

A CONCEPTUAL THRIFTYMEALS BUSINESS MODEL: ENHANCE FOOD SECURITY AND REDUCE FOOD WASTE

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ABSTRACT: This paper introduces ThriftyMeals, a digital platform business model that is reshaping the way people consume food while actively contributing to Sustainable Development Goal (SDG) 12 - Responsible Consumption and Production. ThriftyMeals objective is to address the critical issues of food waste and affordability while aligning with SDG 12's objectives. At its core, ThriftyMeals provides a digital platform designed to reduce food waste by making surplus food available to consumers at reduced prices. The methodology used in this paper is Design Thinking, utilising modeling tools namely the Business Model Canvas (BMC), Value Proposition Canvas (VPC), Business Environmental Map (EM), and Strategy Canvas (SC) to guide the process of designing, testing, and establishing a validated ThriftyMeals business model. This paper collects using surveys and analyzes data from the various customer segments like restaurants and consumers. ThriftyMeals operates with a unique framework that transforms the traditional approach to food sourcing and distribution. At the same time, emphasizing the significance of ThriftyMeals towards achieving global sustainability goals, particularly SDG 12, which advocates for a more responsible and sustainable approach to consumption and production. ThriftyMeals stands as an innovative solution, aligning with the imperative of SDG 12, while reimagining food consumption and waste reduction on a local and global scale.

KEY WORDS: Surplus Food, Food Waste Reduction, Food Security, Digital Business Model, Re-skilling, Sustainable Development Goals

1. INTRODUCTION

In a world where food waste is a growing problem (Chirsanova, 2021), "ThriftyMeals" brings fresh hope and a new way of thinking. This business idea is not about making money but it's about solving a global grand challenge issue which is food waste. To strike a balance between environmental friendliness, resource conservation, and responsible eating, ThriftyMeals is revolutionizing the way in which the community handles food.

ThriftyMeals is more than just a business concept, it is a whole new way of doing things. Its main mission is clear, which is to reduce food waste in supermarkets and restaurants. At a time when food waste is causing serious problems for the environment and people, ThriftyMeals steps up to make a

difference. This paper aims to uncover what makes ThriftyMeals so special, from why it matters so much to how it works.

The core idea behind ThriftyMeals is simple yet powerful that is to take food that might get thrown away, make it affordable, and share it with the needy and low income B40 community. This is not just about saving money but it's about saving the planet too. In fact, ThriftyMeals aligns with Sustainable Development Goal (SDG) 12, which is all about being wise in what we produce and consume. By delving into ThriftyMeals, one can ascertain its inner workings and comprehend its critical significance. It is not just a business idea, but it is a way to change how one handles food and make it affordable and better for everyone.

2. BACKGROUND, CHALLENGES, AND OPPORTUNITIES

Food waste is a severe problem in Malaysia, with restaurants playing a significant role. According to Ng et al. (2021), Malaysians produced 33,000 tons of solid waste daily, with municipal solid waste accounting for the majority at 64%. This waste composition includes food waste, which is a major contributor. This problem stems from the country's rich culinary culture, which creates a considerable quantity of food waste. Malaysia's rich and diversified cuisine pushes food enterprises such as restaurants, cafés, and street sellers to make ample servings and a vast range of meals to appeal to the different preferences of both residents and visitors. However, this frequently leads to overproduction and surplus, resulting in significant food waste. Inefficient food management practices, insufficient storage facilities, and a lack of understanding of the environmental and economic effects of food waste have exacerbated the problem.

Recent studies illuminate food businesses' multifaceted food waste management challenges. The lack of standardized food waste measurement and reporting methods makes it hard to evaluate and compare waste reduction efforts (Muth et al., 2019). Food products are perishable, making inventory management difficult. Balancing supply and demand reduce waste. Consumers discard imperfect but edible produce due to aesthetics, resulting in significant production waste (Hingston & Noseworthy, 2020). Standardized metrics for consistent measurement, cutting-edge technologies for inventory tracking and demand forecasting, and targeted consumer education campaigns to change food aesthetics perceptions are solutions to these challenges. However, a lack of platforms that help these food establishments and methods to help the B40 community with this platform still poses a challenge. Therefore, a new solution is required to overcome these challenges.

3. OBJECTIVES

The main objective of this paper is to create a conceptual business model called ThriftyMeals that focuses on reducing the amount of food excess and food waste created by food establishments. This can be facilitated by introducing an online platform for food establishments to donate or to sell their surplus food items at a reduced-price. Which allows consumers to buy food at a lower price. Thus, reducing food waste. ThriftyMeals will serve as a digital platform which facilitates consumers and business owners for food sponsoring for the B40 community.

4. METHODOLOGY

This paper will adapt the Design Thinking (DT) Methodology. According to Kurek et al. (2023), DT has a purpose in creating creative ideas that are relevant for the users to find solutions that can give a good impact in the future. The DT methodology focuses on a human-centered approach to design and solve problems in five stages. The first stage empathizes with the customers by understanding their perspectives and listing out their needs. The second stage is to define the problems and extreme pains of the customers that need to be solved. The third stage is to ideate as many business models options, embedded with digital platform/app, as possible solutions for the identified problems. Next is the fourth stage where the business model prototype is created in the form of an initial business model, using Business Model Canvas (BMC) framework, embedded with a low-fidelity digital platform/app. The last stage is to test the prototype by getting feedback from the target customer segments (CS) in order to establish the validated business model. Then, the processes will be repeated to implement the feedback given by the target CS. The modeling tools used in this paper are the BMC which is used to capture the nine blocks of the business, the Value Proposition Canvas (VPC) which is used to determine the value the service needs to provide to the customers, the Environmental Map (EM) which is used to figure out external factors that will influence the business and the Strategy Canvas (SC) (Osterwalder & Pigneur, 2010; Osterwalder et al., 2010). The process for establishing the validated business model is done by conducting surveys targeted at the CS of the initial business model. The findings of the survey are then reviewed, and the validated business model in the form of BMC is established. To further validate the conceptual business model, the Strategy Canvas is used to compare the values, relevancy, and performances of ThriftyMeals against other similar businesses.

5. LITERATURE REVIEW

5.1. Food Waste Among Stores in Malaysia

Food waste is a major global problem, and Malaysia is no exception. The retail sector is a significant contributor to food waste in Malaysia, accounting for about 20% of total food waste in the country (Jaafar et al., 2020). There are a number of causes of food waste in the retail sector in Malaysia. One of the main causes is overstocking. Retailers often overstock their shelves to ensure that they have enough products to meet customer demand. However, this practice can lead to unsold, expired, or spoiled food items. Another major cause of food waste in the retail sector is aesthetics. Retailers often discard food items that have blemishes or are not aesthetically pleasing, even if they are still safe to eat. This is because consumers are more likely to purchase food items that are visually appealing. The consequences of food waste can be various in terms of environment, economy, and society. Economically, food waste incurs substantial financial losses for the retail sector (Horoś & Ruppenthal, 2021). Stores suffer not only from the cost of purchasing excess inventory but also from disposal and handling expenses. Efforts to reduce food waste in Malaysian stores encompass various strategies and initiatives. Collaborations with food banks and NGOs have emerged as a viable solution to distribute surplus food to the needy (Spring & Biddulph, 2020).

5.2. Selling Surplus Food as Business in the Digital Economy

Selling surplus food as a business is a new model that aims to reduce food waste and create a more sustainable food system (Yang et al., 2022). Surplus food can be redistributed from businesses to charities, benefiting both retailers and consumers (Davies, 2018). By diverting culled fresh fruits and vegetables from grocery stores, this surplus food can be processed for donation or for new commercial enterprises, generating revenue and supporting community-based enterprises (O'Donnell et al., 2015). Furthermore, it is also stated by Ciulli et al. (2019) that digital platform organizations can also act as 'circularity brokers' that can foster waste recovery in food supply chains. Overtime, digital multi-sided platform adapted to achieve long-term economic viability while minimizing food waste, thereby contributing to social and environmental sustainability (Principato et al., 2023). Moreover, commercial surpluses of food that would have otherwise been wasted can be repurposed, creating new food markets and benefiting the environment (Giles, 2020). The Italian food supply chain has also explored the management of surplus food throughout different stages and sectors, contributing to the sustainable management of the food supply chain (Garrone et al., 2012). Overall, selling surplus food as a business and digital business can help reduce food waste, support communities, and create new economic opportunities .

5.3. Benchmarking of exisiting ThriftyMeals Business Models

5.3.1. ResQ Club

ResQ Club is a Finnish company connecting sustainable restaurants, cafes and grocery stores with consumers that appreciate eating affordable quality food through a digital service (Mesiranta et al., 2020). The application provided by the Finnish company allows restaurants to sell their unsold lunch meals to consumers at a lower price. Restaurants and consumers which are their main customers, can download the application for free and register themselves. Registered restaurants will have the capability to effortlessly list their available meals along with their designated prices. On the consumer side, diners can conveniently peruse the meal options that align with their preferences and complete secure payments directly within the app. By today, tens of thousands of active buyers and thousands of sustainable food business are registered on the platform (ResQ Club, n.d.-h). ResQ Club's mission is to foster waste-free societies, with the initial objective being the eradication of food waste within European restaurants by the year 2030 (Mesiranta et al., 2020). ResQ Club's revenue model relies on earning commissions from each meal sold through its app, making the company reliant on the presence of restaurant food waste. Additionally, the company's day-to-day operations have depended on external financial support, including backing from public investors like Business Finland and private angel investors.

5.3.2. Too Good To Go!

"Too Good To Go" is a popular mobile application that addresses the global issue of food waste, while providing a practical solution for consumers and businesses alike. See Fig. 1. The application was developed with the mission to reduce food waste by connecting consumers with local restaurants, bakeries, grocery stores, and other food establishments that have surplus food they can no longer sell. Through Too Good To Go, users can browse listings of these businesses, which offer 'Magic Bags' or similar deals at a significantly discounted

price. The products are reserved by the customer when Too Good To Go confirms their order with a reservation confirmation. The customer has the possibility to filter the results in the application in consideration of the availability of products to reserve, of the pickup hour, or of the nature of products contained in “magic bags” (Mathisen & Johansen, 2022). These bags contain unsold but perfectly edible food, and users can purchase them through the application, thereby rescuing food that would otherwise end up in the trash. This concept not only helps consumers access affordable and delicious meals but also contributes to a more sustainable and environmentally friendly food system. As such, the stores may be able to reduce food waste and also have a small income from the surplus sales. The stores may post their food surplus in the app with a reduced price and with a defined time frame in which customers may bid for and collect the items. (Mathisen & Johansen, 2022).

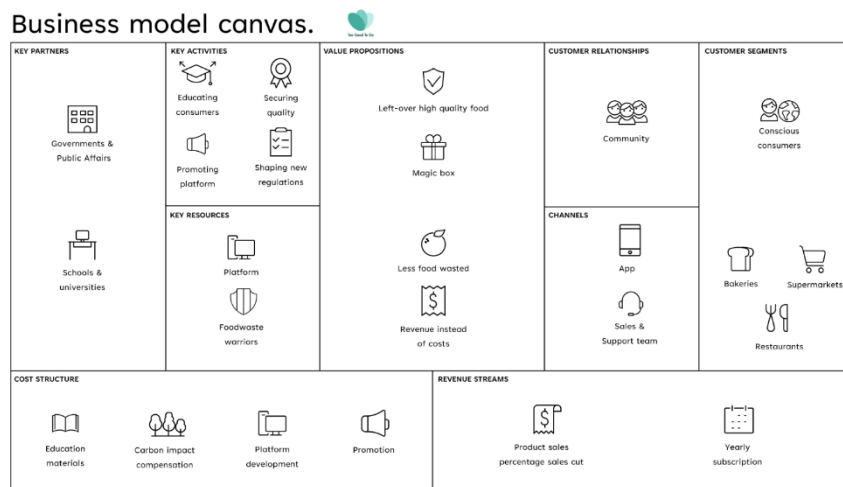


Fig. 1. Business Model Canvas for Too Good To Go!

5.3.3. Olio

Olio's Business Model Canvas

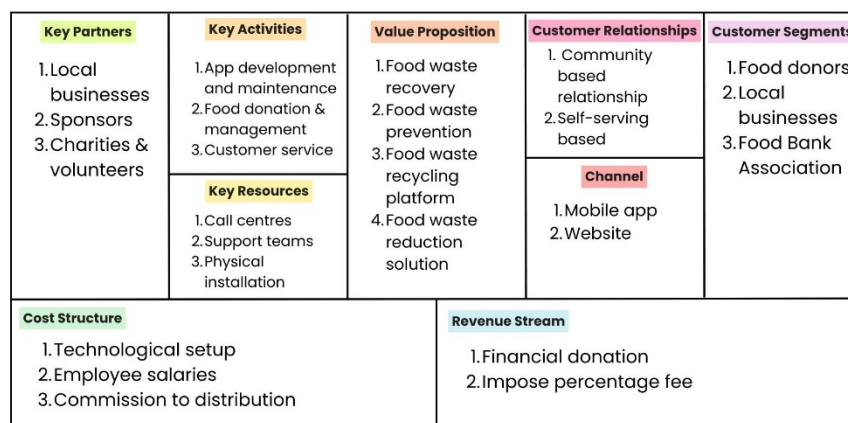


Fig. 2. Business Model Canvas for Olio

Olio is a mobile application that facilitates local sharing by enabling users to redistribute their unwanted possessions to nearby individuals. Fig. 2 shows that Olio is a platform that allows individuals to repurpose their unused possessions, such as food, clothing, books, and toys, contributing to reducing waste and promoting

sustainability efforts. Olio lets users exchange goods without monetary transactions through the acts of giving and receiving, lending and borrowing, or engaging in the purchase and sale of previously owned products. Individuals derive value from sharing their food resources without incurring waste while also benefiting from acquiring complementary commodities. On the other hand, businesses can utilise the consumer network to effectively manage their surplus food for a fixed cost, as opposed to the fees imposed by conventional trash management companies (Ronteau et al., 2023).

In contrast to the food-sharing application Too Good To Go, the connections facilitated by OLIO are entirely free. OLIO generates its money through its commercial operations, and its platform allows for both business-to-consumer (B2C) and consumer-to-consumer (C2C) exchanges (Ronteau et al., 2023). Olio generated revenue initially by imposing charges on larger enterprises for the services rendered through their Food Waste Heroes Programme. Additionally, Olio has established supplementary sources of income. One is offering additional app features in exchange for a minor subscription fee. Furthermore, the Olio app has included ads (Olio, 2023).

5.3.4. HelloFresh

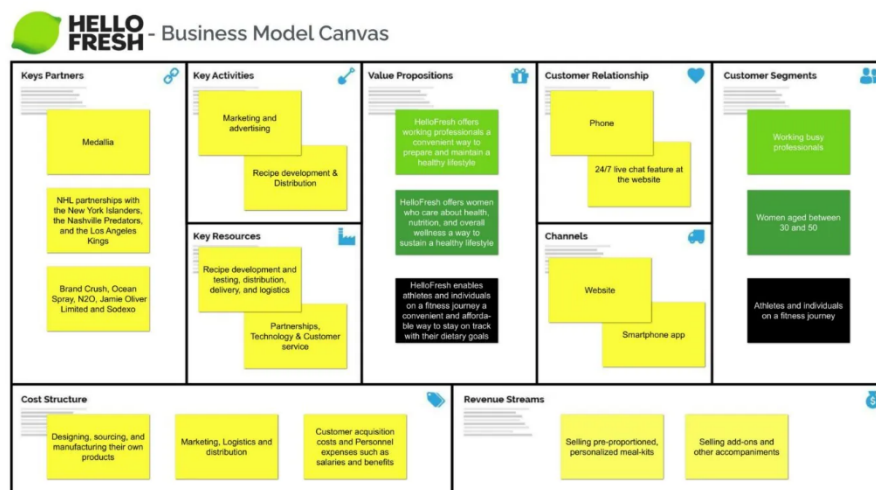


Fig. 3. Business Model Canvas for HelloFresh

HelloFresh is a company based in Berlin, Germany that trades healthy meal-kits. Fig. 3 shows the business model canvas for HelloFresh. The company focuses on working busy professionals, women aged between 30 and 50, and athletes or individuals on a fitness journey as their customer segment. The value propositions of the company are firstly to prepare meals that are convenient and healthy for working busy professionals. Secondly, it is to offer health-conscious women a way to sustain a healthy lifestyle and lastly, to enable people on a fitness journey a way to track their dietary goals. The channels they use to communicate with their customers are through their website and smartphone application. They improve their customer relationships by phone and a 24/7 live chat feature that is available on their website. The key activities of the business are recipe development and distribution along with marketing and advertising said recipes. Next is the key resources needed to complete the key activities which are the delivery and logistics

of the recipe development and maintaining the relationship of the company with their partners and customers. Moving on to the key partners of the company are Medallia, a company that specialises in customer experience and uses IT to improve it, various National Hockey League (NHL) partnerships, and other companies that can improve the user experience on their online platform. Next is the cost structure where designing, sourcing, manufacturing, marketing, logistics, and distribution are the costs incurred for their products along with customer acquisition costs and employee salaries and bonuses. Lastly HelloFresh generates revenue through subscription based selling of pre-proportioned personalised meal kits and by selling additional customisations.

6. INITIAL BUSINESS MODEL (BM) - USING BMC & VPC

The initial business model is derived from the literature reviewed from the previous section. It is also based on assumptions made for each segment in the Business Model Canvas (BMC), Fig. 4, and Value Proposition Canvas (VPC), Fig. 5 to Fig. 8.

Business Model Canvas

Key Partners 1. Local restaurants 2. Local Supermarkets 3. Convenience Stores 4. Food delivery services 5. Donors / Food Banks	Key Activities 1. Build relationship with local food businesses 2. Promotions with sellers and consumers 3. Marketing of platform 4. Manage food quality of sellers and donors 5. Donate excess food Key Resources 1. Database of sellers and donors 2. Online platform 3. Human Resource	Value Proposition 1. Food businesses can sell their excess or unwanted food at a reduced price (instead of throwing away) 2. Consumers can buy food at a cheaper price 3. B40 can get free food 4. Donors get to do good deeds by sponsoring free food to B40	Customer Relationships 1. Communities 2. Online marketing 3. Self-Service 4. Guaranteed food quality 5. Reducing pain Channel 1. Mobile app for Android and IOS 2. Website	Customer Segments 1. Local restaurants/Food establishments a. Food businesses who don't want their food to go to waste 2. Consumer a. People who struggle to afford full-priced food b. People who don't want to waste food c. People who are on a budget 3. B40 4. Donor/Sponsorships
Cost Structure 1. Marketing costs for the platform 2. Employee salaries (If Applicable) 3. Utility costs 4. Taxes (If applicable) 5. Website fees			Revenue Stream 1. Transaction fees from businesses 2. Free for B40 3. Sponsorship from Donors	

Fig. 4. Business Model Canvas for ThriftyMeals

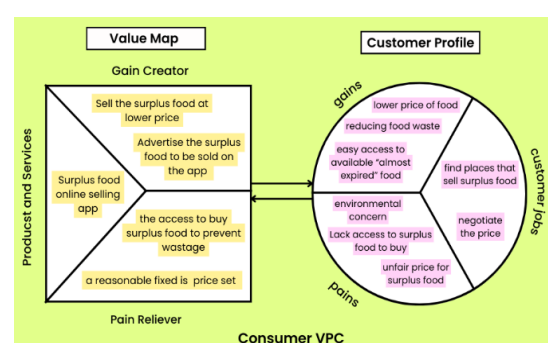
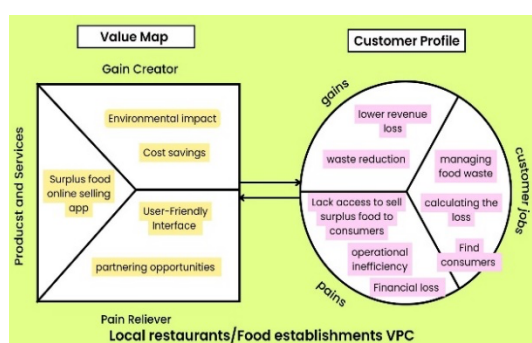


Fig. 5. Value Proposition Canvas for Sellers & Fig. 6. Value Proposition Canvas for Consumers

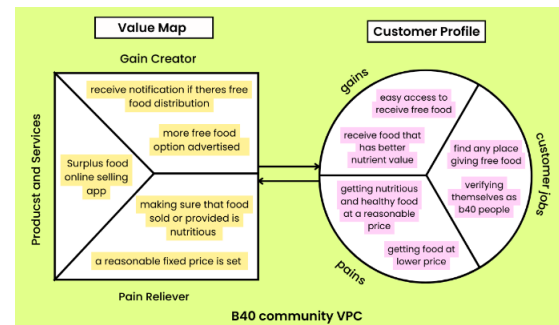
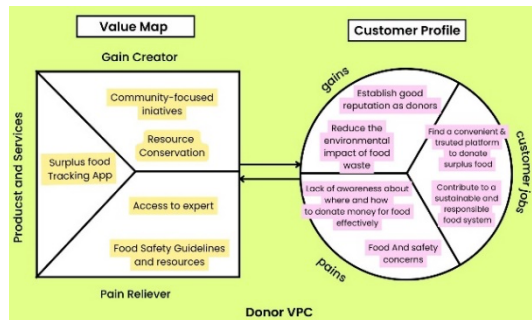


Fig. 7. Value Proposition Canvas for Donors & Fig. 8. Value Proposition Canvas for B40 Community

7. CONDUCT VALIDATION OF INITIAL BM & KEY FINDINGS

To achieve a thorough validation of the initial business model, researchers opted for a meticulous approach, conducting four distinct surveys tailored to specific customer segments: consumers, local supermarkets/restaurants, the B40 community, and donors. This strategic decision aimed to delve deep into the unique experiences, needs, and challenges of each customer group, seeking a comprehensive understanding of their daily lives as it relates to the proposed business model. The surveys were conducted using an online survey platform where the customers could participate anytime they want within the survey distribution period.

7.1. Consumers survey

In the consumer survey, a series of 6 questions were structured in the survey form. A total of 16 responses received which are categorized in 4 different ages of groups which were identified in the first question.

To gauge consumer perceptions of the business model's validity, the next five survey questions are designed to assess their concerns about daily food waste in supermarkets and restaurants. The survey's introductory question delves into this issue, revealing that 12 out of 16 participants express their concern about food waste. This finding highlights the significance of food waste as a social issue that demands attention and action. The third survey question assesses the participant's frequency of seeking out establishments that offer surplus food at reduced prices. The rating scale ranges from 1, indicating no effort to find surplus food, to 5, indicating a strong inclination to actively locate such establishments. As illustrated in Fig. 9, the majority of participants actively seek out surplus food retailers, suggesting a growing awareness and acceptance of this sustainable practice.



Fig. 9. Survey Result – Frequency of Seeking Out Surplus Food

To understand consumer's pain regarding the food waste issue, a survey question was designed to assess their frustration level of not being able to access surplus food retailers. The rating scale from 1, indicating no frustration involved, to 5, indicating a very frustrating situation for them. The survey as shown in Fig. 10 reveals that the majority of respondents (63%) experience some level of frustration when they are unable to access or locate stores offering surplus/stale food items for purchase. This suggests that there is a significant unmet demand for surplus food in the community, and that there is room for improvement in the availability and accessibility of these items.

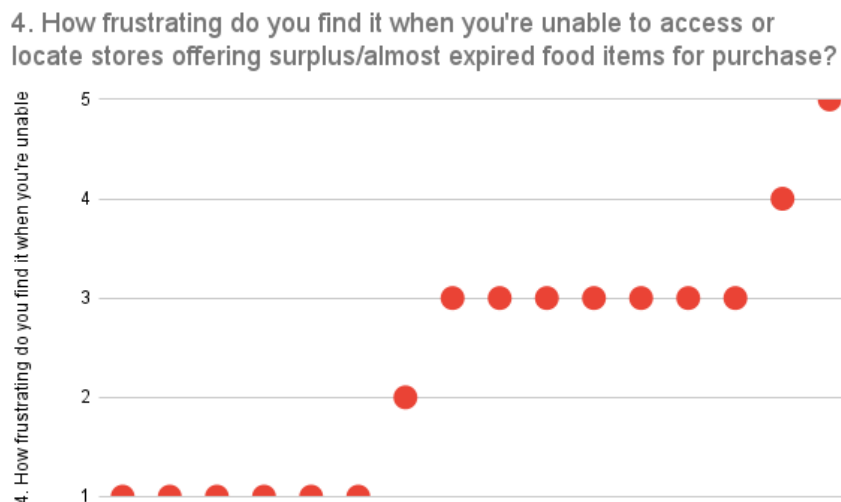


Fig. 10. Survey Result – Frustration Level of Inability to Access Surplus Food

To assess the perceived importance of developing a platform or service aimed at reducing food waste in restaurants and supermarkets, we asked participants to rate their assessment of the proposed solution's potential benefits. As displayed on Fig. 11, the survey results show that the overwhelming majority of respondents (94%) found the platform or service to be beneficial, with 50% rating it as "very beneficial." This suggests that the platform or service is meeting a real need in the community and is providing significant value to users.



Fig. 11. Survey Result – The Degree of Benefit of Having a Platform that Sells Surplus Food

The final survey question explored participants' willingness to purchase surplus food at reduced prices. The insights gained reveal that the majority of respondents (56.3%) are more inclined to purchase food if it was offered at a reduced price due to nearing expiration. This suggests that there is a significant opportunity for businesses to reduce food waste and generate additional revenue by offering discounts on food that is approaching its expiration date. The results also show that a significant portion of respondents (43.8%) are “maybe” inclined to purchase food at a reduced price due to nearing expiration. This suggests that some consumers may need to be persuaded of the benefits of purchasing near-expiration food, such as its affordability and safety.

7.2. Local Restaurants/Supermarkets Survey

In the survey for local food businesses, a series of 8 questions were asked to understand the types of food businesses that may need the online platform while assessing the average amount of surplus food generated by the respondents, the main reasons for the food surplus, the types of food commonly found in the surplus, and the way the respondents deal with the surplus food with the challenges faced by them to manage it. The survey received 5 responses from the target respondents.

In the first question, the types of food businesses vary from a restaurant, catering service, a bakery, and online businesses. From there comes the second question to determine the average amount of surplus food generated. The catering service generated the highest among all the other businesses with an average surplus amount of food of more than 100 kg whereas 3 food businesses with the lowest average surplus amount of food of less than 10 kg. The other respondent, a restaurant owner, had an average surplus amount of food between 10 – 50 kg.

Next, the third and fourth questions analyze the main reasons for the surplus food generated by the respondents and the most common food items in surplus. As expected, most respondents had overproduction as the main reason for the surplus food whereas the other respondents had unsold food and returns from customers as the main cause for the surplus. The common food items in surplus are

perishables and prepared meals which had 2 respondents each and the bakery owner had baked items as the common surplus.

The next section inquired about the ways in which the respondents handled the surplus food and their challenges. 1 out of 5 respondents freeze the leftover food whereas 1 respondent donates the food, and the other 3 respondents can't keep the food. This reveals that 2 of the respondents have a strategy in reducing the surplus food and unsurprisingly, the respondents with no strategy had generated more surplus food than the ones with a strategy. However, only 1 of the respondents donates the surplus food by communicating with a student society whereas the others do not donate due to the SOP of their business, employee mishandling the storage of food, and the unpredictability of customer flow.

7.3. B40 Survey

The B40 survey encompasses seven inquiries focusing on diverse aspects. It explores respondents' age range, their familiarity with various food programs or services, motivations that drive their choices, top priorities when accessing food resources, the challenges they encounter, their current utilization of surplus food, and their interest in a wide array of surplus food options. These questions delve into the multifaceted landscape of respondents' attitudes and experiences concerning food, aiming to gain comprehensive insights into their needs, preferences, and perspectives within this domain.

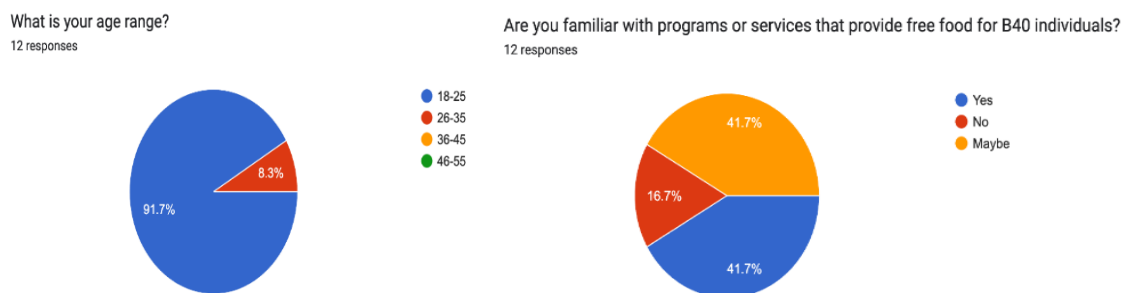


Fig. 12. & 13. Survey Result – Age Range and Familiarity with food programs or services for B40 Individuals.

Fig. 12 shows the B40 demographic reveals interesting insights about the age range of the respondents. The majority, constituting 91.7%, falls within the largest age group with age 18-25 years old, depicted by the blue section of the pie chart. The second largest group, represented by the red section, accounts for 8.3% of the responses with age 26-35 years old. While Fig. 13 shows the familiarity with food programs or services for B40 individuals which indicates the level of respondents have with programs or services that provide food for B40 individuals. Most respondents answered "Yes", indicating they are familiar with such programs or services.

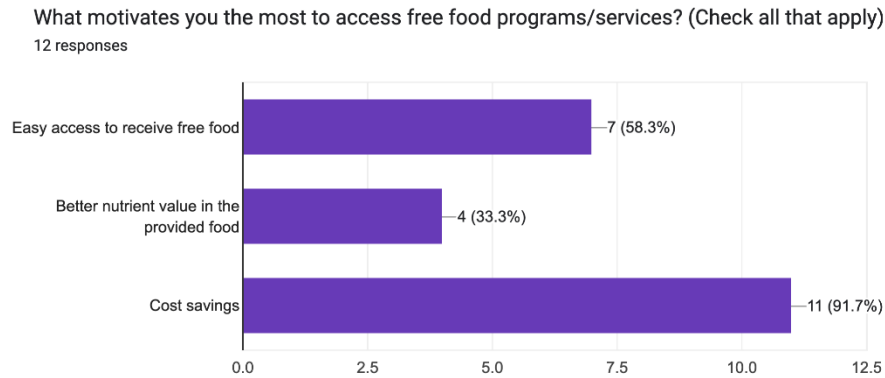


Fig. 14. Survey Result – Motivations of respondents when accessing free food programs/services

In Fig. 14, insightful data reveals the motivations driving respondents' engagement with free food programs or services. Notably, an overwhelming 58.3% of respondents are motivated by the ease of accessing these provisions, signifying its paramount importance. Following closely, 33.3% express a keen interest in the superior nutritional value offered by these programs or services, indicating a significant consideration for health benefits. Conversely, cost savings emerge with the least impact, garnering a response rate of 91.05%. While acknowledged as a factor, it evidently holds less sway compared to the accessibility and nutritional quality of the available food options, as perceived by the respondents.

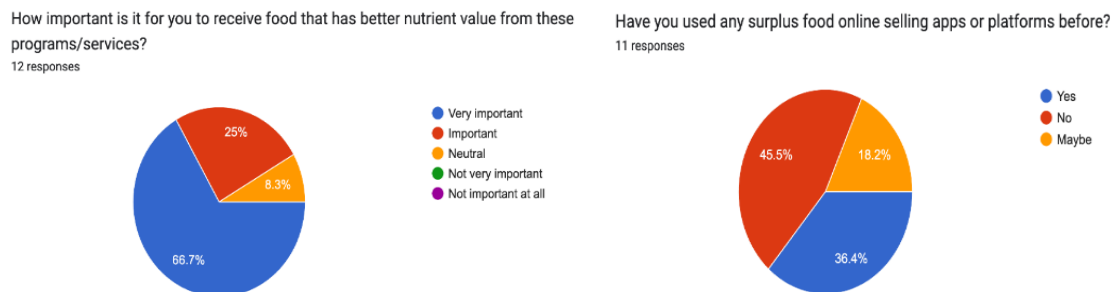


Fig. 15. and 16 survey Result – Respondents' priorities when accessing food programs/services and current state of usage of surplus food selling platforms

Fig. 15 illustrates the significance of nutrient value as perceived by respondents engaged with these programs or services. The pie chart underscores a striking consensus, with 86.7% of participants deeming it "Very Important," and an additional 25% regarding it as "Important." Notably, none of the respondents indicated a neutral stance or deemed nutrient value as "Not Very Important" or "Not Important at All." This unanimous perspective underscores the critical role that the nutritional content of food holds within these programs or services, showcasing its paramount importance among the participants surveyed.

Fig. 16 presents the utilization status of surplus food selling platforms among respondents which is 36.4% have engaged with these platforms, possibly due to convenience and eco-consciousness while 45.5% haven't, likely due to limited

awareness or trust issues and 18.2% are open to future use, highlighting growth potential if barriers are addressed. This data underscores the need for strategies like awareness campaigns and enhanced user experiences to convert potential users, indicating avenues for platform expansion and increased user engagement.

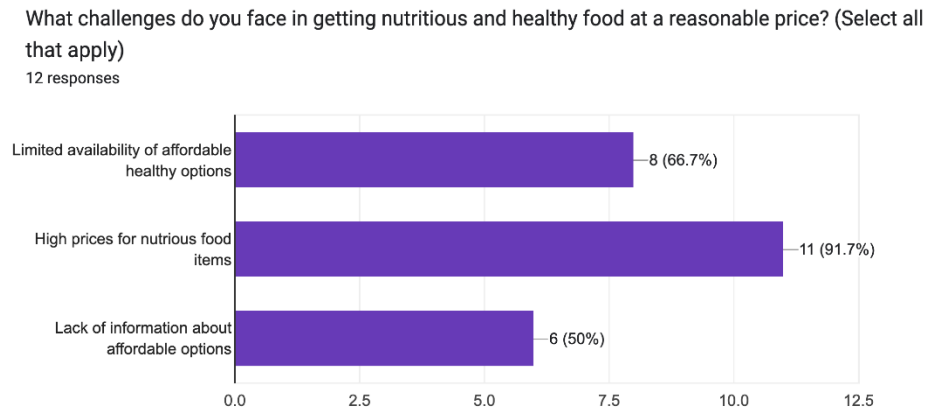


Fig. 17. Survey Result – Multifaceted challenges people face when trying to access nutritious and healthy food at a reasonable price.

Fig. 17 outlines challenges in accessing affordable, nutritious food which around 66.7% face limited availability or distribution issues, indicating accessibility hurdles due to location and distribution networks. Cost is a significant concern, although the exact percentage isn't specified, reflecting financial barriers to healthy options. Furthermore, the lack of information about healthy food options signifies a need for better education and dissemination of such knowledge. This data emphasizes the multifaceted nature of food security, urging comprehensive solutions that address accessibility, affordability, and knowledge gaps in healthy eating for individuals facing these challenges.

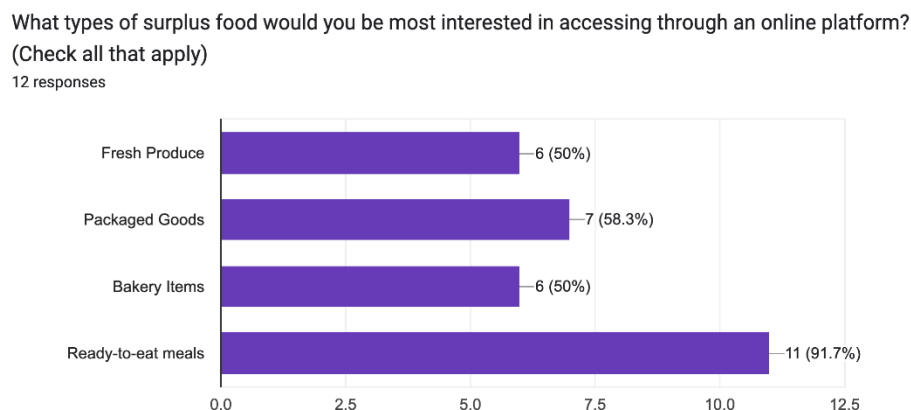


Fig. 18. Survey Result – Broad interest in a variety of surplus food types

Fig. 18 displays the types of surplus food people are most keen on accessing through online platforms. Fresh Produce and Bakery Items each capture 50% interest, indicating a desire for healthy options and cost-effective choices. Packaged Goods draw attention from over 58.3% of respondents, suggesting an

inclination toward longer shelf-life essentials. Surprisingly, Ready-to-eat meals are the least favored at 91.7%, potentially due to concerns regarding freshness, taste preferences, or dietary restrictions. These insights offer guidance for online platforms to align their offerings with consumer preferences while also signaling an opportunity to educate users about the benefits and safety of surplus ready-to-eat meals, potentially increasing their appeal.

7.4. Donor Survey

In the donor survey, the survey form included nine questions. The questions were split into six sections: demographics, awareness and interest, motivations, incentives and benefits, communication preferences, and closing comments.

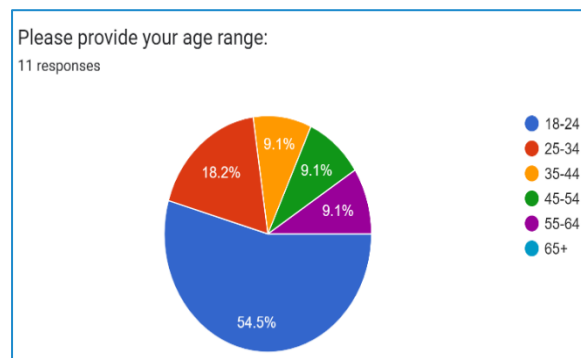


Fig. 19. Survey Result – Age range of donors

The first section is demographic, where we learn about our potential donors' age group and employment status. As indicated in Fig. 19, eleven replies were received and classified into five different age groups identified in the first question. The second survey question asked about the current employment status of the potential donors. According to the statistics, 63.6% are employed, 27.3% are students, and 9.1% are housewives. As a result, the majority of them are employed and hence more likely to be able to donate.

The second section discusses the donors' awareness and interest in platforms that allow food donations and their desire to support a business that aims to reduce food waste. Question three demonstrates that 81.8% of donors are not aware of platforms that allow them to donate food. This is because more well-known platforms are currently required. As a result of question four, all potential donors would want to support our business's initiative to reduce food waste.

The third section examines what motivates donors to give. Question five asks donors why they want to support a startup that sells surplus food at a discount. The top three responses were reduced food waste at 90.9%, environmental sustainability at 81.8%, and ethical consumption at 81.8%. This outcome validates our customer gains in reducing the environmental impact of food waste. Question six asks donors how important it is to support a cause they believe in. Most potential donors felt they needed to support the causes they believed in. This finding suggests that it is critical to consider the donors' values as being similar to the business' values to ensure satisfaction for both parties.

The fourth section investigates the incentives and benefits that potential donors would find appealing. Question seven asks what incentives or benefits they would receive from donating to ThriftyMeals. According to the findings, most respondents

(81.8%) wanted to know how their contribution impacted the B40 group. Similarly, they want to be recognized on the business platform. The donors would be pleased to be involved and contributing to the community after seeing the positive change resulting from their contribution.

The fifth question is regarding the potential donors' communication preferences. 81.8% of them prefer social media updates. This result is because social media is the most convenient and common method of receiving updates.

Finally, the final section welcomes potential donors' comments or suggestions about ThriftyMeals' food waste reduction initiatives. There were three comments regarding the quality of stale food. This is a reasonable concern, and ThriftyMeals intends to establish food safety guidelines and SOP to ensure that the food remains safe to eat despite being stored for so long. One commenter suggested repackaging the food to make it more appealing to buy, which is a crucial point to consider. Another potential donor suggested allowing customers to pay for food for others when making purchases on the platform.

8. VALIDATED CONCEPTUAL BUSINESS MODEL

8.1. Validated Conceptual Business Model

Following our validation surveys on the initial business model, we learned that our clients are generally satisfied with the business model and that changes were made when necessary. As a result, Fig. 20 depicts the validated business model canvas for ThriftyMeals.

Validated Business Model Canvas

Key Partners <ol style="list-style-type: none"> 1. Local food businesses 2. Food delivery services 3. Donors / Food Bank 4. Jabatan Kebajikan Masyarakat (JKM) 5. The Food Safety and Nutrition Cluster (KMP) 	Key Activities <ol style="list-style-type: none"> 1. Build relationship with local food businesses 2. Promotions with sellers and consumers 3. Develop & enhance platform 4. Manage food quality of sellers and donors 	Value Proposition <ol style="list-style-type: none"> 1. Food businesses can sell their surplus food at a reduced price 2. Consumers can buy food at a reduced price 3. B40 can get free food 4. Donors can help the B40 and have better reputation 	Customer Relationships <ol style="list-style-type: none"> 1. Communities 2. Online marketing 3. Self-Service 4. Guaranteed food quality 5. Customer Service 	Customer Segments <ol style="list-style-type: none"> 1. Local restaurants/Food establishments <ol style="list-style-type: none"> a. Food businesses who don't want their food to go to waste 2. Consumer <ol style="list-style-type: none"> a. People who are on a budget 3. B40 Individuals 4. Donors
Key Resources <ol style="list-style-type: none"> 1. Database of sellers and donors 2. Online platform 3. Human Resource 		Channel <ol style="list-style-type: none"> 1. Mobile app for Android and IOS 2. Website 3. Masjid 		
Cost Structure <ol style="list-style-type: none"> 1. Marketing costs for the platform 2. Employee salaries (If Applicable) 3. Utility costs 4. Taxes (If applicable) 5. Website fees 			Revenue Stream <ol style="list-style-type: none"> 1. Transaction fees from businesses 2. Ad revenue on app & website 3. Free for B40 4. Sponsorship from Donors 	

Fig. 20. The validated business model canvas of ThriftyMeals.

The BMC's nine blocks, which are explained below, represent the overall picture of the ThriftyMeals business, components, and procedures.

8.1.1. Customer Segments (CS)

The Customer Segments in this study are the groups of people or organizations we hope to reach or help with this platform. These are the local food businesses that do not want their food to go to waste, consumers looking to cut costs on food, low-income B40 individuals who do not have the money to purchase food, and donors who support "Reduce Food Waste" cause and assist the needy B40.

8.1.2. Value Proposition (VP)

A value proposition is a service or feature offered to suit the needs and wants of certain customer segments. The values provided to each customer type are as follows:

- a. **Local restaurants/Food establishments:** ThriftyMeals is a surplus food sales platform that enables food businesses to sell their surplus food at a reduced price instead of throwing it away. Our platform allows food businesses to create listings for surplus food items and offer them to consumers at a discounted price. This not only helps to reduce food waste but also reduces the business' financial loss and operational inefficiency.
- b. **Consumers:** As consumers, they can purchase quality food at a reduced price. Consumers can browse through the listings and purchase the food items they want for personal consumption or donation purposes. By doing so, consumers can save money on their food expenses while contributing to reducing food waste. ThriftyMeals aims to create a win-win situation for food businesses and consumers by promoting sustainability in the food industry.
- c. **Low-income Individuals (B40):** On ThriftyMeals, low-income individuals (B40) can also benefit from our platform by receiving free food donations from donors. Our platform makes donated food items available for low-income individuals to claim. To receive free food donations, low-income individuals must sign up for an account on ThriftyMeals and provide proof of their B40 status. Once their account is verified, they can browse the listings of donated food items and claim the items they need.
- d. **Donors:** Donors can sponsor free food to B40 individuals on ThriftyMeals and gain a better reputation. By donating money to purchase food items for low-income individuals, donors can contribute to the reduction of food waste and help alleviate food insecurity among those in need. This aligns with the 12th Sustainable Development Goals (SDGs) goal, which is responsible consumption and production. ThriftyMeals aims to create a platform that promotes responsible consumption and production while benefiting the community.

8.1.3. Channels (CH)

Channels explain how we want to reach out to and engage with potential and new customers to provide the value proposition. ThriftyMeals will communicate with its customer groups via its website and mobile application. Customers may also contact us through our Facebook, Twitter, and Instagram social media pages. ThriftyMeals also uses the Masjid as a place for B40 individuals to collect their free food (Nasution et al., 2015; Dahlan et al., 2021).

8.1.4. Customer Relationships (CR)

ThriftyMeals is a platform that focuses on building relationships with current customer segments to provide them with the best possible experience. The platform aims to build a community of like-minded individuals who care about reducing food waste and alleviating food insecurity. ThriftyMeals uses online marketing channels such as social media, email marketing, and search engine optimization to attract new customers and retain existing ones. The platform also offers a self-service feature, allowing customers to create listings, purchase food items, and claim free

food donations. The platform guarantees the quality of food items sold to ensure customer satisfaction. Lastly, ThriftyMeals provides excellent customer support through various channels e.g. email, phone, social media, and Mosques (Hamid et al., 2013; Dahlan et al., 2021) to address any issues or concerns.

8.1.5. Revenue Stream (RS)

ThriftyMeals will generate income via transaction fees from food businesses' sales on the platform, ad revenues on its mobile app and website, and donor sponsorship. In the case of B40 individuals, it will be free.

8.1.6. Key Resources

The most critical assets necessary to make the ThriftyMeals business model succeed are the Key Resources. Our significant resources include a seller and donor database, digital platforms like our mobile application and website, and a competent business team which are the co-founders of ThriftyMeals.

8.1.7. Key Activities

Building partnerships with local food businesses, promotions to sellers and customers, develop & enhance ThriftyMeals' digital platform, and regulating the food quality of sellers and donors are the key activities necessary to make the ThriftyMeals business model function.

8.1.8. Key Partners (KP)

Our business partners are our key partners. Local food businesses, food delivery services, donors, food banks, masjids, Jabatan Kebajikan Masyarakat (JKM), and The Food Safety and Nutrition Cluster (KMP) are among them. Local food businesses will sell their unsold food on our platform. Food delivery services will assist us in delivering purchased food from our platform to the customers. Donors and food banks will assist us in providing funds for the food donations to the B40 individuals. We will cooperate with masjids in local areas to setup a station for B40 individuals to collect the free food donated by the generous donors. Government agency such JKM will assist us with providing a list of B40 individuals and KMP will assist us in making guidelines for ThriftyMeals' Food Safety Guidelines.

8.1.9. Cost Structure

ThriftyMeals' operating costs include the website's utility expenditures, mobile app technological infrastructure, and website and mobile app maintenance. Marketing expenses are required to make ThriftyMeals prominent to customers. Employee salaries are also included in the cost structure. Finally, if applicable, we include the expense of paying taxes in our cost structure.

8.2. Low Fidelity ThriftyMeals Prototype



Fig. 21. Low Fidelity Prototype of ThriftyMeals Mobile App

The Fig. 21 above displays the low fidelity prototype of ThriftyMeals mobile app. Consumers and food retailers each have dedicated main screens tailored to their specific needs. Upon logging in, consumers are presented with an interactive map showcasing food retailers selling surplus food in their vicinity. The map streamlines the process of locating and selecting the desired surplus food items. The consumer menu screen provides an effortless browsing and ordering experience, enabling seamless navigation through the available surplus food options. The consumer can easily browse and order surplus food items on the consumer menu screen. In contrast, food retailers benefit from a dedicated main screen that empowers them to post and manage their surplus food offerings with ease. The notification screen keeps retailers informed of incoming food orders, allowing them to prepare the surplus food for pick-up in a timely manner. The app's simple design and intuitive navigation make it an effective tool for tackling food waste and promoting sustainable practices.

8.3. Business Environmental Map

8.3.1. Key Trends

ThriftyMeals should be aware of three key businesses that could impact business. Firstly, increasing awareness of food waste. Going forward, a more environment-conscious population will likely embrace the cause because it will reduce carbon emissions and facilitate cost savings by not throwing away as much as spoiled food (Alterman, 2021). This awareness is driving consumers and businesses to seek solutions that can help to reduce food waste. Secondly, the rise of technology in food management. Technology is playing a crucial role in reducing food waste. For instance, applications that connect consumers with restaurants that have surplus food are becoming increasingly popular. A less scientific, but certainly practical innovation, is startup Too Good to Go's food waste-reduction marketplace, which currently operates across several European countries (Alterman, 2021).

Thirdly, government regulations and incentives: Governments around the world are implementing regulations and offering incentives to reduce food waste. These could range from penalties for wasting food to tax benefits for businesses that donate surplus food. Staying abreast of these regulations and leveraging the incentives could be advantageous for ThriftyMeals. In achieving more integrated waste management solutions, the Government had further extended the tax incentive for Green Technology through the Budget 2014. This was done to further strengthen the development of green technology (Shahril, 2020).

8.3.2. Market Forces

Consumer demand is one of market forces of ThriftyMeals. On one side of the exchange, restaurants, grocery stores and other food businesses contribute surplus food items. On the other side, consumers can purchase food right before it becomes unsellable. As a result, businesses generate revenue from surplus food, customers can buy food at low prices, and the transactions reduce food waste (Alterman, 2021). Next, regulatory pressure also market forces of ThriftyMeals. The loss of the food itself is bad enough, but the secondary effects are alarming as well: the water consumption linked to food loss and waste amounts to approximately one-fourth of the world's freshwater supply. Greenhouse-gas (GHG) emissions from food loss and waste constitute 8 percent of the global total, or at least four times those of the aviation industry (Borens, 2022).

8.3.3. Macroeconomic Forces

There are two macroeconomic forces for ThriftyMeals. Firstly, are economic incentives. Reducing food waste can lead to significant cost savings for businesses. This not only improves their bottom line but also contributes to their sustainability goals by reducing their scope 3 emission footprint. Research shows that retailers could reduce their cost of goods sold (COGS) by 3 to 6 percent, and manufacturers by 5 to 10 percent (Borens, 2022). This is a clear demonstration of how economic incentives can align with environmental sustainability. Next, the global food crisis. The global food crisis is indeed highlighting the importance of reducing food waste. Solutions like ThriftyMeals are becoming increasingly relevant and are likely to influence both economic policies and consumer behavior. We chose tomatoes because 50 million to 75 million tons of them are lost upstream every year—more than any other fruit or vegetable (Borens, 2022). With 50 million to 75 million tons of tomatoes lost upstream every year, it's clear that there's a significant opportunity for waste reduction. The lessons learned from addressing waste in the tomato supply chain can indeed be extrapolated to other fresh-produce categories.

8.3.4. Industry Forces

In the food industry, specifically within the realm of sustainable food consumption and waste reduction, the key factors of industry forces are consumer preferences, quality and variety. The shifting food preferences of consumers toward ready-to-eat food products owing to the busy lifestyles of working individuals as well as the hectic work schedules of college students is likely to fuel market growth based. Consumer preferences for packaged meals are constantly changing as people are looking for higher-quality ingredients, more variety, and speedier delivery. This has boosted the popularity of ready-to-eat takeaways and same-day delivery. The rising pressure upon brands to offer products that are better for the environment continues to shift the overall concept of packaged food boxes toward

more plant-based or vegan ingredients and the use of sustainable packaging with less plastic and waste (FMI, 2023).

8.4. Strategy Canvas

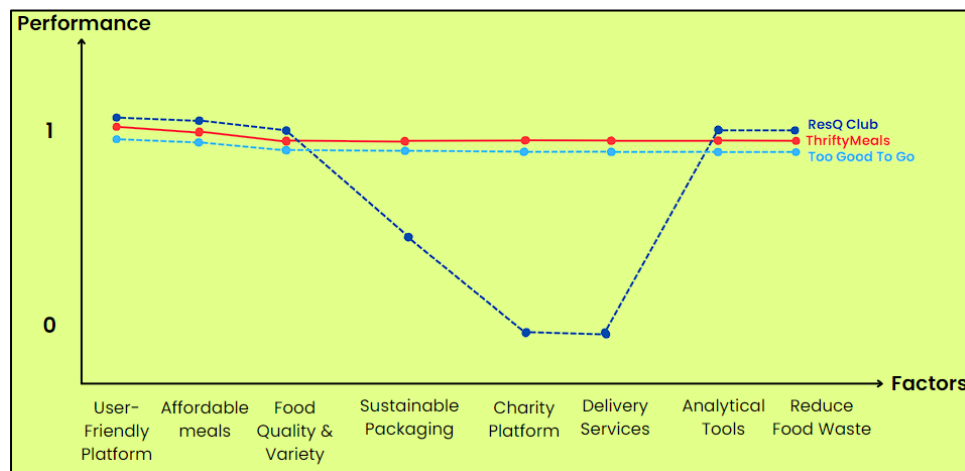


Fig. 22. Strategy Canvas for ThriftyMeals against ResQ Club

The strategy canvas helps compare ThriftyMeals' strategies and values captured with other similar businesses. See Fig. 22. The important key factors that need to be compared in the online platform for ThriftyMeals are the user interface design and user experience in navigating the platform as it will be the main source of interaction between the business and its customers. If the online platform is not as user-friendly as other platforms, then customers will not use it and recommend the platform to their friends. The online platform will have user authentication for the B40 customers, food establishments, and normal customers or donors. This implementation will allow separate user views on the platform where sellers have an additional page where they can use analytical tools to review their performance and an option to pay for their shop to be advertised in the platform.

The next key factor is the quality and variety of the food sources available on the platform. ThriftyMeals will need to build relationships with food establishments or convenience stores, to ensure that customers are able to choose healthy food options. Furthermore, the business will partner with delivery services such as FoodPanda etc. and clarify the locations available with surplus food. Customers can also choose to pick up their food to remove the delivery cost. The meals that are ordered will be packed in an eco-friendly container to attract customers that are concerned about the environment.

Another key factor is the price of the meals. The meals will be sold at a reduced price which will attract thrifty customers. In addition, donors that donate to the platform can see their contributions to the community through the platform. The donations made through the platform will allow B40 customers to verify their status and receive free food from the funds donated. The platform will implement a review section in each seller's platform so that customers can engage with the sellers and provide feedback that can further improve the sellers' products and services.

Lastly, the blue ocean strategy for the business leverages on the fact that there are few competitors that sells the same type of products as ThriftyMeals in Malaysia. Similar businesses in Malaysia include Pasar Grub and Graze Market. However, these businesses currently focus on the excess of fresh produce. Thus,

ThriftyMeals allows access to affordable meals that can be donated while also reducing potential food wastage.

9. CONCLUSION

The vast amount of food waste generated daily at restaurants and supermarkets poses a significant environmental and social challenge. In response to this pressing issue, ThriftyMeals emerges as a conceptual business model dedicated to minimizing food waste and combating hunger. By establishing a platform that connects food retailers and consumers, ThriftyMeals facilitates the seamless exchange of surplus food, reducing the volume of food destined for landfills. Furthermore, ThriftyMeals extends its reach to alleviate hunger by channeling excess food donations to individuals and communities in need, for example the B40 community. Through its dual focus on environmental sustainability and social responsibility, ThriftyMeals presents a promising solution to tackling the multifaceted problem of food waste and hunger.

To further refine and elaborate on ThriftyMeals' conceptual business model, the development of a comprehensive business plan is essential. This plan will serve as a roadmap for implementation, outlining detailed strategies, financial projections, and operational procedures. Additionally, regular reviews and updates of the conceptual business model are crucial to ensure its alignment with evolving technological advancements and market trends. Expanding the customer segment to have B40 community's contribution instead of just receiving the free surplus food presents a compelling opportunity for ThriftyMeals to not only address food insecurity but also empower this underserved group. By providing B40 individuals with opportunities to contribute to the business, ThriftyMeals can foster a sense of ownership, self-reliance, and economic empowerment within this community.

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