

Project Specification

Project Significance (Done2)

Following the covid-19 pandemic, restaurant owners are facing an uphill battle against the prospect of their future financial success. The skyrocket global unemployment rate has led to rising anxiety amongst individuals to spend money in restaurants. Furthermore, we are likely to observe a decline in the supply of waitering jobs given the uprising number of University graduates every year and the aging developed countries. To support restaurant owners through this difficult time, an interesting software project – Hi, i-Waiter! – has been pioneered, a web-based platform that primarily takes orders and payments for restaurant customers.

Project Objectives & Market Competitiveness (Done2)

To introduce the full scope of the project, we cluster the software components into portions that must be done, the minimal viable product; and those that will be done after the project, the future work.

Minimal Viable Product (Done2)

First, we will examine the minimal deliverables that must be completed before the end of the project in March 2021, in terms of the restaurant owners, customers, chef and waiter.

1. Restaurant Owners

a. Lowers Staff Costs by £10,000 - £30,000+

The power of this software system is its dramatic capacity to minimise waitering workload by at least 50%, and consequently half the staff costs. Upon subscribing and adapting fully to the platform, restaurant waitering staff will no longer need to take orders, register meal details to the computer system, take any bills and tips from the customers and send any orders to the kitchen. They only need to serve the food from the kitchen to the table. The £10,000 - £30,000+ figure is derived based on annual minimum wage of a waiter. It is £8 per hour x 8

hours x 6 days x 50 weeks = £19,200 = £20,000. Let's assume that a medium sized restaurant has 3 serving staffs. If less a staff is needed, then we can conclude that the medium sized restaurant owner can earn an upward £20,000 a year.

2. Restaurant Customers

a. Faster Meal Ordering and Payment

For our restaurant customers, they will enjoy immensely the immediate food and drink ordering. They no longer need to patiently wait for staff to come in, take their orders and put it into the computer system.

Future Work (Done2)

This section encompasses the non-essential requirements of the project in the perspectives of the restaurant owners and their customers.

1. Restaurant Owners

a. Reduce Table Reservation Fee by £1,800

Restaurant owners are currently facing hefty fees from online table reservation system. A populous website, OpenTable.com (2010) is charging an enormous £1 per seated person. If we modestly assume that there will be 6 customers reserving their tables via the platform each day, the restaurant will subject to the cost of 6 customers a day x £1 per customer x 6 days x 50 weeks = £1,800 annually. Adopting us as the alternative platform, they will save a tremendous £1,800 each year. We are able to offer this level of service because our main objective is to enhance tractions from the restaurant owners via our ordering platform.

b. Reduce Advertisement Cost by £240

We also take advertisement interests into our hearts. Advertisement is undisputedly the bridge between restaurants and potential customers. However, 5pm.com (2020) currently charges £200 + VAT annual fee for their platform advertisement and electronics reservation system. Comparatively, OpenTable (2010) also charges £199 monthly subscription fee for the same service. We want to offer our clients free advertisement service and save them at least £240 a year. This is to attract restaurant owners to use our robot waiter app.

<https://www.5pm.co.uk/corporate/restaurant/>

<https://blog.opentable.com/2010/how-opentable-works-for-restaurants/#:~:text=Restaurants%20pay%20a%20%24199%20monthly,custom%20configuration%20of%20the%20system>.

c. Free Table Management Software

Successful restaurants usually incorporate intelligent table management system, especially for high yield restaurants in which they face the constant challenge of efficient seat allocation. Restaurant staffs may not be able to glance the restaurant for empty tables and it is a time cost to walk around the restaurant and see whether there is an empty and unreserved table. Consequently, we will establish a platform for restaurant staffs to record the status of each table – occupied or empty – to accommodate the fast-pace change in restaurant operations.

d. Free Staff Rota Software

Experienced restaurant owners will often encounter headaches when writing their staff rota sheet. They need to ask for staff availability and allocate shifts in a way that reflects the demands of many restaurant staffs. As a result, we are passionate to develop an electronic staff rota system to reduce the cumbersome and time-consuming natures of paper rotas.

e. Competitive Accountant & Insurance Rates

As a platform dependent software, we will uniquely attract high volume of online traffics from both the restaurant owners and their customers. We will be able to offer large scale accounting and insurance services via our personalised payment portal. The unique standpoint for this strategy is that it is far most cost-effective to conduct tax and accountant consultant via pre-recorded YouTube videos through hyperlinks from emails/ posts with the quantity of restaurant owner clients that we will acquire.

2. Restaurant Customers

a. Search for Other Restaurants

Another distinct advantage of high quantity traffics is the fact that we can branch out our types of services easily. We want to establish a web-based find-restaurant website that collects all the restaurants in the world. We believe we have a competitive edge over other existing platforms because we can redirect restaurant customers to the find-restaurant page after the payment process. We will display all the restaurants in the city based on proximity and popularity.

b. Search for Nearby Events/ Activities

Event/ Activity Hosting is another segment we want to target. We will be a platform that enables registered users to advertise their local activities. With an established pool of users from the food ordering platform, it should be an easier task for us to re-direct and advertise our own product, e.g. after food payment.

Software Marketing (Done)

1. Email Crawler & Post

To advertise our products, several marketing strategies have been considered. They are the Email Crawler and Post. The idea is that we use Information Retrieval System to collect the restaurant names, addresses, emails, and telephone numbers based on the Restaurant and the Location keywords. For example, we can use the keywords Restaurant and Glasgow to automatically find relevant restaurant websites and push all these data to our database. Then, we can automatically write a high volume of emails and later on posts to these restaurants.

2. YouTube Tutorial Videos

The restaurant owners can then click the link in the email/ keywords in the post and follow the YouTube instructions in the email/ post and start adding their details using our app. Alternatively, they can call or email us to inform us their data and we will start an account for them. We will ask them either upload all the data themselves or upload a menu so we can add the text for them. Now, please go to appendix 1 to see an example of emails and posts we will send them.

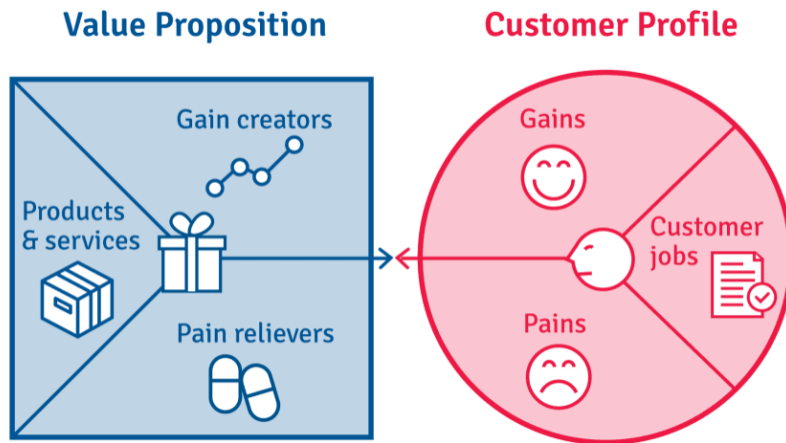
3. Search Engine Optimisation

We will also implement SEO system, so our website appears first in the search results.

Requirement Specification

Value Proposition Canvas

VPC (2014) is the industrial standard practice for analysing the requirements of a software idea.



1. Customer Profile

a. Customer Jobs

- This section defines all the tasks customers/ chefs/ waiters/ restaurant owners wants to accomplish.

i) Customers

Tasks that customers need to do	How can i-Waiter help?
Feel wanting to eat out	
Find a restaurant they want to go online	
Reserve a table	
Find the location of the restaurant	
Go to the restaurant	
Go inside the restaurant	
Wait for a waiter	
Waiter takes customers to a table	
Take a seat	
Take the menu	
Discuss the food and drinks they want with their friends and family	
Come up with the food and drinks they want as a group	
Wait for the waiter to come up	
Listen to waiter's meal recommendations	
Tell waiter the food and drinks they want to have	
Get asked whether they want the food to come separately or together	
Have a conversation and wait for the food and drinks to come	
The food and drinks are served	
Have the food and drinks	
get asked whether they like the food	
Finish the food and drinks	
Have the waiter to collect the plates	
Ask for the bills	

Get the bills	
Pay for bills	
Give a tip	
Leave the restaurant	

- feel wanting to eat out | see our platform/ restaurant all the time - email advertisement, text message, Facebook advertisement, YouTube influencer channels, Google AdSense, advertise other restaurants within your own platform, meal discounts, multi-services (if do those 3 services, 1 of which is for free)
- find a restaurant they want online/ think of a restaurant | recommender system (understand their criteria for a restaurant (design/ size/ type, good review, celebrity spot, location))
- reserve a table | online booking system, quick, easy
- find the location of the restaurant | display some image of the restaurants so the customers can recognise the surrounding of the restaurants, find car parks for them
- arrive to the restaurant |
- take a seat
- order food and drinks
- check bill summary
- pay for food bills
- pay for tips
- leave restaurant

ii) Chefs

- receive an order
- prepare ingredients
- cook the food
- inform waiter food is ready

Jobs that needs to be done	How can i-Waiter help?
Receive an order	
Pick out relevant ingredients	
Cook the food	
Put the food to the tray	
Put the food out for the waiter	
Inform waiter the food is ready	

iii) Waiters

Jobs that needs to be done	How can i-Waiter help?
If there are customers waiting at the door, approach and greet them	
Take them to the table	
Tell them how to order food and drinks (go to the waiter section, ask for a waiter to come)	
Walk away from the customers to give them time to decide for the food and drinks	
After a few minutes, go back to the customers and ask what they want to have for food and drinks	
Take out ordering paper/ machine	

Listen and note down what the customers want to have	
Give the order to the chef OR tap the food and drinks they want to have to send it to the chef	
Clean the restaurants	
If the meal is for takeaway, give it to the driver	

iv) Restaurant Owners

Jobs that needs to be done	How can i-Waiter help?
Recruit chef	
Recruit waiter	
Develop a restaurant website	
Advertise the restaurant via platforms such as OpenTable and 5pm	
Decide on the shifts for the staff	
Pay them daily/ weekly/ monthly	
Taste chefs' food	
Monitor waiter and chef performance	
Train waiter	
Train chef	
Recruit an Accountant for managing tax and legal issue	
Purchase insurance	
Maintain the decoration of the restaurants	
Purchase new kitchen appliances	
Purchase restaurant furniture (tables, chairs)	
Go to a business wholesale supermarket to buy raw materials every 3-5 days	
Design and print menu with a printing company	
Deliver menu to the neighbourhood door by door	
Calculate daily revenue for accounting purpose	
Calculate cost of food, staff	
Pay gas and electric bills monthly	

Think about offers and discounts to attract customers, especially during quiet hours	
Purchase covid-19 equipment (hand sanitizer, masks, wipes)	
Ensure social distancing rules (put stickers on each table)	
Greet health inspection officer	
Greet tax inspection officer	
Register for a food licence (selling, cooking, storing, preparing and distributing food) from the local council	
Ensure the expire dates of the food and drinks	
Ensures the food are cooked properly	
Ensures the food are stored properly	
Obtain feedback from the customers	
Deal with customer's complaints	
Obtain a premise licence for selling alcohol, hot food and drinks between 11pm and 5am or if they provide entertainment such as film screening, sporting events, live music, recorded music, dancing facilities or facilities for making music	
Obtain a TV licence if they put a screen in their premises	
Obtain a leaflet licence if they decide to distribute flyers from local businesses, newspapers and other printed materials	
Awareness of food hygiene and health and safety regulation	
Have a repairer contact in case something is broken	
Legal contracts – restaurant ownerships	
Pay monthly rent	
Think about how to improve the restaurant in terms of the above elements	

User Story Workshop

Detailed Project Conceptual Analysis (Done)

1. Customer's Greeting

First, we have a group of customers waiting at the entrance of a restaurant. Using our app, A waiter will confirm whether they have reservations. If they have a reservation, the staff will take the customers to a reserved table. If they don't have a reservation, the staff will check whether there is an empty table in the restaurant. If there isn't, the staff will ask them to reserve a table for later on sit-in. If there is, the staff will walk them to the table, sit them and explain them the new app. The waiter may say "Hi, there. We are using this new meal ordering app! If you can take out your phone and scan the QR code with the camera, you will be able to use the app!"

2. QR Code

Now, the customers will scan the QR code sticker on the middle of the table and their phone will be redirected to our login page. We want to use a web platform instead of a mobile app because Apple is currently charging 30% of revenue for apps that are displayed in the Apple App Store. Web Development are for *** per month. The QR code will be in the form of location-postcode-ID-table-number. This is to uniquely identify the order. An example of QR code reference is GL-G128QQ-0001-1.

3. Login Page

We want to use a login page because we want to record consumer's behaviours for advertising purposes. We will have Facebook Login, Instagram Login, Microsoft Email Login and the normal email address and password login.

4. Meal Ordering Platform

Now, the customers can see the image, textual description and price of the meals in current time. Meals are different when it is in the morning, afternoon, and evening. We also enable food and drinks to be clustered by the category of food. A possible category is non-alcoholic, alcoholic, starters, main course, and dessert. They just need to select the food and drinks that they like. This will be guided by a 1 second animated video. Once they finish the ordering, they can click the bill icon for the bill summary.

5. Bill Summary & Payment Portal

They will now be able to see the summary of food and drinks that they have ordered. Once the customers confirm that the bill summary is correct, they will either enter their card details (card number, expiry date and security code) or click pay by cash. They can also add tips to the payment. For repeating customers, their card details will be recorded into the system. They just need to enter the CCV code. Once the button order is clicked, the request will then be sent to the kitchen. The customer will be redirected to our “Other Apps” section whereby we promote our partner apps so they can advertise us as well. We will ask the users the ratings and feedbacks of the past restaurants they have been. This data will help the system to recommend users the restaurants they may want to go next time. After that, they will be redirected to our “Restaurant Look-Up” section where all the nearby and recommended restaurants will be displayed.

6. Restaurant Kitchen Receiving an Order

Now, the chef will see the bill summary and will cook the food for them.

7. Staff Bringing Out Meals

Once the food is ready, the staff will bring out the food to the customers. When they have finished the meal, they can leave the restaurant. If they needed to pay their bills by cash, a staff will approach the customers and take the bill payment.

Annual Revenue Estimation (Done)

If we can help business owners to save £10,000 - £30,000 + as indicated in the Section Project Objectives and Market Competitiveness, it would be a reasonable step for us to charge around £2,500 for every £10,000 saving.

Now, let's consider the profit made by a medium sized restaurant which has 3 staffs. It will have around 50 customers x 2.5 rounds x £12 bills x 6 days x 50 weeks = £450,000 revenue. We want to charge them with a reasonable price at £4,500 = 1% of the transaction fee. Now, the annual revenue estimation comes down to:

1 restaurant = £4,500

100 restaurants = £450,000

222 restaurants = £ 1 million

222,222 restaurants = £1 billion

Statista shows that there are 26,265 restaurants in the UK (2019); 660,755 in the U.S (2018); around 1 million in the EU (2016); 21953 in Australia (2016); 8,499 in New Zealand (2017).

<https://www.statista.com/statistics/911294/number-of-food-drink-venues-in-great-britain-uk-by-type/>

[https://www.statista.com/statistics/244616/number-of-qsr-fsr-chain-independent-restaurants-in-the-us/#:~:text=The%20number%20of%20restaurants%20in,a%20little%20over%20two%20percent.&text=The%20two%20main%20categories%20of,full%20service%20restaurants%20\(FSR'S\)](https://www.statista.com/statistics/244616/number-of-qsr-fsr-chain-independent-restaurants-in-the-us/#:~:text=The%20number%20of%20restaurants%20in,a%20little%20over%20two%20percent.&text=The%20two%20main%20categories%20of,full%20service%20restaurants%20(FSR'S))

<https://www.statista.com/statistics/757109/australia-number-of-dining-establishments/>

<https://www.statista.com/statistics/983865/number-cafes-and-resturants-new-zealand/>

<https://www.statista.com/statistics/684211/number-of-enterprises-in-the-food-and-beverage-service-industry-in-the-eu-by-country/>

Product Pricing (Done)

We will charge each restaurant a £200 annual membership fee and 1% of their transaction fee. The membership fee is to cover the costs for tablets. We want to use a tablet because we can have a stand to support it and prevent it from being damaged.

Product Launch Strategy (Done)

The possible deployment options we devised are venture capitalist share buy-out, stock option and crowdfunding platform and self-fund entrepreneurship.

1. Venture Capitalist Share Buy-Out

This is considered the best option depending on the offer on table. If other tech companies see the potential of the application and copy our products, they will dominate the market faster than we do. This option is considered safe if done safely because we just need to sell the product and we don't need any finance to support the business. If we maintain the project as a secret and we pitch the product to the VC, they are likely to negotiate for an offer because they don't want the app idea and implementation to be given to the competitors. The

VC we are looking for are major shareholders in payment transaction because they want to gain business traction in their own industry. We will want to pitch our product to companies such as Stripe, Adyen and PayPal. We will send an email to one company at a time because we don't want to disclose the business details to all companies.

2. IPO – Initial Public Offering

If we cannot attract VC for a buy-out, we will give 10% share of the company to a law firm to initiate an IPO. IPO means to trade a percentage of your company into the stock market. It will help raise capital and attracts businesses to run the company for us.

3. Self-Fund Entrepreneurship

If both option 1 and 2 are unsuccessful, we will deploy the project through self-funding. We will hold the majority share of the company. It only takes 222 restaurants to make £1 million. However, in the long run, we will need a group of experts to lead the project. We are hoping to launch the app internationally. However, we would first want to push the product to the market in populous English-Speaking Countries because our system is written in the English Language. Namely, they are the UK, U.S, EU, Australia, and New Zealand. We will develop an email crawler and send all the emails in a second.

GDPR (Data Protection) (Second Semester)

The project has also taken into account GDPR – General Data Protection Regulation. Our app will collect user personal data

- needed if you collect personal data
- GDPR guidance
- GDPR Guidance – e.g. don't store personal data on the cloud service (GitHub) – how to store then?
- capture data with explicit consent
- keep personal data encrypted
- users have the right to view and delete their data held about them
- store personal data (name, address) anonymously where possible

Non-Disclosure Agreement (Pending)

- presentation doesn't get exposed in a presentation
- ask supervisor
- NDA project work must not be uploaded in the usual way, but with encrypted version tracked USB sticks. Passwords must be sent separately and securely to the marker
- presentation must be done privately in a closed environment

Intelligential Property (Not Done)

- who owns the IP?

- be careful about IP from other sources (background University IP, IP from collaborators)

Project Management Platform (Doing)

Version Control/ Issue Tracker

1. GitLab
 - contains CI/CD pipeline. It is needed because most modern applications require developing code in different platforms and tools and a mechanism is needed to integrate and validate its changes.
 - the goal of CI Continuous Integration is to establish a consistent and automated way to build, package, and test applications.
 - CD Continuous Delivery
 - github, gitlab, bitbucket, Trello

Commit Strategy

- explain options

External Backups

Minutes/ Plans

- Wikis

Test Driven Development

Before we design our software product (the minimal viable product), we want to develop the minimum set of tests that the program needs to pass.

Product Paper Prototype

- find 3 good design patterns
- source the pros and cons of each design, evaluating whether it is good or bad
- hypothesis + evidence + evaluation

How to do paper design?

- example paper designs from Stephen
- why chose a particular design and why not
- paper design books?
- use design studio
- similar restaurants (Type, Cost, Scores)
- food whether available or not

what is the best design platform/ methods for User Interface? (high-fidelity/ low-fidelity prototype)

- existing design products from Stephen
- design methods from a book?
- sitemap
- bottomless design and liquid swipe
- bottom navigation 2.0
- round corners
- advanced animation
- platform: InVision, Framer, Figma, Sketch
- no code revolution
- webflow
- editor X
- bravo
- supernova
- anima
- high fidelity prototype
- works for iOS, Android, mobile, laptop (Apple Mac and Window)
- play
- font calibri
- comprehensive testing, rather than unittest
- Test Driven Development - decompose the problems, create test, satisfies the test with minimal code

- test before coding
- think about possible errors for testing before coding
- think about all potential scenarios that fails

Product Digital Prototype

How to do software interaction design?

- platform used
- example interaction design projects from Stephen

Project Development Platform

Automatic Folder Structure

- automate command line tool (-)
- Make, automake, CMake, Maven, scons – makes build of software reproducible
- automate so all the analysis will be automatically generated with a single command
-

Typesetting Dissertation

- overleaf

Reference Management

- Harvard Referencing & Literature Review
- BibTex, Papis

GUI Tools/ Image & Video & Audio Editing

- Zotero (GUI)
- GIMP (image)
- DaVinci Resolve (video)
- Audacity (audio)

Create Notes for GitHub as Markdown

- pandoc for converting markdown to Latex

Coding

- VS Code
- Atom
- Sublime Text

Document How to Run the Program to the Reader

Others

- endnote
- Mendeley

Don't use these tools

- write source code in WordPad
- build your software with arcane Bash scripts
- draw diagrams for your report using MS paint

Product Coding Platform

How to code the software?

- platform/ languages
- tech stack
- email crawler
- scalability
- cost

Product Evaluation

Ethics (second semester)

- generated codes online
- ethics with human subjects
- ethical approval
- ethical checklist - <http://www.dcs.gla.ac.uk/ethics>. Check it, sign it and countersign by your supervisor, include in the appendices of the dissertation
- summary of checklist can be found in lecture notes
- get school for approval if can't sign the checklist based on its criteria

Legal, Social Issues (second semester)

Product Testing

User Stories

Acceptance Test

Project Deployment

- platform
- consider cost to launch Django via AWS

Others

Colour Psychology

Font Psychology

Word play – balance between warmth and competency

Appendix

1. Email/ Post to Potential Clients

Use Our Robot Waiter to Save £10,000 - £30,000+ Today!

Our Robot will:

- take orders for you
- register meal details to the computer system for you
- send meal details to the kitchen for you
- take bills and tips from the customers for you
- no menu printing costs, and ordering is paperless

<some picture demonstrations>

All service is £500 each year *, including 2 tablets for the kitchen and 1 tablet for the waiter.

*subject to low transaction fee

Come to this [link](#) for YouTube tutorials on how the technology works. Become a premium member and upload your menu details online!

Bibliography

VPC (2014) Value Proposition Design: How to Create Products and Services Customers Want, John Wiley & Sons.