



SOEN 6481: Software Project Management

**Topic: - Food Waste Reduction and Redistribution
Platform**

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1. Problem Identification

Title: Problem Identification Report

Objective:

- One specific problem within the chosen domain of the Food Waste Reduction and Redistribution Platform is the need for more efficient communication and coordination between food establishments and potential recipients regarding surplus food availability. Many restaurants, grocery stores, and other food-related businesses often have surplus food that could be redistributed to local community organizations or individuals in need. However, due to a need for more streamlined communication channels and real-time information sharing, a significant amount of surplus food goes to waste.
- This problem can be addressed through a software solution that utilizes AI algorithms to predict and monitor surplus food inventory in real time. By implementing a platform that connects food establishments with local community organizations and individuals, the software can act as a bridge for efficient communication. The system should be able to notify potential recipients immediately when there is surplus food available, allowing for prompt coordination of pickups and deliveries.
- The software can also address the challenge of logistics by providing tools for scheduling and organizing food pickups, optimizing routes for delivery, and ensuring that the surplus food reaches its intended recipients on time. Additionally, the platform can include features to track and measure the impact of food donations, providing valuable insights for both food establishments and community organizations.

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Problem: The identified problem is the inefficient management of surplus food inventory in food establishments, namely restaurants and grocery stores. This inefficiency results in avoidable food waste as edible items are discarded instead of being utilized to address local food insecurity. Reducing food waste and facilitating the redistribution of surplus edible food is imperative for both economic and environmental reasons. According to the National Zero Waste Council's 2022 research on household food waste in Canada, a staggering 63% of discarded food could have been consumed, translating to 140 kilograms of waste per average Canadian household annually, costing over \$1,300. Nationally, this amounts to nearly 2.3 million tonnes of edible food wasted each year, with a staggering economic impact exceeding \$20 billion. The environmental ramifications are equally significant, as minimizing food waste conserves valuable resources, mitigates greenhouse gas emissions from landfills, and addresses climate change concerns. Additionally, the social impact is substantial, with food redistribution helping alleviate food insecurity and fostering community engagement. Addressing food waste is not only an ethical imperative, ensuring equitable distribution, but it also plays a pivotal role in global food security, biodiversity preservation, and fostering sustainable consumption habits. Government policies and corporate initiatives are essential components of this multifaceted approach to creating a more sustainable and equitable food system.

Opportunity: The opportunity lies in developing a software platform that utilizes AI algorithms to predict surplus food inventory in real time. This platform connects food establishments with local community organizations and individuals, streamlining the coordination of food pickups and deliveries for effective redistribution.

Concise Description of its Significance in the Chosen Domain:

- **Environmental Impact:** Inefficient surplus food management contributes to environmental issues through unnecessary waste. The proposed software optimizes surplus food redistribution, reducing overall food waste and minimizing the environmental footprint of the food industry.
- **Social Responsibility:** By actively connecting food establishments with local community organizations and individuals, the platform promotes social responsibility. It engages the community in addressing food insecurity, fostering a collaborative approach to supporting those in need.
- **Efficiency and Streamlined Processes:** The software's use of AI algorithms for real-time predictions and coordination enhances efficiency in the redistribution process. This not only reduces food waste but also streamlines operations in the food industry, making it more resource efficient.
- **Community Well-being:** Beyond the environmental and efficiency aspects, the platform's role in supporting community members in need adds a crucial social dimension. It contributes to the overall well-being of the community by ensuring that surplus food resources are directed towards those who require assistance.
- **Sustainability:** The project's emphasis on sustainability is evident through its dual impact on reducing food waste and supporting community welfare. It aligns with broader sustainability goals by promoting responsible resource management and community engagement.

Stakeholder Analysis:

1. Food Establishments (Restaurants, Grocery Stores, Cafes, etc.)

1. **Interests:** These businesses are concerned about reducing waste, optimizing inventory management, and potentially improving their public image through responsible food donation practices.
2. **Concerns:** They may worry about the additional costs and logistical challenges associated with implementing new software solutions, as well as potential liability issues related to donated food.

2. Local Community Organizations:

1. **Interests:** These organizations are dedicated to addressing food insecurity and rely on surplus food donations to support their programs and outreach efforts.
2. **Concerns:** They may face capacity constraints in handling large volumes of donations, ensuring equitable distribution, and complying with food safety regulations.

3. Individuals Facing Food Insecurity:

1. **Interests:** Individuals in need rely on consistent access to nutritious food to support their well-being and that of their families.
2. **Concerns:** They may encounter barriers such as transportation limitations, stigma associated with seeking assistance, and uncertainty about the availability and quality of donated food items.

4. Environmental Advocates and Sustainability Groups:

1. **Interests:** These groups advocate for reducing food waste and promoting sustainable consumption practices to minimize environmental impact.
2. **Concerns:** They may question the effectiveness of food redistribution efforts in truly addressing systemic waste issues and seek transparency regarding the environmental footprint of the food industry's operations.

5. Government and Regulatory Bodies:

1. **Interests:** Governments may be interested in promoting food waste reduction initiatives to achieve sustainability goals, alleviate pressure on landfill sites, and address food insecurity issues.
2. **Concerns:** Regulatory bodies may be concerned about ensuring compliance with food safety standards, liability issues related to food donations, and the equitable distribution of resources.

6. Transportation and Logistics Providers:

1. **Interests:** Transportation companies may benefit from increased demand for delivery services related to food redistribution efforts.
2. **Concerns:** They may face logistical challenges such as scheduling, route optimization, and maintaining food safety standards during transportation.

Relevance to Software Solution:

1. Real-Time Communication and Coordination:

- The software solution will develop a platform enabling seamless communication between food establishments and recipients. It will facilitate instant notifications about surplus food availability, simplifying the coordination of pickups and deliveries. This feature streamlines operations, reduces response time, and enhances overall efficiency in food redistribution efforts.
- The platform will include messaging functionalities, notification systems, and scheduling tools to facilitate real-time communication and coordination. It will be designed to be user-friendly, accessible across multiple devices, and integrated with existing communication channels for widespread adoption.

2. AI-Powered Predictive Analytics:

- The software solution will implement AI algorithms to forecast surplus food inventory levels, optimize distribution routes, and suggest donation opportunities. By leveraging

predictive analytics, the platform enhances operational efficiency, minimizes waste, and maximizes the impact of redistribution efforts.

- The platform will integrate machine learning models for inventory forecasting, route optimisation algorithms, and recommendation systems for donation opportunities. It will require robust data integration capabilities, algorithm development, and continuous refinement based on user feedback and performance metrics.

3. Tracking and Performance Metrics:

- The software solution will incorporate tracking food donations, measuring their impact on food insecurity rates, and generating insightful reports for stakeholders. It provides transparency, accountability, and valuable insights to assess the effectiveness of redistribution efforts and make data-driven decisions.
- The platform will include tracking mechanisms for donated items, impact assessment tools, and customizable reporting functionalities. It will require data visualization components, performance dashboards, and integration with external analytics platforms to ensure comprehensive reporting and analysis.

4. Scalability and Customization:

- The software solution will be designed to be scalable across diverse food establishments and community organizations. It will offer flexibility to adapt to varying regulatory frameworks and localized needs while maintaining operational efficiency and effectiveness.
- The platform architecture will prioritise scalability, with modular components and cloud-based infrastructure. It will support customization through configurable settings, localization features, and compliance with industry standards and regulations. Continuous updates and scalability assessments will ensure long-term viability and adaptability.

2. Market Analysis

Title: Market Analysis Report

Objective: The primary objective of conducting a thorough market analysis is to gather comprehensive insights into the target audience, potential users, and competitive landscape within the domain of food waste reduction and redistribution platforms. By delving deeply into these areas, we aim to:

- **Understand Target Audience Needs and Preferences:**

Through detailed research and analysis, we seek to gain a nuanced understanding of the needs, preferences, and pain points of our target audience segments, including food retailers and suppliers, non-profit organizations and food banks, and end consumers. This involves identifying their specific challenges related to surplus food management, distribution, and access to nutritious food options. By understanding their demographics, psychographics, and

motivations, we can tailor our software solution to effectively address these needs and provide tangible value.

- **Identify Market Opportunities and Trends:**

By analyzing the current market landscape, we aim to identify emerging opportunities and trends within the food waste reduction and redistribution domain. This involves examining market dynamics, regulatory frameworks, technological advancements, and consumer behaviours that may impact the adoption and success of our software solution. By staying abreast of market developments, we can position our solution strategically to capitalize on evolving trends and market gaps, thereby maximizing its potential for success and impact.

- **Assess Competitive Landscape:**

A thorough analysis of competitors offering similar solutions is essential for understanding the competitive landscape and identifying key players, their strengths, weaknesses, and strategic positioning. By evaluating competitor offerings, business models, market share, and customer feedback, we can identify areas of differentiation and competitive advantage for our software solution. This allows us to refine our value proposition, enhance our product, and develop effective marketing strategies to differentiate ourselves in the market and attract users.

- **Define Unique Selling Points and Value Proposition:**

Based on insights gathered from the market analysis, we aim to define the unique selling points and value proposition of our proposed software solution. This involves articulating the specific benefits and advantages that our solution offers to target users, such as efficiency, scalability, customization, data-driven insights, and community engagement. By clearly communicating the value proposition, we can effectively convey the benefits of our solution to potential users and stakeholders, thereby driving adoption and engagement.

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Target Audience Identification:

The primary target audience for our software solution comprises of:

1. **Food Retailers and Suppliers:** Food retailers and suppliers represent a crucial segment of our target audience. This includes supermarkets, grocery stores, restaurants, cafes, hotels, and other food establishments. These businesses often face challenges related to surplus food generated from overstocking, expiration, or aesthetic imperfections. Key characteristics of this audience include:
 - **Demographics:** Varied, ranging from small local businesses to large chains. Age and gender distribution varies based on the type of establishment.
 - **Psychographics:** Concerned about sustainability, reducing waste, and social responsibility. Value cost-effective solutions that align with their values.
2. **Non-Profit Organizations and Food Banks:** Non-profit organizations and food banks play a critical role in the redistribution of surplus food to those in need. These organizations rely on donations from food retailers, suppliers, and other sources to alleviate food insecurity. Key characteristics of this audience include:

- **Demographics:** Diverse, consisting of volunteers, staff, and beneficiaries. Age and gender vary.
 - **Psychographics:** Altruistic, focused on community welfare and alleviating food insecurity. Value efficient solutions that streamline food distribution processes.
- 3. End Consumers:** End consumers represent the ultimate beneficiaries of surplus food redistribution initiatives. These individuals or families may face food insecurity or simply seek affordable and nutritious food options. Key characteristics of this audience include:
- **Demographics:** Varied, including individuals from different socio-economic backgrounds.
 - **Psychographics:** Value-conscious, concerned about food quality and affordability. Appreciate access to fresh, nutritious food options.

Competitor Analysis:

There are a lot of organizations working towards a similar goal of food waste reduction and distribution platforms. This assessment delves into the strengths, weaknesses, opportunities, and threats presented by notable players in this domain. The following are some major players working towards this goal in different countries.

1) Kitche, United Kingdom

- a) Helps users save money and reduce food waste.
- b) Users scan and upload products, receive reminders, and access recipes based on existing ingredients.
- c) Won High Commended for Best Zero Waste Brand in Marie Claire's Sustainability Awards.

2) Love Food Hate Waste, United Kingdom

- a) Initiative by WRAP to reduce household food waste.
- b) Provides recipes, helps calculate portions, plan meals, and regulate fridge temperatures.
- c) Reached 31% of people in the UK in 2020.

3) Magic Fridge, France

- a) Anti-waste recipes with a French culinary flair.
- b) Users can browse 4,800 recipes made from leftover ingredients.
- c) Inspired over 2 million people globally to repurpose food creatively.

4) MyFoodways, Switzerland

- a) Offers healthy, sustainable, and flexible recipes based on available items.
- b) Considers users' dietary preferences and encourages sustainable eating patterns.
- c) Users have cooked over 5,000 recipes since the app's launch in 2018.

5) nosh, United Kingdom

- a) Uses AI to track sell-by dates and monitor shopping habits.

- b) Allows users to scan barcodes to track stocked items and suggests recipes.
- c) Won the Best Mobile App Design award in 2020.

6) NoWaste, Denmark

- a) Features tools to organize food and expiration dates.
- b) Options to synchronize and share lists with family and friends.
- c) Tracked over 700,000 food items in private homes in 2021.

7) Olio, United Kingdom

- a) Food-sharing app connecting neighbors and local businesses.
- b) Transformed into a global marketplace saving thousands of food items weekly.
- c) Facilitated over 27 million portions of shared food.

8) Seva Kitchen, India

- a) Crowd-sourced food distribution app connecting donors with recipients in real time.
- b) Addresses surplus food from parties, festivals, and gatherings.
- c) Launched Neki Ka Pitara to provide fresh food for schools and hospitals.

Two players were selected based on their usage and available public information.

Too Good to Go which is a major player in Toronto, Montreal and Vancouver, Canada and used by thousands of people every day. Another one is **Love Food, Hate Waste** in the United Kingdom which has expanded its services in Vancouver, Canada.

Too Good to Go: A service that connects customers to restaurants and stores that have surplus unsold food, reducing food waste and saving money.

- **History:** The company was founded in 2015 in Denmark and expanded to many European countries and North America. It acquired a Spanish startup and partnered with various retail and plant companies.
- **Impact:** The company claims to have saved over 200 million meals from being wasted, serving million users and 164,000 businesses. It is the fastest-growing sustainable food app startup by number of downloads⁶.
- **How it works:** The company developed a mobile app that allows users to order and pay for a 'magic bag' of surplus food from participating outlets at a lower price. The users can then collect the food within a specified time window.

Love Food Hate Waste: A campaign to reduce food waste in the UK and other countries, launched by the Waste & Resources Action Programme in 2007.

- **Campaign achievements:** The campaign claims to have helped almost two million households save money and prevent food waste, by providing tips, recipes, and tools.
- **Plans:** The campaign aims to spread to more countries and regions, and influence policy changes such as ending the use of use-by dates on food products.

1. Too Good To Go:

Strengths:

- **Global Scale:** Too Good To Go is the world's leading platform for reducing food waste. Its global scale gives it an edge over competitors, which are often local threats in particular geographies.
- **Cross-Network Effects:** Over the years, more users have led to more businesses partnering with the platform and vice versa. This has created strong cross-network effects, enhancing its value proposition.
- **Environmental Impact:** The company has saved over 86,747 tons of CO2 and 34.7 million meals since its inception.
- **User Base:** The app is used by 66.5 million people, which is a testament to its popularity.
- **Partnerships:** Too Good To Go has partnered with over 174,000 registered food providers, offering a wide variety of options for users.
- **Innovation:** The company has innovated by offering "surprise bags" of unsold food from cafes and bakeries at reduced prices.

Weaknesses:

- **Limited Availability:** The app is not available in all regions, which can limit its reach.
- **Surprise Bags:** The contents of the food bags are a surprise, which might not be ideal for people with dietary restrictions or allergies.
- **Pick Up Times:** Users can't choose their own pick-up times, which might be inconvenient.
- **Popular Options Sell Out Quickly:** Popular food options can sell out quickly, limiting choices for users.
- **Quality Control:** There have been some reports of retailers filling a box with products over a month past their best before date.

Opportunities:

- **Expansion:** There is potential for the app to expand its reach to more regions.
- **Collaboration:** The app can collaborate with more partners, including governments, businesses, and non-profits.
- **Education:** There is an opportunity to further educate people about food waste and how to prevent it.
- **Policy Influence:** The app could influence policy related to food waste at the federal, provincial, and municipal levels.
- **Addressing Food Insecurity:** The app could potentially expand its scope to address food insecurity.

Threats:

- **Competition:** While it is the world's largest B2C platform aiming to fight food waste, it is now facing competition from similar apps such as Food for All, Olio, and Karma.
- **Disintermediation Risk:** Once businesses have developed a customer base, they can bypass Too Good To Go.
- **User Behavior:** The app relies on users' willingness to buy surplus food at discounted prices. Changes in consumer behavior or preferences could pose a threat.

- **Regulatory Changes:** Changes in food safety or waste regulations could impact the business model.
- **Aggressive Behavior:** The company does not tolerate aggressive behavior, coercive language, abuse, or threats from or against its employees, users, and store personnel. Any instances of such behavior could harm the company's reputation and user experience.

2. Love Food Hate Waste:

Strengths:

- **Proven Model:** The campaign is based on a successful model from the United Kingdom, which helped cut avoidable food waste by 21 percent in its first five years.
- **Collaborative Approach:** It takes a collaborative, cross-sector approach, working with various partners across the country.
- **Effective Strategies:** The campaign offers simple, actionable tips and strategies to help Canadians make their food go further and waste less.
- **Resourceful:** It is Canada's leading resource to prevent household food waste.
- **Cost Saving:** The campaign helps save money for Canadian households by reducing food waste.

Weaknesses:

- **Scope of Influence:** The campaign primarily targets household food waste, but a significant portion of food waste also occurs at the production, retail, and restaurant levels.
- **Behavior Change:** Inspiring behavior change on a large scale can be challenging. Despite the campaign's efforts, food waste remains a significant issue in Canada.
- **Resource Intensive:** Running a nationwide campaign can be resource-intensive, requiring significant time, effort, and funding.
- **Food Insecurity:** While the campaign addresses food waste, there is also a pressing issue of food insecurity in parts of Canada.

Opportunities:

- **Expansion:** There is potential for the campaign to expand its reach to more communities across Canada.
- **Collaboration:** The campaign can collaborate with more partners, including governments, businesses, and non-profits.
- **Education:** There is an opportunity to further educate Canadians about food waste and how to prevent it.
- **Policy Influence:** The campaign could influence policy related to food waste at the federal, provincial, and municipal levels.
- **Addressing Food Insecurity:** The campaign could potentially expand its scope to address food insecurity in Canada.

Threats:

- **Public Awareness:** Despite the campaign's efforts, more than 60% of the food thrown away in Canadian homes could have been eaten. This suggests a lack of public awareness or understanding about food waste.
- **Resource Constraints:** The campaign requires significant resources to operate effectively. Any reduction in funding or resources could threaten its operations.
- **Environmental Impact:** Food waste contributes significantly to greenhouse gas emissions. Any changes in environmental regulations or policies could impact the campaign.
- **Food Insecurity:** While the campaign addresses food waste, it does not directly address the issue of food insecurity, which affects 1 in 6 children each year in Canada. This could be seen as a missed opportunity or a threat to the campaign's relevance.

Conclusion:

In navigating the dynamic landscape of food waste reduction and redistribution platforms, a nuanced understanding of competitor dynamics is paramount. This analysis provides a foundational basis for crafting an innovative software solution proposal that not only addresses current market gaps but also positions our offering as a frontrunner in this vital domain.

Business values:

- Definition of the unique selling points that set the proposed solution apart.
- Articulation of the value proposition for potential users.

Unique Selling Points (USPs):

- **Advanced Predictive Analytics:**
Our platform employs cutting-edge AI-driven algorithms for predictive analysis, allowing businesses to anticipate and minimize food wastage at its source. This proactive approach sets us apart, enabling users to optimize their supply chain processes and make data-driven decisions.
- **Holistic Supply Chain Integration:**
Unlike competitors, our solution seamlessly integrates with existing supply chain management systems. This holistic approach ensures a streamlined and efficient process from procurement to distribution, minimizing disruptions and maximizing the impact of food redistribution efforts.
- **User-Centric Design and Customization:**
We prioritize user experience with a user-centric design, offering an interface that is not only intuitive but also highly customizable. This ensures that businesses can tailor the platform to their specific needs, fostering greater adoption and satisfaction among users.
- **Community Building and Social Engagement:**
Our platform goes beyond mere transactional interactions by fostering a sense of community. Through social engagement features, users can connect, collaborate, and share best practices, creating a vibrant ecosystem committed to the common goal of reducing food waste.

Value Proposition for Potential Users:

- **Optimized Operations:**

Businesses leveraging our platform benefit from advanced analytics, enabling them to optimize their operations and reduce food waste at every stage of the supply chain. This results in significant cost savings and increases operational efficiency.

- **Enhanced Sustainability:**

For organizations committed to sustainability, our solution provides a tangible way to reduce their carbon footprint. By minimizing food waste and facilitating its redistribution, users contribute to global sustainability goals and position themselves as socially responsible entities.

- **Streamlined Collaboration:**

Our user-centric design fosters collaboration among stakeholders, creating a community-driven approach to tackling food waste. The platform's social engagement features facilitate communication and cooperation, empowering users to work together towards a common cause.

- **Scalable Impact:**

The platform's scalability ensures that businesses of all sizes can participate in the food waste reduction movement. From small enterprises to large corporations, our solution accommodates varying needs, making a meaningful impact on a global scale.

Conclusion:

Our proposed solution stands out in the market by combining advanced technology with user-centric design, offering a comprehensive approach to food waste reduction. With a focus on predictive analytics, seamless supply chain integration, community building, and sustainability, our platform not only addresses current market gaps but also provides a compelling value proposition for businesses committed to making a positive impact on both their bottom line and the environment.

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