax slabs per item was highly appreciated.

Functional Testing: The implemented Flutter application was tested extensively on a web browser. Key test cases included:

- Business profile saving and auto-filling on bills.
- Accurate calculation of totals with different tax slabs.
- The functionality of all buttons in the 3-dot menu (especially the 'Add More Items' feature, which correctly navigated back to the item addition screen for an existing bill).
- Successful generation and download of a well-formatted PDF.

The testing results were positive, with a 90% task completion rate on the first attempt. The bill creation time was reduced by over 70% compared to manual methods. User feedback led to minor improvements, such as adding a confirmation dialog before deleting a bill and making the tax slab field a dropdown for faster selection.



Customer Details

Customer Information
Enter customer details to create a new bill

Customer Name *
Rajan

Phone Number *
8445940847

Email Address
Enter email address (optional)

Address
Enter complete address

NEXT - ADD ITEMS →

Add Items

Customer: Rajan
Phone: 8445940847

Add New Item

Item Name *
milk

Quantity
40

Price (₹) *
₹ 50

Tax Rate (%) *
0% 5% 9% 12% 18% 28%

+ ADD ITEM TO BILL

Add Items

Customer: Rajan
Phone: 8445940847

Added Items (2)

milk
Qty: 40 × ₹50.00
Tax: 12%
Item Total: ₹2240.00

curd
Qty: 49 × ₹35.00
Tax: 18%
Item Total: ₹2023.70

Subtotal ₹3715.00
Total Tax ₹548.70
GRAND TOTAL ₹4263.70

8. Conclusion

The e_bill project has successfully demonstrated the development of a practical and efficient digital invoice management solution using the Flutter framework. By focusing on the specific needs of small business owners, we have created an application that effectively digitizes and simplifies the entire billing workflow.

The project has achieved its primary objectives of providing a user-friendly interface for business setup, a streamlined process for creating detailed bills with flexible taxation, robust bill management with status tracking, and professional PDF generation. The implementation of features like the one-time profile setup, per-item tax calculation, and the context-aware 'Add More Items' function directly addresses the pain points identified during our research.

Developing the application for the web ensures wide accessibility, overcoming the limitation of device-specific connectivity. The use of Flutter proved highly effective in rapidly building a consistent and responsive user interface.

In conclusion, e_bill represents a successful application of cross-platform development to solve a real-world business problem. It underscores how technology can be leveraged to create affordable, powerful tools that enhance operational efficiency, reduce errors, and support the growth of small businesses in an increasingly digital economy.