

MRD OUTLINE: **FreshPick**

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Vision

Our vision is to create a world where everyone can easily access and enjoy healthy, sustainable food without waste.

For single, young adults (in their 20s and 30s) who must balance cooking for one while utilizing ingredients that are sold in quantities designed for families, our product is a modular refrigerator attachment system that automatically monitors the food in the fridge to avoid food waste.

Unlike apps that are currently designed to keep people up-to-date on the food left in their fridge, FreshPick's refrigerator attachment does not require upfront work by the user to input all their ingredients into the software. Instead, our device will monitor the food in the fridge and provide real-time notifications when food is about to expire or go bad, allowing customers to use their ingredients before they go to waste.

FreshPick aims to make grocery shopping and cooking more efficient for single-young adults.

We envision the future to be one where people are more conscious and aware of their consumption and contribute to a sustainable future. [See Appendix 1 for Context]

Motivation

Personas

Just Jamie



Profile:

Jamie, 27 years old.

A paralegal working at a top law firm in the city (busy working professional).

Lives alone, with a corgi names Max.

Health conscious - likes to go to the gym but struggles to stick to a routine.

Each week looks different, and does tasks whenever there is time.

Likes to cook but is very busy - ends up resorting to frozen food.

Thinks she'll have more time than she does to cook - ends up throwing away food because it goes bad before she can eat it.

Likes to bring lunch to work but runs out of time in the mornings.

She is optimistic about the grocery shopping and meal-prepping experience, but it is hard for her to follow through on it.

Jamie's Problem:

She ends up throwing away food because it goes bad before she can eat it.

She doesn't know what she has in her refrigerator.

She doesn't have a plan when she goes to the grocery store and often buys what she already has.

Her fridge is full of ingredients that she struggles to turn into meals because she never knows what is in there.

She ends up eating a lot of canned or frozen food and takeout instead of cooking, leaving her fresh ingredients to go bad.

Jamie's Goals:

To reduce food waste both for the planet and to save money by not repurchasing the same food week after week, just to throw it away.

To turn her produce into meals made with fresh ingredients.

Don't throw away more than 10% of the produce she buys.

Bachelor Blake

**Profile:**

Blake, 25 years old.

Ph.D. student at a top research institution (always busy and on the move).

Likes to spend time with his friends and go out on the weekends, so cooking is the last thing on his mind.

Lives alone and often forgets what food he has in the fridge.

Health conscious - goes to the gym regularly and has aspirations to cook healthy meals.

Each week looks different, and does tasks whenever there is time.

Likes to cook and, in his busy life, relies on having the right food at home when he gets there.

Resorts to ordering take out on busy nights so he does not have to think about cooking.

He is always buying specific ingredients for a recipe, and forgetting what he has until it goes bad and turns into food waste.

Blake's Problem:

He is forgetful and can never remember what he has, or that he has to cook at all.

He rarely knows what food is in his fridge and what is closest to going bad.

He does not meal prep, or plan ahead when grocery shopping, so typically, the food he has is a mismatch of ingredients.

He struggles to cook with the ingredients he has and doesn't have a good way to monitor his groceries.

He spends too much money on takeout and eating out at restaurants for his budget.

Blake's Goals:

To reduce food waste both for the planet and to save money by not repurchasing the same food week after week, just to throw it away.

To spend more time cooking and less time ordering food, specifically to cook at least 50% of his meals each week.

Don't throw away more than 10% of the produce he buys.

Single Mom Sam

**Profile:**

Sam, 28 years old, and Layla, 3 years old.

Single mom who works as a teacher during the day, and a tutor during evenings and weekends. Keeping Layla safe, happy, and healthy is the most important thing to her, and being a mom is her favorite part of her life.

Lives in a small apartment just big enough for the two of them and is very budget conscious.

Tries to cook healthy meals, and usually, her meals end up being the leftovers from whatever Layla leaves behind on her plate.

Each week looks different, between work and having a toddler, there is little consistency

Tries to plan ahead for the meals each week to carry over as leftovers since she has to pack Layla a lunch for daycare each day.

Sam's Problem:

She often exceeds her weekly budget by buying food she does not realize she already has at home.

Layla can be a picky eater, so meals tend to stay consistent, which can be difficult for Sam, who tends to forget what food she has in her fridge.

She struggles to find new recipes that utilize the food she already has when Layla decides she doesn't like a certain food anymore.

She struggles to cook with the ingredients she has, and doesn't have a good way to monitor her groceries.

Sam's Goals:

To reduce food waste both for the planet and to save money by not repurchasing the same food week after week, just to throw it away.

To stick to her budget each week and save money by not repurchasing food unnecessarily.

Be aware of what food she still has when she goes grocery shopping.

Coupled Up Christopher and Christine



Profile:

Christopher, who is 29 years old, and his long term girlfriend Christine, who is 27 years old, live together in a two bedroom apartment

Christopher works remotely from their apartment, while Christine works an in person job

Spends \$400/month on groceries, unless they're traveling, then \$250-\$300

Lives in a small apartment just big enough for the two of them and is very budget conscious.

Likes to see all of their groceries rather than sticking them in drawers so they remember what food they have.

Plans to use food in her fridge by making 2 dinners each week and having leftovers for lunch when working from home

Chris and Chris' Problem:

Throws away produce once a week and estimates wasting \$20-30 of food each week

They're interested in reducing food waste but it's not on the top of their priority list right now

Doesn't currently use or know of any food tracking apps

Both are so busy with work, they always think it is the other person's turn to plan and make dinner

Neither enjoys cooking, so it always feels like a chore, especially when it requires a trip to the grocery store since they do not have the right ingredients.

Chris and Chris' Goals:

To reduce food waste both for the planet and to save money by not repurchasing the same food week after week, just to throw it away.

To reduce food waste to \$5-\$10 each week, a 65-75% decrease from their current habits

Get recipe inspiration from TikTok and other internet sources, then decide what is easiest and most affordable to stay on budget and not wait until they're hungry to decide what recipes they have the ingredients for and can make.

Stop arguing about who has to cook, and what they are going to cook.

Unmet Needs

For each persona that is being targeted, there is an emphasis on a struggle to know what foods they have and shop accordingly to avoid food waste and allow them to have the right food to cook healthy and complete meals. Based on interviews with people that fit our target user, it became clear that food waste is most frequently occurring because the person forgets about an item in their refrigerator (i.e. fresh spinach), or they did not see it because it was in a drawer or in the back of their refrigerator.

Customer Problem:

FreshPick wants to target single people in their 20s and 30s who struggle to use their food before expiration when shopping and cooking for one when not in the market for new appliances.

Proposed Solution:

We believe that there is an opportunity to create an integrated add-on to existing refrigerators to help individuals log and utilize their food more efficiently to avoid food waste.

Hypotheses:

- **H1:** I believe people struggle to shop for one, and grocery store portions are typically too large to be consumed by a single person.
- **H2:** I believe food goes bad because people forget what food they have in their fridge.
- **H3:** I believe that the food that is not being eaten is all being thrown away as waste.
- **H4:** I believe that the people struggling with food waste the most are not in the market to buy a new refrigerator.
- **H5:** I believe that even when people know what food they have in their fridge, it can be difficult to ideate recipes that incorporate those ingredients.

When validating these hypotheses by interviewing individuals who fit the personas, here is a

selection of the questions that will be asked. [Appendix 2 for additional questions and details]

1. How do you decide what groceries to buy?
2. How do you store your produce?
3. What produce do you have right now, and what are you planning to do with it?
4. Walk me through your current shopping, storing and meal-prepping experience. What does your ideal experience look like?
5. What are some of the reasons why you think food waste is a problem, and why do you think it's important to address this issue?
6. What are some of the challenges you face in reducing food waste daily, and how do you try to overcome them?
7. How do you think your lifestyle and habits contribute to food waste, and what changes could you make to reduce your impact?
8. How do you feel about your own efforts to reduce food waste, and what motivates you to continue working on this issue?
9. Can you describe a specific scenario where you struggled with food purchasing, portioning, or waste?

Research Conducted:

Research was conducted in the form of interviews and surveys that explored users' current habits, routines, and pain points in their routines. By speaking to users who fit the outlined persona and user criteria, it helped develop more accurate hypotheses of current behavior and unmet needs to design around. Additionally, short surveys will allow us to gather meaningful quantitative data to better characterize the causes and effects of food waste.

Outlined in *Figure 1* is the affinity mapping completed as a result of the interviews which categorized the feedback collected from users about their grocery shopping, eating, food waste, and lifestyle tendencies.

These specific interviews and instances led to a few specific unmet needs to be surfaced, the first being that users forget about food in their fridge, most commonly produce, and then it goes bad and turns into food waste. A second unmet need was not being able to strategically grocery shop to utilize the food they already have, and just supplement with other necessary ingredients, when planning to cook. Users will repurchase food that they already have out of fear they do not have enough, since it can be hard to measure and track with opened, and partially used products. The third main unmet need revolves around users freestyling their cooking, and not using ingredients for a recipe that they intended to, also leading to food waste.



Figure 1: Affinity diagram of research collected during interviews

Customer Journey:

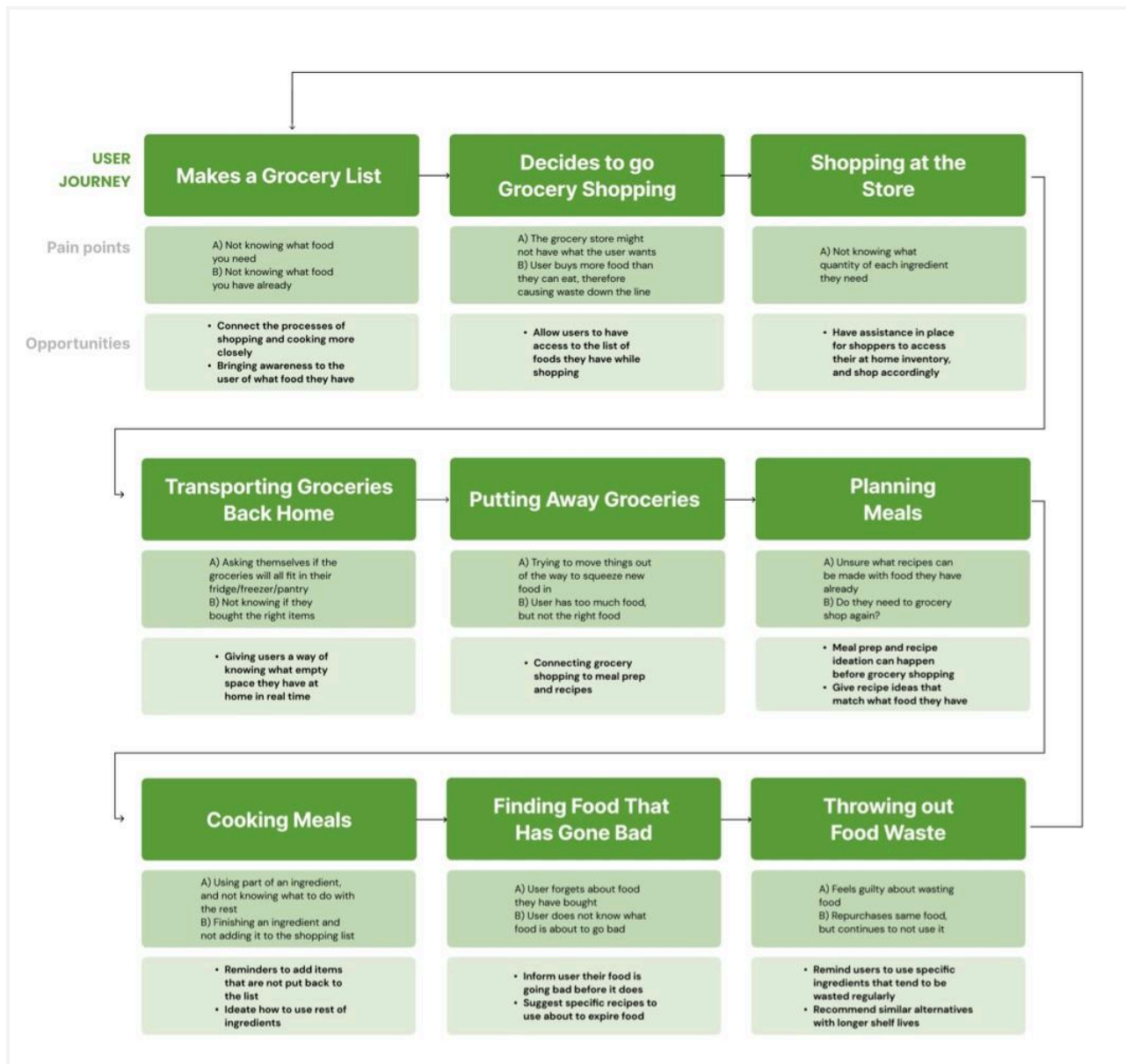


Figure 2: Journey map of user without FreshPick

Expansion on Unmet Needs:

1. Users forget about food in their fridge
 - a. When produce is stashed away in drawers, and not easily visible to the user, they are prone to forgetting that they have purchased it, and had any intention of using it at all. For food that expires quickly, like spinach, there is a small window of use, that when food is “out of sight, out of mind,” it can be easy to miss.
2. Users overbuy and do not utilize existing food
 - a. When a user is shopping for a specific recipe, without knowing for sure that they have the proper ingredients at home to make it, they tend to just repurchase it again to be safe, regardless of if they have it or not. Users have no way of

currently accessing their fridge and pantry inventory at the store when they have not checked before leaving their house.

3. Freestyle while cooking, and does not know how to use ingredients in future recipes
 - a. When making recipes on the fly, the user does not always know exactly what to make with all ingredients. Based on our interviews, we found some users will only buy produce that is on sale or “looks good” to them when in store. Therefore, they do not have a true plan for using the groceries throughout the week.

Existing Solutions

There are three categories of products that currently provide customers with means to track their stock of foods and provide reminders and recommendations to use expiring products. These categories are apps, refrigerator magnets, and smart refrigerators. Within each category, there is a variety of features that different products provide that are explained in detail below:

Category 1: Apps

There are a plethora of free apps that offer inventory and expiration tracking, recipe recommending, and shopping list building. Epicurious provides recommendations for recipes based on certain ingredients entered into the app and creates shopping lists based on recipes users want to make. Cooklist makes inventory tracking easier by connecting to grocery store accounts such as Walmart, Mariano's, Target, Kroger, etc. It also creates grocery lists based on recipes and can organize them based on products' locations in stores and compare prices at different grocery stores, and place pickup orders. Additionally, it provides notifications when foods are close to expiring, although expiration dates have to be manually edited by the user. It also has a “pro” version for a \$49.99 annual subscription that allows users to customize and import recipes, recommend recipes based on their stock, and includes pantry tracking. Pantry Check manages inventory by providing a barcode scanner and a method for manually entering product information. It has a database of products that all users can contribute to. It displays the time until product expiration for every product on the inventory page within the app. It sends notifications to remind users of upcoming expiration dates (that will need to be edited if they are different from what the app predicts at the time of entering the product into the app inventory). It provides an option to add products that are used up to the shopping list and shows prices at nearby stores. NoWaste is similar to pantry check in its inventory and expiration management, but it adds a feature of tracking the amount of wasted food as a percentage of all food tracked through the app. Neither Pantry Check, nor NoWaste offers any recipe or meal-planning services.

Category 2: Refrigerator Magnets

Refrigerator magnets provide a constant visual reminder of produce on the outside of the fridge. There are two types of food inventory magnets: magnetic grocery inventory/shopping notepads and magnets of individual food products that can be grouped and moved into categories at the

user's discretion. The magnetic notepads cost about \$9-15 and provide an easy way for the user to take the list with them when they go shopping. The grocery item magnets cost about \$18-35 but require the user to transfer the list to a physical note or a note on their phone to take with them to the grocery store. For both refrigerator magnet products, it is necessary for the user to check their own inventory to update the lists manually.

Category 3: Smart Refrigerators

Smart refrigerators provide ways for list-making and online grocery ordering at the same location where the food is stored. Some refrigerators, such as LG's ThinQ Refrigerator, provide ways to view what is inside the refrigerator without opening it by turning a window on the door clear by knocking on it. Others, such as Samsung's SmartThings Refrigerator, have connections to online grocery ordering sites like Amazon Fresh and provide recommendations for recipes based on the food in its inventory. As of now, there are no smart refrigerators that don't require manual entry of all products manually into its inventory.

Existing Solutions Matrix

| | Cost | Actions required to keep track of food | Methods to encourage food consumption | Shopping list features | Meal planning/Recipes? |
|------------------------------|---------|---|--|--|------------------------|
| Epicurious | Free | N/A | Provides recipes based on inputted ingredients | Creates list based on recipes you want to try | Yes |
| Cooklist | Free | Connect to walmart, target, or kroger, etc. account. Barcode scanner, store receipt scanner, manual selection | Notifications when food is expiring | Build lists based on recipes. Compare grocery prices, organize by isle, order pickup | Yes |
| Pantry Check | Free | Barcode scanner, manual entry | Displays time until expiration of every product, best by notifications | Restock button on products that run out (percent usage tracked), prices at nearby stores | No |
| NoWaste | Free | Barcode scanner, manual entry | Waste tracker (waste percentage), expiration tracker | automatically add essentials that run out | No |
| Grocery list notepads | \$9-15 | Manual | N/A | Check what you need | No |
| Grocery magnets | \$18-35 | Manual | N/A (Visible on outside of fridge) | N/A | No |

| | | | | | |
|---|---------|------------------------------|--------------------|----------------------|-----|
| LG ThinQ Refrigerator | \$2,999 | Manual, InstaView Technology | N/A | N/A | No |
| Samsung SmartThings Refrigerator | \$2,899 | Manual | Recipe suggestions | Easy online ordering | Yes |

What most of the existing products are missing is the ability to add items to the product's digital inventory with no work required from the customer. Cooklist does this best by connecting to shopper's grocery store accounts so that foods they buy are automatically added to their inventory. This has limitations, however, which include adding foods that somebody buys to give to somebody else and adding foods that weren't purchased at a store the shopper has an account at.

FreshPick's opportunity in this market is to combine many of the features of existing products (easy inventory management, expiration reminders, recommendations of how to use available food). The main unmet need from existing products is easy inventory management that doesn't require users to manually enter their foods or scan receipts. A challenge will be to make the product valuable enough to customers that they will choose it over the free inventory tracking apps.

Unit Economics:

The costs for the hardware portion of our solution would entail the raw materials, a co-manufacturing tolling fee, logistics (freight, warehouse costs) and selling directly to consumers or to retailers. We would seek a 50% margin on the hardware component, with the goal of increasing margins by 20 to 30% as Freshpick achieves economies of scale.

Additionally, there are costs to both Freshpick and the consumer for the software component of this solution. For FreshPick, this app would have the opportunity to collaborate with online recipe sites such as Allrecipes, which would be a premium feature for the user. The user would be able to follow a 'freemium' model, where there is a free version available, with additional features available for a subscription cost. By having a partnership with a secondary company with an established customer base such as Allrecipes, the advertising and marketing costs for FreshPick could be reduced as they target the existing customers of their partner. With the premium version that customers are able to purchase, they will be getting access to additional features such as

- Adding personal recipes
- Access to recipes from chefs
- More capacity for how much food you can log in the app
- More personalized alerts and reminders based on your own usage and schedule

Differentiation

FreshPick is the first service of its kind to make use of the produce and food that consumers already have in their refrigerator before expiration. Currently the market is saturated with meal kit services like HelloFresh, Blue Apron, and Marley and Spoon which are helping with meal prep and recipes. While these services minimize food waste, they do not give consumers the opportunity to get creative with their meals and they are typically formatted to feed 2 to 4 people. Although ideal for busy couples and families, there is a whitespace for individuals cooking for one. An added disadvantage of these meal kits is that they do not provide real time access to the knowledge of what food you have, when it is going to expire, and a place to document recipes and track food waste. Existing products and services do not integrate meal prep and recipes with expiration date tracking and a full camera view of the food a customer has in order to provide the most holistic and accurate approach to cooking.

FreshPick enables consumers to build recipes from their existing produce before it expires. Since FreshPick is focused on the needs and desires of busy professionals, it suggests meals that can be cooked and consumed as 1 portion or, as leftovers for the next day. FreshPick's grocery surveillance, expiration reminders, and meal suggestions, address the unmet need of busy working professionals cooking for one by providing convenient and healthy meal options that minimize food waste. This allows customers to eat wholesome meals without resorting to frozen meals or unhealthy takeout, saving time and promoting better health outcomes.

Why Now?

We believe now is the time to solve the unmet need of busy working professionals cooking for one. While there are copious health and wellness focused products and services on the market, we have found that healthy cooking for one - and making use of existing groceries - is a huge opportunity space. Rather than resorting to frozen meals or unhealthy takeout, consumers using FreshPick can relish the fact that they can eat wholesome meals all while minimizing food waste.

According to a survey by the Hartman Group, approximately 46% of all eating occasions in the US are done by people who are eating alone. This trend is expected to continue to rise, as more people are living alone or have busy schedules that make it difficult to prepare meals from scratch. Additionally, a survey conducted by the Food Marketing Institute found that 58% of consumers are looking for quick and easy meal solutions. There is a growing need for healthy and convenient meal suggestions for individuals who live alone, that utilizes food they already have. This need can be met by products and services that offer healthy meal options and minimize food waste, such as FreshPick.

Use Scenarios

Scenario 1: Sarah, a busy working professional

Sarah is a busy paralegal who often comes home late from work and doesn't have the energy or time to plan her meals. She wants to eat healthily but often ends up ordering takeout or eating something quick and unhealthy because she doesn't have the time to go grocery shopping or figure out a proper meal.

1. Sarah opens the FreshPick app on her phone.
2. She adds the items she has in her fridge and pantry to the app, such as some chicken breasts, a bag of spinach, and some cherry tomatoes.
3. She clicks on the "Recipe Suggestions" button in the app.
4. She sees a recipe for a chicken and spinach salad with a cherry tomato vinaigrette and decides to follow it.
5. She quickly prepares the chicken by seasoning it with salt and pepper and cooking it in a pan.
6. She adds the spinach and cherry tomatoes to a bowl, drizzles them with the vinaigrette, and tops them with the cooked chicken.
7. She sits down to enjoy her meal, pleased that she was able to make something healthy and tasty without spending too much time or effort.
8. She thinks to herself that she'll definitely use FreshPick again in the future to make meal planning and cooking easier.

Scenario 2: John, a forgetful bachelor who wants to cook once and eat twice

John is a hungry single living alone who doesn't think about food until it's too late. He wants to be more intentional about his shopping and eating habits, but finds traditional food management systems to be too much to keep up with.

1. John's sitting on the couch and opens the FreshPick app on his phone.
2. He adds the items he has in his fridge and pantry to the app, such as some ground beef, pasta, and a can of diced tomatoes.
3. He clicks on the "Recipe Suggestions" button in the app and prioritizes easy meals with large portions.
4. He sees a recipe for a beef and pasta skillet meal that serves four and can be easily reheated for leftovers.
5. He decides to follow the recipe and quickly prepares the dish in one skillet, using the ingredients he has on hand.
6. He divides the dish into four portions, puts two portions in the fridge for tomorrow's lunch, and freezes the other two portions for later in the week.
7. He enjoys his dinner and feels satisfied that he'll have an easy lunch and dinner for the next few days without having to cook again.

Scenario 3: Jessica, a single mom and budget-conscious shopper

Jessica is a single mom who has a tight budget and wants to make sure she's not wasting money on groceries she already has at home. She also wants to make sure she's using up all the food she has before it goes bad so she doesn't have to throw anything away. She goes to the grocery store immediately after work before she picks up her kids from school.

1. While in the grocery store, Jessica opens the FreshPick app on her phone.
2. She goes to the grocery store to buy some additional ingredients for enchiladas, casserole, and pizza. She plans to prepare meals for the week.
3. As she's browsing the spice aisle, she forgets if she has the right spices to prepare all three meals.
4. She opens FreshPick to view what's in her pantry and sees that she already has some cumin, chili powder, and Italian seasoning at home, so she doesn't need to buy them again.
5. She checks her fridge and realizes she only has one onion when she needs three to prepare all of her meals, so she rushes to the produce section.
6. Jessica purchases her groceries confident that she's not buying anything she already has and that she's making the most of the ingredients she already has at home.
7. When she gets home, she makes the enchiladas, casserole, and pizza, using the ingredients she bought at the store and the items she already had in her fridge and pantry.
8. She enjoys a delicious and affordable meal with her children, pleased that she was able to save money by using FreshPick to avoid buying items she already had and make the most of the ingredients she already had at home.

Market Size

Based on the estimated market size for meal kit delivery services and smart kitchen products, as well as the growing demand for healthy eating options and convenience, it is likely that the total addressable market for FreshPick is big enough to warrant further development. According to the Food and Agriculture Organization of the United Nations ([FAO](#)), roughly one-third of the food produced in the world for human consumption every year (approx 1.3 billion tons) is lost or wasted. This suggests that there is a significant market opportunity for solutions that address this problem.

The SAM (Serviceable Available Market) could be more focused on individuals who are struggling to use their food before the expiration date when shopping and cooking for one when not in the market for new appliances. According to the U.S. Census Bureau, there are around 44 million single people aged 18-34 in the US. If we assume that some of these individuals struggle

with food waste and meal planning. Since FreshPick is a startup and is just starting to develop its product and marketing strategy, we cannot estimate the SOM with certainty. However, we can assume that it will be a small percentage of the SAM, perhaps around 10-20% initially. As FreshPick grows and gains more traction, it may be able to capture a larger portion of the SAM.

FreshPick's focus on helping consumers reduce food waste and make the most of the ingredients they already have at home also aligns with the increasing demand for sustainable and eco-friendly solutions. Additionally, the app's feature that allows customers to see what's in their fridge and pantry live can help them save money by avoiding duplicate purchases and reducing food waste, which can be a significant factor for busy professionals and budget-conscious shoppers.

According to ChatGPT:

The estimated market size for a tool like FreshPick would depend on several factors, such as the target market, geographic location, and the level of competition in the market. However, according to a report by Grand View Research, the global meal kit delivery services market size was valued at USD 9.74 billion in 2020 and is expected to grow at a compound annual growth rate (CAGR) of 12.8% from 2021 to 2028. This growth is attributed to the increasing adoption of healthy eating habits, the growing demand for ready-to-eat meals, and the convenience of meal delivery services.

Furthermore, according to a report by Allied Market Research, the global smart kitchen market size was valued at USD 12.54 billion in 2019 and is projected to reach USD 43.40 billion by 2027, growing at a CAGR of 16.9% from 2020 to 2027. This growth is attributed to the increasing demand for automation in the kitchen, rising awareness about healthy eating habits, and the increasing adoption of smart kitchen appliances and devices.

Based on these reports, it can be inferred that there is a growing market for tools like FreshPick that offer convenience and healthy eating options and help users make the most of the ingredients they already have at home.

Adoption Barriers

1. Modular design - Users may feel overwhelmed by the modular nature of the physical component. They may not know what pieces are right for them or their lifestyle
 - a. To address this: could feature a standard (or set of standard) starter kit(s), or, if we find that customization is the best option, create some sort of online quiz to match people to their products and increase consumer confidence.
2. Lack of reputation - Users may not know the brand, or may not know if it will fit their fridge size

- a. To address this: Could create partnerships with major refrigerator manufacturers to increase reputation and sense of compatibility. Products should be inherently cross compatible and adaptable across refrigerator styles, and the partnership will serve as an emotional boost, not a functional necessity.
 - b. To address this: Offering a trial period where users can return parts if they do not fit with the fridge they have.
3. Indirect results- users may have trouble understanding to what extent FreshPick will impact their eating and shopping experiences
 - a. To address this: Marketing commercials showing use cases as well as quantified results (people save \$_ or _lbs of food per __ of time)
4. Lack of familiarity/lack of similar devices or procedures - users may not understand how the product works, may feel intimidated by the apparent complexity of the product or the required interactions
 - a. To address this: use primarily visual directions and explanations in conjunction with a robust documentation and supplementary resources database that is easy to navigate and does not overwhelm the user with information
5. Low technical literacy - users may not be comfortable navigating complex mobile applications and interfacing with hardware components
 - a. To address this: see 4a
6. Low self-confidence in installation - users may be nervous about installing hardware, especially if they are unfamiliar with their fridge apart from using it functionally.
 - a. Provide step by step video tutorials along with written instructions and images. Create a variety of tutorials that are specific to different refrigerators, where the person can just put in what kind of fridge they have (maybe also guide them on how to find this information) and direct them to the appropriate video tutorial. Provide the option for live support and in person installation for those who are physically unable and don't have access to help.
7. For multi-family households where one person does the cooking and the other controls finances - it may be difficult for the party that is directly involved with the food to communicate the extent of the issue to the party that makes purchases. They may not think that it is a big enough problem to spend money to solve.
 - a. To address this: Have resources available that quantify the problem. This could be based on averages, or it could take the form of a "personal calculator" that can tell you how much money you have wasted or would save through adopting this product.

Risks/Key Dependencies

| Risk | Description | Mitigation strategies |
|-----------------------------------|---|--|
| Privacy | Data privacy is a big concern, particularly as it relates to the camera and to the tracking of food usage and consumption patterns. The user should feel confident knowing that their data is theirs only and does not get shared with anyone else. They should trust in the security of the system and the system should not be easily breached. | <ul style="list-style-type: none"> ● Storing data locally - would not be able to be backed up or shared amongst devices but would not be accessible by any nefarious party ● Separating user identification data from food data (or simply not collecting user information -do we need this?) ● Partnering with trusted companies (ring, blynk, etc) to create a robust secure interface ● Specifically promising to not partner with companies (i.e. amazon) that will use the data to provide ads or curated content based on consumption habits |
| Legal concerns around food safety | Any claims or advice given to consumers in the safety of storing or consuming their food is subject to legal scrutiny. | No absolute claims can be made that say that a food is safe to eat. While guidelines can be provided, it must be made explicitly clear to the user that these are subjective and it is their responsibility to make the final decision |
| Patent concerns | Due to the fact that the system features both a physical product as well as a software component, it will be difficult to patent the entire system. Software in general is extremely difficult to patent and is often still easy to recreate retroactively. | An extremely thorough patent covering the hardware portion of the device will need to stand alone while also incorporating the software elements. Algorithms created to determine recognition or recommendations should be kept as trade secrets. |
| Food safety standards | Since the hardware portion of the product is going to come into direct contact with food, it will need to be placed under a higher standard of materials and manufacturing methods | All materials used should be made of food grade materials. They should be easily disinfected and wherever possible dishwasher safe. They should all be clearly labeled on how to use and store (microwave safe as well) and there should be a way to let the |

| | | |
|--|--|---|
| | | user know when it is time for a replacement part (chips, cracks, etc) |
|--|--|---|

Dependencies:

1. Connection between camera vision and weight sensing pads - the camera will be able to tell what items are going into and out of the refrigerator, but the pads are the ones that can determine the location and quantity of product by weight. These two systems will need to work in perfect unison and testing will need to be done to understand how to create an algorithm that can detect different use cases such as stacked items and how to adapt if an item is placed back into a different area of the refrigerator.
2. App is dependent on information from hardware - the data tracking on the app will need to depend on the hardware, meaning that the camera will need to correctly identify the specific product and the pads will need to be able to identify the specific amount of that product based on publicly available information. One way this could be improved is to have users scan new products' barcodes (just the first time that they are introducing an item to their fridge, not for "refills" of the same product) to improve the accuracy of the visual recognition system, though testing will need to be done to identify whether or not this is necessary.
3. Any external integrations or internal shopping list management would need to take data from the app and hardware. This is particularly true for any integrations with recipes (whether it be internally submitted or collected from a database) that would need to know not only if an ingredient exists in the user's fridge, but also how much of it and compare it to how much is called for by the recipe.
4. Compatibility with different refrigerator models: There is a risk that the product may not be compatible with all types of refrigerators, which could limit the target market and affect sales. When designing the product, special attention should be given to ensuring that it is as adaptable as possible.

Strategic Considerations

The proposed solution does not inherently rely on any existing organizations. FreshPick can be a valuable addition to many complementary organizations, especially those in the food, kitchen and home appliance industries. Due to the flexibility of the modular system, it's extremely compatible with 3rd party refrigeration products. It can be adapted to the needs of both the users as well as of the products they buy. For example, a user that consumes a large quantity of fruits and vegetables can choose to purchase a larger set of humidity controlled chambers, while someone that consumes a lot of ready-made-meals can opt for smart shelving. Possible partnerships with traditional smart-home ecosystems would pair seamlessly with the proposed

solution both from a functional and branding perspective as they both emphasize passively improving the user's lived experience. Even hardware based smart-ecosystems like existing smart-fridges that allow you to see the contents of your fridge would benefit from using our system. The meet-you-where-you're-at system would also pair well with many modern recipe-based platforms including HelloFresh, which already emphasizes reducing food waste. Since we are not actually selling food, these platforms are not competitors, but rather potential partners.

FreshPick is not selling food, so it could be a potential partner rather than a competitor for existing organizations and products. It can potentially be a complementary product with Pinterest and other online moodboards and recipe inspiration platforms. By partnering with these recipe platforms, it could suggest recipes based on the customer's inventory and expiring ingredients. This could enhance the overall user experience and increase the value proposition of both FreshPick and recipe inspiration platforms, as users searching for recipes on the platform may be interested in a tool that helps them reduce food waste and make better use of their ingredients.

Team Members

We are collectively working on this project and decided on delegating tasks based on the need.

- **Corinne Brady**, corinnebrady2024@u.northwestern.edu, **Role:** Project Manager
- **Jordyn Brown**, jordynbrown2023@u.northwestern.edu, **Role:** Subject Matter Expert
- **Christie Bok**, christinebok2023@u.northwestern.edu, **Role:** Quality Assurance Specialist
- **Ana Carvalho**, anacarvalho2024@u.northwestern.edu, **Role:** Team Lead
- **Lindsay Lipschultz**, lindsaylipschultz2022@u.northwestern.edu, **Role:** Product Design Specialist
- **Ritika Ramesh**, ritikaramesh2024@u.northwestern.edu, **Role:** Technical Specialist

Go/No Go Recommendation

Based on our research and understanding of the unmet needs of consumers, we believe that FreshPick is a promising and innovative solution to the problem of food waste and the inefficiency in grocery shopping for busy young adults who face this challenge on a daily basis. We hope to conduct further research and understand customer needs to understand this space further and validate our prototype before going forward with refining our product.

One of the key challenges for us would be to make a product valuable enough to consumers that they will choose it over the free inventory tracking apps. Hence it is important to consider that we need to conduct more in-person research to understand the current consumer behavior,

routines, and pain points to be more aware of their process and the potential adoption barriers. This will be crucial for our design process on the application to ensure that we create a seamless product that can be integrated into any appliance.

Customer Research Data Appendices

Appendix 1: Context:

[Households](#) are the largest contributors to food waste, with US households wasting an estimated 76 billion pounds of food annually. Approximately 40-50% of all food waste, including 51 to 63% of seafood waste, happens at a consumer level. Fresh fruits and vegetables accounts for the largest losses at a consumer level, followed by dairy, meat, and seafood. Food spoilage at home is due to improper storage, lack of visibility in refrigerators, partially used ingredients, and misjudged food needs. The remaining third of household food waste is due to people cooking or serving too much food. Date label confusion is also a major contributor, with an estimated 80% of Americans prematurely discarding food due to confusion over the meaning of date labels. Overbuying and poor planning, including unplanned restaurant meals or food delivery, can also lead to food at home going bad before it can be used.

Appendix 2: Interview:

It might be helpful to conduct research and answer some of these questions:

- How do you decide what groceries to buy?
- How do you store your produce?
- What produce do you have right now, and what are you planning to do about it?
- Walk me through your current shopping, storing, and meal-prepping experience. What does your ideal experience look like?
- What are some of the reasons why you think food waste is a problem, and why do you think it's important to address this issue?
- What are some of the challenges you face in reducing food waste daily, and how do you try to overcome them?
- How do you think your lifestyle and habits contribute to food waste, and what changes could you make to reduce your impact on the environment/footprint?
- When was the last time you had to throw away food waste? Could you walk us through it?
- How do you feel about your own efforts to reduce food waste, and what motivates you to continue working on this issue?
- Can you describe a specific scenario where you struggled with food purchasing, portioning, or waste management?

Additionally, it might also be useful to collect quantitative data and conduct a survey to understand consumer habits and behavior, particularly in relation to food waste:

- How often do you go grocery shopping?
- How often do you check the expiration dates on a food product in your fridge?
- How often do you throw away food that has gone bad?
- How often do you plan meals in advance?
- How often do you use recipes to guide your meal prep?
- How important is it to you to reduce food waste in your household?
- How likely are you to use a product that helps you track and utilize the food in your fridge?

Note: An important factor that plays into conducting research is to make sure you have a diverse representation. This includes single people in their 20s and 30s struggling to use their food before expiration. They do not necessarily need to be conscious individuals who have already adapted workarounds into their daily life. We hope to select individuals through in-person recruitment at grocery stores or apartment buildings with a high density of single young adults.