

# DM565 Innovation Project

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# 1 Introduction

This report concerns the innovation project in the Formal Languages and Data Processing course. The task of this project is to find an idea for a product involving some type of open data, and then evaluate the this idea as a basis for a startup in a structured manner with the business model canvas. Finally we need to construct a prototype showing the idea in practice.

## 2 Idea Description

The basis of the idea is to web scrape recipes of different sites, to create a database of various recipes and the ingredients of these recipes. This database of recipes and ingredients will then be paired with the cost of these ingredients included in the recipe. This will enable us to show an estimate of the cost of making the recipe. The cost of the different ingredients can be found using the public product suggestion API made by the retail company Salling. This API references the prices on the `bilkatogo.dk` website. Another resource for current pricing information is from the `etilbudsavisen.dk` API, which shows the current offers of local chains. Prices are also available on some pages that do not have any APIs. Here is another place that we may need to use web scraping. This price information can be used to let the users query recipes based on their specific budgets. Another way for the product to utilize the price information, is that the user can input their current owned ingredients, and get suggestions on recipes of which the user is only missing a few ingredients to be able to make. This can help combat the waste of food.

## 3 Business Model Canvas

For evaluating our idea the business model canvas will be used. The business model canvas is a template for systematically documenting the business model of an existing business or prospect startup. The business model canvas focuses on four different key areas of a building a sustainable business:

1. Infrastructure
2. Offering
3. Customers
4. Finances

### 3.1 Offering

The offering is the our value proposition. The value proposition is the services that our product provides. The value proposition is what sets the product apart from the competition. The value which we provide to the customer, is to give the ability to view prices of items that are in a given recipe, this will

also present the total cost of the recipe to the customer. The product will also provide value in enabling the customer to submit their own recipes, to share with other customers. Given that we have different recipes with price data, we can also provide the users with options for a number of recipes given different price points. The problem we solve for the customer is the issue of estimating the cost of a given recipe. Another problem, which we could solve for the customer is the issue of finding a recipe for which the user already has the ingredients (or some subset of ingredients). Solving this problem for the customer can also contribute to less wasted food. It is clear that different services can cater to different customer segments. Eg. more cost-conscious consumers may be drawn to the feature of a total cost estimate of a given recipe. The general the value proposition of our product is to provide a service, which gets the job done, and offers convenience for the customer.

## **3.2 Infrastructure**

### **3.2.1 Key Activities**

The key activities, are the most important activities for executing our value proposition. To provide value for our customers we examine which key activities our value proposition requires. In our key activities we first and foremost focus on problem solving:

1. To provide value in terms of offering a price estimate on recipes, we first and foremost must establish a system, which handles recipes and the ingredients of these recipes. The ingredients of the different recipes must be linked with prices of products.
2. We must provide a way of presenting the recipes to the user in appealing way.
3. Providing ways for the customer to participate in a community, thus engaging the customer and pushing them to share recipes and thus provide value for other customers.

### **3.2.2 Key Resources**

Key resources are the resources, which our value propositions, distribution channels, customer relationships and revenue streams require. One of our key resources is the data generated by the customers, when they submit recipes. Another key resource is the public API provided by Salling, which aides in producing the prices of individual ingredients. Active users is also a key resource, in that they bring in advertisement revenue. Thus it is important to keep a good relation to customers, such that they come back for more recipes.

### 3.2.3 Key Partners

A key partner is Salling, which provides pricing data from their open API. This pricing data is hard to source from other places, thus they are an integral partner to our business. A key supplier is the hosting service, which delivers hosting for our website. A hosting service should provide a reliable service, such that we can guarantee availability to our customers. Another key partner is various search engines (although mostly Google), this is of utmost importance, since the vast majority of site visits will come from people searching for a specific recipe. Thus optimizing our service for discoverability (Search Engine Optimization) is very important in acquiring new consumers.

Down the line we could also incorporate prospect key partners, these could be different retail chains sharing prices with us. This could enable us to provide more value to our customers in terms of comparing prices and enabling competition.

## 3.3 Customers

### 3.3.1 Customer Segments

At first we must examine who our customers are, in order to more efficiently provide value for them. However ultimately our target is to create value for a mass market audience, since we provide recipes, and most people will at some point search for a recipe. However our core customers are those which contribute recipes, and participate actively in the community around sharing recipes. This would thus equate to people interested in cooking, baking and the like. Another core customer base is the frequently returning customer, which primarily uses the service for looking up cost of recipes, this is the cost-conscious customer. The cost-conscious customer can be people from most walks of life, it could be a cash-strapped student or the working mom looking to reduce the grocery shopping bill. Returning customers also generate more data, which could be used to suggest recipes, or even better advertisements. Thus there are three overall groups of customers.

- The customer attracted from a search engine
- The contributing, food-enthusiast, which is returning customer
- The returning cost-conscious customer

### 3.3.2 Customer Relationships

Establishing and maintaining customer relationships is an integral part of retaining returning customers. The customer relationship is also a core part of turning briefly visiting customers into returning customers. However we must approach the different customer segments in their own way as they are using the site for different purposes. Regarding expectations from customers, the briefly visiting customer does not expect us to establish a relationship with them. They

are looking for our content nothing more. However through relevant channels we could entice some small amount of briefly visiting customers to become contributor or returning customers. For returning customers (and contributors) we must continually engage with through relevant channels.

However we are looking to keep the costs of maintaining customer relationships low, as continuously creating engaging content can be costly. Thus we must interact with the customers in terms of an automated service, serving the content they are looking for.

### **3.3.3 Channels**

Customer channels are a crucial part of establishing and maintaining customer relationships. Our product can engage with customers through different channels. For our returning customers we can connect with through mail, so building an e-mail list could be very advantageous. Through mail we can incentivise participation and contribution. For our cost-conscious customers we can highlight discounted recipes, or other relevant offers. However the best way to build a great relationship with any customer (including the ones which only visit briefly) is through having the best content. This could be reviews of the different recipes, great photos and other informative content to help the customer engage with the recipe. Thus the goal is to create a product where each type of user can form their own individual relationship with the service, utilizing the service for their specific needs.

We can also generate more reach through targeted online ads. However the primary channel, from which we can acquire new customers is through online search engines.

## **3.4 Finances**

### **3.4.1 Cost Structure**

Our business focuses on being cost-driven, thus minimizing costs and increasing automation. It is important to reduce cost, eg. in not having a manual review process for the submission of ingredients and recipes, but having this process automated. We can then focus the remaining funds on creating more value for customers, this could be creating pictures associated with different popular recipes.

The cost structure of the product include variable cost like hosting fee, which rise with the amount of customers. There could also be some fixed costs like salaries for content production if that becomes a priority, however this would only be viable after the product the reached a certain scale.

### **3.4.2 Revenue Streams**

Regarding the revenue streams of the product, we can assume the customers are not willing to pay up-front for our services. Since we are catering to cost-conscious consumers, and food-enthusiasts, we cannot expect at any point that

they are willing to pay out of pocket. We thus have to seek other revenue streams. The most likely way of generating revenue is through advertisements. Advertisements generate revenue, at no cost to the customer. However one could envision a subscription-based model, where the customers are given more premium recipes to choose from, these could be accompanied by instructional videos. This however requires a large paying user-base to be viable. Returning to the current realistic revenue streams, we can also generate a lot of data from returning customers. This data can be sold to third parties, however we must be conscious of the impact on our customers if utilizing with revenue stream.

We must also be mindful of rapid growth, this can be a pitfall if the variable costs quickly outgrow the revenue streams.

## 4 Prototyping

Our goal in creating a prototype of the idea is to showcase the concept of the idea.

### 4.1 System Architecture

On figure 1 the overall structure of the system is shown. This is a three layer architecture. Here the User Interface(UI) is the top layer. This is where the user interacts with the system. The Domain layer is where the logic is located. The domain layer interacts with the UI. The Domain layer is where we process requests for eg. a specific recipe. The Domain layer then interacts with the database, requesting the right data in the form of queries. The data scraper is a module to the system. The role of data scraper is to populate the database with the correct data.

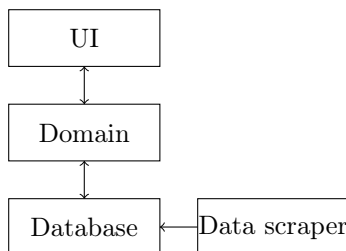


Figure 1: Architecture of the system

## 4.2 Scraping Data

## 4.3 Sanitizing Data

## 4.4 Getting Prices

## 4.5 Creating Relationships in the Data

## 4.6 User Interface

### 4.6.1 Generating the html

**Jinja2** For our user interface we have used html, which makes sense when making a webapp. To generate our html templates we have used a templating engine called Jinja2 which our app engine flask supports. Jinja2 is widely used for python web framework, because it is fast, secure and easy to use.

The language can use control expressions like if statements and for loops. It also use of blocks and macros. Blocks are used for template inheritance which allows us to create reusable templates. The templates are created as html files where we add the control structures using Jinja2 expressions. We have defined a base template that imports css and scripts that are used by all the templates. Using blocks other templates can add to the base template. In our case the base template is 'templates/main/base.html'. We then reuse that template to create other templates and avoid duplicate lines of html.

**jQuery and Ajax** jQuery is a javascript framework that enables easy HTML DOM, event handling, css animation and ajax request. It treats html documents like a tree structure, which lets us easily add and remove html elements.

Ajax is asynchronous javascript and XML which can be used to make asynchronous web applications. We use it primarily to query data on the backend and then show it using jQuery on the frontend.

**Views** Our webapp has two primary views which are:

1. /recipes/
2. /ingredients/

**Recipes** The recipes view shows all the recipes that are scraped and collected. The recipes can be searched by name by writing in the search input and then pressing enter. We then use jQuery and ajax to query a endpoint that returns all the names that match a regular expression. The recipes can then be accessed individually using links from the list.

We can also create a new list using the 'lav ny' button which redirects to a view with a form. The form has a field called 'Ingredients' where if we



write something of four characters length and press down we get a list of viable ingredients. We then add a a amount and a unit and press 'Add ingrediens' to add it to the recipe. When filled out we can press 'send' and send the data to our backend where it is validated and added to the database.

**Ingredients** Ingredients has a list view just like recipes where all the ingredients are listed. The ingredients can be searched just like recipes and there are links for individual links for every ingredient.

When we access the individual ingredients we can see the alias for the ingredient and the recipes the ingredient is part of.