CHAPTER I PRELIMINARY

I.1 Background

In this new era, every businesses and brands need supply chain management to support them in order to make it developed (O'byrne, 2019). Supply chain itself contain all processes from upstream to downstream. It flows product, information, and money. Besides, supply chain also contains several parties to fulfill the customer request, directly or indirectly. The supply chain includes not only the manufacturer and suppliers, but also transporters, warehouses, retailers, distributors, and even customer themselves (Chopra & Meindl, 2015).

One of the type of businesses that is commonly found nowadays is delivery and logistic service company. In Indonesia, there are a lot of company that provide delivery and logistic service. PT. XYZ is one of the companies that run in that field of business. PT. XYZ have several network facilities in Indonesia, one of the network facilities is located in Bandung. Bandung itself, has the highest demand compared with another cities that located in West Java.

Bandung's distribution center has 13 delivery centers in Bandung Raya. There are 5 delivery centers in Bandung City, 5 of them located in Bandung Regency, 2 located in West Bandung Regency, and 1 in Cimahi City. Common problem occurs in PT.XYZ is the number of unfulfilled demand, means that the goods that are supposed to shipped to customers are delayed. These are the percentage of unfulfilled demand and the lost cost of each delivery center:

Table I. 1 Unfulfilled Demand and Loss Cost Percentage

Delivery Center	Unfulfilled Demand	Loss Cost
Asia Afrika	13.4%	10.5%
Cikutra	4.1%	3.2%
Cipedes	5.8%	4.5%
Situsaeur	13.9%	10.9%
Sekejati	8.3%	6.6%
Cimahi	5.3%	6.3%
Ujungberung	7.3%	8.5%
Soreang	11.9%	14.1%
Dayeuh Kolot	22%	25.9%
Cikeruh	3.5%	4.1%
Padalarang	2.2%	2.7%
Lembang	0.9%	1%
Majalaya	1.5%	1.8%

As can be seen on the table, there are several delivery centers that has percentage of unfulfilled demand and loss cost above the average. Those delivery centers located in Asia Afrika, Situsaeur, Ujungberung, Soreang, and Dayeuhkolot. Means that PT. XYZ have to optimize the last-mile delivery design through exploring new alternative facility. Last mileage delivery is a complex segment in the entire supply chain, it is defined as the last delivery from a warehouse, distribution center or cross-dock point to the customer, either at a specific address or pickup location. (Collins & Wang, 2019).

PT.XYZ is willing to build a new delivery center to decrease the number of unfulfilled demand. In general there are several ways to decrease the unfulfilled demand, for example, increase the capacity of facility, hire new drivers, add another vehicles, etc. This company prefer to build a new facility because the company want to get closer to the customers. Other than that, the problematic area covered so many and big area. Therefore, building a new facility is a solution for this problem.

There are several reasons for company to investing new facilities other than to fulfill demand. Several of those reasons are to increase its production capacity, to extend its product range, or to enter new market(Arumugham, 2015). The new delivery center must be in the near area of the problematic delivery center in order to help that delivery center to fulfill the demand. However, problematic delivery centers that located in

Bandung City are excluded because PT.XYZ prefer to build a new facility outside the center of Bandung City.

To determine the potential location for the new facility, gravity model, is used as a method. Gravity model is one of the simplest method in site selection that pulled the middle nodes between existing facility location and the greatest demand location. The input for gravity model are number of demand and the distances between the facilities(Collins & Wang, 2019). This model is part of the supply chain management network development strategy used to determine the location of facility such as warehouse, factory, etc(Effendi & Siswanto, 2017).

After the potential location are determined, method that can be used for last-mile delivery design is uncapacitated facility location problem. The objective of this model is to identify the optimal location that leads to the minimum total costs (Collins & Wang, 2019). Before building the model, the most important step to do is identify the input. Inputs that must be include are customer demand and location, facility information and cost, and transportation cost.

To find out whether the construction of the new facility can be considered or not, a feasibility study is conducted. Feasibility study is assessment which is comprehensive and highlight all aspects of project feasibility or investment. The purpose of conducting a feasibility study is to avoid the continued addition of investment which is too big for the activity turned out unfavorable(Tulus Jatmiko & Soejanto dan Intan Berlianty, 2019).

I.2 Problem Identification

Based on the background described above, the problem is found in this study are:

1. Where are the potential facility location of PT.XYZ?
2. Which of potential facility location result the least transportation cost?
3. Is adding the new facility on that location worth considering based on the feasibility study?

I.3 Objectives

The Objective of this research are:

1. To determine the potential facility location
2. To determine location that result the least transportation cost
3. To know whether adding the new facility is worth considering based on feasibility study

I.4 Problem Scope

Problem scope used to limit and clarify a problem that is discussed and solved by the researcher.

1. This research is only cover location in Bandung Raya.
2. This research use data before the Covid-19 pandemic occurred (2019).
3. The data used is only e-commerce delivery.
4. The inflation and demand increase is based on assumption.

I.5 Research Benefits

This research hopes to be able to:

1. Help companies and practitioner to determine new facility location.
2. Help academics to learn how to solve facility location problem.

I.6 Writing Systematics

The preparation of this report consists of several chapters, the following is a summary systematic report writing:

CHAPTER I PRELIMINARY

This chapter consists background of the research that include the problem symptom and root cause or problem identification of the logistic and delivery company. Which then leads to objectives, scope and assumption of problem, research benefits, and finally written at the systematic writing.

CHAPTER II THEORITICAL BASIS

This chapter consists basic theory relevant to the problem on the previous study to solve the problem. Other than that, this chapter discuss about the relation among the related concepts. Concepts that discussed on this chapter are Supply Chain Management,

Network Design, Last-Mile Delivery Design, Gravity Model, Uncapacitated Facility Location Problem, and Feasibility Study.

CHAPTER III RESEARCH METHODOLOGY

This chapter explains the interrelationships between the concepts of research studies are discussed and become the basis for establishing research steps of this site selection. In addition, systematic problem solving is the structure of the problem solving process to get the objectives.

CHAPTER IV DATA COLLECTING AND PROCESSING

This chapter is an implementation of a systematic solution the problem of the stage of collecting and processing data on Chapter III that contains processing, discussion, and explanation of complete data regarding the process of the problem solving. Data that include in this chapter are location of existing facility, customer distribution, customer nodes, customer demand, and customer unfulfilled demand. Those data got from the company and which then be used as input for data processing. The data processing steps are area selecting, gravity model, uncapacitated facility location problem, and the last is feasibility study.

CHAPTER V ANALYSIS

This chapter contain analysis of the data processing that has been done in chapter iv. It also explain all of the results of the problem identification or research question that was compiled in the previous chapter with applicable scopes and assumptions.

CHAPTER VI CONCLUSION AND SUGGESTION

This chapter contain conclusions about the results of research based on the objectives which matches the results obtained in data processing and analysis. Providing advice to companies as input for the company and the researcher.