



Refill.Me

No Waste, No Haste - Package-Free

Feasibility

By Team Iron
Old Dominion University
CS 410
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Image source:
<https://www.pexels.com/photo/person-holding-orange-fruits-in-white-net-3737624/>





At a Glance

Meet the Team.....	3
Problems with Packaging.....	4-5
Recycling.....	6-7
Package-Free Shopping.....	8
Target Group.....	9-10
Problem Statement.....	11
Problem Characteristics.....	12
Current Process Flow.....	13
Solution Statement.....	14
Solution Characteristics.....	15
Solution Process Flow.....	16
Benefits.....	17
Stakeholders / Customers / Users.....	18
Major Functional Component Diagram...	19
Risks.....	20-22
Competition.....	23
What our app will not do.....	24
Key Points.....	25
References.....	26

Image source:
<https://piximo.com/food-and-drink/ingredients-market-boxes-colours-foodfruit-vegetable-grocery#>

Meet the Team



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Packaging Waste: A Big Problem

USA

- ❖ 82.2 million tons of packaging waste / year
(in 2018) ⁽³⁾
- approx. 160 times the weight
of the One World Trade Center
- ❖ 28.1 % of total waste generation ⁽³⁾



Image source:

https://commons.wikimedia.org/wiki/File:One_World_Trade_Center_Building.jpg

Main Issues With Packaging

Plastic - Paper - Aluminum - Glass

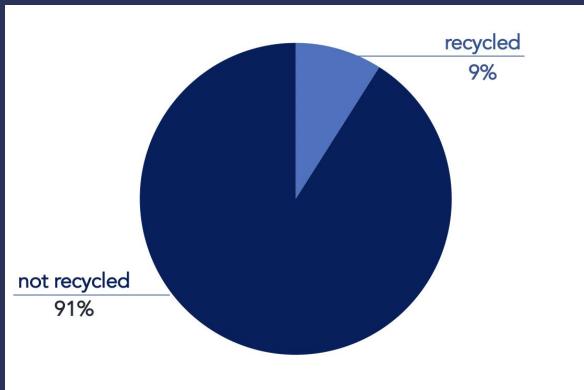
- ❖ greenhouse gas emissions ⁽⁸⁾
- ❖ microplastics pollution ⁽⁸⁾
- ❖ usage of nonrenewable resources ⁽⁸⁾
- ❖ plastic and glass do not biodegrade ⁽¹⁾
- ❖ paper can be recycled max. seven times ⁽⁹⁾
- ❖ leakage of harmful chemicals from plastic packaging into food ⁽⁵⁾
 - ❖ paper packaging: often lined with plastic ⁽¹⁰⁾



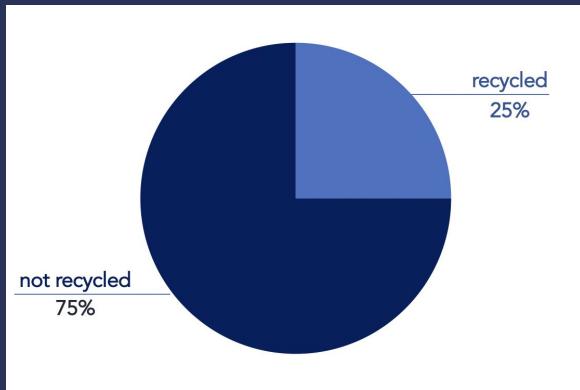
Image source: <https://www.flickr.com/photos/jeepersmedia/15213386005>

Recycling Is Not Good Enough

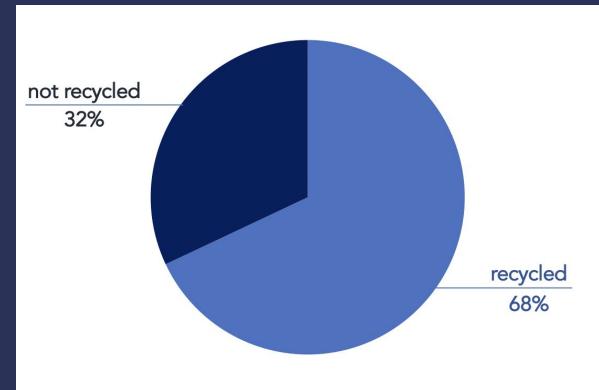
Recycling rates (in 2018) ⁽⁴⁾



Plastic



Glass

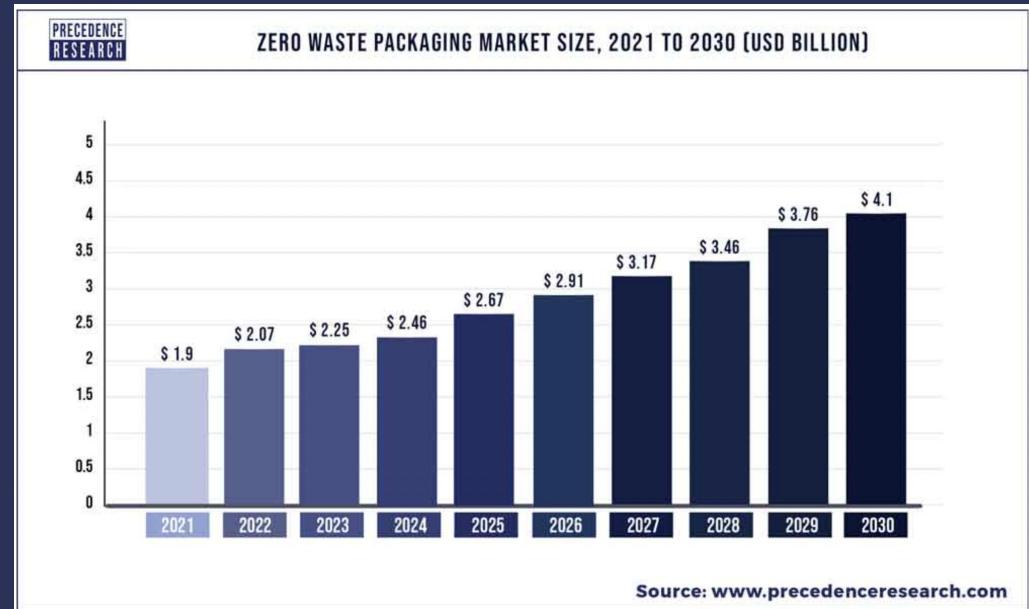


Paper

Market of Reusable, Compostable, Edible Goods

predicted to increase significantly as a result of:

- ❖ the strict regulatory environment
- ❖ single-use plastics are prohibited in a large number of nations
- ❖ the worldwide environmental crisis



What We Mean By Package-Free Shopping

BYOC Bring Your Own Containers

- ❖ tote bags
 - ❖ plastic or glass jars, boxes
 - ❖ plastic or glass bottles for liquids
 - ❖ produce bags



Who Is Struggling?

Shoppers who would like to

- ❖ reduce their packaging waste
- ❖ reduce transportation emissions
- ❖ consume with consciousness

In the USA, concerned about packaging waste: ⁽²⁾

87% of Generation Boomers

79% of Generation X

83% of Generation Millennials

85% of Generation Z



Image source:
<https://www.pexels.com/photo/crop-woman-putting-vegetables-into-wicker-basket-7262859/>

The Characteristics of Our Primary Target Group

- ❖ mostly women ^(6, 7, 11)
- ❖ from Gen Z to Baby Boomers ^(7, 11)
 - ◊ ages 18 - 65
- ❖ mainly reside on East and West coast ⁽⁷⁾
- ❖ diverse income levels ^(7, 11)
- ❖ highly educated ^(7, 11)
- ❖ passionate about environmental change ^(6, 7)

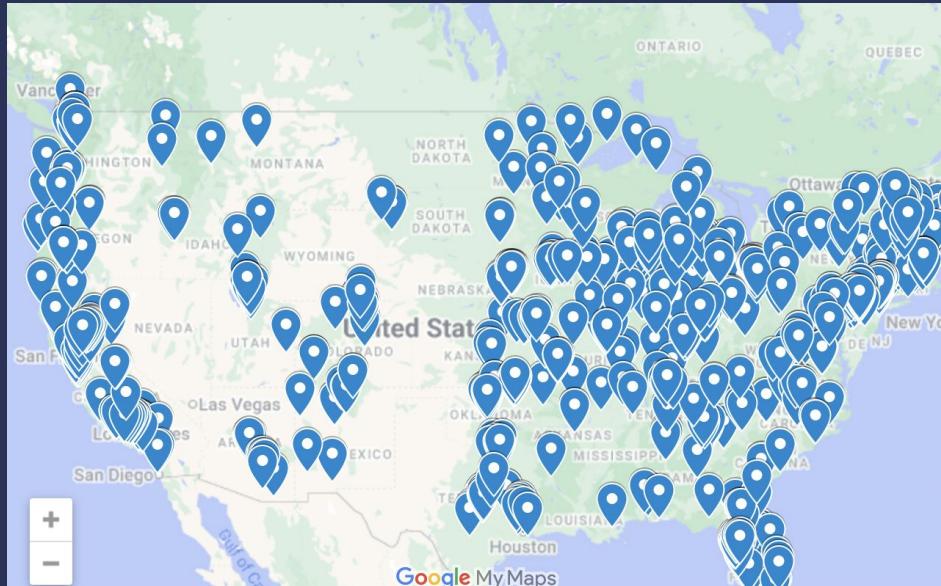


Image source:
<https://www.backcountrycitygirl.com/blog/where-to-zero-waste-shop-all-across-america> 10

Problem Statement

Mainstream grocery shopping damages our ecosystem through packaging waste from cans, glass, cardboard, and plastic.

Shoppers who are interested in reducing their environmental impact and would like to do package-free shopping lack detailed information such as product and price listings of loose products that are available in their neighborhood.

These shoppers need a tool that provides relevant and accessible information to make sustainable shopping less intimidating.



Problem Characteristics

Lack of Information

zero or little knowledge about where package-free stores are located

lack of knowledge about stores' package-free offerings

lack of transparency regarding prices of loose products

Shoppers' Struggle

frustrated by unnecessary, wasteful packaging

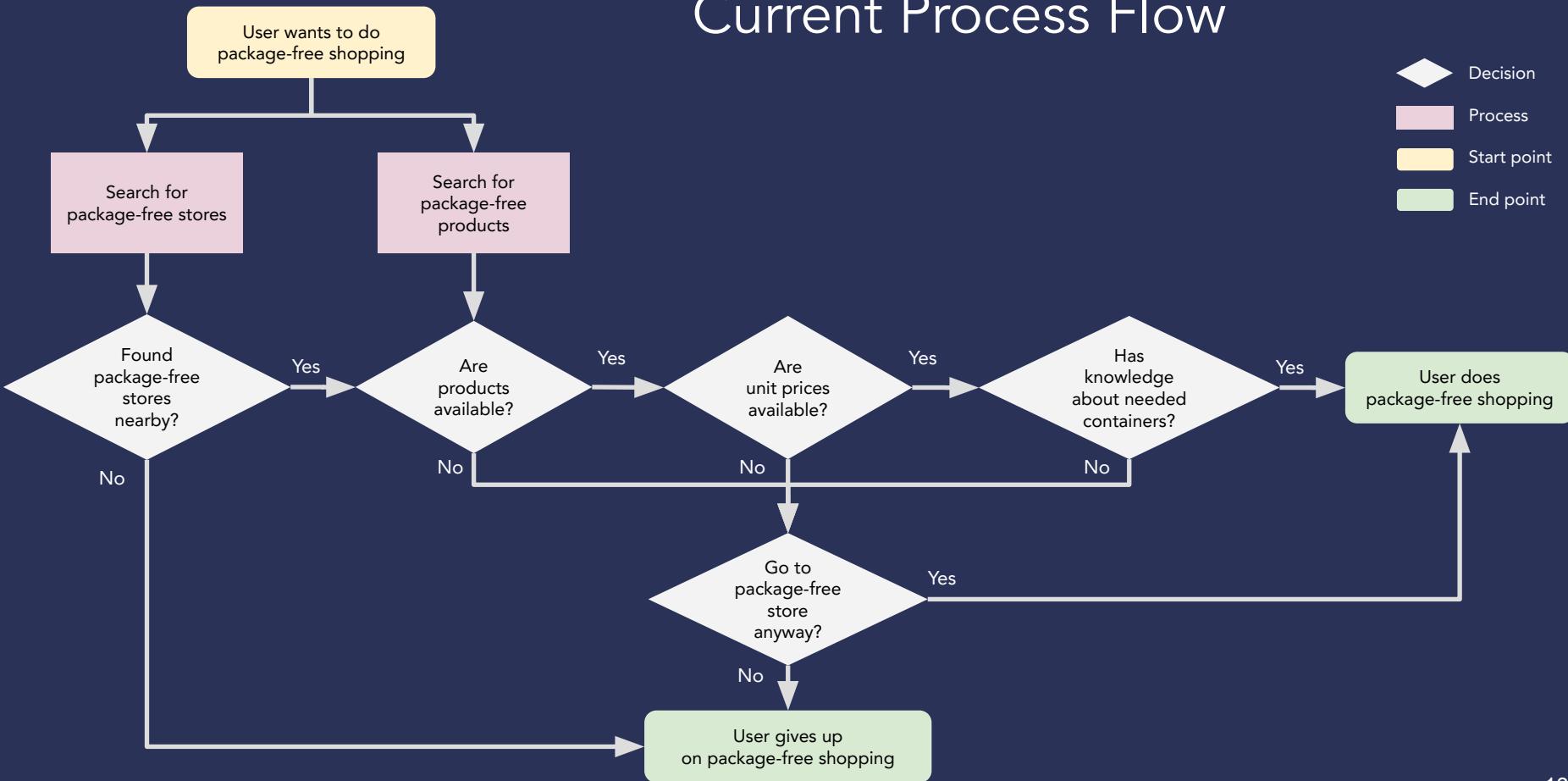
tiresome and difficult to search for package-free stores and products

lack of knowledge about containers to use

Missing Hub

existing apps offer limited features that are only somewhat useful for package-free shoppers, as opposed to many apps supporting mainstream grocery shopping

Current Process Flow



Our Solution: Refill.Me

Refill.Me is an encompassing information-hub in the form of a mobile phone application that provides relevant, practical and up-to-date information regarding package-free shopping.

Refill.Me helps novice package-free shoppers throughout their transition into package-free shopping and supports experienced shoppers to keep up their eco-friendly shopping habits.

By using Refill.Me, package-free shoppers save time and support local businesses, while reducing packaging waste.



Image source
<https://www.flickr.com/photos/nenadstojkovic/49984904868>

Solution Characteristics

Plenty of Information

exhaustive listing of nearby supermarkets with bulk section, package-free stores, and farmers' markets

product listings with unit prices

Shoppers' Delight

easy search by product or by stores
information about containers provided in the Container Guide, and by the smart container recommendation feature

shopping list makes shopping easy to plan

reward system, Reward.Me to collect points and enjoy discounts

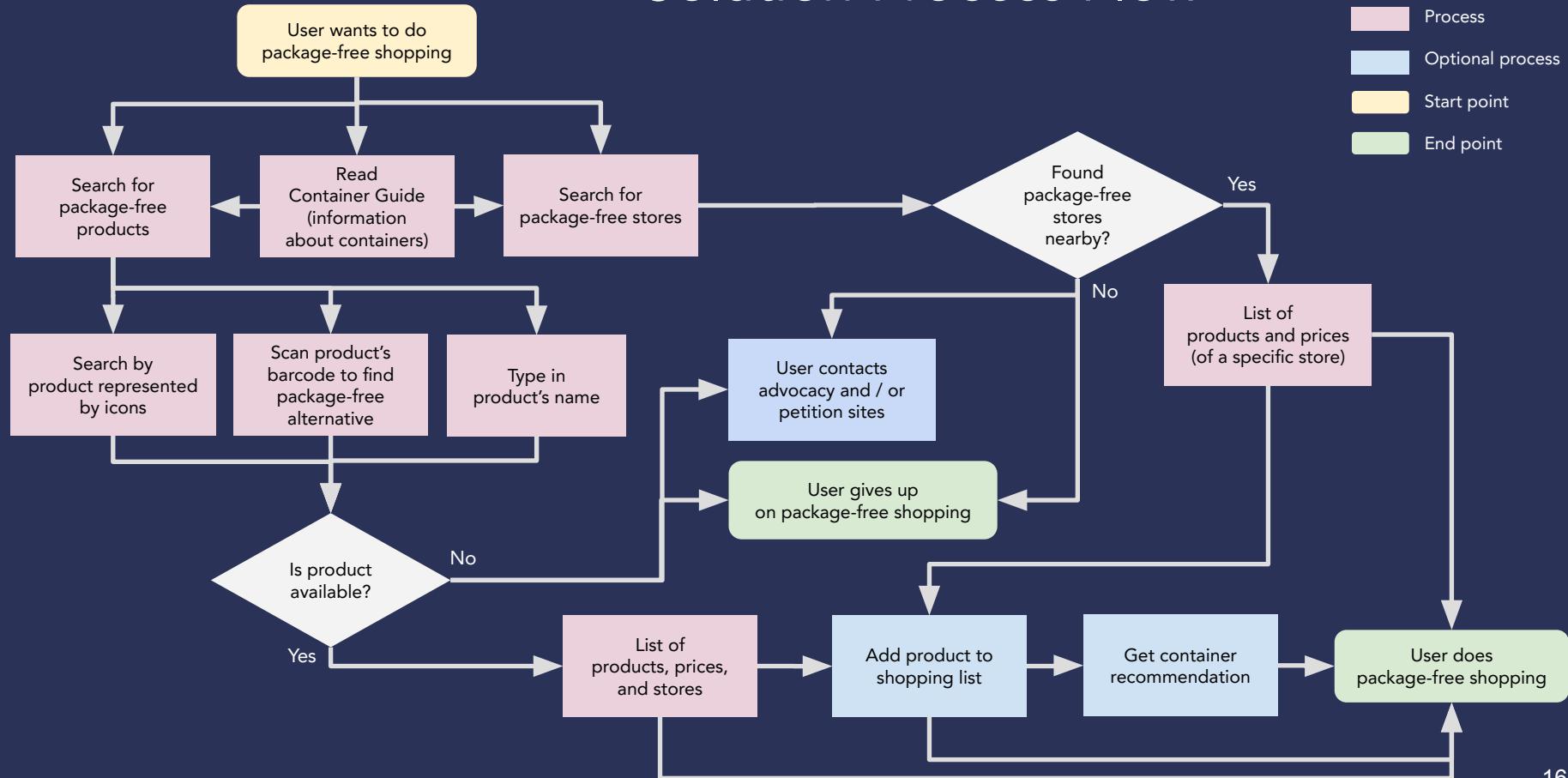
Resource Hub

a convenient app for both new and experienced package-free shoppers

use crowdsourcing to increase data accuracy

collect shoppers' search information to improve stores' product offerings

Solution Process Flow



Benefits

Users

easy to plan package free shopping based on store and product information

good understanding of needed containers

transparency regarding prices

Shops

attract package-free shoppers

increase revenue

increase digital presence

gain first-hand information about products that shoppers are searching for

Environment

less trash

less food waste

less harmful chemicals

Our Partners

Stakeholders

- non-governmental environmental organizations
- individual investors

contributions

- ❖ initial funding
- ❖ ideas
- ❖ networking

Customers

- supermarkets with bulk section
- package-free stores
- farmers' markets

app usage

- ❖ free account
- ❖ website
 - manage list of products
 - update prices

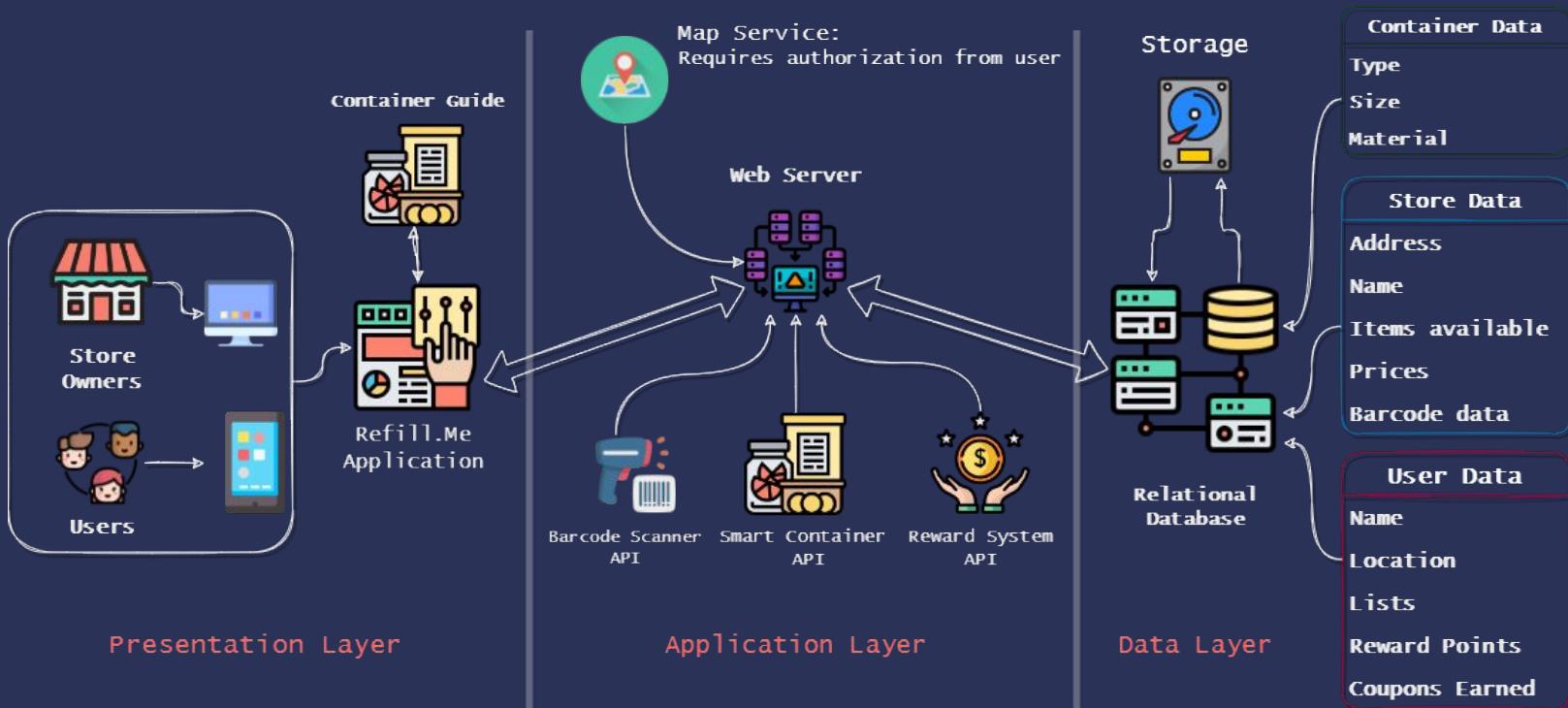
Users

- novice package-free shoppers
- experienced package-free shoppers

app usage

- ❖ free trial period
- ❖ subscription-based pricing model

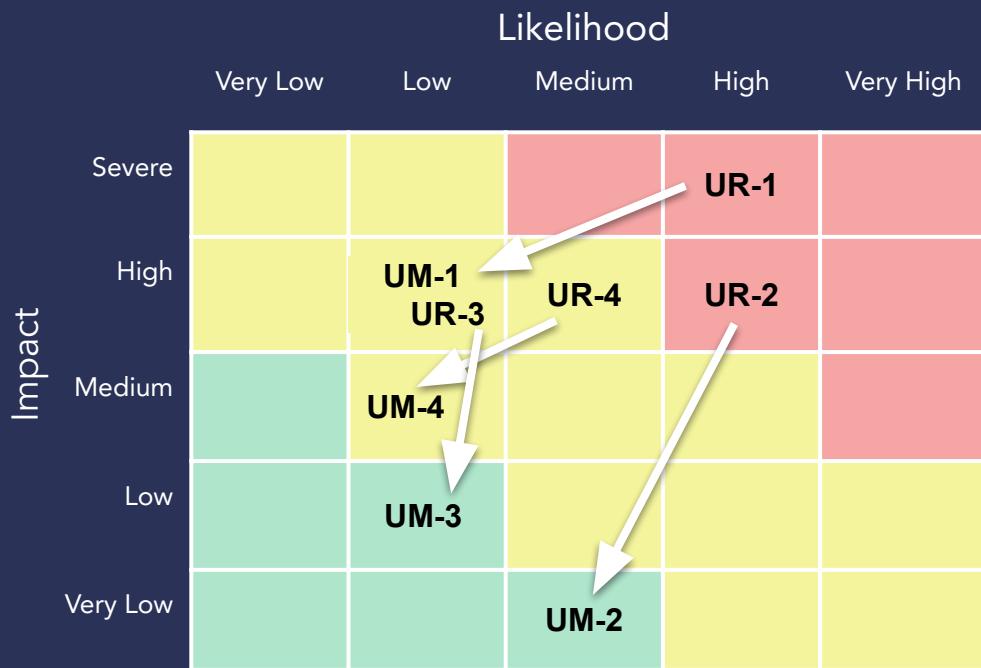
Major Functional Component Diagram



Legend:



User Risk Matrix



Risks

- UR-1: Shopper has no package-free stores in their area
- UR-2: Shoppers are not familiar with needed containers
- UR-3: Shopper loses interest in the app
- UR-4: Shopper types in product name and app returns no product available

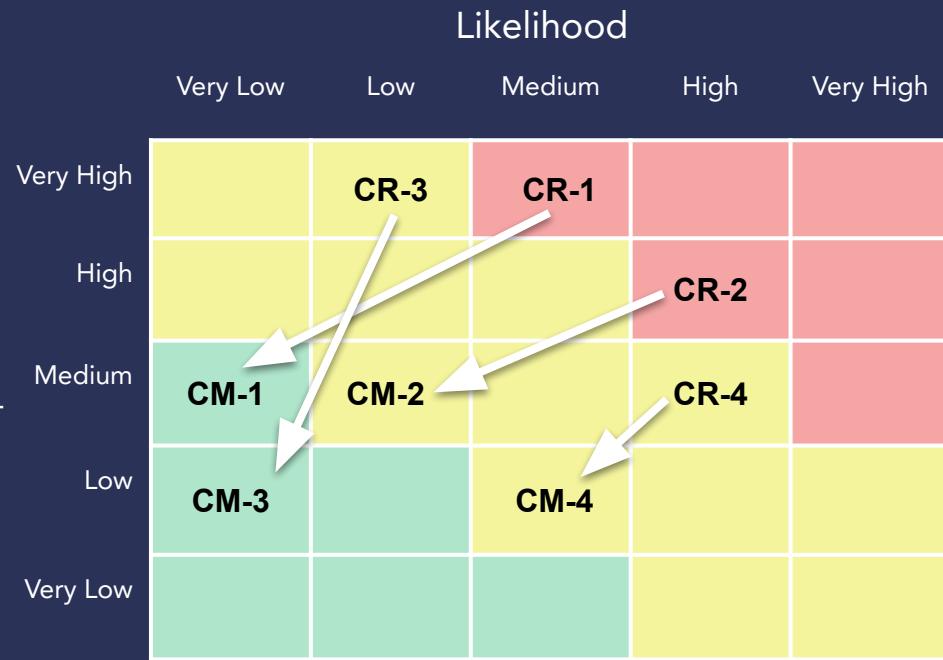
Mitigation

- UM-1: App connects shoppers to advocacy and petition sites
- UM-2: App provides 'Container Guide'
- UM-3: Product and price listing is constantly updated, reward system keeps shoppers engaged
- UM-4: App lists related products

Legend:

- low risk
- medium risk
- high risk

Customer Risk Matrix



Risks

CR-1: Stores cannot keep product/price information up-to-date
CR-2: Stores submit partial information
CR-3: Stores are unable to scan the barcode provided for the reward points for the user
CR-4: Holiday hours are not updated

Mitigation

CM-1: Remind stores weekly to update product/price information
CM-2: Provide a template/form for store owners to follow
CM-3: Generate new barcode for the shopper
CM-4: Automated reminder for stores to update their holiday hours

Legend:



Technical Risk Matrix

Risks

TR-1: Receipt upload fails because the OCR cannot process the data

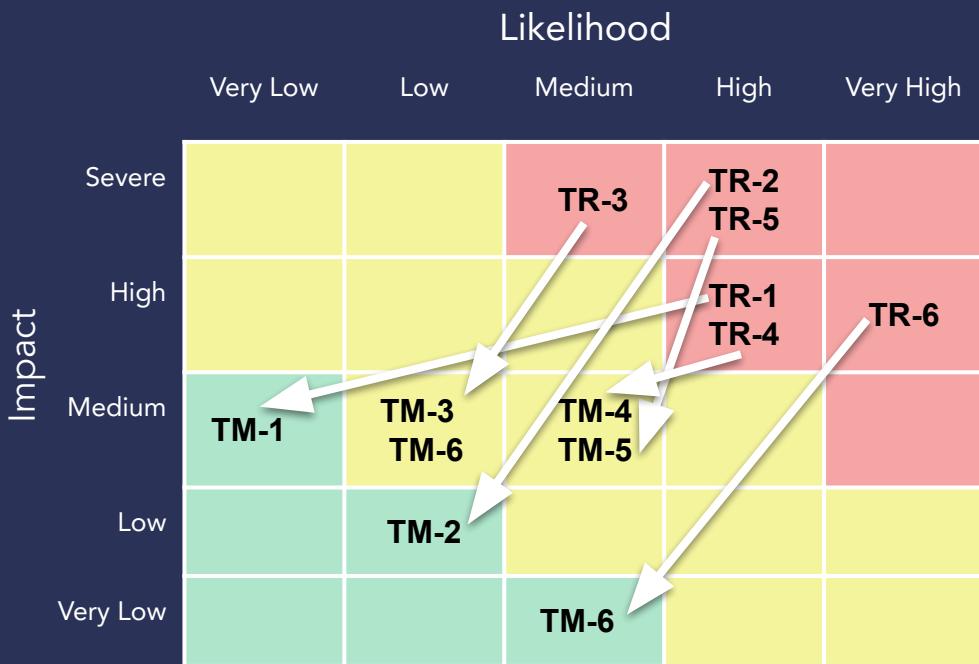
TR-2: App lists wrong product or wrong price

TR-3: Infrastructure failure

TR-4: Credentials/data compromised

TR-5: API integration comes with technical complexities

TR-6: Mapping feature fails



Mitigation

TM-1: Allow user to manually enter the data

TM-2: App updates data every 4-8 hrs with automated scheduled script; error log for developers to track

TM-3: Adopt mitigation data/server protection practices, outsource server hosting

TM-4: Use good cybersecurity practices

TM-5: Studying API documentation, using an API Integration Platform

TM-6: An offline map of the closest 5 stores to the user will be saved

Sizing Up The Competition

	Refill.Me	Go Zero Waste	Zero Waste App	ZeroWasteHome	Litterless	Google Maps
Nearby Stores	✓	✓	✓	✓	✓	✓
Product Availability	✓	✓	✓	✓	✓	
Search by Product	✓	✓		✓		
Unit Prices	✓					
Shopping List	✓					
Container Recommendation	✓					
Store Rating	✓	✓				✓
Reward.Me	✓					

implementation: ✓ full ✓ partial

What Refill.Me Will Not Do

- ❖ Not a webshop
 - ◊ system for delivering products in reusable containers is not in place - yet
 - ◊ buying loose products from trucks is not widespread - yet

- ❖ Not an educational app
 - ◊ plenty of websites and blogs related to package-free shopping



Image source:
<https://www.rawpixel.com/image/3307216/free-photo-image-warehouse-food-distribution>

Key Points

Refill.Me provides
*the service of connecting people
with the nearest package-free stores.*

A comprehensive tool for

- ❖ novice shoppers who want to transition into package-free shopping
- ❖ experienced package-free shoppers who want to keep up their shopping habits
- ❖ package-free stores to attract shoppers



Image source:

https://commons.wikimedia.org/wiki/File:USDA_is_working_hard_to_expand_access_to_farmers%20%99_markets_for_those_participating_in_the_Supplemental_Nutrition_Assistance_Program_%28SNAP%29.jpg

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