Rotterdam School of Management
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Assignment 1: Business Case

CONCLUDISHES

Group 11

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1. Business Needs

At this moment, the food waste level shows no decrease, despite the United Nations' target of halving global food waste by 2030 (United Nations, 2022). In the European Union, 88 million tons of food are wasted annually (Stenmarck, Jensen, Questen & Moates, 2016), and 36 million people cannot afford a proper meal (Eurostat, 2020). Globally, the situation is direr, with one-third of food produced being lost or wasted (Zhongmin, Linong, Xiaona, Wangquang & Wei, 2021). Hence, nearly one-third of the global population does not have access to enough food. Wasting food is an ethical, economic, and environmental issue. By reducing food waste, we can reduce the global footprint as 10 percent of global greenhouse gas emissions comes from food waste, redistribute food to those in need, and save money, as 1 trillion euros is being lost due to food waste. The described problem relates to two of the United Nations Sustainable Development Goals (SDG); 'SDG 2: Zero Hunger' and 'SDG 12: Responsible Consumption and Production.' Additionally, the secondary SDG includes 'SDG 13: Climate Action'.

The population of the Netherlands is, on average, wasting over 50 percent more food compared to the average European Union number (Zero Waste Europe, 2020; No Waste Network, n.d.). While all food waste is important, we believe that there is a skewed focus on retailers' waste. In fact, 13 percent of total food waste comes from retailers compared to 26 percent from food services. According to Food Waste Reduction Alliance (2014), only 1.4 percent of restaurant food waste is being donated, the majority is being disposed of. Furthermore, two-thirds of restaurants indicate that there are barriers to food donation, the main barrier being transportation costs. Another barrier to donating food is the lack of staff time necessary to manage donation programs. However, instead of focusing on donating, restaurants should consider selling food that would otherwise be disposed of. Creating another source of revenue would incentivize restaurants to allocate staff time to selling food waste. Consumers would be able to get meals at a discounted price, incentivizing them to buy restaurant food to prevent further food waste.

One promising approach to combat food waste is to create a platform that incentivizes restaurants to sell, generate more revenue, and reach more customers while allowing consumers to buy discounted food price at a discounted price. ConcluDishes is also able to deliver sustainable ideas to internal and external stakeholders. Restaurant turnover is the highest of any industry in the U.S. (Verstegen, n.d.), with similar patterns across the developed world. According to Toast (2019), employee turnover worries half of the restaurant owners, ranking hiring and retaining staff as a challenge. Organizations that act more sustainably can attract and retain and engage their employees to a higher degree than their non-sustainable counterparts. There are numerous benefits for restaurants when joining ConcluDishes, helping people and guiding the planet to a greener future.

2. Stakeholder Analysis

This section analyzes the stakeholders' influence and interest in solving the mentioned business problem. The following Table 1 shows the overview of the primary and secondary stakeholders, divided into internal and external types. Additionally, stakeholder power and interest are also evaluated.

Internal stakeholders	**Description**	**Power**	**Interest**	**Type (primary/ secondary)**
Management Board	Responsible for decision-making.	*High*.	*High* - A successful and sustainable project.	Primary

Marketing department	Responsible for app branding and customer promotion.	*Medium.*	*High* - Brand awareness.	Primary
IT department	Responsible for the application development and maintenance	*High* - Crucial for developing the application.	*High* – Users satisfaction	Primary
HRM department	Responsible for hiring/firing and training employees.	*Low.*	*High* - Highly qualified employees.	Primary
Finance department	Responsible for overseeing and managing budget and cash flows.	*Medium.*	*High* - Professionally invested.	Primary
Deliverers	Responsible for executing deliveries.	*Low.*	*High.*	Primary
External stakeholders				
Customers	The front-end users of the ConcluDishes	*High.*	*High* - High-quality and low-price food.	Primary
Suppliers	The food suppliers for the Concludishes.	*High.*	*High* - Reduction in the economic losses caused by food waste.	Primary
Competitors	The companies developing similar technological applications.	*Low*	*Low*	Secondary
Investors	Investors are concerned with the financial performance and growth of ConcluDishes	*High.*	*High* - High Return on investment	Primary
Government	The application should meet national regulations. The government may encourage restaurants and customers to use Concludishes.	*High.*	*Medium* - Reduction in food waste.	Secondary

Table 1. Stakeholder analysis

3. Success Criteria

In order to cover the business needs and objectives that have been identified, the following key success criteria should be met.

Key success factor	Measurement	Goal (3 years)
Reduced excess stock for restaurants	Stock record *Measured in %*	Decrease ≥ 35%
Reduced amount of food thrown away from the restaurant	Food waste record *Measured in %*	Decrease ≥ 35%
Reduced aggregated cost for restaurants activities in dealing with leftovers	Expense record *Measured in %*	Decrease ≥ 30%
Financial success of Return on investment	Financial feasibility analysis	Realize ≥ 11,00% ROI
Increased customer satisfaction	Customer satisfaction *Measured by 5-point scale survey*	Rating ≥ 4.5
Reduced prices for food to end-customer	Food price record *Measured in %*	Decrease ≥ 10%
Increased customer reachability	Customer data record *Measured in %*	Increase ≥ 20%
Reduced hunger rate	Prevalence of undernourishment *Measured in %*	Decrease ≥ 2%
Increased menu options for customers	Menu record *Measured in %*	Increase ≥ 5%
Increased customer anti-waste awareness	Customer awareness sensing *Measured by a 5-point scale survey*	Rating ≥ 4.3
Compliance with regulations for ConcluDishes	Compliance with laws and regulations set by the government *Measured by Yes/No*	Yes

Table 2. Overview of Success Criteria

4. Alternative Solutions

In this section, we propose four important solutions and evaluate them against the applicable success criteria.

4.1 Null option

The null option is where restaurants discard unused food or materials close to their use-by dates. It does not reduce food waste, improve stock control systems, or reduce waste discarding costs. And it does not provide restaurants with a way to capture potential profit from expired food. It also causes customers to miss opportunities to pay less for food that can be nice but just slightly lower in quality. It also impedes customers from being aware of and engaging in activities that can reduce food waste and provide more options, at the expense of living in an environment exploited because of food waste.

4.2 Solution 1: End-of-day discount, manually conducted

According to Wang and Li (2012) and Whitehead et al. (2011), problems with product handling are among the most common food waste causes in retail businesses. A known technique to sell food closer to the use-by date is discounting. Some approaches include setting up physical banners outside the restaurants, having push notifications via their own apps or websites, manually reaching out to contacts they have, or allowing employees to take surplus food home with discounts. While it provides more options and satisfaction to customers and can even raise their awareness about food waste, it has limited reachability, and the costs of action are usually higher than purely discarding it.

4.3 Solution 2: Optimizing quality control

Mismanaged quality control is also one significant cause of perishable food waste (Wang and Li, 2012; Whitehead et al., 2011). Optimizing "shelf life" (the time between production and the expiry date) in cooperation with the retailer's management system can be a useful solution. There are models to assist stock management based on a dynamic shelf-life DSL (as opposed to a fixed shelf-life), such as the Time-Temperature Indicators (TTI) and bacterial growth models (Gharehyakheh et al., 2019). Although these methods can be precise in determining the shelf-life of individual products, the nature of restaurant dishes makes it difficult to apply these models and the DSL approach because it is not their priority to explicitly and accurately state dishes' expiry date. Restaurants of smaller scales might not find those precise management systems more economical than discarding food.

4.4 Solution 3: Donate surplus food to charity

A common way for several restaurants to deal with surplus food is through charity donations. At the end of the business day, local charities, community groups, volunteers, or other non-profit organizations help collect unused meals, recook them into quality ones, and redistribute them to needy people. Groups of people who benefited from this activity include homeless shelters, food banks, household support, and charity organizations.

5. Solution 4 (Preferred Solution)

The preferred solution is to create ConcluDishes – a software that allows local restaurants to sell their unsold or surplus food in acceptable conditions that aim to profit and help cover the loss of restaurants, benefit customers, and involve both parties to reduce food waste. It is an online platform where restaurants gather and upload their surplus food. Customers can browse around, select the desired offer, and pay directly via ConcluDishes. ConcluDishes' delivery partners transport the food from the restaurants and to the end-user. Typically, food should be sold per pack at a lower price than usual to attract customers, wherein restaurants should label the pack's content. The restaurant can state the discount percentage from the original price to make the offers look more attractive. Restaurants can label the carbon footprint on the package, so customers feel more engaged in food waste saving. ConcluDishes is free for customers to sign up. For restaurants, the app charges less than the cost of other options.

Compared to other solutions, ConcluDishes avails for the following reasons. Firstly, for restaurants, joining this collaboration can surely reduce the amount of food thrown away and overall, can minimize the loss of excessive food stock and even make profits from food close to use-by date. While solution 1 can help cover some costs, the scale is not comparable to the preferred solution. The emphasis of solution 2 on implementing systematic stock control can reduce excessive stock, but the cost and the scope are not always optimal for smaller or more independent restaurants. Solution 3 is an effective way to boost restaurants' image and avoid food waste, but it does not compensate for the loss of unused food. Another unique aspect

is that ConcluDishes attracts and acquires new browsing customers. For suppliers, adopting our preferred solution is a more complete and affordable solution.

Secondly, for customers, ConcluDishes can increase customer satisfaction by providing quality restaurant food at a high discount percentage on the original price. In combination with the diversity of restaurants in one interface making it easy for customers to browse, menu options for them can be increased and broadened. This aspect is hard to achieve with the other solutions because they either focus internally or on a small number of external receivers (which are non-profit), which do not engage customers or are limited in reachability. Moreover, the labeling of carbon footprint can further engage customers' journey, boost their awareness, and promote restaurants' social image. It is really about the rich and barrier-free nature of ConcluDishes that makes it stand out in reachability, gaining customers' attention and further making them satisfied, compared to other options.

Concerning SDG 12, it is fair that ConcluDishes is the preferred solution because it has its advantages over the others in terms of suppliers, consumers, and society. An overview of the evaluated solutions is shown in Table 3. In terms of financial evaluation, only the ConcluDishes solution is profitable per se, but it is not the focus of solving the business needs. All solutions should comply with the regulations, and therefore this factor is also minor.

	Null	S1	S2	S3	S4*
Reduce excess Stock	no	no	yes	no	no
Reduce food waste	no	yes	yes	yes	yes
Reduce waste cost	no	yes	unknown	no	yes
Financial (to ConcluDishes)	n/a	n/a	n/a	n/a	profitable
Increase customer satisfaction	no	slightly	no	no	yes
Increase reachability	no	slightly	no	unknown	yes
Reduced price	no	slightly	no	no	yes
Reduced hunger rate	no	slightly	unknown	yes	yes
Increase menu options	no	no	no	no	yes
Increase waste awareness	no	slightly	no	yes	yes
Legal	yes	yes	yes	yes	yes

Table 3. Overview of proposed solutions

6. Cost and Benefit Analysis:

6.1 Cost analysis

Generally, the software development process for a food delivery app, like Uber Eats, requires around 550 to 800 hours (Saba, 2022). We decided to outsource the ConcluDishes application development project, and estimate the time needed to complete this project to be around 6 to 9 months. Table 7.1 presents our subjective cost estimation to develop and deploy the ConcluDishes app. The costs are separated into two categories: one-time and annual. And we break the one-time cost of the software development process down into six main stages: Requirement Specifications, UI & UX design, Back-end & Front-end development, API integration, Prototyping & Testing, Deployment, and Launch (Saba, 2022). Financial assumptions and further details are presented in section 8.2.

			One-time		Annual	
Assumptions	**Cost**	**Description**	**Low**	**High**	**Low**	**High**
FA1	Software development	Requirements Specifications	€ 3	€ 5		
		UI & UX design	€ 12	€ 15		
		Back-end & Front-end development	€ 25	€ 60		
		API integration	€ 5	€ 7		
		Prototyping & Testing	€ 10	€ 20		
		Deployment and launch	€ 1	€ 1		
FA2	Operations	Maintenance + App feature and performance updates			€ 18	€ 50
FA3	Infrastructure	Data server + Domain and hosting			€ 1	€ 2
FA4	Marketing	Platform marketing + App store optimization	€ 20	€ 30	€ 15	€ 15
FA5	Overhead	Administrative, patent, opportunity, and unforeseen costs	€ 3	€ 6	€ 2	€ 4
Total			**€ 79**	**€ 144**	**€ 36**	**€ 71**

Table 4. Cost analysis to develop ConcluDishes app (values are in thousand euros)

6.2 Benefit analysis

Overall, three major stakeholders in ConcluDishes' value proposition are end customers, delivery partners, and restaurant partners. Value is created for end consumers by offering them high-quality surplus food at up to 70% discount. Delivery partners get time-flexible deliveries based on proximity to restaurants and customers. They obtain an 80% total delivery fee and the minimum earning per delivery is €4. Lastly, ConcluDishes builds a marketplace for restaurant partners to rescue their surplus food that would otherwise go to waste.

Monetary benefits come from two main revenue streams: Commission on orders and Service fees. In detail, ConcluDishes gain a 30% commission from the restaurant partners on the cost of each customer-ordered item. Meanwhile, the Service fee equals to Total delivery fee minus the Deliverer earnings. Table 7.2 presents the estimated annual monetary benefits. And yearly, we expect this figure to grow by 100-120%, accordingly to our business scale rate.

	Monetary Benefits	**Description**	**Annual**
FA6 FA7	Revenue	Commission on orders	€ 75
FA6 FA7		Services fee	€ 70
Total			**€ 145**

Table 5. Monetary benefit analysis for ConcluDishes app (values are in thousand euros)

Next to financial benefits, certain stakeholders may enjoy the following non-monetary benefits:

Stakeholder	**Benefits**
Customers	Educational messages on reducing food waste by better buying

Restaurants	Attracts and acquires environmentally conscious customers for restaurants that have signed up for the app
Public Affairs	Cooperate with policymakers to adopt an efficient regulatory framework to make food consumption system more sustainable
Environment	Save meals & reduce CO2 emission
ConcluDishes	Boosts the corporate social responsibility image

Table 6. Non-monetary benefit analysis for ConcluDishes app (values are in thousand euros)

7. Assumptions and Limitations:

7.1 General Assumptions

GA1: Restaurants aggregated cost to manage leftovers is significantly greater than the cost of using our software to manage leftovers.
GA2: The carbon footprint of each dish is feasibly traceable for each restaurant.
GA3: The aggregated cost for restaurant activities in dealing with leftovers includes the cost of making the dishes.
GA4: The cost of manually discounting dishes as individual restaurants are higher than purely discarding them.

7.2 Financial Assumptions

FA1: Hourly wages for a freelance software developer in the Netherlands are €23. And we outsource our project to a dedicated team of four developers (Software Development Hourly Rate in Netherlands | PayScale, 2022)
FA2: Yearly maintenance and software updates cost from 20% to 50% of the initial development cost of the app (Sveta, 2022)
FA3: A managed dedicated server costs for corporate vary around €80 to €140 per month (Casey, 2021)
FA4: We % of yearly revenue on Marketing.
FA5: Software development overhead cost approximately 5% total cost
FA6: We assume our market share is 0.1% of Too Good To Go ApS– the top incumbent player in the same industry, which generated €144,171,723 in 2020. (Deloitte, 2021)
FA7: Service fee (equals to Total delivery fee minus Deliverer earnings) accounts for 48% of total revenue. The commission fee, which charges restaurants 30% on customer orders, accounts for 52% of revenue. This assumption is motivated by UberEATS 2021 revenue breakdown. (Austin, 2022).

7.3 Limitations

L1: The application requires electronic devices and online payment methods to use.
L2: Language usage is only in English and Dutch.

8. Risk Analysis

During different phases of the project, multiple types of risks may occur.

	Risk type	Probability (1-5)	Impact (1-5)	Description of risks	Potential mitigation strategy
Development Phase					
Application development	Project	4	5	Problems in the process of development	Frequent communication with the development department
Local and national regulatory	Project & Product	3	5	Conflicts between the local regulatory and project	Extensive background research on relative regulatory
Implementation phase					
Customer resistance	Product	3	4	Customers are unwilling to use this platform to buy food	Propagandize the product in an early stage and give a bonus to the new users
Restaurant resistance	Product	2	4	Restaurants are unwilling to supply food	Propagandize the product in an early stage
Application bugs	Product	4	3	Problems when using the application	Continuously monitor the application
Ongoing risks					
Low-quality food	Business	3	5	The food sold is low-quality (got expired or uneatable)	Set up the standard for each food product under what condition it could be sold
Seasonality in demand and supply	Business	3	4	Food categories vary by time, leading to the mismatch between demand and supply	Plan for the year-round stock by collecting and analyzing customer preference data
Customer privacy & data	Product	3	5	Customer privacy and information are at risk of being leaked or violated	Only personal process data to the extent needed to perform work duties for the system and restaurant. Keep all personal data strictly confidential and handle it in a secure way
Tampering	Business	2	4	Food sold is deliberated containment by related stakeholders (restaurant staff, delivery man, etc.)	Supervise all employees and related personnel, especially new-comers

Deliver issues	Business	2	3	Delay, wrong delivery, etc.	Provide regular training to
Unclear Liability	Project	1	3	Unable to locate the person responsible for issues when complicated cases happen	Establish the whole supervision and tracking system
Financial risks					
Lack of budget	Project	2	5	It is difficult to estimate development cost at the initial stage, resulting that the project may run out of budget to carry out	Monitoring and cost controlling, set up regular evaluation
Low revenue	Business	2	3	The project doesn't generate as much revenue as estimated.	Set up regular revenue stream evaluation to adjust strategy and business model

Table 7. Risk assessment

9. Conclusion & Implementation plan

Food waste is a global problem with no signs of improvement. The consequences of food waste have a detrimental effect on the climate, a total of one-tenth of global greenhouse gas emissions come from food waste. More than one-fourth of food waste comes from food services, such as restaurants. Thus, restaurants need to be incentivized to sell food that would otherwise go to waste.

ConcluDishes' goal is to solve this problem and help to tackle the United Nations' Sustainable Development Goals 2, 12, and 13. ConcluDishes will simplify how restaurants can sell food that would otherwise be disposed of by taking care of transportation costs and creating a new revenue source. At the same time, consumers will be able to get cheaper restaurant food conveniently. In conclusion, a successful launch of ConcluDishes is going to contribute to food waste and therefore, likely to make a lasting, positive change.

Figure 1 shows the course of action required to design, develop, and successfully launch ConcluDishes.

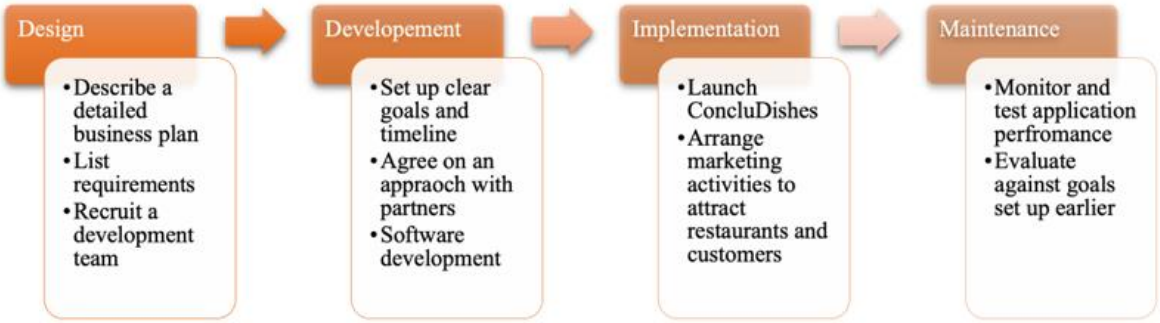

Figure 1. ConcluDishes Implementation plan

10. Bibliography

2019-Restaurant-Success-Report.pdf. (n.d.). Retrieved September 18, 2022, from https://d2w1ef2ao9g8r9.cloudfront.net/resource-downloads/2019-Restaurant-Success-Report.pdf

Austin, L. (2022, June 5). *The Uber Eats Business Model (2022 Update)*. FourWeekMBA. https://fourweekmba.com/uber-eats-business-model/

Buisman, M. E., Haijema, R., & Bloemhof-Ruwaard, J. M. (2019). Discounting and dynamic shelf life to reduce fresh food waste at retailers. *International Journal of Production Economics*, *209*, 274–284. https://doi.org/10.1016/j.ijpe.2017.07.016

Casey, R. (2021, July 12). *How Much Does Web Hosting Cost? | HostGator*. https://www.hostgator.com/blog/how-much-does-web-hosting-cost/

Deloitte. (2021). *Too Good To Go ApS Annual report 2020*. Deloitte. https://regnskaber.cvrapi.dk/40316573/amNsb3VkczovLzAzLzU3L2MxL2U0LzA3L2NlMWEtNDhmYi04NjRhLTFkNWViNzMyYTdhMw.pdf

FWRA_BSR_Tier3_FINAL.pdf. (n.d.). Retrieved September 18, 2022, from https://foodwastealliance.org/wp-content/uploads/2020/05/FWRA_BSR_Tier3_FINAL.pdf

Gharehyakheh, A., Krejci, C., Cantu, J., & Rogers, J. (2019, May 18). *Dynamic Shelf-Life Prediction System to Improve Sustainability in Food Banks*.

How to Calculate your Restaurant Turnover Rate—On the Line | Toast POS. (n.d.). Retrieved September 18, 2022, from https://pos.toasttab.com/blog/on-the-line/restaurant-turnover-rate

Indicator 2.1.1—E-Handbook on SDG Indicators—UN Statistics Wiki. (n.d.). Retrieved September 18, 2022, from https://unstats.un.org/wiki/display/SDGeHandbook/Indicator+2.1.1

Saba, S. (2022, April 7). A Guide on Food Delivery App Development Cost for 2022. *TekRevol*. https://www.tekrevol.com/blogs/how-much-does-it-cost-to-develop-a-food-delivery-app-like-ubereats/

Software Development Hourly Rate in Netherlands | PayScale. (2022). https://www.payscale.com/research/NL/Industry=Software_Development/Hourly_Rate

Sveta, C. (2022, August 31). *How Much Does it Cost to Maintain and Support an App in 2022 | Mobindustry*. https://www.mobindustry.net/blog/whats-the-cost-to-maintain-and-support-an-app/

Zero_waste_europe_CS7_CP_TooGoodToGo_en.pdf. (n.d.). Retrieved September 18, 2022, from https://zerowasteeurope.eu/wp-content/uploads/2020/01/zero_waste_europe_CS7_CP_TooGoodToGo_en.pdf