



Refill.Me

No Waste, No Haste - Package-Free

Feasibility

By Team Iron
Old Dominion University
CS 410
10/18/2022

Image source:
<https://www.pexels.com/photo/person-holding-orange-fruits-in-white-net-3737624/>





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

Meet the Team



Judit Chang
Project Manager



Abdullah Pathan
Webmaster



Katelynn Hull
Front end developer /
Document specialist



Gavin Rios
Back end developer



Michael Colombini
Front end developer



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Database Developer / Tester



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Mentor

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

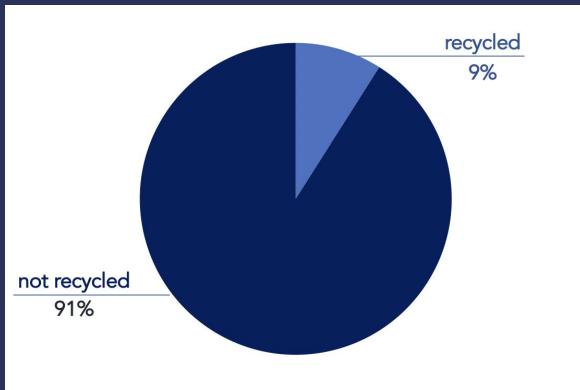
- ❖ greenhouse gas emissions ⁽⁷⁾
- ❖ microplastics pollution ⁽⁷⁾
- ❖ usage of nonrenewable resources ⁽⁷⁾
- ❖ plastic and glass do not biodegrade ⁽¹⁾
- ❖ paper can be recycled max. seven times ⁽⁸⁾



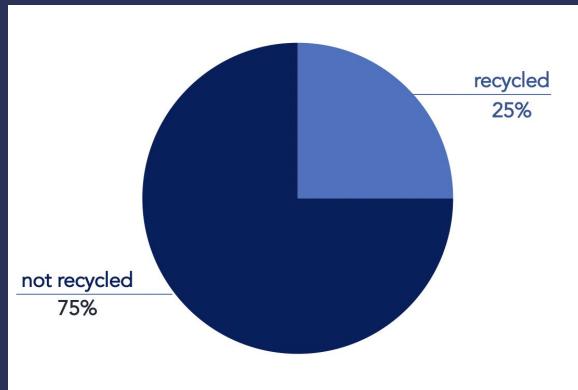
Image source: <https://www.flickr.com/photos/jeepersmedia/15213386005>

Recycling is not good enough

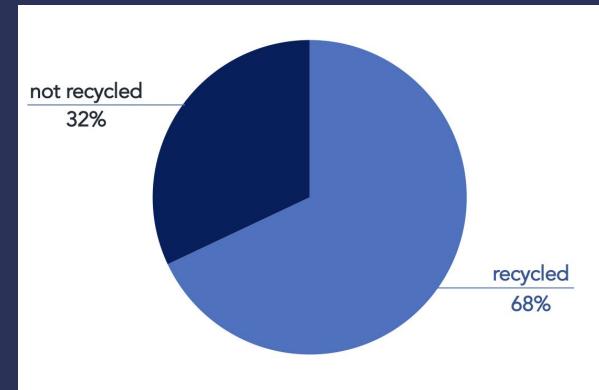
Recycling rates (in 2018) ⁽⁴⁾



Plastic



Glass

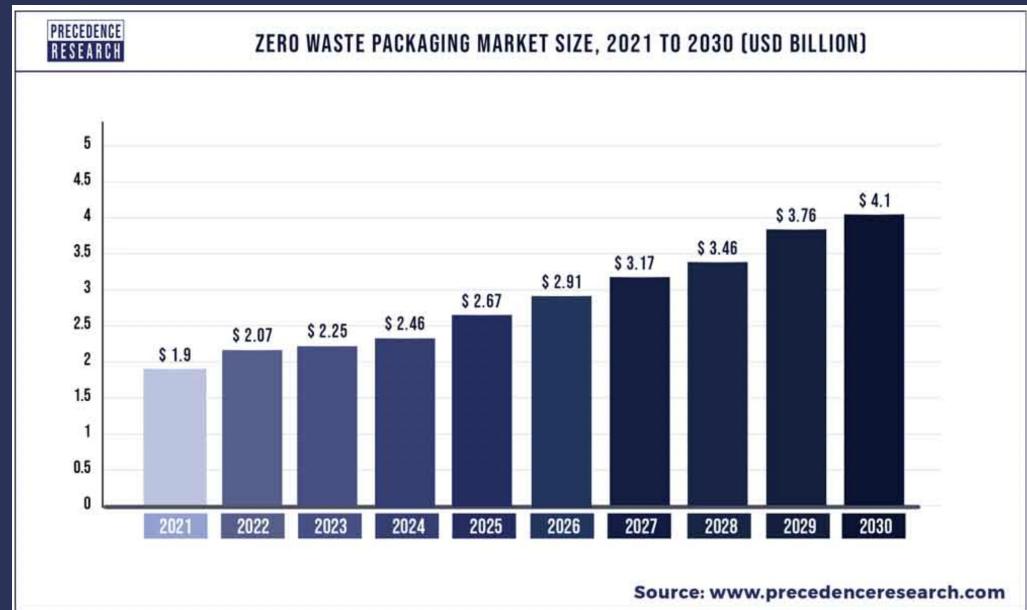


Paper

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/>

Our Target Group

- ❖ mostly women ^(5, 6, 9)
- ❖ from Gen Z to Baby Boomers ^(6, 9)
 - ◊ ages 18 - 65
- ❖ diverse income levels ^(6, 9)
- ❖ highly educated ^(6, 9)
- ❖ passionate about environmental change ^(5, 6)



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

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 transparency regarding prices of loose products

Shoppers' Struggle

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

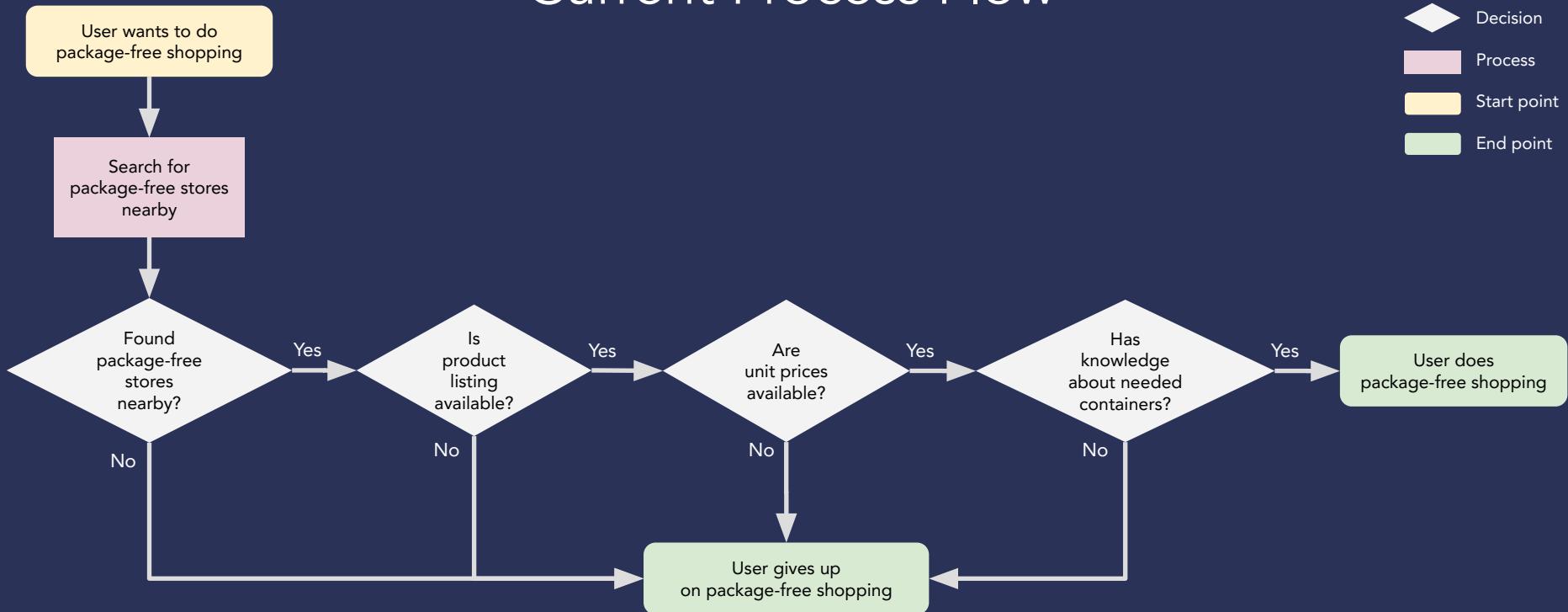
frustrated by unnecessary, wasteful packaging

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

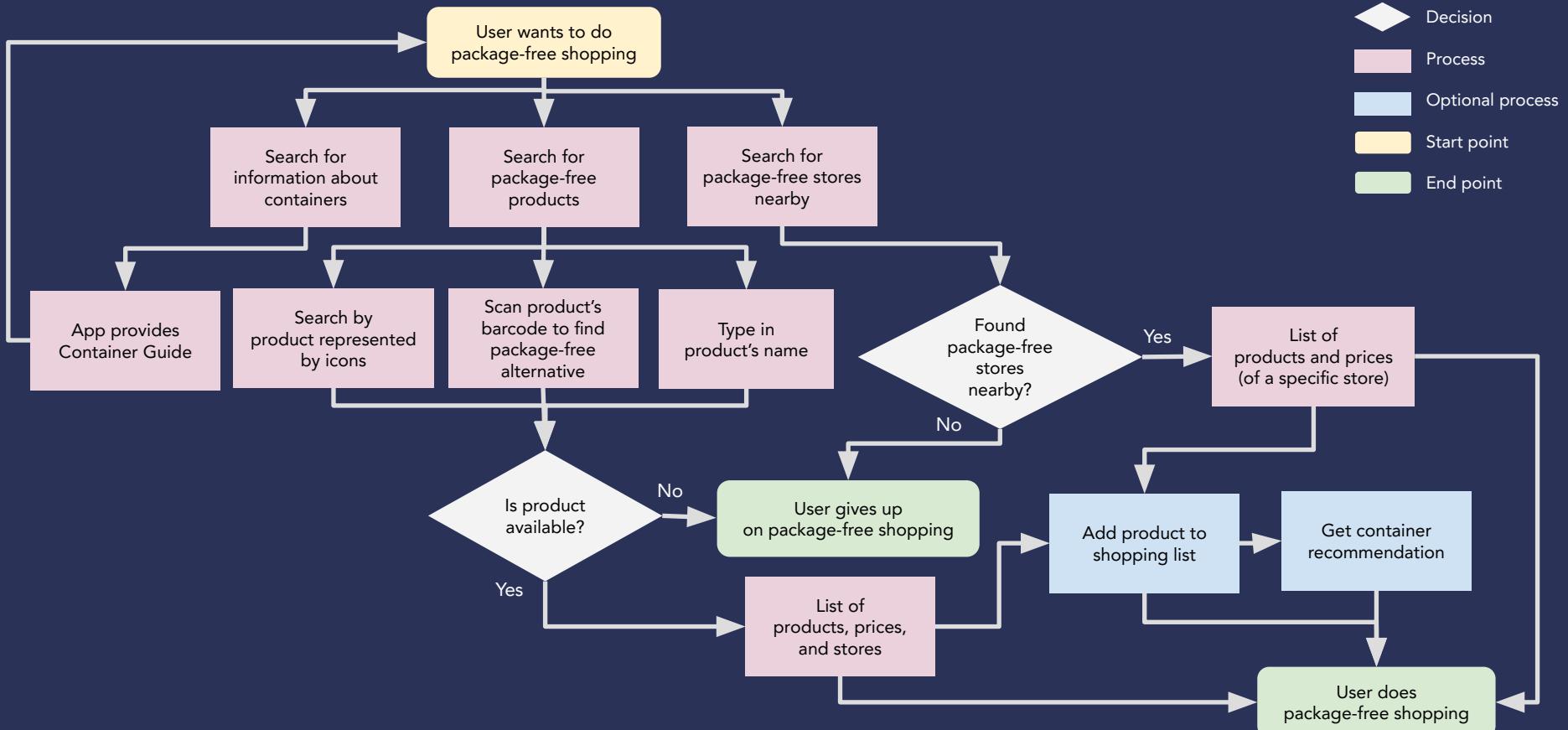
shopping list makes shopping easy to plan

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

Resource Hub

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

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

Environment

less trash

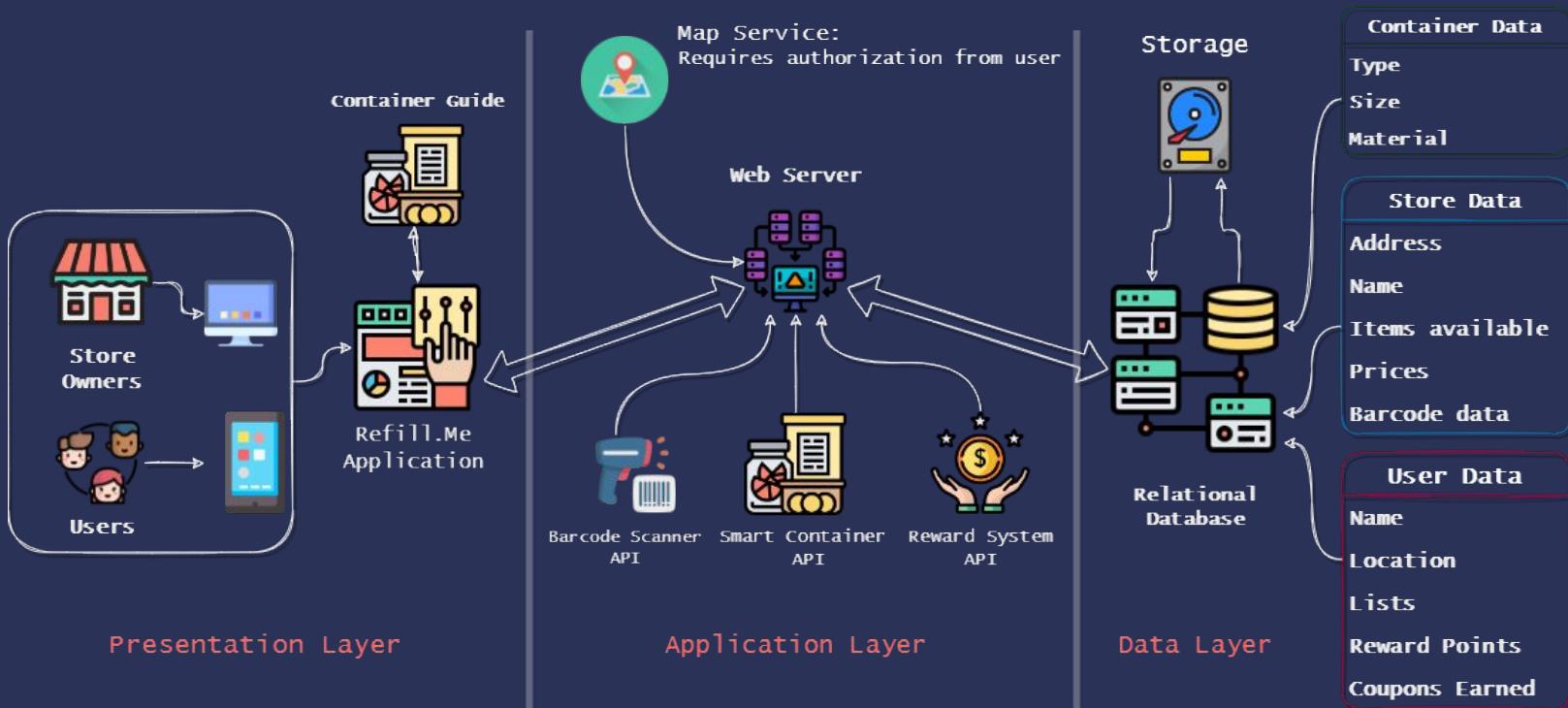
less food waste

less harmful chemicals

Our Partners

Stakeholders	Customers	Users
<ul style="list-style-type: none">- non-governmental environmental organizations- individual investors	<ul style="list-style-type: none">- supermarkets with bulk section- package-free stores- farmers' markets	<ul style="list-style-type: none">- novice package-free shoppers- experienced package-free shoppers
<p><i>contributions</i></p> <ul style="list-style-type: none">❖ initial funding❖ ideas❖ networking	<p><i>app usage</i></p> <ul style="list-style-type: none">❖ free account❖ website<ul style="list-style-type: none">- manage list of products- update prices	<p><i>app usage</i></p> <ul style="list-style-type: none">❖ free trial period❖ subscription-based pricing model

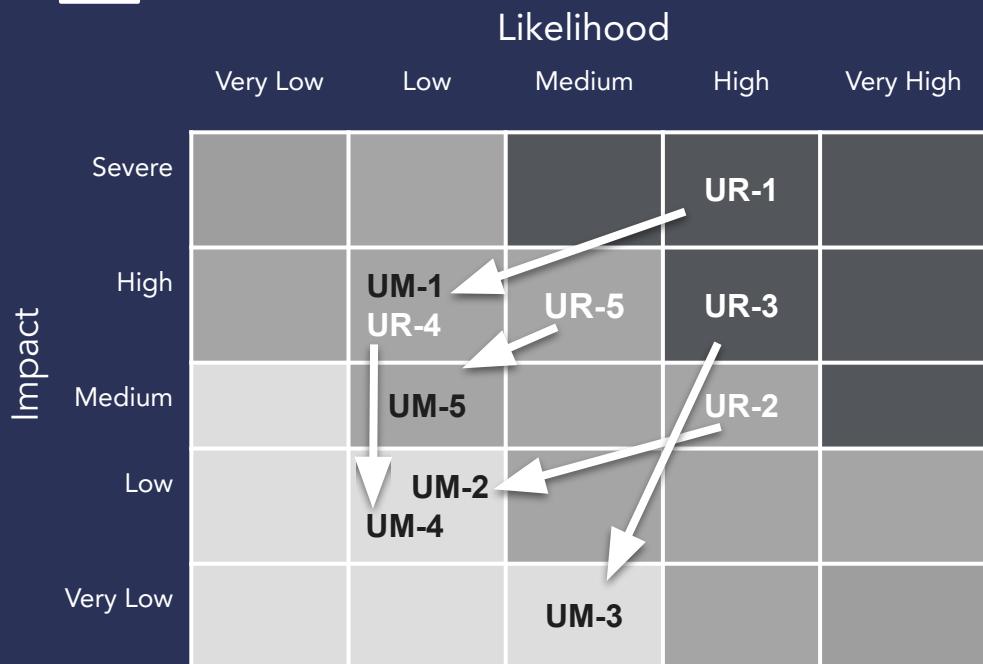
Major Functional Component Diagram



Legend:

- low risk
- medium risk
- high risk

User Risk Matrix



Risks

- UR-1: Shopper has no package-free stores in their area
- UR-2: Some shoppers cannot afford nearby package-free stores
- UR-3: Shoppers are not familiar with needed containers
- UR-4: Shopper loses interest in the app
- UR-5: Shopper's search returns no product available

Mitigation

- UM-1: App connects shoppers to advocacy and petition sites.
- UM-2: Shopper finds other stores nearby with the app
- UM-3: App provides Container Guide
- UM-4: Product and price listing is constantly updated, reward system keeps shoppers engaged
- UM-5: Shoppers can search by icons that represent products available package-free

Legend:

- low risk
- medium risk
- high risk

Customer Risk Matrix



Risks

- CR-1: Stores cannot keep 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

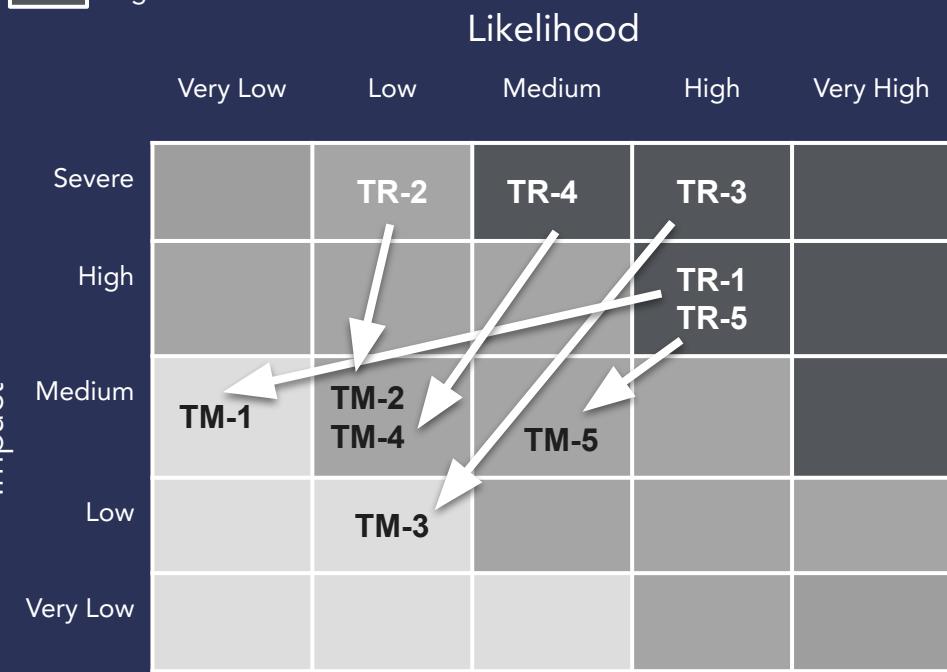
Mitigation

- 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

Legend:

- low risk
- medium risk
- high risk

Technical Risk Matrix



Risks

- TR-1: Receipt upload fails because of damaged receipt
- TR-2: Shopper uploads forged receipt
- TR-3: App lists wrong product or wrong price
- TR-4: Infrastructure failure
- TR-5: Credentials/data compromised

Mitigation

- TM-1: Identify exact problem, and notify user
- TM-2: Compare receipt ID with the database of the store
- TM-3: App updates data every 4-8 hrs with automated scheduled script; error log for developers to track
- TM-4: Adopt mitigation data/server protection practices, outsource server hosting
- TM-5: Use good cybersecurity practices

Sizing Up The Competition

	Nearby Stores	Product Availability	Search by Product	Unit Prices	Shopping List	Container Features	Reward.Me
Go Zero Waste	✓	✓	✓				
Zero Waste App	✓	✓					
ZeroWasteHome	✓	✓	✓				
Litterless	✓	✓					
Google Maps	✓						
Refill.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%26%20%29_markets_for_those_participatin g_in_the_Supplemental_Nutrition_Assistance_Program_%28SNAP%29 jpg](https://commons.wikimedia.org/wiki/File:USDA_is_working_hard_to_expand_access_to_farmers%26%20%29_markets_for_those_participating_in_the_Supplemental_Nutrition_Assistance_Program_%28SNAP%29.jpg)

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