MANIPAL INSTITUTE OF TECHNOLOGY

MANIPAL

(A constituent institution of MAHE, Manipal)

Department of Humanities and Management

DESIGN THINKING (HUM 4412)

April 2025

INTERNAL ASSIGNMENT-3

on

(Smart Grocery Management System)

Submitted by

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Introduction

Securing the monthly ration was a top priority for Indian households. With a fixed budget allocated for essential groceries, families would stock up during the first 7 days of the month to ensure their basic needs were covered. This practice was deeply ingrained in the Indian household routine, offering security.

However, the convenience and speed of 'Quick Commerce' services have changed this habit. Now, consumers are increasingly buying groceries according to their immediate needs rather than stocking up. And traditional supermarkets are feeling the brunt.

DMart's LFL growth dropped significantly in recent years. This has resulted in overstocked inventory, tying up capital and increasing risk of storage. It also increases the labour costs of handling this excess inventory.

Hence, we wanted to bridge the gap between managing inventory for supermarkets and catering to the consumers who want quick and cheap delivery of grocery products. So, we came up with an app that solves this problem which allows supermarkets to sell their excess inventory and allows consumers to buy products at a cheaper rate than from traditional QCOM platforms.

Empathy Mapping

To get an in-depth understanding of the diverse consumers groups, we conducted market research using google forms to curate and analyse the behaviour and needs of the target users.

Link to google form- Consumer Behaviour when buying groceries
Google form responses- Consumer Behaviour data

Target Personas

1. College students:
    - Age group: 18-24
    - Live in hostels on PGs.
    - Buy groceries daily/weekly due to limited storage space.
2. Working Professionals:
    - Age group: 25-45
    - Cater to their families.
    - Struggle to keep track of grocery items.
    - Prioritize easy access (like delivery systems or smart home appliances).
3. Elderly people:
    - Age group: 45-70
    - Prefer easy to use interface for shopping applications.
    - Highly concerned with health and nutrition of their meals.

4. Homemakers:

- Age group: 25-45
- Meal planning is a major concern for them.
- Need an intuitive, time-saving, and flexible solution for grocery shopping.

What does the user **say**?

- "I tend to forget what groceries I already have."
- "I throw money away purchasing something I bought last week."
- "If only I could remember before something expires."
- "Don't know how to keep track of expiry dates."

What does the user **think**?

- "It would be so convenient if my phone could keep track of my groceries."
- "Grocery management is time-wasting and tedious."
- "I want to save money and not throw food away."
- "Technology needs to make doing chores at home easier."

What does the user **feel**?

- Frustrated with food items going bad without noticing
- Feeling guilty about food wastage
- Burdened with managing groceries along with other tasks
- Worried about being out of essentials at an inconvenient time

What does the user **do**?

- Handwrites grocery lists (on paper or phone)
- Shops impulsively without reviewing latest availability
- Forgets to buy items or purchases them twice
- uses reminder apps (but not grocery-specific)

Problem statement

Quick Commerce platforms often apply deep discounting strategies on their services. For example, a Nescafe coffee jar priced at ₹622 for small retailers is sold at ₹514 on Zepto and ₹577 on Swiggy Instamart. This creates unrealistic price expectations for products that disrupt the retail space. Once the competition has become lopsided towards these platforms and when funding is dry, these platforms may indulge in price surges which would result in consumers spending more out of their pocket for buying products.

On the other hand, due to the convenience of Quick commerce, Retail Giants like Dmart are facing a huge decline in sales. DMart's annual revenue decreased from ₹24,738 crore in FY2020 (before QCOM's rise) to ₹14,462.39 crore in Q4 FY2025. This represents a 41.54% reduction in

revenue over this period. Retail Giant Metro's revenue dropped from ₹6,915 crore to ₹5,638 crore. This is an 18.47% revenue drop during that period.

This has also resulted in Supermarkets' inventories overflowing. DMart's overstocked inventory grew by 23%, reaching ₹3,450 crore in H1 FY25, up from ₹2,800 crore in FY23. The turnover ratio has dropped from 14.8 in FY23 to 6.6 in H1 FY25, indicating that inventory is being held for longer periods and the retail giant is unable to push them out at a fast enough speed.

Although we have inventory management systems like Odoo in the market, no business is solving consumer product price problems or excess inventory issues for supermarkets that lack the tech infrastructure to compete with the QCOM platforms. From our survey, we found that most of the population buys groceries from online platforms and are greatly influenced by the price. They also suffer from overspending.

This further validates the need to solve for this growing concern.

Ideation: Brainstorming & Solutions

Problem Statement

"Consumers tend to forget to replenish or overstock food, resulting in waste, unnecessary cost, and inconvenience. A smart system can track, remind, and recommend food based on consumption habits."

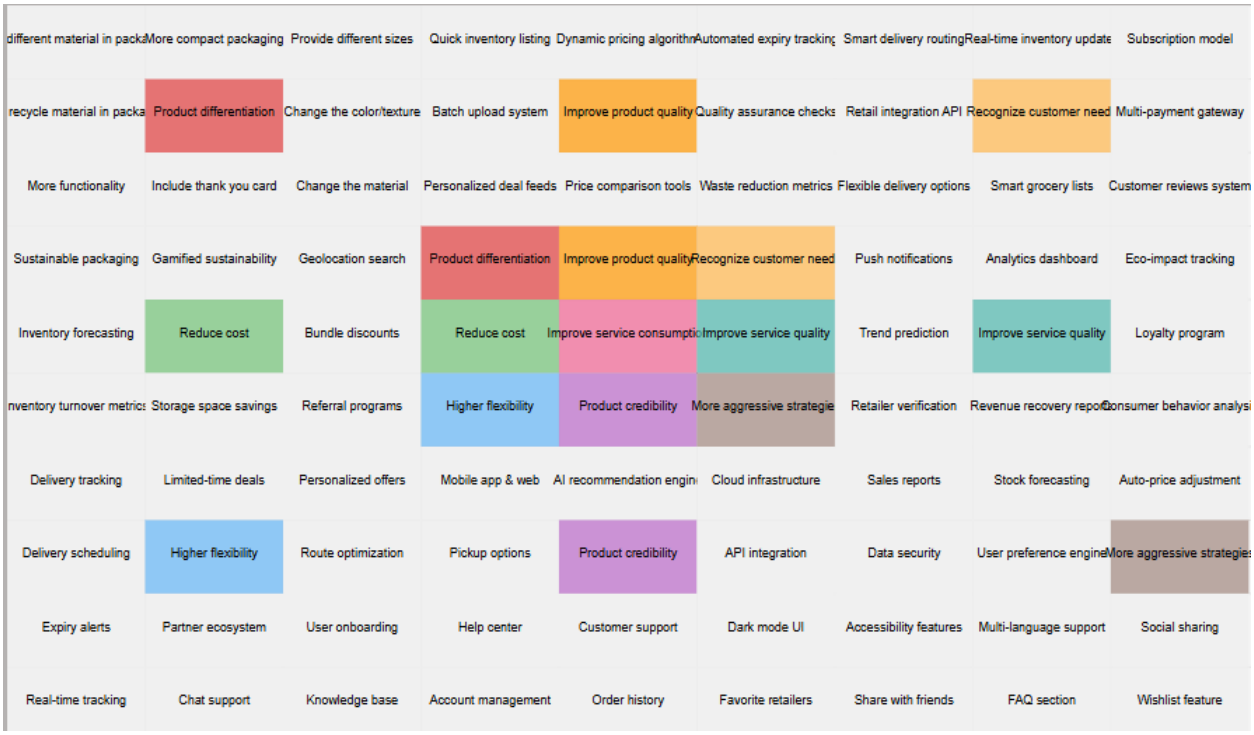
Ideas Generated

1. A grocery application through which vendors can sell surplus stock at lower prices, assisting them in removing inventory while giving customers value for money.
2. Smart Pantry App – Users enter groceries, and the application monitors quantity and expiration dates. Notification is sent when an item is running low or near expiration date.
3. Voice-based Input – Add groceries via Alexa/Google Assistant.
4. Shared Access – Roommates/family members can view and edit the grocery list collaboratively.
5. Recipe Ideas – Recommend recipes depending on what one must limit waste.
6. Linking with Web Grocery Stores – Purchase straightaway when it finds low stocks.
7. Waste Analysis Report – Monthly account on food waste to promote aware consumption.

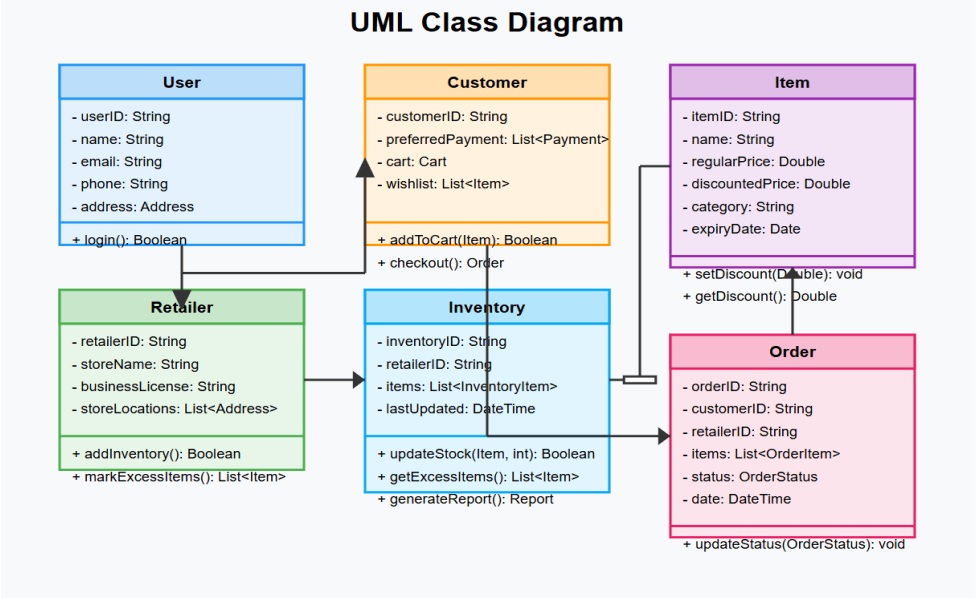
Final Approach:

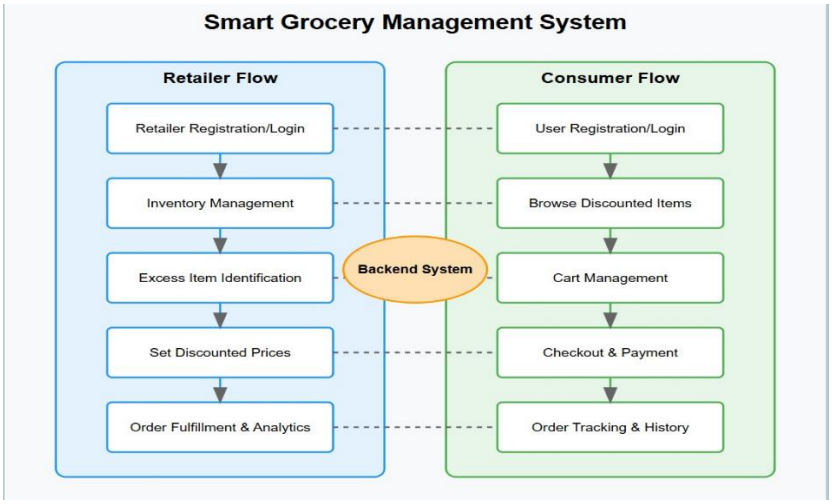
A grocery app where sellers can offload excess inventory at discounted prices, helping them clear stock while offering buyers affordable options. The platform reduces food waste, provides a convenient shopping experience, and supports local businesses with features like geo-location, expiry alerts, and delivery options.

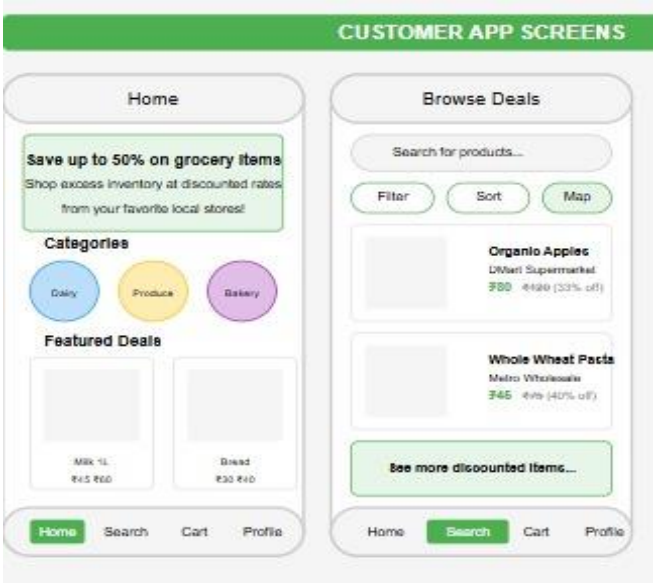
Lotus Blossom Diagram:



Prototype




Smart Grocery Management System
Retailer Flow
Retailer Registration/Login
Inventory Management
Excess Item Identification
Set Discounted Prices
Order Fulfillment & Analytics
Backend System
Consumer Flow
User Registration/Login
Browse Discounted Items
Cart Management
Checkout & Payment
Order Tracking & History


CUSTOMER APP SCREENS
Home
Save up to 50% on grocery items
Shop excess inventory at discounted rates from your favorite local stores!
Categories
Dairy
Produce
Bakery
Featured Deals
Home
Search
Cart
Profile
Browse Deals
Search for products...
Filter
Sort
Map
Organic Apples
₹80
Whole Wheat Pasta
₹45
See more discounted items...
Home
Search
Cart
Profile


RETAILER APP SCREENS
Dashboard
230
Items Listed
₹12,500
Revenue
Inventory Alert
42 items identified as excess inventory
Mark for Discount
Recent Orders
Order #4236
Order #4234
Home
Inventory
Orders
Profile
Inventory Management
Search inventory...
All
Low Stock
Excess
Organic Apples (1kg)
Whole Wheat Pasta (600g)
Milk (1L)
EXCESS
Home
Inventory
Orders
Profile
Analytics
Overview
Sales
Stock
Inventory Turnover Rate
Total Stock Value
₹145,300
Excess Value
₹34,250
Optimize inventory by marking 42 items as excess
Home
Inventory
Orders
Profile

Smart Grocery Management App - Technology Stack

Layer	Technology Stack
Consumer App	React Native, Redux, React Query, React Native Paper
Retailer App	Kotlin, Jetpack Compose, ML Kit, Android Jetpack
Backend API	Node.js, Express, MongoDB, Redis, Elasticsearch
DevOps & Infra	AWS, GitHub Actions, Docker, Kubernetes (Future)
Monitoring	New Relic, Firebase Analytics
Payments & Maps	Razorpay, PayTM, Stripe, Google Maps API

Features and Functionality

Key Features for your Smart Grocery Management App

For Retailers:

1. **Excess Inventory Dashboard**: A centralized system for retailers to easily add and manage excess inventory items with photos, descriptions, quantities, and expiry dates.
2. **Dynamic Pricing Tools**: Algorithms that suggest optimal discounted prices based on expiry dates, quantity, demand trends, and current market prices.
3. **Inventory Analytics**: Detailed reports showing inventory turnover rates, popular items, revenue recovery, and waste reduction metrics.
4. **Automated Alerts**: Notifications when inventory is nearing expiry to prompt listing on the platform with appropriate discounts.
5. **Batch Upload**: Ability to quickly list multiple items at once using CSV uploads or integration with existing inventory systems.

For Consumers:

1. **Personalized Deal Feeds**: AI-powered recommendations based on purchase history, preferences, and browsing behavior.
2. **Price Comparison**: Shows savings compared to regular retail prices and competing quick commerce platforms.
3. **Flexible Delivery Options**: Same-day delivery, scheduled delivery windows, or in-store pickup options.
4. **Subscription Plans**: Weekly/monthly grocery boxes of discounted items matching customer preferences.
5. **Smart Lists**: Automated grocery lists that notify users when their regular items are available at discounted prices.

Platform Features:

1. **Geolocation-Based Search**: Shows nearby retailers with excess inventory matching user preferences.
2. **Real-Time Inventory Updates**: Ensures listings are accurate and prevents disappointment from out-of-stock items.
3. **Gamified Sustainability Impact**: Visualizes the environmental impact of purchasing excess inventory (food waste prevented, carbon footprint reduced).
4. **Retailer Verification System**: Quality assurance processes to ensure all listed products meet safety and quality standards.
5. **Multi-payment Gateway**: Various payment options including digital wallets, UPI, credit/debit cards, and cash on delivery.

This concept addresses a real market need while creating value for all stakeholders. The retailers reduce waste and recover costs, consumers get discounts, and the platform helps bridge the gap between traditional retail and quick commerce models.

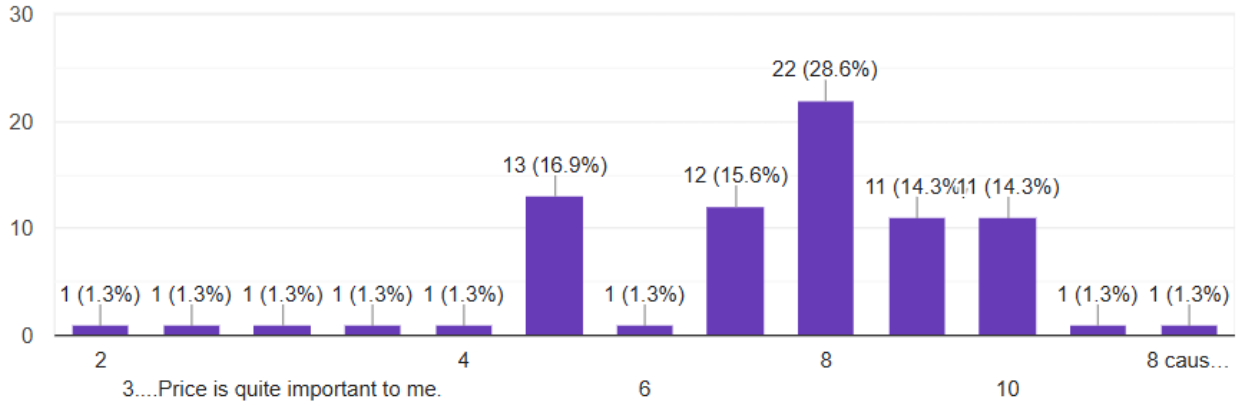
Results and Analysis

Our survey targeted a diverse demographic to understand current grocery purchasing patterns, price sensitivity, and preferences between traditional retail and QCOM (Quick Commerce) platforms. The analysis of the results provided us with the following insights:

1) Consumer Price Sensitivity:

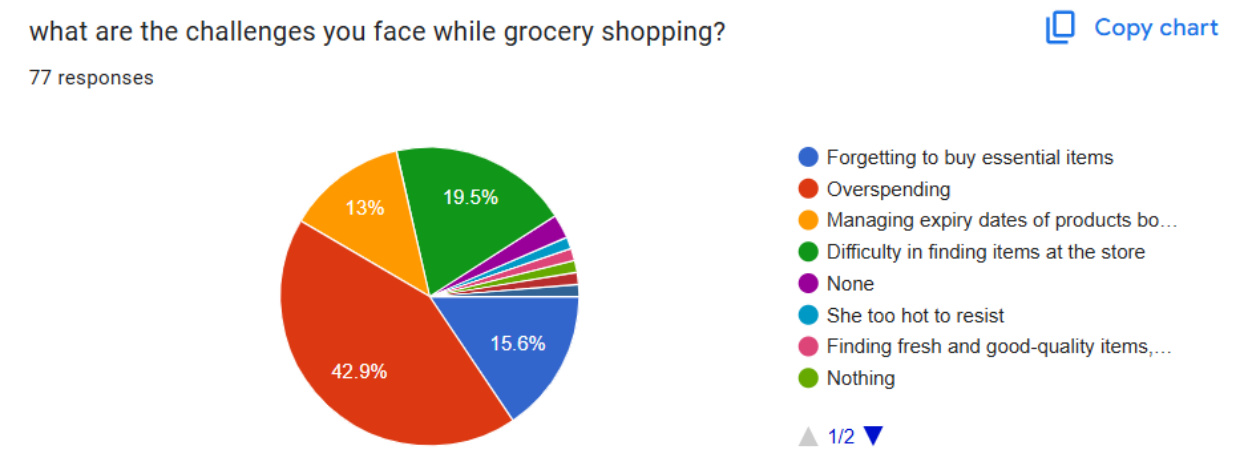
A heavy reliance on discounts was revealed, with approximately 83% of the consumers indicating that competitive pricing and frequent discounts significantly influence their choice of grocery platforms. QCOM easily capitalized on reliance on discounting, by providing extensive

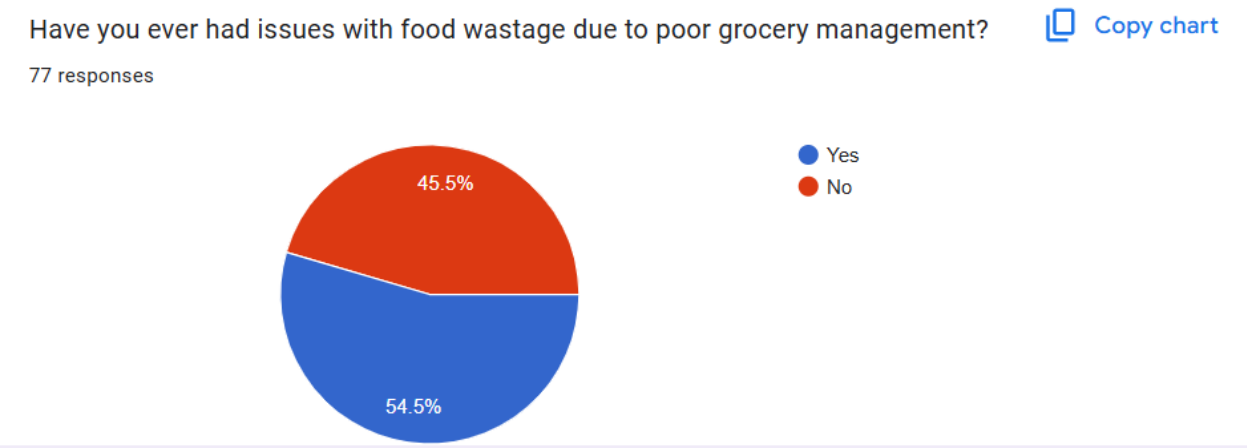
promotional pricing on the branded packaged products. It is also observed from the data that price and discounts now override brand loyalty.



2) Shift in Buying Patterns:

With refined computations and analytics, it was revealed that 74% of the respondents reported that they no longer shop in bulk quantities at the start of each month. Rather, they opt for smaller purchases based on immediate needs. This "buy-as-you-need" culture aligns with the nature of QCOM platforms, highlighting a fundamental shift in consumer behaviour.





3) Overspending and Impulse Purchases

Over 50% of users acknowledged that they overspend on groceries while using QCOM apps, primarily due to ease of access and promotional offers. This further implies that QCOM platforms are successfully stimulating heightened consumer engagement and larger average order values due to increased impulse purchases which have historically been good for growth of quick commerce markets and platforms to be profitable

4) Tech Infrastructure Gap

Small and mid-sized supermarkets lack the tools to engage users on mobile apps, list excess inventory dynamically, or offer flash discounts — the very strategies that drive QCOM success. This would evidently result in wastages, stockouts, or overstocking, which undoubtedly points to the need for real-time inventory management tools. Moreover, QCOM platforms rely on

algorithms to promote recommendations and offers based on usage patterns, providing high personalization in conventional retailing.

5) Opportunity for Sustainable Retailing:

Overstocking not only holds up capital but also leads to wastage of food and inefficient supply chain. According to the survey, 72% of respondents said they would actively use a platform that offers grocery items at cheaper rates, especially if the app is powered by excess inventory from local supermarkets. This clearly shows market willingness for a solution that combines affordability, convenience, and retail effectiveness.

Conclusion

The survey results validate the urgent need for an innovative platform that supports both consumers and traditional retailers. On the one hand, consumers are actively seeking lower prices and spending less time on bulk grocery planning. On the other hand, supermarkets are struggling to move inventory and remain competitive due to the rise of QCOM platforms.

Our app emerges as a bridge — enabling supermarkets to digitize and dynamically sell excess inventory while offering consumers real-time discounts on grocery essentials. This addresses the unsustainable pricing wars in QCOM and the operational struggles of offline retailers.

By combining affordability, accessibility, and inventory optimization, this solution aligns with changing consumer behavior and ensures sustainability for retailers. It is not just a price disruption tool — it's a new model for inventory-liquidation commerce, empowering both ends of the retail spectrum.

Future Enhancements

Since most of the customers buy groceries weekly, a subscription model could be implemented to make it convenient for buyers.

This can also be done to integrate local kiraana stores once enough scale has been achieved to make the app more impactful.

AI and data analysis methods can be used to analyse customer buying data to cater to their needs better**.**