# A Step Towards Same-Day Deliveries


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This project concerns the evaluation of the same-day proposition as a measure to improve the profitability of an instant deliveries provider. The main purpose of the project is to design a proposition that could improve the company's competitiveness and financial situation.

Different scenarios are initially identified and selected based on their relevance. The scenarios are then investigated in the different areas of the company to evaluate their relevance against the companies objectives. It is found that the solution is technically but, in order to provide a complete solution, development is needed. The current tasks performed at the company would not change significantly but training on new practices is needed. The solution could also be implemented in a relatively short amount of time, 3/4 weeks, which could increase to six if the solution is fully developed. From an economic point of view, it is found that the solution would have some margins for a positive profit.

From the results of the different scenarios, it has been decided to run a test of the proposition in order to validate the assumptions and collect feedback.



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# Preface

This report represents the graduation project of Lorenzo Capelli studying M.Sc. in Operations and Innovation Management at Aalborg University. The project has been completed in the period from January 2019 to June 2019.

**Reading Guide**

All chapters with underlying sections have an incorporated numbering system, dividing the report into eleven main parts:

1. Introduction
2. Project Objective
3. Problem Analysis
4. Project Design
5. Problem Analysis
6. Project Solution
7. Test
8. Conclusion
9. Discussion
10. Bibliography
11. Appendix

References throughout the report are made according to the Harvard Referencing method, where in-text references contain author(s) and publication year, e.g., (Ridley, D., 2012). These are accumulated in the bibliography containing author(s), year of publication, title of reference, place of publication, and publisher, e.g., Ridley, D., 2012. The literature review: a step-by-step guide for students. 2nd ed. London: SAGE. [Anglia Ruskin University, 2016]

Product images for the project have been provided by Quiqup.

# Table of Contents

# Chapter 1
# Introduction

The purpose of this chapter is to introduce the project theme, same-day deliveries, and the case company in which the project took initially place.

This project is part of the last semester of the Operations and Innovation Management course that takes place at Aalborg University. This report also represents the graduation project of the programme and aims at identifying, analyse and trying to solve a problem currently faced in the industry.

## 1.1. Same-day Deliveries

The beginning of the 21st century has been characterised by the rapid growth of e-commerce. More and more people are now used to browse websites in order to find clothes to buy or even their groceries, to have them directly delivered at home or at the office where they work. As can be seen in Figure 1.1, this resulted in a correlated growth of the parcel deliveries sector, especially in the standard 3-5 days offering that can achieve a high rate of optimisation and therefore a competitive price.

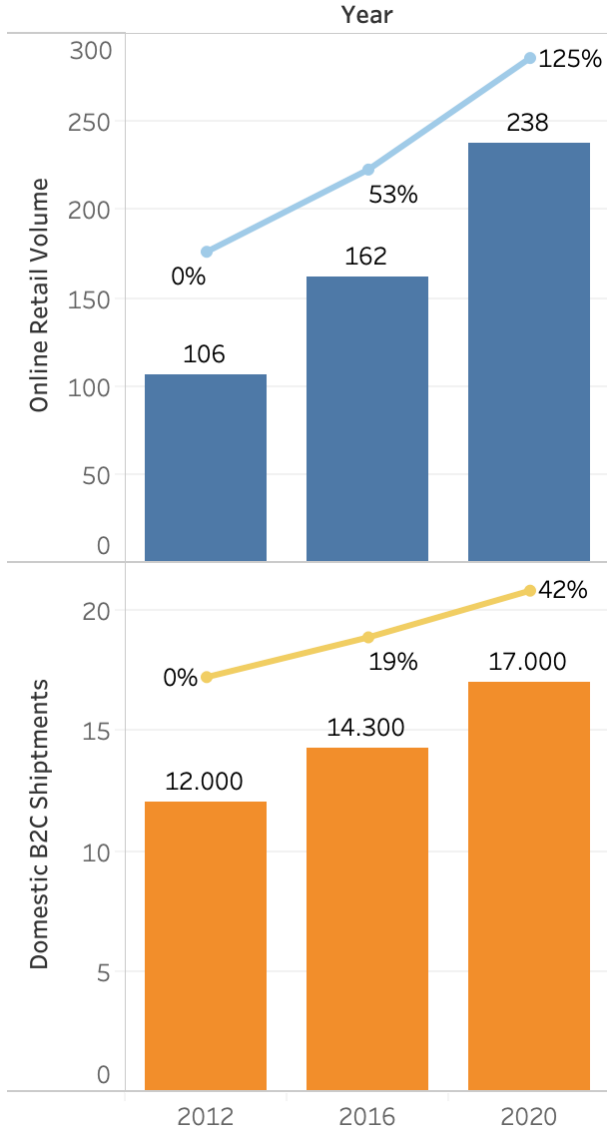



Figure 1.1: Graph showing the market size increase (billion €), (Hausmann et al., 2017)

At the same time, a new type of deliveries became to rise, the instant deliveries, especially driven by a restaurant that offered takeaway with their own drivers. This sector existed for decades but remained quite small until the formation of platform providers that aggregated the demand from multiple businesses (e.g. Just Eat, Deliveroo, …). These deliveries usually last less than an hour from when the customer places his order until when the food has been received, representing de facto a completely different offering than the usual 3-5 days deliveries or even next deliveries. Instant deliveries, in fact, do not require a huge infrastructure such as hubs and depots were to consolidate parcels, but just moped and bicycles that go from point to point with a single parcel. Due to this, lower optimisation can be achieved as a usual courier can deliver even 12 parcels per hour (depending on the density of the area) whereas a courier for instant deliveries can just deliver 2 parcel per hours (given the fact that it needs 30 minute to complete the delivery).

This significant difference means that lower entrant barriers are present in the instant deliveries sector, which fostered the entrance of start-up in the market in an attempt to disrupt traditional carriers by combining delivery services with IT platforms (Julian Allen, 2018).

Currently, more than 66% of the delivery start-ups are operating in the instant deliveries sector, leading to some challenges for the smaller ones that struggle to remain profitable. At average variable costs per delivery as high as $7 to $10, profitability will remain out of reach for these start-ups in the broader market—unless they reinvent themselves and address the limitations of their instant delivery model. (Hausmann et al., 2017) One way to do so would be to a move towards a more efficient consolidation of parcels from the current point-to-point deliveries, same-day deliveries. This proposition, in fact, is experiencing an incredible growth.

In 2017 it has been estimated that the goods delivered through a same-day offering ware valued $3.35 billion, with a compound annual growth rate of 154 percent from 2013 to 2018 (Forer, 2017). Moreover, McKinsey predicts that by 2025 20-25 percent of orders will require same-day delivery (Joerss & Neuhaus, 2016).

Profitability is not the only driver of same-day deliveries, but there are also customer expectations involved and traditional players that could revamp their market with a new value proposition.

Customer expectations on deliveries have been increasing by the instant deliveries, creating a need to speed up the usual 3-5 days proposition to a next-day or even same-day proposition. The market for same-day deliveries has also been fueled by increased GDP per capita (more people are willing to pay a premium price for faster deliveries), urbanization that has increased the density of demand and the rapid e-commerce adoption (Hausmann et al., 2014). Go People says as much as 61% of shoppers are willing to pay extra for the convenience same-day delivery brings, including saving time and a trip to go pick up the goods. (William, 2018)

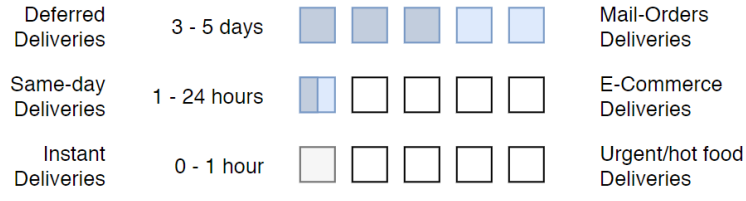



Figure 1.2: Comparison of different delivery options

On the other side, traditional brick-and-mortar stores are interested in regaining the market taken from pure e-tailers by offering a competitive proposition. They alone have the dense network of physical stores to support same-day order fulfilment and delivery from "the city as a warehouse." (Hausmann et al., 2017) Offering same-day delivery could increase customer satisfaction and gain a competitive edge over 85% of other industry players (William, 2018).

This has great potential but does not come without challenges as these players would need to enhance their digital infrastructure in order to provide their customer with a good experience, for example by enabling live in-store inventories and pleasant app experience.

Earlier in the century, few startups already tried to tap into the same-day delivery but failed to actually succeed due to not being able to reduce the costs. This has been mainly due to a lack of demand and therefore scale which, nowadays, does not represent a problem anymore as more and more customer are actually willing to pay a premium price for faster deliveries (Hausmann et al., 2014).

## 1.2. Quiqup

Quiqup is a London based company that was founded in 2014 with the mission to foster last mile deliveries. The original proposition was to let the customers order anything on their app, from groceries to the forgotten keys of the apartment. An algorithm was then responsible to match the order to a driver registered on the platform, that would travel to the pickup location, collect the order and deliver it to the customer. All of this, in less than an hour.

This has not been without complications as enough drivers need to be onboarded and online on the platform in order to be able to complete the orders and customer support need to be available as well in order to assist both the customers and the drivers.

Initially founded by an undisclosed amount Series A round, Quiqup received an additional injection of 20 mln in 2017 during a Series B round. This last round marked the pivot of the company into servicing business, following the trend of other start-ups such as Deliveroo, Gophr and Stuart. One of the main reason that led to this shift was the need for a higher demand density which has been difficult to achieve through an only a customer proposition. Initially, Quiqup started working with Birger Kind, delivering their hamburgers on-demand, and with Tesco, opening the Tesco Now service of groceries on-demand. These strategic partnerships have enabled the business to have a stronger selling point in order to gain market shares and therefore increase the demand density.

In 2018 the company also expanded its operations in the middle east, opening new offices in Dubai. There the market is completely different from the British market, with more customers willing to pay a premium price for instant deliveries that had fostered the demand volume, with a surprising month on month growth. At the end of 2018, Dubai already delivered double the size of London volume and was close to reaching breakeven.

One of the reasons London is a more challenging market is mainly due to high competition on hot food and steep demand curves that lead to a difficult task when trying to optimising the operations. Quiqup therefore in 2018 decided to enter the same-day market by signing a contract with H&M and started developing the tech necessary to integrate the existing platform with the retailer's supply chain. During the development, it became more and more obvious that same-day deliveries had a big potential for Quiqup as they could help the company levelling the demand curve and therefore achieve a higher optimisation of their fleet of couriers. "Sameday is a market offering we do not currently have and cannot fulfil or price efficiently without. In London especially, many opportunities have been lost because our current offering and pricing does not suit their needs." (Business Development Manager, 2019)

In February 2019 the company received another round of investment that was bounded to the expansion in the Middle East. Investors were preoccupied with the amount of money London was burning and did not want the new investment to be used to "feed" the British offices. The only option for an extremely unprofitable office was to shut down operations and fire the employee to continue to focus in the Middle East.

Currently, Quiqup is still operating in London with a very small team that fulfils H&M orders and tries to sell same-day deliveries to new clients.

## 1.3. Scope

The scope is to investigate how a same/day offering could provide a new competitive advantage and what could be the best path to enable it.

The new proposition should target small to medium clients for which instant delivery is a proposition too pricey to offer.

One of the limits imposed is due to the fact that developers and operations are already busy, the new proposition should be simply implementable. Moreover, when the project has been initiated, there was a need for the company to prove profitability in the London market, and therefore time had been a limit. The new proposition should have been implemented in the shortest amount of time possible in order to reap the possible benefits faster.

# Chapter 2
# **Project Objective**

The purpose of the chapter is to outline the problem that will be answered through the solution. The problem statement is supported by three sub-questions, setting the direction for the remainder of the project.

The general objective of the project is to :

## Assess the feasibility of a same-day proposition

- Evaluate logistic use cases to identify the challenges usually faced and how they are dealt.
- Assess what are the current capabilities at Quiqup related to same-day deliveries and what is the gap that needs to be filled
- Define the best path to enable same-day deliveries at Quiqup

# Chapter 3
# Theoretical Background

The purpose of this chapter is to analyse theory which is relevant to the problem objective in order to develop the framework that is presented in the Project Design Chapter. Firstly, theory concerning projects feasibility is presented, followed by a review of theory related to delivery propositions, the challenges faced and solutions adopted.

## 3.1. Project Feasibility

"Once a problem has been recognised and identified, the feasibility study is the first step of the system life-cycle". (Heathcote 2005)

A feasibility study is used to evaluate whereas a project is worth doing or not by analysing the requirements, the change that would happen and the economic impact. Even though it is just an assessment of a project in order to understand if it is worth investing money and time in, it also provides some other upsides. The process of structuring a feasibility study forces the team to think through the logistics, planning, costs and implementation timetables (Rudy, 2014). A feasibility study can help to prepare the ground for the project by spreading the information about the project inside the company and at the same time collect feedback.

To evaluate the project feasibility, the TELOS framework has been chosen as the main tool to structure the analysis as it provides a broad structure that is generic enough to be used in different projects. The world TELOS derives from the Greek and stands for "end", "purpose", or "goal"). In this case, it is an acronym for the 5 areas of the project that need to be investigated. This investigation does not follow a chronological sequence but it should be done in an iterative way.

**T - Technical**
Is the project technically possible?

In this area, the technical requirements of the project are identified. It starts by investigating whereas the technical level required by the project is actually feasible. If the technology is not available or impossible to acquire, this could lead to an iteration of the project where a lower technical level is required, in order to reach a feasible state.
In this phase the technical design is also drafted, representing de facto the first stage of the solution development. Here it is defined the final solution outcome, how is it going to be designed, how people will interact with it, and what can be developed in house and if others need to be developed by an external supplier.

**E - Economic**
Can the project be afforded? Will it increase profit?

The economic area investigates the benefits and the costs of the solution in order to answer if it is worth proceeding with its implementation. In order to do so, it is recommended to analyse the cash-flows and identify the breakeven point. Usually, the time span for this analysis is 5 years.
To note that some benefits are not always economically quantifiable, but could still be included in the analysis and the evaluation of the project.

**L - Legal**
Is the project legal?

Another important aspect of a feasibility study is to determine whereas the project break any laws, for example, trademark laws, labour laws, confidentiality agreements and more.

**O - Operational**
How will the current operations support the change?

This area is focused on the human aspect of the project and how the change will affect the workforce. In particular, it should analyse the impact of new work procedures, how they are going to be integrated with the current ones, the training needed by the personnel, etc..

**S - Scheduling**
Can the project be done in timeù?

Lastly, in this area, the time required by the project in order to be planned, developed and implemented is analysed. In some cases, time could be a hard constraint, and therefore more attention should be put into designing a solution that can be run in between the boundaries.

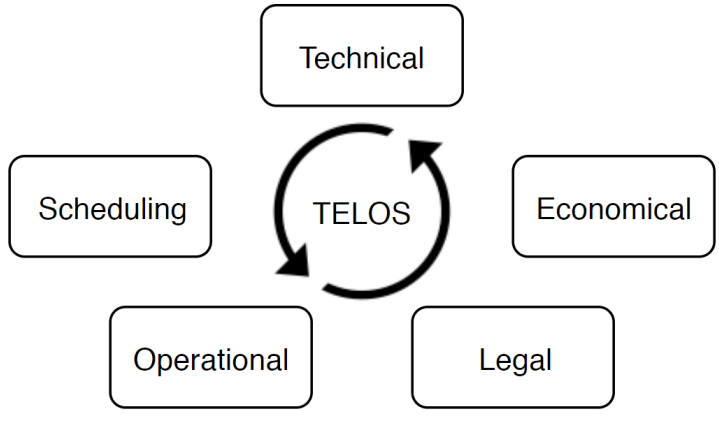



Figure 3.1: The areas of the TELOS framework

## 3.2. Challenges of Last-Mile Deliveries

Same-day delivery is quite a recent proposition and, therefore, not a lot of literature has been written on the topic. In order to get some insight into the challenges faced in the logistics sector and how they have been dealt with, various papers and articles about last-mile deliveries have been analysed. Even though some of them do not specifically address same-day deliveries, they can still provide some useful information on how to deal with this proposition.

Most of the literature reviewed agreed on the fact that the predicted growth of e-commerce, ask for deliveries to be fast, cheap and reliable (Gdowska et al. 2018). The emphasis is specifically on creating efficient and low-cost last-mile deliveries, mainly because it is estimated that 13% to 75% of the total supply chain costs are generated on the last leg of delivery (Gevaers et al. 2014).

This is difficult to achieve in same-day deliveries due to a variety of operational challenges that are caused by the continuously arriving demand and more frequent returns of drivers to the loading facility. Moreover, costs increase quickly if service providers answer small-volume requests with an excessive number of stops per delivery route. (Scherr et al. 2018) Higher demand density leads to higher route optimisation and lowers cost. This is mainly due to the fact that in dense areas there is a higher possibility that the deliveries are going to be located in a narrower area or even in the same building, decreasing significantly the time spent by the courier to drive to a location and search for a parking lot. In same-day deliveries, lower volumes are reached in respect of 3-5 days deliveries as the time horizon is substantially lower. Volume decreases even further if multiple delivery windows are offered.

### 3.2.1. Variables

When simulating the delivery efficiency, different mathematical models are utilised with different objective functions to minimise. The most common one is the travelled distance but also others can be evaluated such as service level, number of routes, vehicle utilization, travel time, and level of carbon emissions. (Muñoz-Villamizar et al. 2015)

De Baere & Van de Voorder suggest using a delivery cost function which is based on both general time and transport distance (Blauwens et al. 2010).

$TC = T*t + D*d + Z$

Where:

- TC stands for total transportation cost
- T stands for duration/time of the transport
- T stands for the time/hour coefficient
- D stands for the distance driven
- D stands for the distance coefficient
- Z stands for extra costs not related to distance and/or time

When optimising the objective function there are also some independent variables considered (Gevaers et al. 2014). In Figure 3.2, the list of the variables identified and the explanation is shown.

It is also found that when dealing with deliveries and optimisation problems, scenario simulations are utilised. Different coefficients are compared such as, for example, the density area or the demand volume. Since this practice is deemed useful in order to get insight and better understand what can be the different performance level of the proposition with different values, a review of how scenario simulation is made is done in the following sections.

| | |
|---|---|
| Stop | The average number of stops per delivery route per driver per delivery window |
| Q | Quantity of products to deliver |
| w | Time window coefficient. This is particularly important because narrowing a delivery window implies that a driver can do fewer deliveries. The reason is that when the delivery window is narrowed, efficiency is lost due to a decrease in volumes which increases a ping pong effect in the route patterns. |
| r | Reverse logistics coefficient. This coefficient is used to include the costs of items returned in the cost function. If 0, no return is made, if 1, then both the outbound and inbound leg of the delivery will be calculated in the cost function. |
| lc | Logistics handling coefficient. This represents the cost of checking the returned parcel and putting it back in inventory |
| ht | Average handling time in the reverse leg of a chain. Time spent checking the returned parcel. Multiplied by lc, gives the total cost of handling a parcel return. |
| ip | Manned versus unmanned (in person) delivery coefficient. This coefficient represents the first time hit rate which |
| cp | Collection point coefficient. In some cases, parcels can be delivered to collection points instead of home addresses, increasing the efficiency and possibly increasing the first time hit rate as well. This coefficient tries to encapsulate these efficiency gains. |
| ad | Area density coefficient. This factor highly influences the efficiency of the deliveries as is in direct correlation with the average distance travelled by a courier. Higher density means higher changes that the route will have closer stops. |
| p | Pooling of parcels coefficient. This coefficient is used when deliveries from logistics companies are aggregated in order to increase the drops density and therefore the efficiency. |
| v | Type of vehicle coefficient. In the model, an average distance cost is used, but each vehicle can have a different distance cost. Therefore, the v coefficient expresses what is the percentage increase/decrease of the average. |
| ict | ICT is a coefficient that gives the relation between the effect on the increasing/decreasing number of kilometres/miles one has to drive to execute in a certain region the average amount of stops. |
| pac | Packaging coefficient. It expresses the impact of efficiency that different packages can have in relation to vehicle capacity. |
| SHF | Extra special handling fee |

Figure 3.2: Different varibles of delivery costs identified (Gevaers et al. 2014)

## 3.3. Scenario Simulations

Fahey and Russell define scenarios as "projections of a potential future" (Randall 1998), and they are widely used in decision-making in order to analyse and evaluate different outcomes.

### 3.3.1. Building Scenarios

When building scenarios, Schwarz recommends the following 8 steps (Craddock, 2009):

- Identify objective
- List the key factors that will influence the project
- List of the forces behind the key factors and how they are related
- Rank the key factors and driving forces based on both their importance to successful decisions and their uncertainty
- Identify the scenario logic, how they are built and why they are chosen
- Descriptions of key scenarios.
- Determine the implications of each scenario.
- Identify the main metrics from which the evaluation of the scenarios is made

Scenarios have three key features that make them a useful tool to cope with uncertainty (Roxburgh, 2009).

**Expand your thinking**
Usually, when making decisions, people are prone to think of just one possibility which typically resembles the past. When dealing with scenarios there an obligation to think of the possible outcomes, the relation between the different events and the possible complications. Having drawn the different possibilities might help in the future when dealing with uncertainty.

**Uncover inevitable or ner-inevitable futures**
Scenario planning can also help to identify some uncontrollable driver of change that will inevitably influence the outcome of the project. These drivers are usually demographic trends, economic action and reaction, the reversal of unsustainable trends, and scheduled events.

**Protect against groupthink**

Especially in large company employees fear to express themselves in the presence of a senior person. Since in scenario planning contrarian thinking is actually more than welcome, it fosters a free flow debate.

Scenario planning also has some challenges that need to be dealt with (Roxburgh, 2009):

**Paralysation**
When dealing with an uncertain environment, there could be a risk of overthinking the possible outcomes by including a wide range of variables. This could generate confusion in the organisation and therefore paralyse a company's leadership

**Communication**
Leadership usually set a vision for the future and influences the company in order to achieve it. With scenarios, this can be more difficult as a leader should not communicate with the organisation via scenarios as it creates confusion, but should instead create a set of goals that can be achieved while being robust under different scenarios.

**A narrow set of outcomes**
When dealing with scenarios there is a risk of focusing too much on the past and discard completely highly unlikely scenarios, which could highly impact the outcomes. This happened, for example, during the financial crisis where an investment bank modelled a 5% decrease in revenue which was far too optimistic and therefore failed to react.

**Focus only on certain scenarios**
People tend to choose the scenarios that are closer to reality and ignore the unlikely ones as their investigation represents a waste of time. Even though is true, this could lead to being blind in the future when such unlikely change happen. Moreover, thinking outside of the box in order to provide a solution for drastic scenarios, could help find a creative solution even for the more possible ones.

**Avoid scenarios when uncertainty is too high**
When the future is highly unpredictable build scenarios with a meaningful level of could actually be counterproductive and generate long speculations about the outcomes.

## 3.4. Other Challenges

Research papers also explore the problem of determining the maximum volume that can be delivered in each window in order to ensure profitability. This is a challenge for businesses that have a limited amount of supply (couriers) is available to fulfil the orders because it requires to calculate in short run times the availability of supply for each time window (Köhler and Haferkamp 2019).

This problem is not evaluated in this project as it is not a primary concern for Quiqup and time limitations. Currently, Quiqup is in the opposite situation where too much supply is unutilised leading to inefficient operations. A way to increase fleet utilisation is more than needed and there is no concern that capacity is going to be exceeded, at least in the early stages of same-day deliveries.

## 3.5. MVP

During the project, it has become apparent that too many variables need validation, as well as the proposition itself. Due to this, it has been decided to run a test of the proposition following the principles of the Minimum Viable Product (MVP).

Usually defined as “that version of a new product which allows a team to collect the maximum amount of validated learning about customers with the least effort.” (Hart 2012), the MVP is particularly useful to validate the assumptions and gain feedback from customers without fully develop a product.

The main benefit of this process is that it can help to decrease the risks and the costs of developing a product in case of a failure or providing a feedback loop to help future developments in case of success.

### Benefits

- Be able to test a product hypothesis with minimal resources
- Accelerate learning
- Reduce wasted engineering hours
- Get the product to early customers as soon as possible
- Base for other products
- To establish a builder's abilities in crafting the product required
- Brand building very quickly
- Testing

**Challenges**
Utilising MVP strategies has also some challenges, especially when releasing an early MVP and therefore exposing intellectual property and product insights to competitors. Moreover, the release of an ‘incomplete’ product could lead to negative customer feedback that could hurt the company reputation (Matanov 2018).

The analytical framework that has been developed from the theory reviewed is then presented in the next chapter, alongside with the data that is needed to be collected from different stakeholders involved in the project.

# Chapter 4
# Project Design

The purpose of this chapter is to present the methodology utilised throughout the project. The chapter starts by presenting the analytical framework derived from the theory reviewed in the Theoretical Background. Then the operationalisation of the framework is presented in terms of data that needed to be collected.

## 4.1. Analytical Framework

Figure 4.1 represents a concept of the analytical framework utilised to guide the project. This derives from the theory reviewed in the Theoretical Background chapter about project feasibility studies and scenario simulations.

Firstly, the objective of the project is highlighted and the different variables that play a role in the achievement are listed. From this, different scenarios are depicted. In this project three main variables are identified where each one of them could assume two values. This leads to eight possible combinations of different scenarios. From these nine scenarios, just three are chosen as suggested from theory by taking the two extremes and one middle solution. For the scenario selection also a workshop with the different managers have been performed in order to validate the assumptions taken while choosing the variables and the scenarios to chose.

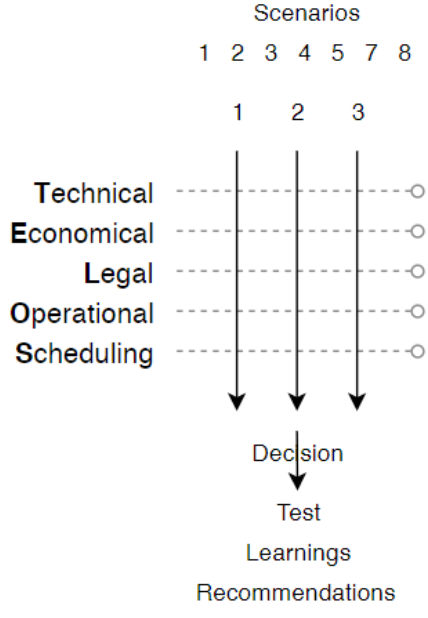



Figure 4.1: Conceptualisation of the analytical framework used throughout the project

The different scenarios are then compared in each of the areas that should be investigated as suggested from the TELOS framework. Since the process is iterative and not linear, the different section has been rearranged in order to be in more logical and easier to read sequence.

Firstly, the technical feasibility is analysed in terms of what is the development needed by the solution. The next area then investigates how the new proposition would be integrated into the company's current processes. It is very important that regardless of the technical solution chosen, the people are going to be prepared and aware of the change.

Once the different tasks and operations that need to be performed are identified thanks to the technical and operational analysis, they are summarised in the scheduling area. There, the best way to sequence them in order to achieve a smooth implementation in the shortest amount of time is presented. The last area of TELOS, the economic one, is then analysed by summarising the costs identified in the previous sections. In this area also the costs associated with the proposition are simulated in order to forecast the gross margin. For this reason, also an indicative price for the new proposition is set thanks to a competitor analysis.

Since it has been decided with the leadership that the Legal area does not need to be analysed due to time limitations, it is not included in this project. It is nevertheless going to be analysed in the company as it is a sensitive topic.

At the end of the TELOS framework, the summary for each scenario in relation to the objectives is presented. Thanks to a workshop performed with the decision makers, a scenario is chosen in order to run a test to prove the assumptions and test the processes developed.

From this test, the results and the learning are presented and, lastly, final recommendations are made.

## 4.2. Data

During the project, a large amount of data has been analysed, both qualitative and quantitative.

Most of the quantitative data has been obtained through the company's data warehouse where an extensive amount of information is stored. Since the Data Team, who is responsible for ensuring that the data stored is consistent and accurate, no further data processing and validation have been needed.

The quantitative data used has been utilised mostly to analyse the past performance of the operations, both on the supply side and quality of service side, in order to predict the future baseline for quality and the behaviour of the fleet.

Separate from the company warehouse, quantitative data about the competitors have been acquired by contacting the different providers and asking for their standard pricing for same-day deliveries.

Not only quantitative data has been analysed, but also quantitative ones. The information is collected through a series of workshops and interviews. Moreover, a considerable amount of information has been acquired by working closely to operations for 8 months at Quiqup and other 2 months with a competitor company. In the following table, a summary of the sources used throughout the project is presented.

| Area | Topic | Source |
|---|---|---|
| | Project objective | Meeting with COO & Operations Team Manager |
| Scenario | Scenario Objective | Workshop with different departments involved |
| | Scenario Variables | Workshop with different departments involved<br>Data from Company Warehouse |
| | Scenario Selection | Workshop with different departments involved |
| | Client preferences | Meeting with BDMs and AMs |
| Technical Area | Input of developement needed | Meeting with FullStack developer for H&M same-day |
| Operational Area | Input on Sales Tasks | Meeting with BDMs and AMs |
| | Input on Fleet Tasks | Meeting with Operations Executive |
| | Input on Customer Support Tasks | Meeting with Training and Quality Manager |
| Scheduling Area | Input on Tasks duration | From meetings done above |
| Economic Area | Pricing | Meeting with Strategy Manager<br>Data from Competitors |
| | Variables Estimation | Data from the Company Warehouse |
| Test | Performance Review | Data from the Company Warehouse |
| | Feedback | Meetings from different people involved<br>Conversation on the company's messaging system |

# Chapter 5
# Problem Analysis

Based on the theory analysed, the areas identified are going to be analysed in Quiqup's environment to understand to what extent they represent a challenge. At the same time, what are the requirement from Quiqup and the current status of the different areas in regards to same-day deliveries is presented.
In the same way, the different variables identified from theory are used to highlight what are the key factors for Quiqup and evaluate whereas other variables should be considered following the first points of the scenario planning methodology. This section is mainly done with the input of a series of interviews with the employee.

## 5.3. TELOS

### 5.3.1. Technical Area

Same-day delivery is not a completely new project for Quiqup as it is already servicing H&M with a similar proposition. One of the main issue, though, is that the solution developed for H&M is fully customised around their operations and, therefore, cannot be used for other generic clients. Nevertheless, since some parts of the current H&M process has been used in this project, an overview of H&M solution is shown in Figure 5.1 .

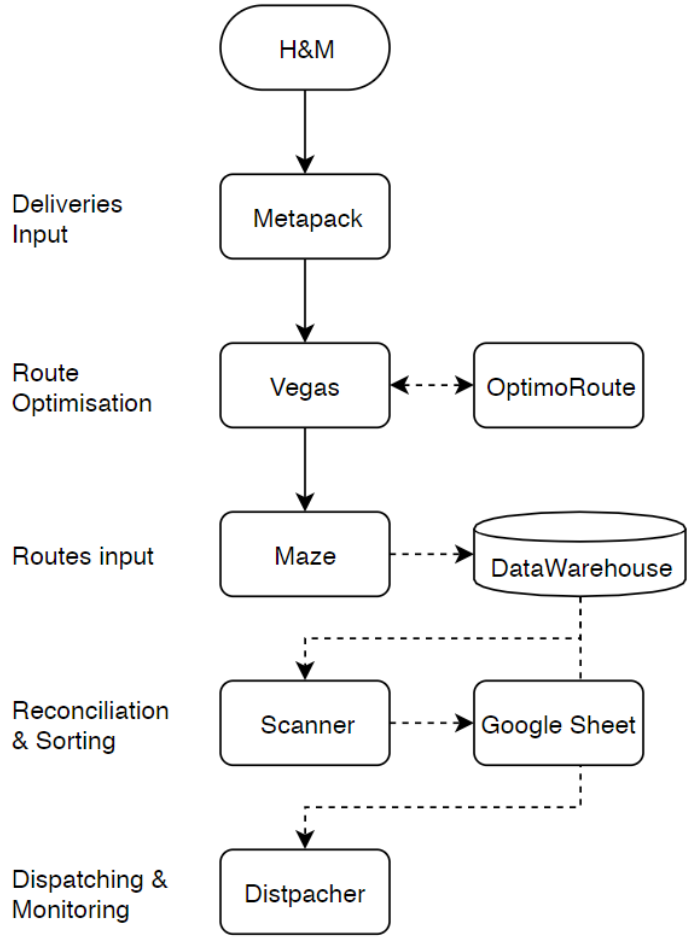



Figure 5.1: Diagram showing the current H&M Process

Firstly the orders that need to be delivered are received from H&M through Metapack, an eCommerce delivery management software. From there, a software developed by Quiqup called Vegas collects the .csv files into a "bucket" and combines them in order to facilitate later processing. The different delivery details, in fact, are then input through API into Optimoroute, a third-party route optimisation software. Vegas then is also responsible for collecting Optimoroute output, which will now include the route numbers to which the deliveries have been assigned.

The second software developed, Maze, then takes the output from Vegas in inputs the orders into the data

warehouse to make the information accessible to the other software. One of the most important ones is Dispatcher, which is used to used at Quiqup to manage and monitor deliveries. This software is very important because is the backbone of Quique's operations, where all the deliveries can be accessed.

Since Dispatcher has been originally developed to monitor instant deliveries with no more than 2/3 drop s permission, some modification has been made. Same-day jobs for H&M, in fact, can contain more than 10 deliveries, creating some during monitoring because of how the UI has been initially designed. In the new version of Dispatcher, same-day deliveries are fully integrated and as easy to monitor as instant ones. Moreover, another additional feature has been added as per H&M request, the delivery signature. Customer support can now easily check in Dispatcher if the customer had signed the delivery or not.

Similar to Dispatcher, also the Courier App required some modifications as the visualisation for more than 2/3 drop per job was not optimal, resulting in a messy experience for the drivers. For the same reason, a signature request has been added at the end of each H&M delivery.

Another component that has been developed for H&M same-day deliveries is related to the process of receiving the parcels, handling and sorting. Since these tasks are not going to be performed in the project solution, they are not analysed.

Lastly, few dashboards have been created in Tableau, the company Business Intelligence tool, in order to make retrospective analysis on the performance.

### 5.3.2. Economic Area

Quiqup, similarly to its competitors, is currently operating with a negative gross margin, meaning that for every delivery made, it loses money. This is mainly due to the high underutilisation of the fleet outside the demand peak which generates costs. Figure 5.2 shows a conceptualisation on how the shifts are scheduled in relation to the demand. At it can be seen, since the shifts have a minimum length, after the peak at 12am, the fleet would remain mainly underutilised.
Based on this, if same-day deliveries can help to increase the utilisation of the fleet outside peak, would already be a better situation than the current one. Consequently, there are no strict requirements on the economic side, apart from being at least breakeven.

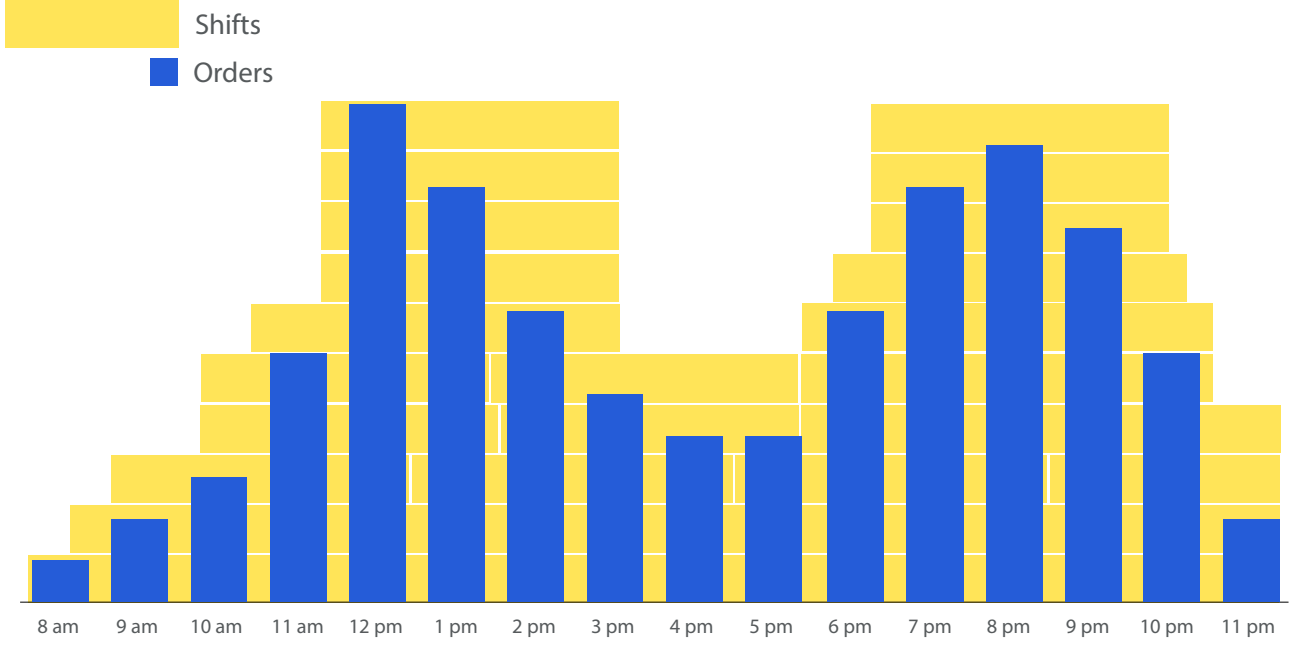



Figure 5.2: Conceptualisation of the hourly demand (orders) and the supply (shifts).

On the other side, development hours for a new proposition need to be evaluated as developers are currently busy on other projects. Resources for developing a same-day solution could be allocated only if benefits are high enough. During meetings though, it has not been clear what the threshold should be.

### 5.3.3. Legal Area

The legal section of the solution is not going to be investigated in this project due to time limitation. Nevertheless, is an important area which needs to be taken into account both from a client-side and supply-side.

H&M and other companies, for example, can request specific legal requirements to a delivery provider such as chain of custody documentation, specific certificates for the people and vehicles involved, etc. Since the same-day proposition is meant to be offered to smaller clients which usually do not have any strict legal requirements, this aspect is not going to be investigated further.

From the supply side, since couriers are not directly employed, one of the challenges is not to cross the legal line that defines them as self-employed as there could be a risk of a lawsuit and the related extra costs.

### 5.3.4. Operational Area

Currently, at Quiqup, diverse tasks are performed in order to ensure that all the solution offered to the clients are sold with a competitive quality of service. In order to do so, few processes are in place. These processes have been documented thanks to the knowledge acquired while working in the company, through a series of interviews and company review. In the following summarization of the main processes that are going to be touched by the project solution is made.

#### Product maintenance and development

A key part of Quiqup competitive advantage is its technology, ranging from a solid IT architecture to a pleasant User Interface of its applications. Most of Quiqup's products have been developed in house, and therefore require constant maintenance and development in order to always improve the user experience and the quality of the data.

The main principles that are used to manage the different projects are taken from the Agile methodology, with monthly reviewed sprints planning and backlog. Since not part of this project, Agile methodology is not going to be expanded further.

#### Sales

Another critical aspect of a proposition is to have people to sell it. Quiqup relies on a team of Business Developer managers that has the responsibility of attracting new customers and sell the product. It is important that the Sales team is always up to date with Quiqup current offering, especially in terms of what can be sold to a client, in order to optimally manage expectations and provide a good quality of service. Moreover, in the first months of acquisition of a new client, Business Development Managers are responsible for ensuring that the clients are satisfied with the performance offered by maintaining close communication with them. After a client is considered fully onboarded, it is transferred to the Account Managers' Team that becomes responsible for maintaining a communication channel with the client. Maintaining a good relationship with clients is key for ensuring transparency from both sides. Clients want to have insights into the performance achieved but is also important that they also share insights into their volume fluctuations, in order for Quiqup to be able to reach and ensure an optimal alignment between demand and supply.

### Operations

It is necessary when the sales team is in contact with a client, that close collaboration with the operations team is maintained. The reason for this is that in order to assure a good quality of service, supply needs to be able to match the expected volume from the clients. It might be necessary to, for example, create a rollout plan to ramp up the volume and ensure a smoother implementation or to collect feedback about expected volume increase/decrease. Moreover, the operations team have the necessary insight to suggest sales what are the performance that can be guaranteed to a client.

Operations are also responsible for ensuring an optimal alignment between supply and demand by constantly monitoring the different metrics that influence it. The risk is not only that not enough driver will book the shifts, but also that the ones that booked then do not show up, leading to a shortage of supply and therefore poor quality of service. Metrics as shifts filling rate, no shows rate and volume variations are constantly monitored in order to spot trends. Moreover, external factors such as bank holidays or weather are also taken into account as they can influence supply significantly. One process in use to react to disruption in the supply and demand alignment is the contingency plan (Appendix A).

### Supply

Another important side of operations is supply management, which encompasses different tasks in order to ensure that enough couriers are available and well trained. Firstly, there is the onboarding phase where applicants are screened in order to ensure that just the needed amount of different drivers is onboarded. The people have then to do a brief test to assess their skills and knowledge, and then go to the office where an introduction and a training session is made in order to familiarise the couriers with the equipment, best practices and the application.

Similar to the Sales funnel, after the drivers have been successfully onboard, there is then a process to ensure retention. This is done in several ways, from constantly checking the performances and rewarding the best couriers, to continuously train on new best practices the couriers in order to ensure the best delivery experience for the end customers.

### Customer Service

Last but not least, there is the Customer Service which is responsible for monitoring the instant demand and supply, making sure that the correct drivers are assigned to each delivery. Customer Support is also in charge of dealing with complaints, both from clients and courier side, in order to provide a good customer experience.

Since the tasks that Customer Support has to do are varied and always changing, constant performance monitoring and training on best practices are needed.

## 5.3.5. Scheduling Area

Even though no formal deadline has been set for this project, it has been requested to be completed in the shortest amount possible. The main reason is that Quiqup is struggling to prove its profitability in the London market and needs to show to investors that new actions are taken. Since Quiqup is usually operating in a fast-paced way, it is assumed by leadership that the project would be completed in 1.5/2 months.

## 5.4. Scenario Simulation

Following the methodology presented in the Theoretical Background chapter, the first steps of scenario simulations are going to be analysed in the following section.

### Objectives

The objectives of the scenario simulation are multiple:

- Identify a proposition with an expected positive gross margin
- Provide a good quality of service to the clients, in line with the current propositions
- Short implementations time
- Help to better optimise current operations, and therefore improve the overall gross margin

### Variables

In Figure 5.3 are represented the main variables that influence the objectives and their relations.

The first objective to be analysed is the **gross margin**, which is calculated as the revenue (mainly dictated by the price) minus the cost of goods sold.

Since this is a new proposition the price can be set using the mark-up model, which basically consist of increasing the cost of the goods sold by a percentage, the mark-up, and therefore ensuring a positive gross margin. This is not entirely possible as in last mile deliveries competitions is one of the main factors to be considered when setting a price, due to the high competitiveness of the sector. Moreover, a price higher than the competition can lead to lower volumes and therefore less room for optimisation that, as is explained in the following paragraphs, would lead to an increase in costs.

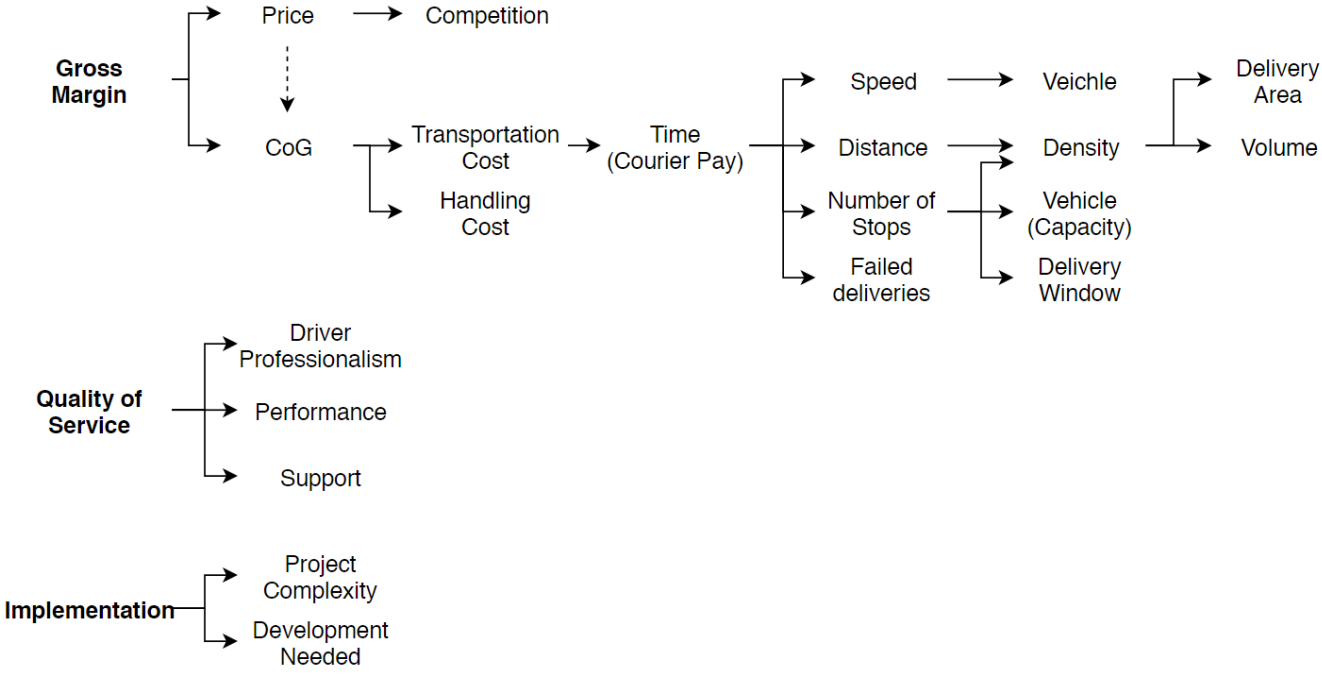



Figure 5.3: Diagram showing the variables and relationships for each objective

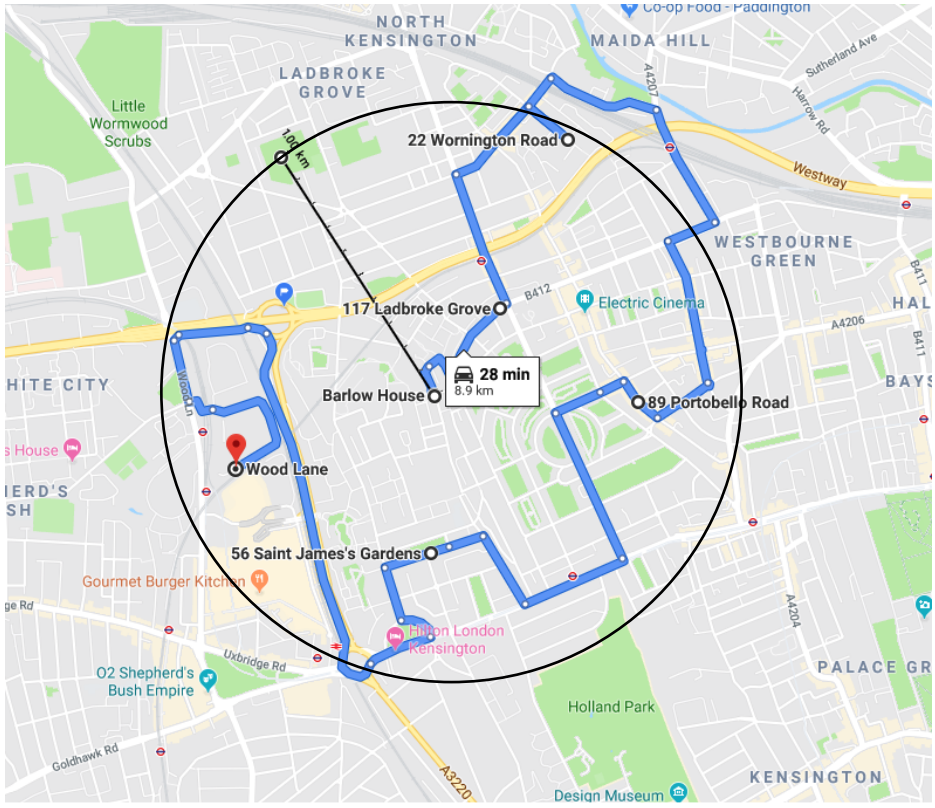



Figure 5.4: Map showing the total distance of a route (8.9 Km) with 5 deliveries in 1Km radius

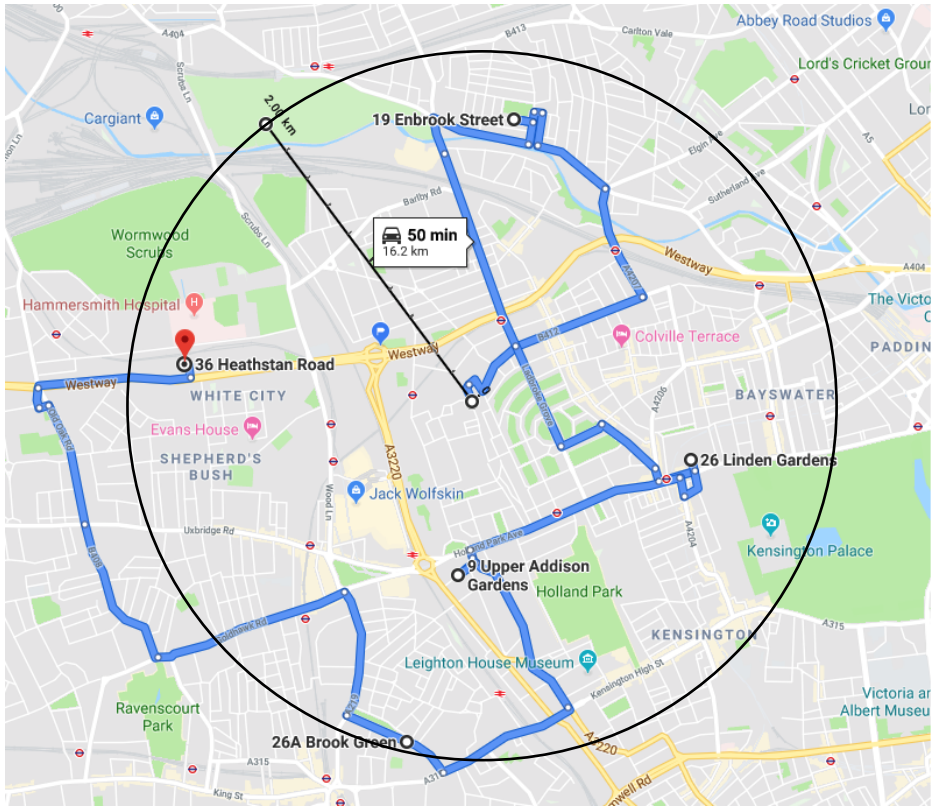



Figure 5.5: Map showing the total distance of a route (16.2 Km) with 5 deliveries in 2Km radius

The cost of the goods sold is mainly composed of the transportation cost but could also include the handling costs if consolidation is needed. In Quiqup's case, the same-day delivery proposition would not include handling costs as these tasks are going to be the responsibility of the client.

The transportation cost instead, since Quiqup's couriers are self-employed, is only composed of the hourly pay of the drivers, which is dependent on the time spend on deliveries. The main drivers of time spend on deliveries is the driver route distance, the number of stops and the speed of a vehicle.

The speed is mainly dependent on the vehicle used, a car usually is faster in low dense areas and routes, whereas bicycles are faster in urban areas as they can dodge the traffic and find parking easily.

The route distance is mainly dependant on the demand density of an area. If the volume is high in a small area, there is a higher chance that the route generated are going to be smaller with a higher amount of stops per hour. In Figure 5.4 and Figure 5.5 it can be seen that the average distance between drops when the radius is 1 Km is ~1.78 Km whereas in a 2Km area the average distance is ~3.24 Km.

The number of stops, though, is also related to the capacity of a vehicle and the number of delivery windows per day. For example, if in a 6 hours delivery window, a driver could carry in one route 60 packages, when reducing the window to 2h, more driver would be needed and they would carry a lower amount of parcels per route in order to deliver everything in the 2h window. Moreover, having 2 delivery windows of 6 hours, or 6 delivery window of 2 hours will reduce the density of the demand throughout the day, leading to higher distances and more time needed per route.

Even though not mentioned in the figure, a secondary objective for the solution is to improve the overall gross margin, considering all Quiqup's offering. This is the main concerns for the company as the current instant delivery proposition it is not profitable, but high synergies can be obtained by combining it with same-day deliveries.

**Quality of service** is a key for Quiqup in order to guarantee a good client experience. This is mainly driven by the performance that the company can offer in terms of on-time deliveries and reliability. This is a key element that needs to be considered when designing the same-day proposition. By assuming a speed too high in the planning phase, for example, could lead to fewer drivers needed that could not be able to deliver every parcel inside the delivery window.

Another factor that affects the quality of service are the drivers as they represent the "face" of the company. A good attitude, knowledge of the tasks that need to be performed and correct equipment are basic needs that need to be guaranteed when offering a service.

Lastly, another client facing a process that is key in order to ensure a good quality of service is the customer support. This needs to always be online to assist both driver and clients and ensuring that the performance required is met.

**Implementation** is also a relevant area that needs to be addressed as Quiqup wants to start offering same-day deliveries in the shortest amount of time possible. This influenced by the solution complexity and the amount of development needed.

### 5.4.1. Main Variables

From the variables identified above, the main ones are going to be explained even further in relation to Quiqups current operations. It is key to analyse these variables as they also represent assumptions and decisions that the business would need to take when introducing the new proposition.
The main variables of **gross margin** to be analysed are:

#### Volume

This variable refers to the demand volume for the same-day proposition. Since it would be a new product in Quiqup's offering, it is difficult to forecast the exact demand the new clients could give to the company. For this reason, this variable would be considered as independent during the evaluation of the gross margin.

#### Delivery area and Operating area

As is going to be explained in the Project Solution chapter, the delivery area is widely used by competitors to define the price of the delivery. This is mainly due to the fact that it highly influences the cost of delivery as the routes become longer. Similar to volume, this variable is going to be evaluated in each scenario.

Different from the delivery area, the Operating area can be decided a priori by Quiqup. Currently, it is defined as London Central (roughly zone 1 and 2) where there is more inhabitant density. This would dictate also where the end customers can ask their items to be delivered, limiting the delivery area. It is a concern from the sales team as they have already done some market investigation and found that there is a high number of clients interested in the proposition, but they have a relevant amount of customer in London M25, a wider area as can be seen in Figure 5.6.

Keeping the same operating area as now would mean that some clients would not use Quiqup as delivery service, decreasing the number of clients and therefore volume that could be acquired. At the same time, a wider area would require a change into the current operations, as both the software utilised would require some changes (in order to enable deliveries outside the

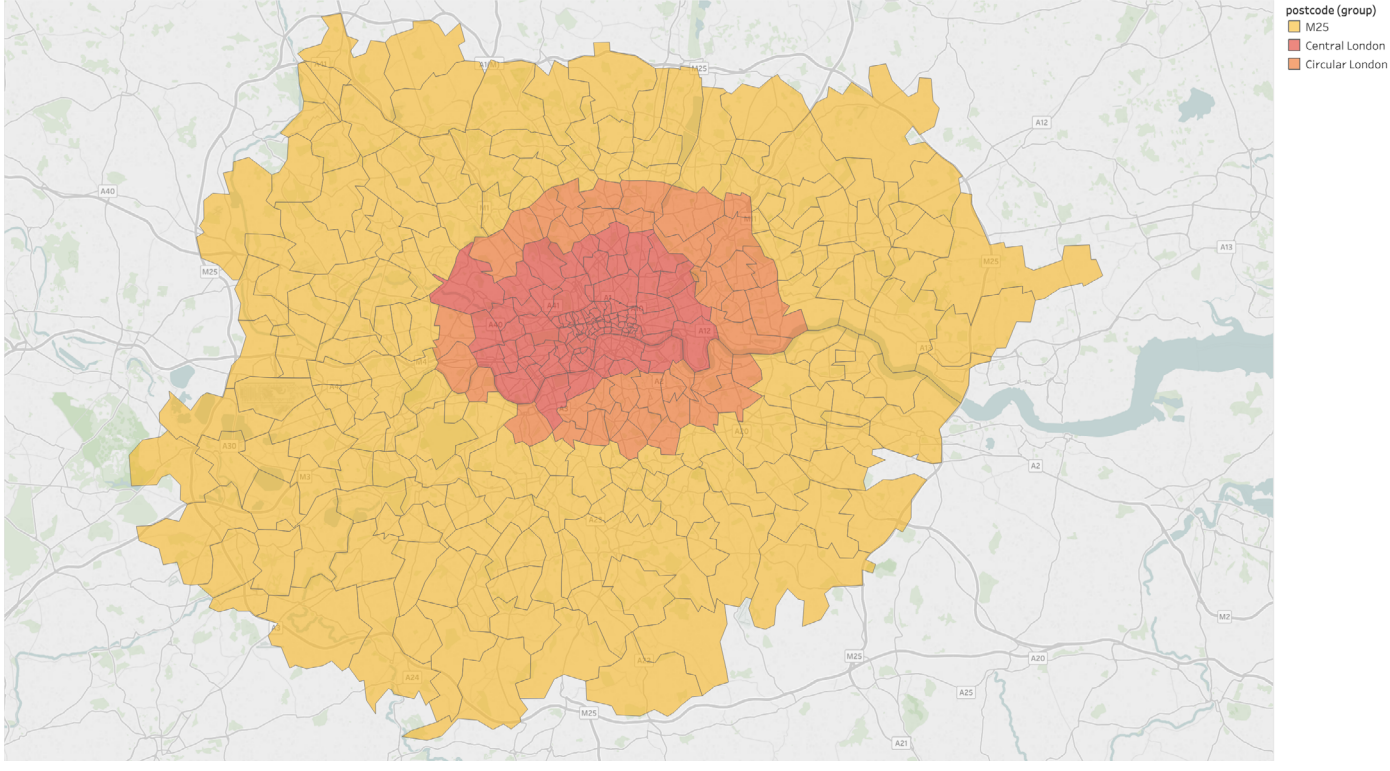



Figure 5.6: Map of London, divided in London M25, Circular and Central

current delivery area just for same-day clients) and the couriers would need some extra training and, more importantly, to agree to travel for further distance.

### Vehicle, in terms of speed and capacity

Speed is a tricky variable as it is different for each vehicle but also by delivery area. A bicycle, in fact, can be faster than a car in an urban area with short distances, but slower in long-distance routes. Although this is true, capacity for moped or bicycles is very limited compared to a car, which makes the two-wheelers an un-optimal transport mode for same-day deliveries, where a high number of deliveries per route represents an optimisation factor.

Capacity, though, highly depends on the package size of the deliveries and if the packages are stackable or not. Fragile items, for example, that cannot be stacked on top of each other, would represent a limiting factor. During the cost estimation, the delivery costs would be adjusted in order to take into account different package sizes (e.g. if a client wants to deliver fragile boxes).

### Delivery window

The number and length of delivery windows can be decided by the company. Usually, in the market of same-day deliveries as seen in the pricing section, the preferred length is 4h. This would mean that 3 delivery windows could be offered throughout the day.

Based on the market insight provided by the Sales team, the preferred windows would be:

- Morning: 8am to 12pm
- Afternoon 1pm to 5pm
- Evening 6pm to 10pm (after office hours)

With the collection of the items to be made in the half an hour before the start of the delivery window, in order for the driver to have time to collect and start driving towards the first stop.

Another constraint is the cutoff time, a limit until when the orders need to be submitted to Quiqup in order for them to be processed. Since the task to be done are various (collecting the orders, optimising the routes, input the orders in the system and checking if enough supply is available) and untested, the cutoff time should be, at least, 3h. Once the preparation phase is well-founded the cutoff time could be closer to the delivery window.

One of the main concerns raised by the operations team is that the morning delivery window would overlap with the current demand peak which happens roughly from 11:00 am until 13:00 pm. This would increase even more the peak and the supply needed at that time, representing an operational risk and cost.
The main variables of **quality of service** to be analysed are:

### Driver professionalism

Driver professionalism is usually achieved at Quiqup through training and constantly monitoring the performance of each driver. This aspect is especially important because the couriers are not employed and therefore is more difficult to keep a close eye on them.

With same-day deliveries, training would be required to ensure that each driver assigned to a mission would now what he needs to do in order to ensure a flawless client experience. Even with training, some drivers could find difficult to work the new type of delivery, being used to just do instant deliveries. For this reason, one of the decision to be made is if a dedicated fleet for same-day deliveries should be created. This could help to assure that just the right drivers are assigned to same-day missions and provide the best performance and experience to the customers. Moreover, a dedicated fleet of drivers could be easier to convince to deliver in the M25 area.

One of the main issues of having a dedicated fleet is that new drivers would need to be onboarded to compensate for the supply taken from the generic fleet of instant deliveries. Moreover, a dedicated fleet would

mean that the current inefficiencies of the generic fleet, which is underutilised after the morning peak, would not be mitigated. On the contrary, inefficiencies could be increased if demand fluctuations for same-day deliveries are high and therefore leading to a need for extra dedicated supply to be planned.

### Performance

As explained previously, performance is highly influenced by the decision made on the setting of the variables related to time. A speed set too high would lead to longer route that in practice cannot be done inside the delivery window. Moreover, higher performance could be reaped with a dedicated fleet of drivers that would be proficient in same-day deliveries.

### Support

Customer support highly relies on training. This is not considered a decision variable, but more a basic need. If same-day deliveries are introduced at Quiquip then training of employee is need.
The main variables of **implementation** to be analysed are:

### Project complexity

This variable is difficult to assess but is going to be mainly based on the time and people needed to implement the solution. Feedback is going to be collected through a series of meeting and a workshop conducted with the managers.

### Development needed

Since currently, the developers at Quiqup are busy working on different projects and improving the H&M same-day delivery solution, the development needed for a new proposition represents an important aspect to be considered. A solution with little development needed would be preferred as it would not increase developers' workload and would require less time to be implemented.

## 5.5. Conclusion

Thanks to this analysis it is possible to highlight the main decisions that need to be made in regards to same-day deliveries.

- Operating area: Decided if the operating area should be expanded to M25 or remain in central London
- Fleet: If a new dedicated fleet should be created in order to fulfill same-day deliveries or if the current generic one could be used.
- Delivery window: If the delivery window in the morning should overlap with the current demand peak or not.
- Amount of development needed for the new proposition

# Chapter 6
# Project Solution

The purpose of this chapter is to analyse the same-day proposition throughout the different areas of the framework. Initially, the different scenarios are identified and selected to be further investigated. The different areas are then analysed, highlighitng what are the different steps that needs to be performed alongside with the time and costs estimations. Lastly, the scenario chosen is presented.

## 6.1. Scenario Selection

Figure 6.1 shows the different combinations of the scenario variables identified in the problem analysis and validated during a workshop with the different stakeholders. At the top of the figure are also represented the rules which restrict the values variables can take. For example, if the delivery window overlaps with the peak, dedicated fleet is needed as the generic one is required to fulfil instant deliveries demand. Dedicated feel is also required if M25 is chosen as already explained in the Problem Analysis. These requirements are identified in the graph by an "X".

During the workshop, a "new" value for the fleet variable has been suggested. This has been defined as the "Hybrid" model and would represent a conjunction between dedicated and generic fleet. This new value is especially useful in case the delivery windows overlaps with the morning peak. In order to keep cars free for the morning delivery window, the dedicated fleet could be chosen. In this case, drivers would start their shift with the same-day exclusive tag, which will ensure that the designated drivers are assigned just to same-day missions. Once the peak is finished, since there is already an oversupply of couriers, a generic fleet can be used to fulfil the afternoon and evening delivery windows.

Since not all the scenario can be evaluated, as theory suggests, and also due to time limitations, three scenarios are selected. The selection mainly follows the principle of selecting the two extreme scenarios and a middle one, in this case, the hybrid one as can be seen in the Figure. Moreover, the scenario to be selected have been evaluated during the workshop with the stakeholders involved in order to ensure that the more insightful cases are investigated.

As explained in the Problem Analysis chapter, the help of developers should be avoided, at least in the initial stages, due to other projects in their backlog. For this reason, the cases with no development are going to be considered by default. Nevertheless, the option of developing a product update is going to be investigated in terms of requirements, time and costs. This is done in order to involve also the developers' team, let them familiarise with the new proposition and collect feedback. Moreover, even though leadership is adamant about the no development option, showing a summary of benefits and costs could shift their opinion.

Below a summary of the scenario chosen:

### Scenario 1:

Delivery Area: M25
Fleet: Dedicated
Delivery window and cutoff times:

- 8am to 12pm cut off by 5pm the day before
- 1pm to 5pm cut off by 10am
- 6pm to 11pm cut off by 3pm

This scenario ensures high flexibility for sales, decreasing the operational flexibility and the possibility to harvest the benefit of having demand off-peak.

### Scenario 2:

Delivery Area: Central London
Fleet: Dedicated (morning), Generic (afternoon & evening)
Delivery window and cutoff times:

- 8am to 12pm cut off by 5pm the day before
- 2pm to 6pm cut off by 11am
- 6pm to 10pm cut off by 4pm

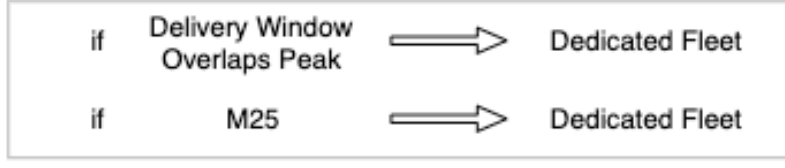
In this scenario, there is a delivery window in the morning to be fulfilled with a dedicated fleet (in order to not impact the catering peak) whereas in the afternoon the generic fleet is used. Constraints of using the generic fleet is to limit the Geography to the OA.

### Scenario 3:

Delivery Area: Central London
Fleet: Generic
Delivery window and cutoff times:

- 8am to 11am cut off by 5pm the day before
- 2pm to 6pm cut off by 11am
- 6pm to 10pm cut off by 4pm

This scenario ensures high flexibility and optimisation our current operations by creating demand outside the catering peak that can be fulfilled by our current 'generic' fleet.



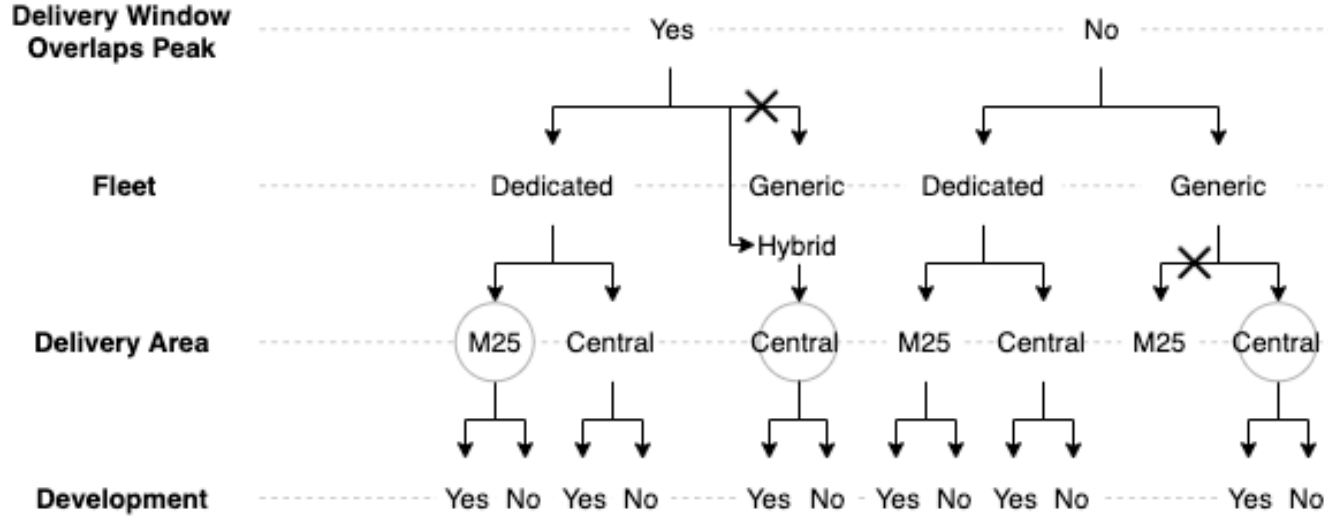




Figure 6.1: Possible scenarios resulting from the combinations of the variables. On the top, the rules, whereas circled the scenarios selected.

## 6.2. Technical

### 6.2.1. Development

In order to make the proposition work, there are several steps that need to be done, and even a little development is needed. In this section, firstly the solution with a minimal amount of development needed is presented, followed by the full solution.

To complete this section, a workshop with the developers that took part in the H&M same-day project has been performed.

#### Solution 1

In this solution, the work from developers would be needed in order to extend the functionalities developed for H&M to every generic client interested in the same-day proposition. The amount of development needed is not excessive as few hours have been already worked on the H&M same-day project. Nevertheless, the current same-day offering is not flawless but new bugs need to be solved daily. Due to this, it is difficult to assess whereas developers could actually have time to be allocated for another same-day solution.

Few components of the software would need to be updated in order to support the new proposition:

**Order input**
In order to facilitate the order input from the client side, a new interface should be developed with the option to choose between instant or same-day deliveries and, in case of the latter, which delivery window.

Moreover, since the current interface is not made to input more than 2/3 drops per missions, a new feature to upload multiple deliveries at once should be developed.

**Route Optimisation**
This process should not be too complicated to develop as the Vegas, the component that is responsible for optimising the deliveries in different routes has already been created. The main difference with the H&M process is that a generic same-day process should be run multiple times per day and that the depot, which currently is set to be at Quiqup headquarters, should be different for each client. Furthermore, the order lines would not come from meta pack but directly from QuiqDash, the company's dashboard to input orders.

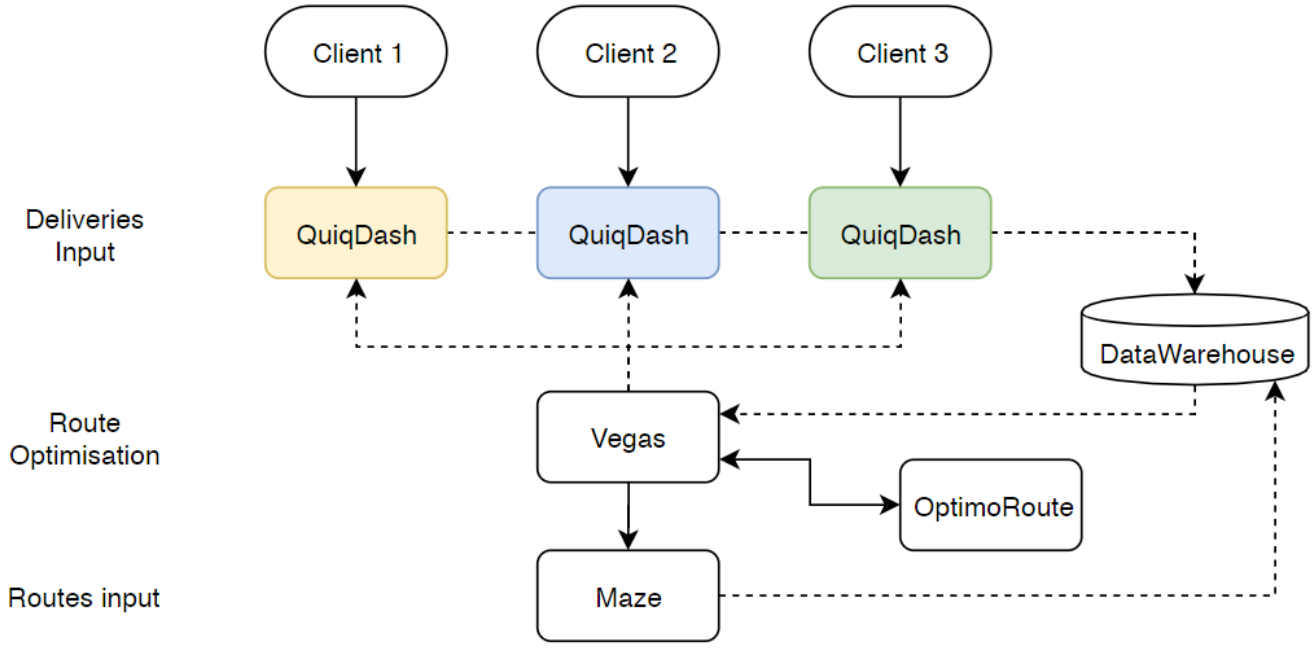



Figure 6.2: Diagram showing the different steps and components of the Solution 1

**Routes Processing**

For this step, the current component used for H&M should not need particular changes as it would simply take the output from Vegas and input the orders in Dispatcher. In this way, the missions will have the same-day tag applied.

**Route Monitoring**

For this process, no major changes are needed as Dispatcher has been already updated in order to facilitate monitoring multidrop-deliveries. Moreover, since in this case the same-day tag would be applied to the missions, they will be easier to control and the courier app would benefit from the improved UI for same-day missions as well.

## Solution 2

For this solution, the main objective is to minimise the amount of input from developers in order to speed the development and lower the initial costs.
This step is going to be initially performed by the client through QuickDash, the current software utilised to submit instant deliveries. For each same-day client, a new account is going to be created specifically to be used for same-day deliveries. There the clients can they submit, as they are already used to do, the deliveries that need to be performed. Once the cut-off time of the delivery window is reached, the accounts would be locked for 30 min in order for the following steps to be done without the interference of new orders coming into the system.

All the orders submitted until that point in time are then extracted from the data warehouse, and the original orders are deleted. The orders are then processed via a custom python script that elaborates the data, send them to OptimoRoute via API, and download the results.

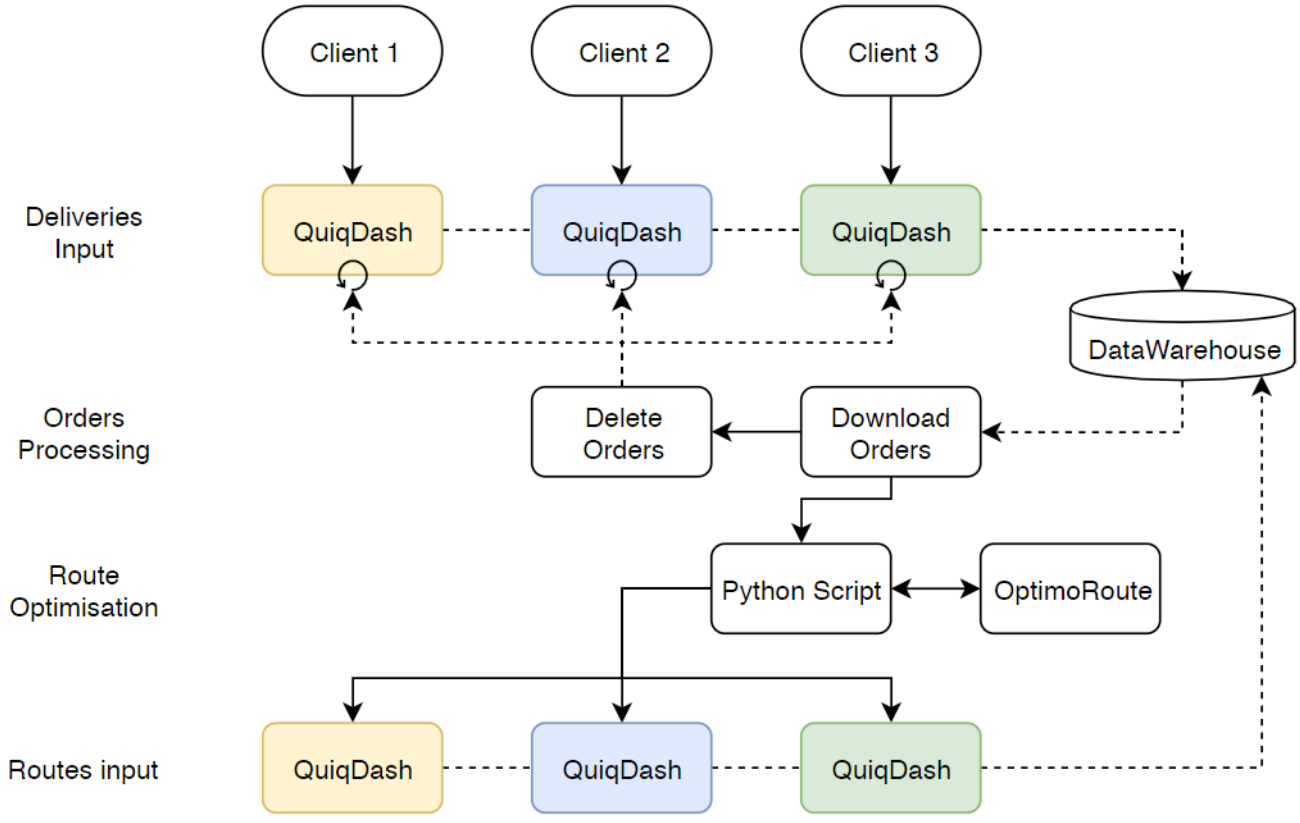



Figure 6.3: Diagram showing the different steps and components of the Solution 2

Once the results are downloaded, they can be uploaded into the different QuickDash account via the bulk upload feature. In this way, the orders submitted are going to be considered by the system as multi-drop missions, but not as same-day orders. This could create a little confusion as the missions for same-day H&M are tagged as Same-day missions and therefore can be easily monitored in Dispatcher. Moreover, the same-day tag, trigger a different interface in the courier app, better suited for multi deliveries missions. The same-day tag, as it has been developed specifically for H&M cannot be easily applied to a mission, but needs to be done in the backend and, therefore, help from developers is needed.

### 6.2.2. Cost

The development needed for solution two to run is marginal as is just related to the Python script. As the same script is developed for the simulation, it is not considered a cost.

For solution one, the major part of the development has been already done for H&M, but a huge part of work is needed in order to ensure that the new process can be integrated seamlessly in the current system. In the past, in fact, major delays have been encountered when integrating new features in the system due to unexpected interference and bugs. It is estimated that two weeks of development are going to be needed, followed by four weeks of debugging and testing. For this task, it is assumed that one developer is going to work on the project for 20 hours per week (half time).

## 6.3. Operational

In this section, the different tasks that need to be integrated with the current operation at Quiqup are explained. This is very important because even though a new proposition does not represent a big change operationally, is still a change in the work tasks of the employee and therefore, need to be carefully analysed in order to integrate them in the best way. The resistance to the change is not foreseen as the need for a same-day proposition is felt from the employees.

In order to list all the different changes and the employees that are going to be involved, a series of meetings have been held with different stakeholders such as the Customer support manager, fleet manager, strategy manager and sales manager.

The result of these meetings is summarised below and divided into phases, similarly on how current processes are documented at Quiqup. For each phase or task, a responsible person is going to be defined. Moreover, before the implementation of the operational tasks, some processes need to happen in order to prepare for the change and support them. These are going to be listed alongside the tasks.

### 6.3.1. Review Phase

This is the initial phase where the client is approached by the BDMs in order to sell the same-day proposition. This process needs to ensure that the new client expectations are met and that quality of service can be guaranteed. For this phase, three main step needs to be performed.

#### Client Proposal

In this step, the client needs to be informed on the details of same-deliveries, such as pricing, what are the delivery windows, when the packages need to be ready and so on. This step is very important in order to align expectations and make sure that the client is fully informed about how the proposition works. One of the main aspect to cover in this section is to decide how to deal with failed deliveries as Quiqup cannot store the packages in a warehouse. The failed deliveries could be done in the next delivery window (apart if it is the last one) or returned to the client after the previous deliveries have been completed.

For this step, some material needs to be prepared such as the proposition deck, a set of slides where all the information concerning the proposition is condensed. This is going to be done by the Senior Business Development Manager together with the Marketing Team. Moreover, pricing needs to be defined and this is going to be done in this project in collaboration with the Strategy Manager and approval from the leadership.

#### Provisioning Review

Before acquiring a new client, its demand is analysed in order to evaluate what are the supply requirement. This step is already documented in the current practices of the company and would not need significant changes for same-day deliveries. The data is usually collected by the BDMs and submitted to the Operations Team which will then analyse and evaluate the amount of supply needed. If it is deemed that not enough couriers are available on the platform to fulfil the demand, the input from the Fleet Team is going to be used in order to determine the lead time needed in order to source new countries.

#### Account Setup

After having examined the data, the Operations Team can then decide if and when the client could start submitting orders. If the client agrees, its account needs to be set up in Quiqup's system. This process is going to be similar to the one already in place for instant deliveries where its details are filled, an account created and the client trained on how the orders can be input. This process also includes the pricing setup.

In summary, for the review phase to be operational, there is a need for the pricing to be defined and the deck to be created. For provisioning review and account setup, no actions are needed as the process is going to be similar to the current one in place, therefore just an update of the processes documentation should be made.
It is estimated that it would take 1 week to define the pricing and 1 week to create the sales deck.

## 6.3.2. Planning Phase

### Provisioning

This phase happens weekly on Wednesday when the shifts for the next week are uploaded. Currently, this process is done through demand forecasting and shift scheduling and outputs the number of shifts that are going to be needed in order to meet demand in an optimal way and provide a good quality of service. This process would happen differently if a generic or dedicated fleet is chosen.

**Generic Fleet**

In this case, the usual supply forecast can be adjusted by increasing the hourly number of couriers needed during the different delivery windows. To determine the number of couriers that are going to be needed, the model developed during the simulation can be utilised. From the simulation, in fact, the number of couriers needed for each delivery can be evaluated from the delivery area and the volume. After the first two weeks where data on the client is collected, an analysis of the client volumes for each day and delivery window can be made in order to forecast the number of couriers needed. Input from the client of expected volume fluctuations due, for example, to promotions, would still need to be communicated.

In Figure 6.4 an example on how the demand courier is going to be adjusted for same-day demand is shown. On the top, the output of the analysis of the couriers needed for each delivery window whereas on the bottom the hourly drivers forecasted to fulfil instant deliveries demand. The output is then the total number of hourly drivers needed which can then be used to optimise the shifts schedule.

**Dedicated fleet**

If a dedicated fleet is chosen, the step is going to be performed separately for what is done for instant deliveries. Firstly, the couriers needed are going to be determined in the same way as the generic fleet case, from the model developed for the simulation and the data from the client. The shifts are then created taken into account that extra drivers need to be provisioned as not all of them actually show up to perform their shifts, usually ~10%. The shifts identified are then released to the selected driver that have been specifically assigned to do same-day deliveries. It will be then responsibility of the Fleet Team that the shifts are picked by the driver and that there is always enough driver available in the dedicated fleet. If this does not happen, as an extreme measure, few generic couriers could be trained and integrated into the dedicated fleet.

In both cases, it is responsibility of the Operations Team to design and document the process and collaborate with the Fleet Team. It is assumed that this task would take 1 day, and therefore it is not included in the summary.

| Monday | | | |
|---|---|---|---|
| Delivery Window | Start time | End time | Drivers needed |
| Morning | 8 | 12 | 3 |
| Afternoon | 14 | 18 | 4 |
| Evening | 18 | 22 | 5 |

| Hour | Forecasted Driver Demand | Same-day Drivers | Total Drivers Nedded |
|---|---|---|---|
| 7 | 3 | 0 | 3 |
| 8 | 5 | 3 | 8 |
| 9 | 3 | 3 | 6 |
| 10 | 4 | 3 | 7 |
| 11 | 20 | 3 | 23 |
| 12 | 12 | 0 | 12 |
| 13 | 5 | 0 | 5 |
| 14 | 2 | 4 | 6 |
| 15 | 3 | 4 | 7 |
| 16 | 4 | 4 | 8 |
| 17 | 6 | 4 | 10 |
| 18 | 9 | 5 | 14 |
| 19 | 15 | 5 | 20 |
| 20 | 18 | 5 | 23 |
| 21 | 5 | 5 | 10 |
| 22 | 2 | 0 | 2 |
| 23 | 3 | 0 | 3 |

Figure 6.4: Example on how provisioning is going to take into account for same-day demand

## Sourcing

Sourcing is the process that aims at always having the right amount of couriers on the platform in order to fill the slots published. This process range from managing marketing campaigns to source new candidates, CV screening, online lessons and tests, and on-boarding. Below the changes expected depending on which type of fleet is chosen are described.

**Generic fleet**

If generic fleet is chosen the process of sourcing drivers need to change in order to include the new material regarding same-day deliveries. This would mean that the online course and test need to be updated alongisde with the onboarding presentation. It is estimated that at least at the beginning, no boost in sourcing is needed as more than enough drivers are already working underutilised during the week. The new demand would actually help to have a stable amount of shifts through the day making couriers busier and happier. It is estimated that at least 40 drivers could work on same-day deliveries throughout the day.

It has to be considered thought that in order to ensure professionalism, the current fleet would need to be trained in the new proposition and this would require a massive amount of work as there are more than 2000 drivers currently registered on Quiqup's platform. Moreover, something similar has never been done on this scale and would represent a challenge for the fleet team. For H&M same-day deliveries a small set of couriers (20) has been trained in the office. This represents a cost because couriers expect to be paid during the hour spent at the office and a challenge due to people not actually showing.

To reduce the time needed to train the whole fleet, the training could be divided into small sets by targeting the courier that usually work close to the same-day clients. In the backhand, a tag could be applied to the courier that have received the training in order to ensure that they are going to be the only one to receive same-day missions.

Usually, onboard one driver costs roughly 130£ (from the costs of running advertisement campaigns, screening, training and equipment). Moreover, on average for that price, four drivers can be onboard every week. The number could increase if more resources are allocated to advertisements.

**Dedicated fleet**

In case of dedicated fleet, a new fleet would need to be employed that would operate in parallel to the generic one. In the beginning, few couriers from the generic fleet could be trained for same-day deliveries, similar to what happened for H&M but in the long run, a separate funnel should be designed with different job advertisements, online course and training material. This is especially true if the deliveries need to be done in M25. Delivering in M25, in fact, is a consistently different requirement for the actual one of delivering in Central London. It is estimated that adding a new funnel would take 1/2 weeks.

For dedicated couriers, the only tag applied would be the same-day tag, meaning that they could not be assigned to instant deliveries. Since it is deemed that it would be more difficult to source drivers that would be willing to deliver in M25, also the onboarding costs would rise, mainly due to a higher cost of advertisement, plus the cost of setting a new sourcing funnel.

There is still an unsolved question on what will the courier do in case of oversupply. For simplicity purpose, it will be assumed that the courier would still need to be paid their hourly wage. It could happen though that the driver would be required to move to the operating area and perform instant deliveries.

It is estimated that the price to onboard a driver for M25 would be higher than the usual price considered for Central London as fewer drivers are going to be interested in delivering in the bigger area. The price assumed is 150£ per courier and that two couriers per week could be onboarded.

A requirement in both cases is that the fleet needs to be trained on same-day deliveries and to know all the different steps that need to be performed. Since training material such as presentations, emails and cheat sheets have been already prepared for H&M, just minor adjustments are needed. Main responsible for this step is the Fleet Team and it is estimated that updating the material would take 1 week.

### 6.3.3. Prep Phase

This phase happens daily, after every after cut-off, when the actual demand for the delivery window is received. This phase aims at ensuring that the actual demand meets with the actual supply.

#### Generate Routes

This step takes as input the orders received from the client and generate the routes. This step has been already explained in the development section and it depends on which decision is chosen. Regardless of the method utilised, the main responsible for this step would be the Operations Team.

#### Provisioning Check

Provisioning check aims at reviewing the actual supply and the actual demand and making sure they match correctly. From the output of the previous step, it is possible to identify how many couriers are needed to fulfil the orders in the delivery window.

If the **generic fleet** is chosen, it is assumed that enough driver would be available and, therefore, no actions would be needed. The risk is that if more drivers are needed for same-day deliveries than what provisioned resulting in an undersupplied instant delivery demand. This effect would be marginal, at least at the beginning, due to the fact that the same-day volume is not expected to have high fluctuations and that it would represent a fraction of the instant delivery volume as it would still be the dominant proposition.

If the **dedicated fleet** is chosen instead it is going to be more difficult to rapidly source drivers from the generic fleet as they are missing training and especially if the delivery area is extended to M25 for same-day deliveries. One way to absorb excess in demand is to create a backup fleet that has been instructed on same-day deliveries and that would be fine to deliver in M25. In extreme cases, the Fleet Team could identify some drivers currently working on instant deliveries, instruct them via phone and sent them a cheat sheet.

Since it is most likely that developers are not going to be involved in the same-day delivery project, it is assumed that the time to develop and test the script to optimise the route would take 1 week. The time is considered short as most of the work has already been done for the simulation.

### 6.3.4. Live Phase

Once the prep phase is finished the missions for same-day delivery would be ready to be assigned to couriers. Thanks to the route optimisation done previously, the missions would already be scheduled for a driver to arrive at the pickup location at the optimal time in order to complete the first delivery at the beginning of the window. Even though the system automatically assigns drivers, monitoring is needed in order to ensure correct fulfilment.

#### Monitor live missions

Customer support is in charge of making sure that the best service is provided to the client, firstly by checking that the system is operating in an optimal way by assigning drivers and if needed override its actions. In both generic and dedicated fleet, there would be no significant changes in the logic the system uses to assign drivers. For dedicated drivers, a tag can be added on their shifts and to the clients in order that missions with a specific tag are going to be assigned just to courier with the same label.

Another task of customer support is to answer queries from both courier and client side. Is therefore important that every employee in customer support is trained on the new proposition.

The Training and Quality Assurance Manager for Customer support estimates that a week is needed in order to prepare video training that can be then shared to the employees. This has been proven to be an efficient method to update customer support on new information and best practices. It is opinion of the Manager that a more time-consuming way to update employees such as workshops would not be required as they have already had similar training for H&M same-day deliveries.

No extra cost is considered due to the increased workload on Customer Support as it is the opinion of the Team that the change would be marginal.

### 6.3.5. Non Live Phase

Once the missions are finished and the goods delivered there is a need to evaluate what has been the performance, especially at the first stages of the implementation

#### Monitor performance and evaluate the proposition

For this step, few dashboards are going to be developed in order to constantly monitor the performance such as the variables used to model same-day deliveries (speed, time at drops/pickups,...) and quality of service. Since the data is going to be already available by default in the system there is only a need to design the dashboards. For this, the main responsible would be the Operations Team and the tool used is Tableau, the company BI software. It is estimated that the creation of the dashboard would require 1 week of work.

| Area | Task | Reponsible | Scenario Var | Cost | Time |
|---|---|---|---|---|---|
| **Rewiew Phase** | Pricing definition | Operations / Strategy | | - | 1 week |
| | Deck Creation | Sales | | - | 1 week |
| **Planning Phase** | Update Material | Fleet | | - | 1 week |
| | Setting New Funnel | Fleet | Dedicated fleet | - | 1 week |
| | | | Generic fleet | - | - |
| | Sourcing | Fleet | Dedicated fleet | 150£ / courier | 1 week / 2 drivers |
| | | | Generic fleet | 130£ / courier | 1 week / 4 drivers |
| | Initial Training | Fleet | Dedicated fleet | - | - |
| | | | Generic fleet | 20£ / courier | 2 weeks |
| **Prep Phase** | Develop Process | Operations | | - | 1 week |
| **Live Phase** | Create Training Material | Customer Support | | - | 1 week |
| | Training | Customer Support | | - | 1 week |
| **Non Live Phase** | Dashboards | Operations | | - | 1 week |

Figure 6.5: Summary of the tasks costs and duration, alongside the responsible teams

## 6.4. Scheduling

In this section, the different requirement from the different areas in terms of tasks that needs to be performed and their duration are summarised. Figure 6.6 shows the tasks sequence divided by each Team that is responsible for its completion. As can be seen, the main difference is in the longer time that it takes to onboard a new type of fleet. Important to highlight that these could be accelerated by directly training some drivers from the generic fleet instead of waiting to source new ones. Since supply is already tight during demand peak, this is not recommended.

Development of a full solution would increase the implementation time to six weeks as development and testing are required.

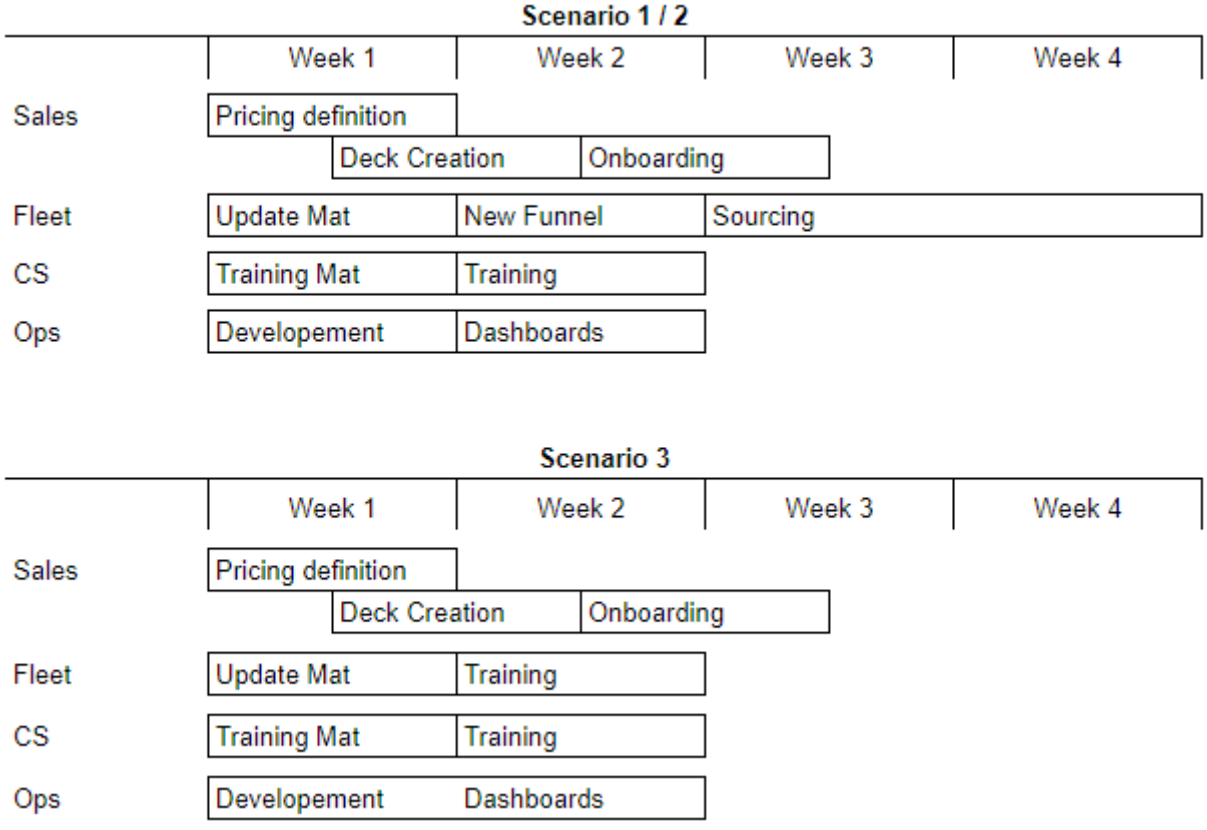



Figure 6.6: Rapresentation of the tasks that need to be pefromed in the different scenarios.

## 6.5. Economic

In this section, the economic factor of the solution is analysed. The section firstly starts by describing how the price has been determined and then quantifies the costs associated via a simulation.

### 6.5.1. Price

As described in the previous section, the pricing baseline should be set looking at the competition. Data from 3 different companies that currently operate in London with a similar proposition (4h delivery window) has been collected and compared. Figure 6.7 shows the different pricing of the 3 companies dependent on distance and transport type utilised.

Based on this, it has been decided that the pricing of Quiqup should be in line with the average of the competitors pricing. In Figure 6.8 the result is shown.

| | Quiqup | | |
|---|---|---|---|
| Distance (km) | Bicycle | Car | Van |
| 0 - 1 | £4.50 | £6.50 | £9.00 |
| 1 - 2 | £4.80 | £7.70 | £11.00 |
| 2 - 3 | £5.40 | £8.20 | £11.60 |
| 3 - 4 | £6.00 | £9.00 | £12.90 |
| 4 - 5 | £6.00 | £9.00 | £12.90 |
| 5 - 6 | £6.60 | £10.00 | £14.20 |
| 6 - 7 | £7.90 | £11.10 | £15.50 |
| 7 - 8 | £9.20 | £12.60 | £16.80 |
| 8 - 9 | £11.20 | £13.30 | £16.80 |
| 9 - 10 | £12.40 | £14.90 | £18.10 |
| 10 - 11 | £12.40 | £15.60 | £18.10 |
| 11 - 12 | £14.80 | £17.20 | £20.70 |
| 12 - 13 | £17.20 | £18.80 | £23.30 |

Figure 6.8: Quiqup's approved pricing for same-day deliveries

| | E-Courier - same day during business hours | | | On the Dot - 4hr SLA | | | Gophr | | |
|---|---|---|---|---|---|---|---|---|---|
| Distance (km) | Bicycle | Car | Van | Bicycle | Car | Van | Bicycle | Car | Van |
| 0 - 1 | £3.95 | £6.45 | £8.95 | £4.82 | £6.42 | £8.56 | £4.50 | £7.75 | £11.00 |
| 1 - 2 | £6.35 | £8.95 | £11.55 | £4.82 | £6.42 | £8.56 | £4.50 | £7.75 | £11.00 |
| 2 - 3 | £6.35 | £8.95 | £11.55 | £4.82 | £6.42 | £8.56 | £5.40 | £9.20 | £13.00 |
| 3 - 4 | £7.55 | £10.50 | £12.85 | £4.82 | £6.42 | £8.56 | £6.00 | £10.18 | £14.37 |
| 4 - 5 | £7.55 | £10.50 | £12.86 | £4.82 | £6.42 | £8.56 | £6.00 | £10.18 | £14.37 |
| 5 - 6 | £8.75 | £11.45 | £14.15 | £5.82 | £7.42 | £9.56 | £6.60 | £11.17 | £15.73 |
| 6 - 7 | £9.95 | £12.50 | £15.45 | £5.82 | £7.42 | £9.56 | £7.90 | £13.28 | £18.66 |
| 7 - 8 | £11.15 | £13.95 | £16.75 | £6.82 | £8.42 | £10.56 | £9.20 | £15.39 | £21.58 |
| 8 - 9 | £11.15 | £13.95 | £16.75 | £6.82 | £8.42 | £10.56 | £12.15 | £17.60 | £23.04 |
| 9 - 10 | £12.35 | £15.50 | £18.05 | £7.82 | £9.42 | £11.56 | £15.10 | £19.80 | £24.50 |
| 10 - 11 | £12.35 | £15.50 | £18.05 | £7.82 | £9.42 | £11.56 | £17.10 | £21.80 | £26.50 |
| 11 - 12 | £14.75 | £17.50 | £20.65 | £8.82 | £10.42 | £12.56 | £19.10 | £23.80 | £28.50 |
| 12 - 13 | £17.15 | £20.25 | £23.25 | £8.82 | £10.42 | £12.56 | £21.10 | £25.80 | £30.50 |

Figure 6.7: Pricing comparison of Quiqup's competitors

## 6.5.2. Cost Simulation

The main goal of the simulation is to quantify the costs associated with a same-day delivery proposition in order to then evaluate its feasibility. This section starts with a further investigation of the variables related to costs identified in the Problem Analysis chapter to define what needs to be simulated. Then the method utilised is described and the results presented.

The simulation is restricted only on quantitative measures which are related to the gross margin objective. Nevertheless, the other two objectives are always taken into consideration during the simulations setup and are later discussed. Consideration on the other two objectives.

### Independen t Variables

In order to quantify the costs bounded to a same-day proposition, the independent variable(s) need to be defined. According to the theory related to deliveries, density highly influences the transportation costs. As seen previously, the density is defined from the delivery area and the volume, therefore these two variables are going to be set as independent variables. Moreover, as seen in the pricing section, cost of delivery is usually defined using the delivery area (from the radius) and, therefore, it seems reasonable to use it as an independent variable.

Based on this, a matrix volume/delivery radius is going to be used. The radius samples are defined based on the pricing that competitors employ which goes from 1 to 12 Km. To set the volume axis instead, input from the Sales team is utilised in order to find what are the values that should be tested. The results can be seen in Figure 6.9 where the matrix is shown.

### Dependent Variables

In order to simulate the costs of same-day deliveries, the variables need to be quantified. To do so, both historical data and estimation are used as explained below. Every value used has been calculated by using the most conservative method in order to ensure to be covered for the worst case scenario. For example, to evaluate time at drop instead of the average has been used the 90 percentile.
The data used is shown in Figure 6.10.

| Area Sqkm | 3 | 13 | 28 | 50 | 79 | 113 | 154 | 201 | 254 | 314 | 380 | 452 | 531 | 616 | 707 | 804 | 908 | 1018 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Drops / Radius | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 | 11 | 12 | 13 | 14 | 15 | 16 | 17 | 18 |
| 5 | | | | | | | | | | | | | | | | | | |
| 10 | | | | | | | | | | | | | | | | | | |
| 15 | | | | | | | | | | | | | | | | | | |
| 20 | | | | | | | | | | | | | | | | | | |
| 25 | | | | | | | | | | | | | | | | | | |
| 30 | | | | | | | | | | | | | | | | | | |
| 35 | | | | | | | | | | | | | | | | | | |
| 40 | | | | | | | | | | | | | | | | | | |
| 45 | | | | | | | | | | | | | | | | | | |
| 50 | | | | | | | | | | | | | | | | | | |
| 60 | | | | | | | | | | | | | | | | | | |
| 70 | | | | | | | | | | | | | | | | | | |
| 80 | | | | | | | | | | | | | | | | | | |
| 90 | | | | | | | | | | | | | | | | | | |
| 100 | | | | | | | | | | | | | | | | | | |
| 150 | | | | | | | | | | | | | | | | | | |
| 200 | | | | | | | | | | | | | | | | | | |
| 250 | | | | | | | | | | | | | | | | | | |
| 300 | | | | | | | | | | | | | | | | | | |

Figure 6.9: Example of the matrix used during the simulation

**Historical**

- Speed (by TT, distance)
  This is the only variable which is not only dependent by the Transport Type (TT), but also by the distance between the driving points. The distance stops at 10 Km since historically not enough deliveries required a distance between stops above 10 Km.

- Time at drop
  This variable expresses the time spent by the driver searching parking and actually delivering the parcels to the customer, a value that is not encapsulated into the average distance driven and the speed. To evaluate the time at drop historical data has been used, and an approximation of the 90 percentile of time spent ad drop for each MOT has been used.

- Time to pickup
  This is the time usually spent by a courier driving to the pickup location. For this value, the 90 percentile of the historical value of time to pickup has been used.

- Pay
  For this variable, the current wage has been considered.

**Estimation**

- Time at pickup
  The time at pickup has been determined by timing the current process of parking, waiting and loading the vehicles. This is considered to be an estimation because the sample size is not big enough to be considered fully sound (just 5 evaluation have been made).

- Capacity
  For the sake of the simplicity of the analysis, the standard value used at Quiqup to compare the different vehicle's capacity is going to be used. In this model, the average package is of the same size as a show box (a value that is deemed a good estimation).

- Efficiency
  This variable is usually utilised at Quiqup in order to encapsulate the inefficiency of the real system compared to the modelled ones. The value usually considered for couriers is 75%.

| | Speed | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|
| **TT / Km** | **1** | **2** | **3** | **4** | **5** | **6** | **7** | **8** | **9** | **10** |
| **Bicycle** | 13.1 | 12.8 | 12.6 | 12.3 | 12.3 | 12.3 | 12.3 | 12.3 | 12.3 | 12.3 |
| **Car** | 11.4 | 10.4 | 11.2 | 11.6 | 11.7 | 11.7 | 11.1 | 12.2 | 12.8 | 12.6 |
| **Van** | 9.9 | 8.6 | 9.0 | 9.0 | 9.8 | 10.4 | 9.9 | 11.3 | 11.1 | 12.7 |

| Assumptions | | | | | |
|---|---|---|---|---|---|
| | **Time at Drop** | **Time at Pickup** | **Time to Pickup** | **Capacity** | **Wage** |
| **Bicycle** | 5 | 15 | 10 | 3 | 12 |
| **Car** | 7 | 15 | 15 | 20 | 15 |
| **Van** | 7 | 15 | 20 | 60 | 20 |

| | |
|---|---|
| Efficiency | 75% |
| DW | 4 |
| MOT | Car |

Figure 6.10: Data used for the simulation

## Method

The main principle that has been considered when designing the method to simulate the costs is that it should be flexible in order to accommodate for changes in the assumptions or data utilised, or so that it can be modified based on the needs. This could come, for example, from a client that usually delivers bigger packages that what has been considered therefore influencing the capacity of the vehicle. Or by the business deciding to offer a shorter delivery window.

In order to simulate the performance, the same software that is used for H&M same-day deliveries is utilised, Optimoroute. This software allows to input several different variables, similar to the one identified in this project, in order to optimise the routes. Another reason this software has been chosen for the simulation is that it is going to be used during the operational tasks, to optimise the actual routes. This ensures consistency between the designing phase and reality.

Optimoroute takes as input the deliveries details, such as drop and pickup address, contact name, package size, the vehicles detail such as capacity and speed and some global variables such as the time at drop and pickup. The output is then generated and consists of the route details such as the distance and time between each delivery, and the driver assigned. In this way, Optimoroute can estimate exactly how much courier time is needed in order to perform the deliveries uploaded as input. One of the main issues of utilising Optimoroute time in order to evaluate the costs is that it cannot be adjusted if, for example, the assumed time at drop is proven wrong. If this happens, the whole simulation would need to re-run in order to take into account the new value.

Since a more generic model needs to be developed, the most granular value that is output from Optimoroute is going to be used. This is the average distance between drops and is independent by the capacity of the transport type, by speed and by times spend on non-driving tasks (time at drop and pickup). It is important to highlight that the average distance between drops is also dependent on the route, making it impossible to generate a random amount of drops in an area and then take the average distance between them. In order to simulate the average distance between drops, the routes should be simulated.

As seen previously, in order to calculate the costs, the average distance between drops needs to be calculated for each cell of the volume/radius matrix. Since the route optimisation does not find an optimal solution but just a possible one that is satisfactory, few simulations are going to be performed and the results averaged. The amount of simulations for each cell of the matrix has been set to 5 in order to smoothen the values but limit the number of simulation hours needed.

In Figure 6.11 the process used for the simulation is shown which has been mainly done in python. The reason why python has been chosen as a programming language is that developers at Quiqup had already built a library to interface with OptimoRoute through API.

The script takes as an input the different values of the matrix and iterates between them to find the average distance between drops. For each cell of the matrix, the script generates a random amount of drops based on the radius and the number of drops. The pickup point of the map has been chosen in the centre of London for simplicity.

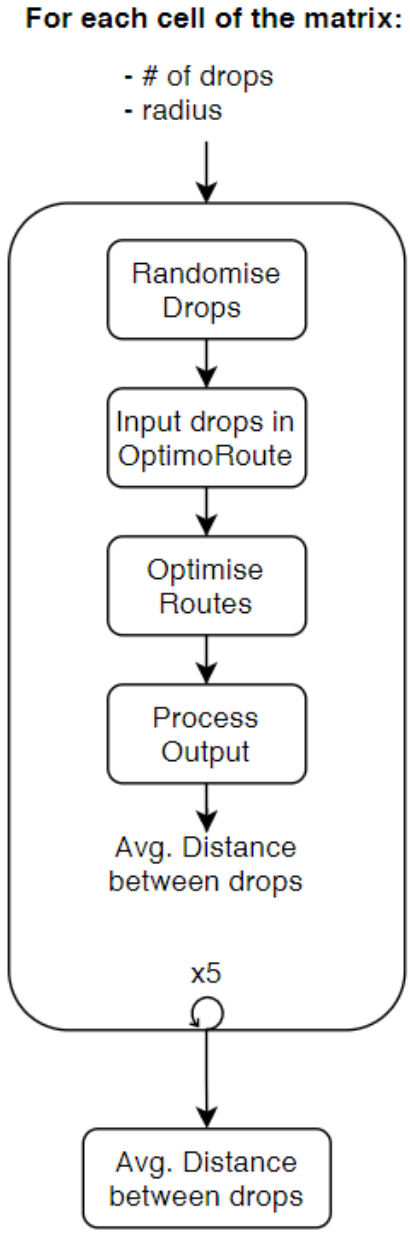



Figure 6.11: Conceptualisation of the python script used to evaluate the average distance between drops

The random drops generated are defined by a latitude and longitude and are processed in order to be formatted for OptimoRoute. The drops are then inputted via API on OptimoRoute server and the routes optimised. The output is then captured and then processed in order to extract the average distance between the drops of the different routes.

This process is then repeated for other 4 times and at the end, the cell of the matrix is filled with the average value of the averaged distance between drops of the 5 simulations.

One of the limitations of this method is that by randomly generating the number of drops in an area, it does not consider the population density variation throughout the different areas. An area more densely populated would probably have a higher demand density as well.

Another limitation is given by Optimoroute that does not consider the “apartment block effect” which decreases the amount spent at each drop. This effect happens when multiple deliveries are done in the same building which can happen for example in residential zones with skyscrapers. In these cases, a courier could deliver multiple parcels in a short amount of time by not having to drive nor search for parking. OptimoRoute in cases when a parcel needs to be delivered in the exact same building as another considers the time at drop to be double.

Figure 6.12 shows how the costs are calculated from the average distance between drops found by the script.

Firstly, delivering time is calculated. From the average distance between drops, the volume and the speed of the vehicles, the driving time is calculated. Depending on home many drops needs to be done, the time at drop is then added, resulting in the delivering time. This figure represents the total time that is going to be spent by courier delivering items.

The next step is to calculate the non-delivering time, which is composed of time to and at pickup. Since this variable is dependent on the number of couriers used to fulfil the deliveries, the number of drivers needed is calculated from capacity and delivery window constraints.

The delivery window constraint calculates the number of drivers needed in order to fulfil the deliveries inside the window. To do so, the total delivering time is divided by the length of the delivery window. For example, if the total delivering time is 7 hours and the delivery window is 4 hours, the number of couriers needed is 2. This calculation takes also into account that if a driver finishes before the delivery window, it can go back at the depot and fulfil other deliveries. For this, time to pick up and at pickup is subtracted to the delivery window length. This represents a simplification as it assumes that all the drivers employed would need to drive for the same amount of time.

The capacity constraint instead, is simply calculated as the volume to deliver divided by the capacity of the vehicle. The maximum number between the two constraints is then selected.

From the sum of delivering time and non-delivering time, the cost can be calculated by multiplying the total time by the hourly wage.

Lastly, the gross margin can be calculated by subtracting the costs from the revenues.

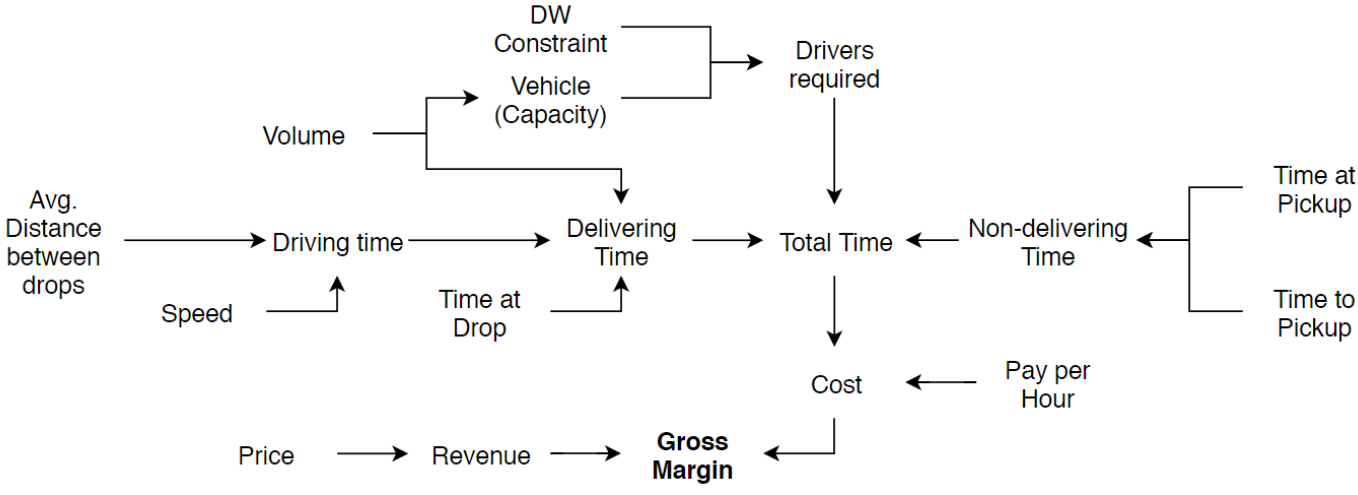



Figure 6.12: Rapresentation of how the variables are used to calculate the gross margin

### Results

In Figure 6.13 the average gross margin per drop per volume and delivery area is shown. As can be seen, the simulation returns a negative value for lower volumes, even in small areas. These results are going to be considered valid for each scenario because it is assumed that the value assumed for the variables do not change between the different scenario. Even though some variables might change, such as the speed of the vehicle or time at drop that could be faster in an area with lower urban density, it has been impossible to quantify what would have been the new value. If it is found that the values assumed are in reality different, the new correct values can be easily inputted in the model developed.

## 6.5.3. Revenues

In order to compare the different scenarios, the revenues that could be achieved with the different options should be compared against each other. In order to do so, an estimation from the Sales Team about the client that could be onboarded and their forecasted volume should be collected. It has been however impossible to gather the necessary data as the Sales Team has been to busy and could not make any reliable estimations without gathering data.

For this reason, no estimation of the revenues is going to be made. Since this data is missing, is not possible to make an estimation on the profit flow of the proposition during the years following the implementation. Nevertheless, it is important to highlight that volume fluctuations would highly impact the profitability of the proposition. In Figure 6.14 the estimated yearly revenues from deliveries of a radius of 12km (Central London) is shown based on the daily delivery volume. As can be seen, thre is a significant difference between the different cases, with 30 deliveries daily representing the breakeven scenario. Similar is done in Figure 6.15 where a bigger area with 18km radius is shown.

| Gross Margin per Delivery | | | | | | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Radius / Drops | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 | 11 | 12 | 13 | 14 | 15 | 16 | 17 | 18 |
| 5 | -2.88 | -2.72 | -3.92 | -4.38 | -9.30 | -9.39 | -9.17 | -10.98 | -14.15 | -16.84 | -23.31 | -27.92 | -35.79 | -43.79 | -55.61 | -69.63 | -86.30 | -108.15 |
| 10 | -0.48 | -0.07 | -2.16 | -1.82 | -3.98 | -4.02 | -6.46 | -5.47 | -7.62 | -10.19 | -13.30 | -17.28 | -22.20 | -27.84 | -36.83 | -46.44 | -59.01 | -73.92 |
| 15 | -0.22 | 0.19 | -0.39 | -0.72 | -1.45 | -3.39 | -4.67 | -4.94 | -6.28 | -8.31 | -11.84 | -14.53 | -19.43 | -25.31 | -32.44 | -41.77 | -53.59 | -67.60 |
| 20 | 0.63 | 0.89 | 1.11 | -0.08 | -0.93 | -1.09 | -2.00 | -2.80 | -3.67 | -3.81 | -6.72 | -9.07 | -12.12 | -17.12 | -22.63 | -29.87 | -39.07 | -50.04 |
| 25 | 1.43 | 1.71 | 1.22 | 1.60 | 0.82 | 1.07 | 0.68 | 0.94 | -0.38 | -1.63 | -2.06 | -2.97 | -4.82 | -7.90 | -12.12 | -17.25 | -23.45 | -31.36 |
| 30 | 2.06 | 2.42 | 2.12 | 2.37 | 1.96 | 2.21 | 2.07 | 2.71 | 1.89 | 1.94 | -0.04 | 0.14 | -0.62 | -2.88 | -5.74 | -9.65 | -14.42 | -20.57 |
| 35 | 2.37 | 2.49 | 2.62 | 2.91 | 2.36 | 2.65 | 2.88 | 3.63 | 2.96 | 3.01 | 2.08 | 0.62 | 1.07 | -0.35 | -3.03 | -6.33 | -10.38 | -15.64 |
| 40 | 2.61 | 2.95 | 3.01 | 3.33 | 2.63 | 3.01 | 3.51 | 3.92 | 3.86 | 4.09 | 3.12 | 2.71 | 2.54 | 1.86 | -0.62 | -3.44 | -6.94 | -11.50 |
| 45 | 2.58 | 3.19 | 3.48 | 3.67 | 3.08 | 3.52 | 4.01 | 4.55 | 4.58 | 4.88 | 4.15 | 3.95 | 2.93 | 2.60 | 1.31 | -1.12 | -4.39 | -8.16 |
| 50 | 2.76 | 3.38 | 3.72 | 3.75 | 3.44 | 3.94 | 3.98 | 5.06 | 4.79 | 5.60 | 4.99 | 5.00 | 4.67 | 3.97 | 2.92 | 0.58 | -2.09 | -5.63 |
| 60 | 2.98 | 3.48 | 3.86 | 4.30 | 3.90 | 4.29 | 4.58 | 5.56 | 5.60 | 6.15 | 5.84 | 6.11 | 6.03 | 4.39 | 4.16 | 3.25 | 0.64 | -2.31 |
| 70 | 3.00 | 3.70 | 4.11 | 4.57 | 4.25 | 4.70 | 4.90 | 5.84 | 6.07 | 6.73 | 6.68 | 7.03 | 7.09 | 6.32 | 4.42 | 4.13 | 2.71 | 0.20 |
| 80 | 3.15 | 3.86 | 4.30 | 4.66 | 4.52 | 5.02 | 5.27 | 6.15 | 6.30 | 7.31 | 7.02 | 7.68 | 8.02 | 7.33 | 6.30 | 5.51 | 4.56 | 2.16 |
| 90 | 3.15 | 3.89 | 4.34 | 4.84 | 4.73 | 5.31 | 5.46 | 6.50 | 6.60 | 7.67 | 7.46 | 8.20 | 8.58 | 8.10 | 7.25 | 5.44 | 5.19 | 3.72 |
| 100 | 3.25 | 4.00 | 4.47 | 4.89 | 4.79 | 5.52 | 5.71 | 6.69 | 6.94 | 8.05 | 7.92 | 8.53 | 9.09 | 8.83 | 8.12 | 6.42 | 6.26 | 5.22 |
| 150 | 3.30 | 4.14 | 4.62 | 5.19 | 5.12 | 5.90 | 6.43 | 7.37 | 7.65 | 8.66 | 8.59 | 9.74 | 10.35 | 10.41 | 10.16 | 9.54 | 8.52 | 7.73 |
| 200 | 3.39 | 4.27 | 4.76 | 5.36 | 5.31 | 6.12 | 6.73 | 7.92 | 8.11 | 9.16 | 9.27 | 10.44 | 11.21 | 11.18 | 11.25 | 10.90 | 10.20 | 8.63 |
| 250 | 3.41 | 4.32 | 4.81 | 5.43 | 5.39 | 6.22 | 6.89 | 8.16 | 8.37 | 9.54 | 9.68 | 10.63 | 11.77 | 11.88 | 12.02 | 11.78 | 11.39 | 10.56 |
| 300 | 3.45 | 4.39 | 4.88 | 5.52 | 5.48 | 6.33 | 7.04 | 8.30 | 8.78 | 9.77 | 10.00 | 10.98 | 11.89 | 12.37 | 12.39 | 12.48 | 12.21 | 11.60 |

Figure 6.13: Matrix with the results of the simulation

## 6.5.4. Summary

Thanks to the analysis made in the different areas it has been possible to identify what are the processes needed and the impacts of the solution at Quiqup.

In terms of gross margin, no significant difference has been found between the different scenarios, mainly due to a missing sales forecast. The gross margin, in fact, is bounded to a minimum amount of orders submitted per client., without an estimation of this, it is impossible to evaluate profitability differences. It is the opinion of the Sales Team thought that expanding the delivery area to M25 would increase the chances of reaching the minimum volume needed to guarantee a positive gross margin. It should also be considered that expanding to M25 would require a dedicated fleet which is more costly to source and maintains.

Moreover, it has been impossible to develop a model that could quantify the value of having delivery windows non-overlapping with the demand peak. It is the opinion of the Operations Manager that benefits would certainly be gained but very difficult to quantify due to the uncertainty of the assumptions. For this reason, they have not been included in the economic evaluation.

In terms of quality of service, due to the conservative assumptions made, it is estimated that most of the parcels would be delivered within the delivery windows. The main difference between the scenarios would arise if a dedicated fleet is chosen, mainly because just selected and trained drivers would be available to perform same-day deliveries. Moreover, in this case, it would be assured that enough drivers are always available to fulfil the demand.

Based on implementation complexity and time, scenario 3 is the one that would require less operational work and just 3 weeks to be implemented. The other two scenarios would instead require four weeks.

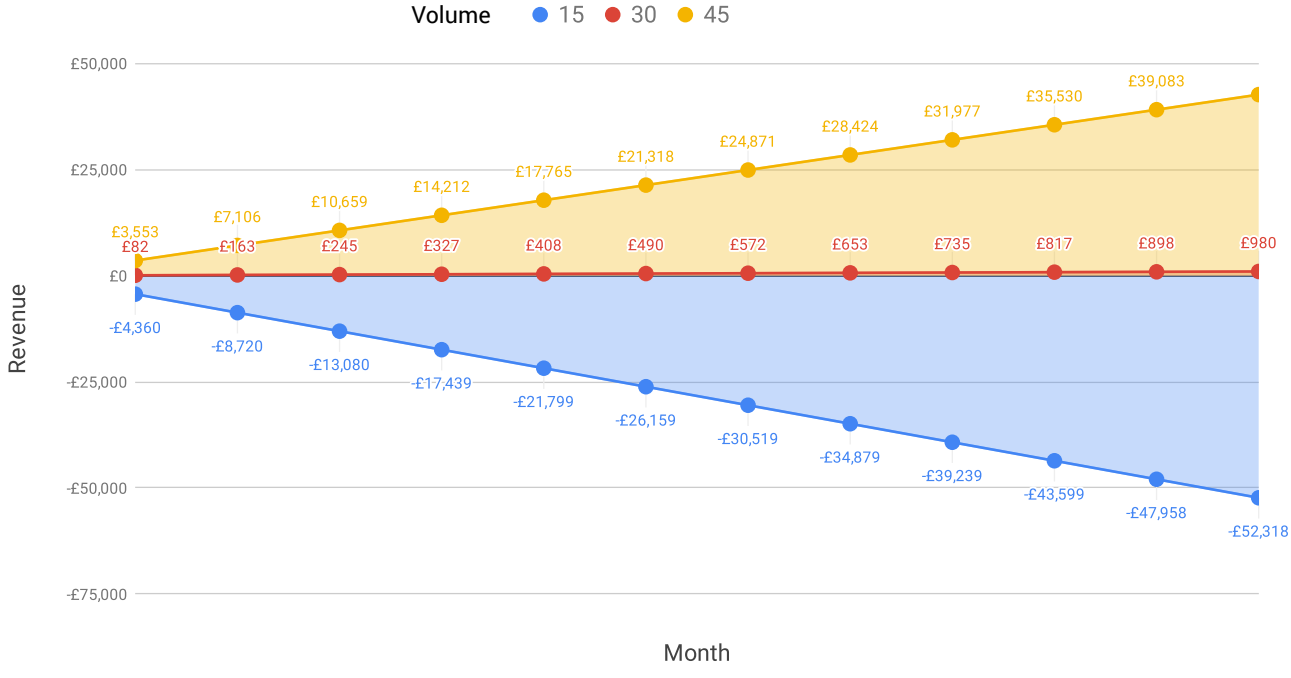



Figure 6.14: Graph showing the predicted revenues over the months based on the daily volume. Delvery radius of 12Km.

## 6.6. Conclusion

From the evaluations of the costs and the time to implement the solution but mostly due to the high uncertainty of the assumptions, it has been decided to run a test of the proposition for a short amount of time. This test would serve the purpose to collect data and feedback from customers before committing to developing a new proposition. Since the test should run the minimum viable product, scenario 3 is chosen as is the most simple and easy to implement. For the test purpose, all the tasks identified in the operational section are assigned to the different responsibles. Since initially, just a few clients are onboarded, only a selected group of couriers is going to be trained for same-day deliveries.

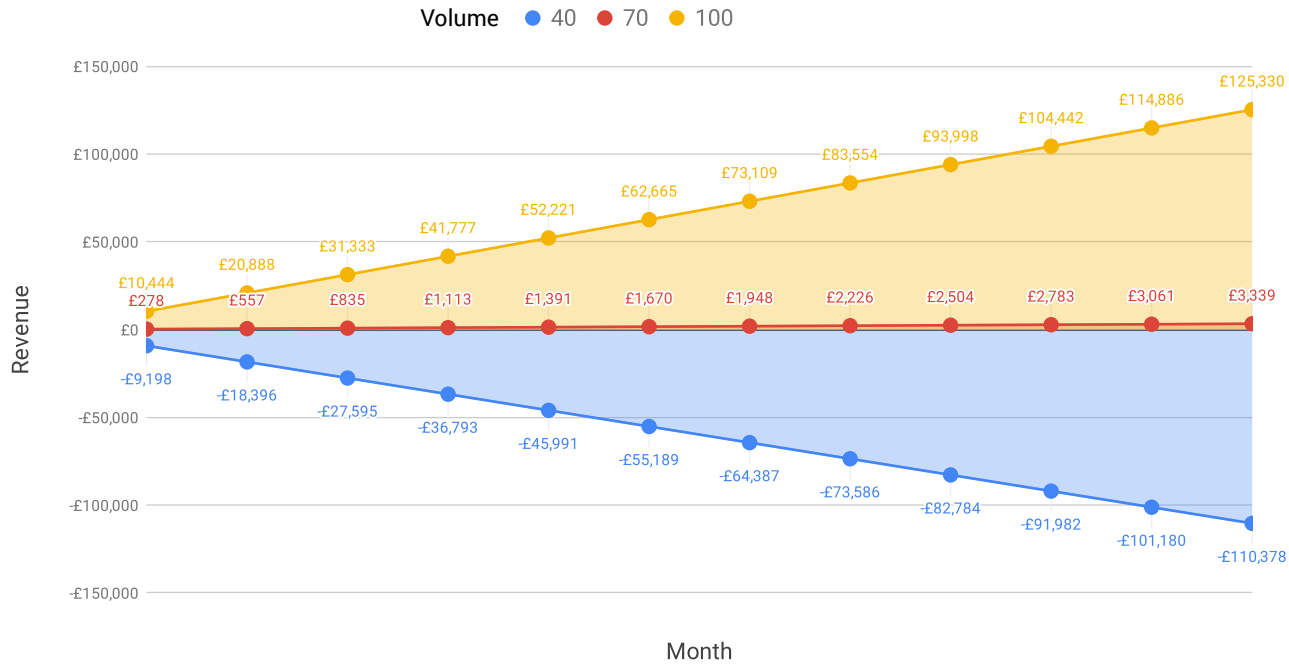



Figure 6.15: Graph showing the predicted revenues over the months based on the daily volume. Delvery radius of 18Km.

# Chapter 7
# **Project Test**

The purpose of this chapter is to present the results of the test phase. Firstly, the description of how the test phase has been conducted is presented, followed by the feedback collected from the different stakeholders. A performance review is then made and lastly, learnings and next steps are presented.

As explained in the chapter before, it is decided to run a test of the same-day proposition in order to validate the assumptions and better understand the costs related. To do so, the scenario with less complexity and faster implementation is chosen.

The duration of the test phase has been set to three months in which few clients are going to be onboarded to use the new same-day proposition. For this reason, the Sales Team has the target to successfully onboard eight clients during the test phase.

## 7.1. Timeline

Initially, the different tasks have been assigned to the different teams according to the plan explained in the scheduling section. Since the sales team already found a client that was willing to use Quiqup as a provider for its same-day deliveries, as soon as all the tasks have been completed the new proposition have been implemented. Soon after another client have been onboarded on the same-day proposition.

Together with the Fleet Team, it has been decided to onboard just the minimum amount of drivers needed for the same-day deliveries and to assign to them a same-day tag to ensure they were the only drivers considered for the same-day missions. Moreover, in this way, customer support could monitor them better and ensure the correct fulfilment of the deliveries.

Since, as explained in the introduction, the company decided to shut down operations in London, the test phase has been halted after a month.

## 7.2. Challenges

While running the test few challenges arose. These are divided into each area of relevance:

### 7.2.1. Sales

Firstly, the clients onboarded promised to give an initial volume of 10 deliveries per delivery window that would slowly increase over the months. This had been proven to be wrong as the clients submitted 3 / 8 orders per day, mainly blaming seasonal trend and issues with their delivery system. Figure 7.1 shows the number of drops for each same-day mission received. As can be seen, the demand has been lower than forecasted and very erratic.

Another issue from the client side is that the delivery windows chosen did not match with their operations. One client, a cake shop, wanted to fulfil deliveries in the morning delivery window but failed to prepare the orders before 9:30 am because the shop opened at 8:30 and needed some time before the cakes were ready.

The second client, a flower shop, had a similar issue as their in-house delivery window did not match with Quiqup's ones and therefore, new times were adapted for the client as the sales team sold already the proposition. This complicated operations even more as different cutoff times were then in place, duplicating the workload.

A general issue of both clients onboarded is that they had clients outside the operating area and, therefore, they were not willing to use Quiqup as a provider. Due to the urge to test the proposition, the clients were acquired anyway with the promise to deliver also outside the operating area. This, together with the low volume, determined a very low demand density and therefore high operational costs.

Lastly, another issue encountered was regarding failed deliveries, as some shops closed after the end of the evening delivery window, making impossible for the driver to go back to return the parcel.

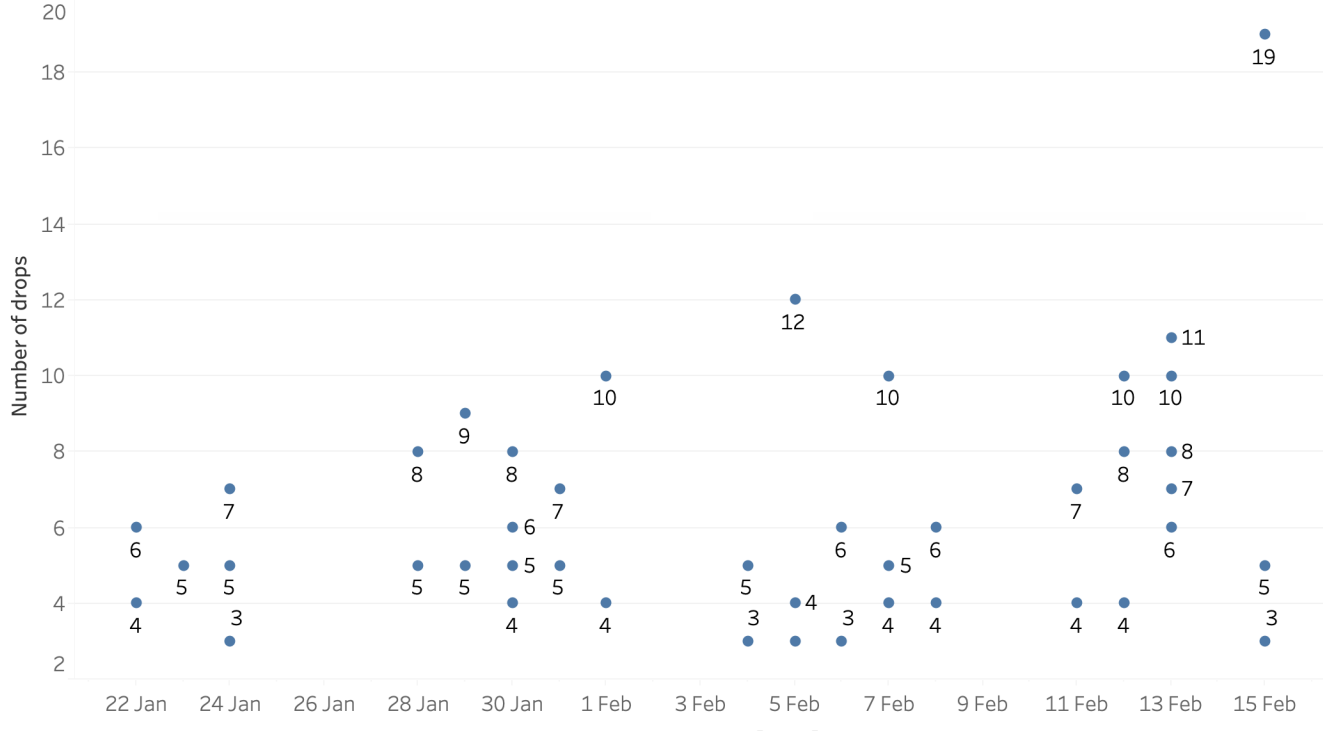



Figure 7.1: Graph showing the number of deliveries done for each mission throughout the month

## 7.2.2. Operations

From the operations side, it has been reported that the process is quite time-consuming as the orders need to be processed and double checked for each step. This is because there is no automated tool to error-check the output and needs to be done manually in order to ensure that the routes are defined properly and each drop scheduled. Moreover, since the clients had to deliver outside the operating area, the postcodes in which the clients need to deliver parcel need to be whitelisted in the system. Since there is no automated way to do it automatically, every single postcode in which the client is going to deliver need to be processed, leading to a large amount of time spent on the task.

Another issue that arose from the missions completed is related to the delivery window constraint. It happened in a few cases that traffic and parking difficulties led to underestimate the time spent on missions. This caused some deliveries to be performed outside of the window.

For example, one of the mission consisted of 8 drops as shown in Figure 7.2 where two drops (the ones on the right of the map) outside of the operating area. This mission was supposed to take approximately three hours (one and a half from driving, as shown in the map, and another hour and a half loading, searching for parking and delivering the parcels). Since most of the drops were located in Canary Wharf an area where parking is extremely difficult, and because the deliveries took place in the evening during peak hours, the mission actually took four hours and a half, with the last two parcels delivered outside of the four hours delivery window.

Lastly, another process that had been proven to be time-consuming is the pricing for the clients that since it is depended on the delivery radius, needs to be set for each order. Even though a dashboard has been created in order to facilitate the process, it still remains quite manual and prone to error. A solution where the interface is fully developed should address this issue as the pricing would be applied automatically by the system.

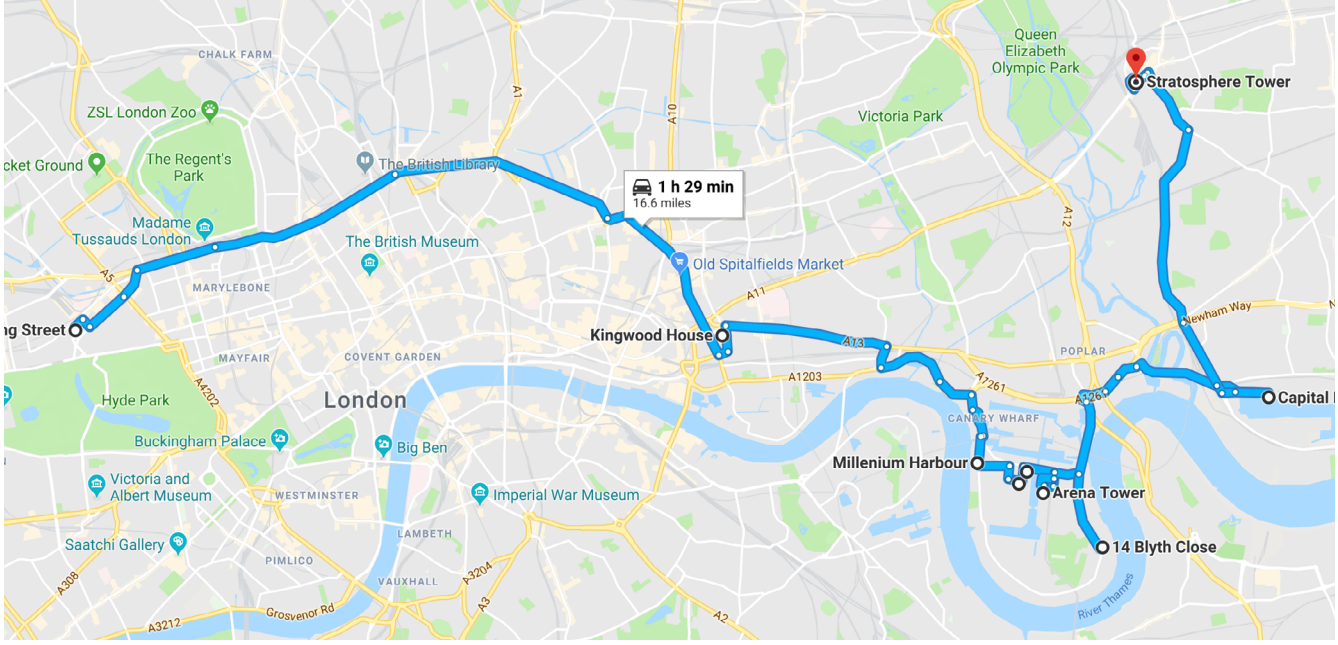


Figure 7.2: Map of a route completed the 30/01/2019

### 7.2.3. Fleet

The drops outside of the operating area caused some issues also for the Fleet Team that had to manage couriers complaining about the long distances. This happened especially because if the drops are outside of the operating area, is it most likely that the last delivery would be outside as well, meaning that the courier would need to drive back to the operating area in order to be able to fulfil instant deliveries.

To solve this problem, each route with the last drop outside the operating area has been adjusted in order to set the last delivery to be near central London as can be seen inFigure 7.3.

In Figure 7.4 is shown another example of a route with very low density, just two drops with a radius of 18 Km for which a driver would be busy at least two hours and a half (taking into account time to and at pickup and time at drops).

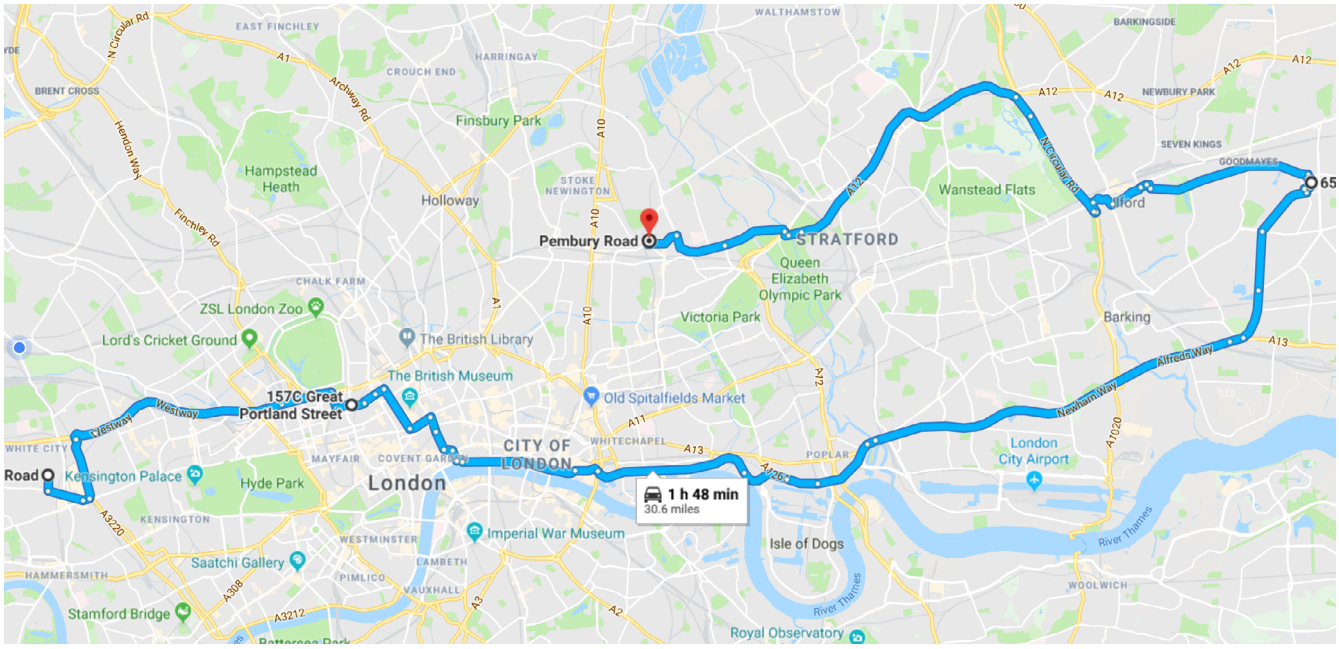



Figure 7.3: Map of a route completed the 7/02/2019

## 7.3. Results

### Premise

As the test period lasted for a shorter amount than expected and with a lower volume than forecasted, not enough data has been collected in order to make a proper analysis and evaluate the performance. Moreover, since the new same-day proposition involved missions with more than the usual 1/2 drops, it created some difficulties for the system for capturing data. Figure 7.5 shows an extract of data that has been collected during the test. As can be seen, most of the different time values are missing due to inconsistent timestamp collection.

### 7.3.1. Performance evaluation

Even though data is incomplete and not enough data has been captured during the project, a rough evaluation of the performance achieved is done. From the variables identified during the project solution, it has been possible to evaluate just time to/at pickup and to/at drop. Figure 7.6 shows a comparison between what has been assumed and the actual value recorded during the test phase. As can be seen, marginal differences have been recorded, with the highest one being time to pickup. The reason for this is that drivers allocated for same-day deliveries have been pulled away from the pickup location by other instant deliveries resulting in a higher time to go back.
It has been impossible to compare the average time to drop as it is highly dependant on the number of drops delivered. To have a meaningful comparison, each different estimation made by the radius/volume matrix developed should have been compared to the actual one. This would have not provided conclusive answers as not only too little data for each volume/radius case have been collected but also because, as seen previously, some data have not been captured.
Due to the explained issue related to data collection, it has not been possible to extract other meaningful information in order to evaluate the other assumptions

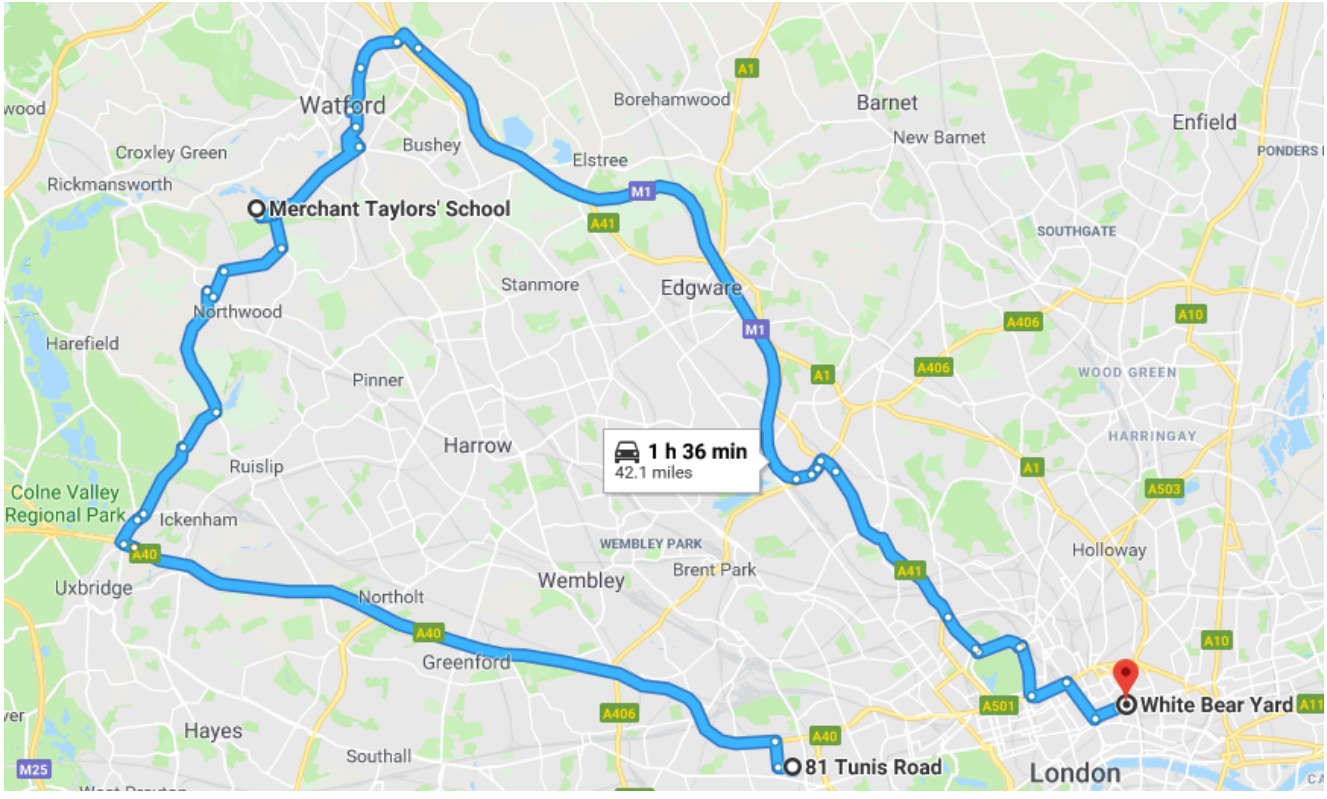



Figure 7.4: Map of a route completed the 5/02/2019

| | Actual | Assumed |
|---|---|---|
| Avg. Time to Pickup | 19.47 | 15 |
| Avg. Time at Pickup | 14.19 | 15 |
| Avg. Time to Drop | 14.72 | - |
| Avg. Time at Drop | 8.81 | 7 |

Figure 7.6: Table showing the performance achieved in reality compared to the assumed ones

| Mission ID | Waypoint Id | Waypoint Type | Time At Waypoi.. | Time To Waypoi.. |
|---|---|---|---|---|
| 3443661 | 2769971 | Pickup | 25.2 | 8.2 |
| | 2769972 | Dropoff | | |
| | 2770615 | Dropoff | 17.7 | 56.5 |
| | 2770630 | Dropoff | 10.2 | 16.1 |
| 3445296 | 2771300 | Pickup | 9.6 | 25.6 |
| | 2771301 | Dropoff | | |
| | 2771319 | Dropoff | | |
| | 2771489 | Dropoff | | |
| | 2771497 | Dropoff | | |
| | 2771546 | Dropoff | | |
| | 2771659 | Dropoff | 5.5 | 77.2 |
| | 2771672 | Dropoff | | |
| | 2771703 | Dropoff | | |
| | 2771714 | Dropoff | 4.1 | 1.8 |
| | 2771725 | Dropoff | 7.6 | 9.3 |
| | 2771768 | Dropoff | 5.3 | 14.0 |
| | 2771821 | Dropoff | 1.3 | 2.9 |
| 3445799 | 2772004 | Pickup | 1.9 | 0.2 |
| | 2772005 | Dropoff | | |
| | 2772017 | Dropoff | 7.8 | 14.4 |
| | 2772028 | Dropoff | 1.1 | 14.3 |
| 3447826 | 2773465 | Dropoff | | |
| | 2773466 | Pickup | 20.8 | 17.6 |
| | 2773472 | Dropoff | | |
| | 2773479 | Dropoff | | |
| | 2773485 | Dropoff | | |
| | 2773496 | Dropoff | | |
| | 2773498 | Dropoff | | |
| | 2773499 | Dropoff | 6.2 | 119.4 |
| | 2773503 | Dropoff | 7.1 | 10.7 |
| | 2773509 | Dropoff | | |
| | 2773516 | Dropoff | 5.0 | 7.9 |
| | 2773523 | Dropoff | 3.1 | 6.4 |

Figure 7.5: Table showing the detail of each delivery. Most of the values are null due to issues with data collections

## 7.3.2. Feedback from stakeholders

As mentioned earlier in the section, the test ran for a short amount of time. However, feedback from the different people involved has been collected.

Even though clients preferred the same-day deliveries as a cheaper option of instant deliveries, they complained about the lack of flexibility in choosing the delivery windows times. Even though fixed times for delivery windows are common in the same-day market, smaller independent clients prefer to have more flexibility. Other competitors of Quiqup for this reason, decided to offer a 4h guaranteed delivery time. In this case, the company has 4 hours from when the order is placed to deliver the parcels. This could still be a possible solution to address the underutilisation of the fleet as peaks in demand can be smoothened by postponing same-day deliveries for less busy hours.

For the reason mentioned above and because of the restriction to Central London, Sales have had difficulties in selling the same-day proposition to clients. For this reason, the Sales team have been allowed to sell deliveries even outside of Central London, generating other issues.

Couriers reacted strongly against the longer distances outside of Central London, and customer support sometimes struggled to find a driver to complete the deliveries. Occasionally bonuses had to be given in order to convince drivers to accept the missions.

As mentioned in the challenges, without a full product solution developed, the current process cannot be scaled up unless more resources are allocated.

### 7.3.3. Learnings & Next Steps

Thanks to the test phase, it has been realised that a fully developed solution was necessary as the workload and chances of errors were too high with a manual solution.

Moreover, it has been noted that a silos culture was developing at Quiqup with different departments not collaborating enough with each other and taking decisions without informing/consulting other teams. This happened to be clear when clients for same-day deliveries that requested parcels to be delivered outside the operating area have been onboarded without informing the Operations Team.

It has also been noted that smaller clients would prefer more flexibility in terms of delivery windows, and therefore a new proposition was going to be evaluated. In this new proposition, the delivery window would still be of 4 hours, but instead of having a fixed one, the start of the delivery window would coincide from the moment the order has been requested. In this case, though, a full solution should be developed as it is impossible that employee at Quiqup could manually optimise the deliveries. Figure 7.7 shows an exemplification on how the proposition would work. Quiqup would have 4 hours to deliver the order from when it has been scheduled, but until the end of the delivery window, other orders could be fulfilled first, based on what is the most optimal sequence in order to decrease the inefficiencies. This would be a different proposition from the ones currently offered by Quiqup and would, therefore, require substantial development.

Since Quiqup decided to shut down operations, everything has been halted apart from the H&M same-day proposition which still runs in London. It is the plan of Quiqup, in fact, to continue serving the clothing-retail company and possibly expand to other similar companies. It has been noted though, that other competitors of Quiqup have been investigating the feasibility of a same-day proposition as part of a manoeuvre to increase the profitability of instant deliveries providers.

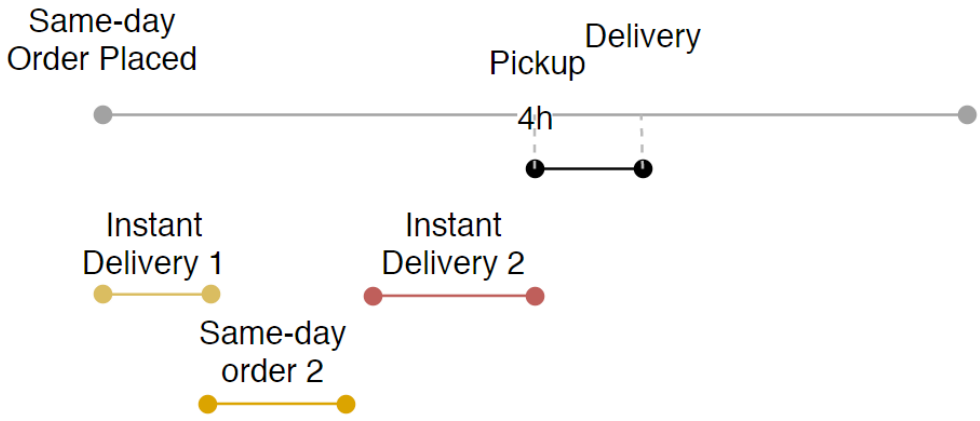



Figure 7.7: Concept of the dynamic 4 hours delivery window

# Chapter 8
# **Conclusion**

In this chapter, the conclusion to the project is presented. The conclusion concludes upon the overall objective of the project:

Assess the feasibility of a same-day proposition

In order to evaluate the feasibility of a same-day proposition and how to enable them at Quiqup, scenario planning has been used. To do so, the main objectives of the solution have been identified, develop a solution with a positive gross margin, which could provide good quality of service and easily implementable. From these objectives, the main variables that influenced them have been examined and three main scenarios were chosen. These three scenarios have been evaluated against each other in relation to the objectives identified.

During the analysis has been found that the solution is technically feasible but in order to provide the best experience and scalability, development is needed.

Operationally the new proposition would not require a huge transformation of the current operational setup, as the new tasks introduce would blend with the existing ones. Little preparation is needed, especially in creating the training material to instruct the employee on the new procedures.

In terms of time, the new proposition could be implemented in three to four weeks if no development is chosen, whereas a scenario where the solution is fully developed would demand at least six weeks.

Even though it has not been possible to evaluate the profitability of the same-day proposition on a time horizon due to missing forecasted sales data, it has been possible to assess the boundaries of profitability of the solution. Since it has not been possible to identify major economic changes between the scenarios identified, mainly due to missing volume estimation, the only objectives used to evaluate them was the implementation complexity and quality of service. Due to the uncertainty of the assumptions taken and of the clients' response to a same-day proposition, it has been decided to run a test with the less complex scenario. This test represented a minimum viable product for a same-day proposition and had been run with selected clients during a limited period of time. Thanks to this, it has been possible to collect feedback on how to improve the proposition and on the actual performance achieved.

Quiqup's decision to shut down operations in London though, highly impacted the outcome of the project, making it impossible to provide a conclusive evaluation of the assumptions taken. Regardless of this, the procedure adopted and the model developed to assess the feasibility of the same-day proposition have been positively addressed by the company.

Moreover, it has been concluded that the same-day proposition could solve the profitability issue bounded to the instant delivery demand.

# Chapter 9
# Discussion

This project thesis took place mainly at Quiqup in the period from January 2019 until March 2019, as part of a bigger internship that lasted almost nine months.

One of the main issues that have influenced the outcome of the project is certainly bounded to the decision of Quiqup to shut down its operations in London at the end of February 2019. Even though Quiqup is still highly interested in the topic of same-day deliveries, it has not been possible to continue with the test phase of the project and therefore provide a meaningful and conclusive analysis.

Furthermore, other issues have been identified which are related to how leadership have dealt with the project.

In general, this has been a top-down initiative pushed by leadership in an attempt to convince investors to invest in the unprofitable London market. The same-day proposition has been presented to the company as a decision on how to structure it had already been taken. This created some confusion between the employees as in reality nothing had been thought through nor decided. The initial stages of the implementation of same-day deliveries had been driven by a lack of communication and collaboration as the Operation Team thought that the solution to implement was the one presented during the town hall. It was after a meeting with a Sales Team, where the member did not have any idea about the same-day proposition, that it became apparent that a project was needed, the one summarised in this report. This resulted in a lack of initial collaboration and communication which had a negative impact on the project as the Sales Team, for example, felt cut out from the project and acted negatively against the ideas of the Operations Team. This improved after a workshop between the different departments had been held in order to discuss the same-day proposition. The workshop not only helped to collect ideas and feedback but also helped improve the commitment from the different people involved with the change as they felt included in the project.

Another factor that had influenced the project negatively is embedded in Quiqup's start-up culture of quickly implementing changes with, sometimes, little planning. This meant that the same-day project received some push from leadership in developing a solution as fast as possible. This has also been worsened by the fact that Quiqup needed to prove its profitability to investors.

This is just an example of how Quiqup sometimes failed to address the people variable when managing the company. A change for example, even if small, needs to be properly communicated to the employees in order to prepare them and settle a good foundation for the change.

Regardless of these remarks, the project ran successfully and even though the test phase was not conducted as planned, it still gave some opportunities to collect feedback and learn from the mistakes done. Moreover, insight had been collected about the logistics sector and how same-day deliveries can enhance big companies supply chains.

Same-day delivery is a sector which is expected to have a huge role in the logistic future. Not only Quiqup but also big logicists players are interested in this such as GeoPoste and Rico Logistics. The main reason is that a significant number of companies are not only interested in offering their client an affordable same-day proposition but also to use their infrastructure assets of shops in a more efficient way.

Birck and mortar businesses with also an online presence such as H&M or Nike could use their stores located in urban dense areas as local warehouses from which fulfil same-day demand with a cut-off significantly closer to the beginning of the delivery window. Currently, in fact, most of the demand is fulfilled from warehouses located far from the urban areas. H&M, for example, uses a warehouse that is located 4 hours away from London, whereas Nike uses a warehouse that is in Belgium, almost 15 hours away from London.
Moreover, a same-day proposition could be used by businesses to move stock from one store to another, without having to wait for a delivery from the main warehouse.

In both use cases, not only the end customers would benefit from a better experience, but also the businesses would gain economic benefit.
The main challenge that is currently halting these companies to harvest these benefits is not just bounded to logistics provider to implement a profitable same-day offering. Digitalisation, in fact, is one of the main ones. Real-time inventories with a strong data infrastructure to keep the network of store synchronised are essential in order to enable stores to become warehouses.

# Chapter 10
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# Chapter 11
# Appendix

## Appendix A. Contingency Plan

### Issue

No procedure is in place for how to cope with disruption in alignment between demand and supply, and measures are used in an uncontrolled way resulting in a chaotic process.

The proposal is to create a contingency plan on how and when to react to disruptions. The first step is to determine what are the disruptions and evaluate their gravity and then check what are the measures that can be used and act. This process is focused on Car shifts in the morning.

**Data - Used to evaluate how many slots we need**

Supply
- Projected Picked slots (WoW slot comparison)
- Drop rate trend

Demand
- Volume Fluctuation from new/existing clients

**Phases**

Step 1. Check the projected picked slots and compare to the one we need.

Slots needed are calculated based on the slots that usually are picked (assuming no volume fluctuations).

If special events (e.g. volume increase form CP) then evaluate how many more slots are needed

If slots needed are more than the projected picked, then need to evaluate as well in which location they are needed. (From unpicked slots location)

Check the drop rate trend, if it is increasing we might need to call drivers to confirm attendance (if tight on projected picked slots)

Step 2. Check Contingency Matrix

Utilise the Contingency Matrix to check the lead time (time between the check day to the day the of the slot), and assess measure to use (or not)

Step 3. Monitor

Check the number of hours added after release, either after having extended or added slots

Step 4. Learnings

Reevaluate the process in order to improve it and make it more effective.

| Today | Thursday |
|---|---|

**Check Lead time**

| | Friday | Saturday | Sunday | Monday | Tuesday | Wednesday | Thursday | Friday | Saturday | Sunday |
|---|---|---|---|---|---|---|---|---|---|---|
| | Check | | | 3 | 4 | 5 | 6 | 7 | 8 | 9 |
| | | Check | | 2 | 3 | 4 | 5 | 6 | 7 | 8 |
| | | | Check | 1 | 2 | 3 | 4 | 5 | 6 | 7 |
| | | | | Check | 1 | 2 | 3 | 4 | 5 | 6 |
| | | | | | Check | 1 | 2 | 3 | 4 | 5 |
| | | | | | | Check | 1 | 2 | 3 | 4 |
| | | | | | | | Check | 1 | 2 | 3 |

**Check Initiatives**

| | | *Lead Time* | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|
| | | **9** | **8** | **7** | **6** | **5** | **4** | **3** | **2** | **1** | **0** |
| *Slots needed* | **3-5** | | | | | | | a. b. | | f. | |
| | **5-10** | | | | | | a. b. | a. b. | c. | f. | d2. |
| | **10-15** | | | | a. b. | a. b. c. | a. b. c. | a. b. c. | a. b. c. | f. d1. | d3. |
| | **15-25** | | | a. b. | a. b. | a. b. c. | a. b. c. | a. b. c. | a. b. c. | f. d1. | d4. |
| | **25+** | | | a. b. e. | a. b. e. | a. b. c. e. | a. b. c. | a. b. c. | a. b. c. | f. d1. | d5. |

Figure 11.8: Contingency Matrix, used to first check the lead time and then the initiatives to use

## Supply

| | | | |
|---|---|---|---|
| a. | **Communication** | SMS & Captains Telegram at 18:30 or at 7am | at least 3 days before |
| b. | **Change WIW slot release** | | at least 3 days before |
| | Change Location | if too many open slots, change # of slots needed to a more popular location | |
| | Extend Slots | if too many open slots, extend # of slots needed by 2h | |
| | Change Start Time | If too many slots stacked | |
| | Add slots | If no slots available, add # of slots needed | |
| c. | **Call driver to pick slots** | Utilise the dashboard to identify best drivers to call<br>Make sure other substitute MOTs are going to be available, if not call them to pick slots | at least 1 days before |
| e. | **Incentive** | Defined case by case | at least 4 days before |
| f. | **Call to confirm slots** | Utilise the dashboard to identify best drivers to call - to confirm will be cars and vans working at peak. To pick will be couriers who worked the previous week on the necessary days and those who work afternoons/evenings<br>Make sure other substitute MOTs are not going to drop, if not call them to confirm slots | day before |

## Demand - these measures should be avoided

| | |
|---|---|
| d1. | **Inform on Slack Channel #doomsday** |
| | **LSR to cancel orders** |
| d2. | B2C |
| d3. | Non-partner OD |
| d4. | Non-partner Sch |
| d5. | Launch/fragile |
| d6. | Key Partner |

Figure 11.9: Initiatives that can be used to decrease the mistmatch between forecasted demand and supply