MSE 302 – Individual Project: Milestone 1 (IP: M1)

Student: Thomas Huang

Repository link: https://github.com/t8huang/mse302\_ip\_thomas\_huang

# Part 1 – Problem Brainstorm (max ~1 page)

In the table below are five distinct problem areas and brief summaries (2–4 sentences each).

|  |  |  |
| --- | --- | --- |
| **#** | **Problem Area** | **Brief Summary** |
| 1 | Urban Food Waste & Food Rescue | Restaurants and grocers discard significant amounts of edible food daily. A coordinated system is needed to signal surplus in real time, match it with nearby recipients (food banks, shelters, community fridges), and move it quickly under food-safety constraints. This has strong social and environmental benefits and requires thoughtful process and information-system design. |
| 2 | Medication Adherence for Seniors | Older adults often juggle complex medication schedules, leading to missed doses or errors. A solution could combine simple reminders, packaging, and caregiver visibility to improve adherence. Human factors (cognition, accessibility, trust) and regulatory/safety constraints are central. |
| 3 | Accessible Public Transit Navigation | People with disabilities face barriers navigating transit (e.g., elevator outages, unclear step-free routes). Improving transit apps/feeds to provide reliable, accessible routing and alerts can materially improve mobility and independence. Requires UX accessibility standards and integration with real-time data. |
| 4 | Digital Overload in the Workplace | Workers are overwhelmed by constant messages, meetings, and alerts. An intervention—policy or tool—could reduce low-value communication and help focus time on deep work. Measuring impact (e.g., interruption rate, task completion) and change management are key. |
| 5 | Recycling Contamination in Smart Cities | Contamination causes recyclables to be landfilled and raises processing costs. A solution could blend just-in-time guidance (signage/app) with sensing or post-collection sorting support. Behavioral nudges and feedback loops would be important to sustain correct habits. |

## Evaluation of the Five Ideas & Rationale for Selection

All five ideas are authentic and valuable. The medication adherence concept scores very high on impact but may be harder to scope due to health/privacy constraints. Digital overload is feasible but difficult to validate beyond a small context. Accessible transit and recycling contamination both offer clear societal value and interesting data/UX challenges. The strongest balance across the criteria is \*\*Urban Food Waste & Food Rescue\*\*: it features high social and environmental impact, multi-stakeholder process design, tractable secondary research, and known exemplars to benchmark for gaps. Therefore, I select \*\*Urban Food Waste & Food Rescue\*\* for the contextual research plan.

# Part 2 – Contextual Research Plan into Chosen Problem (max ~5 pages)

## Step 1: Define Areas for Research

### Initial Problem Statement

In cities, large quantities of safe, edible food are discarded daily by restaurants, grocers, and cafeterias while many residents face food insecurity. A fast, trusted mechanism is needed to identify surplus food, match it to appropriate recipients, and move it within safety windows. The design challenge is to specify a process and information system that enables reliable, low-friction redistribution under constraints of perishability, safety, and logistics.

### What is Known (from secondary sources and public reports)

• Food waste is a documented sustainability and social issue; governments and NGOs have strategies to reduce it.  
• Only a fraction of surplus food is currently rescued; existing platforms and charities demonstrate partial but limited capture of this surplus.  
• Food insecurity coexists with surplus; charities report variable supply and resource constraints (transport, cold chain, volunteer availability).  
• Donation is permitted under guidelines and liability protections in many jurisdictions; best-practice guidance exists for safe handling.  
• Several solution archetypes exist: B2B donation matching platforms, consumer-facing ‘surplus deals’, community fridges, and coordinated NGO logistics.

### What is Assumed (to be validated)

• Businesses will donate if the process is easy, timely, and liability-safe.  
• A lightweight marketplace model (real-time listings/matching) can efficiently connect donors and recipients.  
• Safety and quality can be preserved with clear rules, simple tooling (labels, time stamps, insulated carriers), and rapid pickup.  
• Non-monetary incentives (recognition, impact reporting) and/or small benefits (reduced disposal cost, tax receipts) can sustain participation.

### What is Unknown (research questions)

• Which barriers matter most to donors (time, awareness, liability, storage, transport)?  
• Which items/conditions are most useful to recipients, and what causes rejection or waste at the receiving end?  
• Typical timing/volume patterns of surplus by donor type; implications for pickup capacity and routing.  
• Practical safety constraints and minimal viable controls (e.g., time-temperature rules) for prepared vs. packaged foods.  
• Sustainable incentive structures and governance (who operates the system, how costs are covered).

### Decomposition into Aspects

• Processes & Steps: Surplus identification → listing & matching → pickup/transport → distribution → feedback/impact logging.

• People & Roles: Donors (restaurants/grocers), recipients (food banks/shelters/community fridges), volunteer/driver network, coordinators, city/regulators.

• Interactions: Donor ↔ platform; donor ↔ recipient; drivers ↔ donor/recipient; platform notifications, confirmations, receipts.

• Environment & Context: Urban density/traffic/parking; regulations; socioeconomic factors; tech readiness; seasonal/weather impacts.

• Analogous Contexts: Ride-hailing/delivery dispatch; charitable goods donation workflows; demand-response logistics; resource-sharing communities.

## Step 2: Define Sources and Methods

### Key Publications / Media / Databases

• Government/NGO reports on food loss and waste (e.g., Environment & Climate Change Canada; municipal waste strategies; UN SDG 12.3 materials).  
• Research papers on donation logistics, last-mile rescue, safety in surplus redistribution, and behavior change in waste reduction (Scopus/Google Scholar).  
• Platforms and program sites (e.g., FoodRescue.ca, Too Good To Go, Olio) including FAQs, case studies, and any published impact stats.  
• Media coverage and practitioner blogs about food rescue operations, community fridges, and donor perspectives.  
• Local statistics/open data (food bank usage, waste audits) where available.

### Key People / Stakeholders (for perspective gathering)

• Restaurant/café and grocery managers (donor practices and pain points).  
• Food bank/shelter coordinators (usefulness of donations, constraints, logistics).  
• Volunteer drivers/dispatchers (routing, handoff, cold chain practicalities).  
• City sustainability/health officials (guidelines, incentives, liability context).

### Methods for Collecting Information (secondary emphasis)

• Literature review with targeted keywords (e.g., “food donation logistics”, “surplus food rescue”, “community fridge operations”, “cold chain in food donation”).  
• Benchmarking of existing tools/programs: process mapping, feature comparison, identification of gaps/opportunities.  
• Media/social media scan for real-world pain points and successes (e.g., Reddit threads from donors/volunteers; local news case studies).  
• Optional brief stakeholder conversations or email exchanges (opportunistic, to validate assumptions or uncover blind spots).  
• Synthesis: content analysis; simple affinity clustering; needs/priorities mapping to identify “most important, least satisfied” needs.

## Step 3: Research Plan Timeline (to Milestone 3 – Oct 10)

|  |  |  |
| --- | --- | --- |
| Task | Method | Time Estimate |
| Review core reports & 3–5 papers | Collect key government/NGO reports and academic articles; extract statistics and constraints | 6 hours |
| Benchmark existing solutions | Analyze FoodRescue.ca, Too Good To Go, Olio, community fridge playbooks; feature/process comparison | 5 hours |
| Stakeholder perspective scan | Secondary sources (blogs/forums); optional 1–2 short conversations or emails with a donor/receiver | 6 hours |
| Regulatory & best-practice review | Summarize donation guidelines, liability protections, and minimal safety controls for various food types | 4 hours |
| Analogous models exploration | Review ride-hailing/dispatch optimization and community resource-sharing insights for transferable ideas | 3 hours |
| Synthesis & problem refinement | Affinity themes, needs/priorities matrix; initial system requirements/opportunities draft | 4 hours |
| Optional additional interviews | If available, 1–2 targeted chats (e.g., city official/food bank coordinator) to close key unknowns | 3 hours |