CHAPTER I
INTRODUCTION

1.1 BACKGROUND

In the Industry 4.0 era, the rapid growth of the e-commerce industry has occurred worldwide. Research by [1] show that this phenomenon has provided a great opportunity for the e-commerce sector to develop significantly. In this context, the State Post Bureau of China reported that the volume of online shopping parcels in China increased drastically from 5.69 billion in 2012 to 40.06 billion in 2017, with an average annual growth rate of more than 47% during the period. these five years. Likewise, digital transactions in Indonesia have also experienced a significant increase, with the number of Internet users estimated at 93.4 million in 2015. This indicates that there is an increasing demand in the delivery of goods as a result of the rapid growth of e-commerce. Therefore, the link between e-commerce and logistics is very strong. The higher the demand for delivery of goods from the e-commerce sector, the more important the role of logistics service providers [2].

Logistics operations have an important role in optimizing space and time. These types of uses are an integral part of business and government operations in the transportation sector [3]. One of the most studied problems in the field of transportation is the Vehicle Routing Problem (VRP) which was introduced by Dantzig & Ramzer in 1959 [3]. VRP is related to the distribution problem that seeks the optimal route for vehicles with a certain capacity to serve consumers. In the context of last mile delivery, the concept of crowdsourcing service is an attractive solution to increase the efficiency and flexibility of goods delivery [4]. Crowdshipping can be implemented through various methods, in which couriers use private vehicles to

deliver packages to end customers [4]. In addition to road modes of transportation, goods delivery can also use other modes of transportation such as rivers, ships, or public transportation, depending on the characteristics of the city[5].

A study by [6] highlights the impact of last-mile logistics on e-commerce in cities. This study aims to investigate the impact of this phenomenon in various aspects, including economic, social, environmental, and technological aspects. The method used in this research is Systematic Literature Review (SLR) and PRISMA. In their review of the literature, researchers found that research on the impact of last-mile logistics on e-commerce in cities is still relatively new, but has experienced significant growth in the number of academic articles published in recent years. In terms of economic impact, research indicates a focus on the costs associated with urban transit distribution systems and the potential for optimization to increase efficiency [6]. Social impacts include contributions to community welfare, quality of life, behavior, and activities of individuals and groups[6]. Environmental impacts include contributions to environmental management, such as natural resources, environmental pollution, climate, and meteorology [6]. Technological impact relates to the use of technology to generate suggestions and alternatives in traditional urban logistics [6].

Other research, such as that conducted by [7], also explore crowdsourced delivery and identify the key elements of this delivery system that differentiate it from other transportation systems. The research shows that crowdsourced delivery has created a new solution in the long distance delivery industry and has received attention in the academic literature. The use of ad hoc drivers in crowdsourced delivery has been shown to optimize vehicle capacity and routing, resulting in significant cost and mileage savings compared to traditional delivery systems [8].

Based on an understanding of these studies, the research that will be carried out aims to develop a Crowdsourcing-Last Mile Logistics service model in rural areas. In this context, the company that is the focus of this research is Indah Kargo Mojokerto. This study aims to determine a model that minimizes costs and obtains the fastest route for Crowdsourcing-Last Mile Logistics in rural areas. The method that will be used in this study is an effective and efficient heuristic approach for logistics operations in rural areas, by exploiting the potential for community participation in the delivery of goods. It is hoped that this research will contribute to the development of a sustainable and optimal final delivery system in a rural context, as well as provide significant benefits for Indah Cargo Mojokerto in minimizing operational costs, increasing customer satisfaction, and improving the performance of logistics delivery services in rural areas.

1.2 SUMMARY OF THE PROBLEM

With the existing problems, the focus of research is:

1. How are the models *Crowdsourcing Service-Last Mile Logistic in Rural area?*

2. How to determine the minimum cost *Crowdsourcing Service-Last Mile Logistic in Rural area with* fastest *route*?

1.3 RESEARCH OBJECTIVES

The intent and purpose of this research is so that the formulation of the problems that have been written before can be answered objectively. So based on the idea of the existing problem, there are several points to be achieved as the ultimate goal of this research, namely:

1. To determine the model *Crowdsourcing Service-Last Mile Logistic in Rural*

area?

2. To determine the minimum cost *Crowdsourcing Service-Last Mile Logistic in Rural areas with* fastest *routes*?

1.4 LIMITATIONS AND PROBLEM ASSUMPTIONS
1.4.1 LIMITATIONS OF THE PROBLEM

The limitations of the problem that will become the focus of the research are intended so that the flow of research problems does not deviate or widen from the subject matter of the problem formulation, including:

1. Amount *Crowdsourcing* as many as three according to which vehicle owned by Indah Cargo Logistics.

2. Research is in the Mojokerto area

3. The research consists of two*echelon* (level) deep*supply chain*, namely the retailer consumer

4. Research using time windows

5. Type of vehicle used L300

1.4.2 PROBLEM ASSUMPTIONS

1. Every incoming order cannot be rejected, meaning other than doing Delivery also picks up goods.

2. Vehicles used in accordance with the requirements and specifications necessary to transport goods efficiently and safely.

3. Rural roads are considered to be in good condition, with no damage

significant constraints or constraints that may impede delivery.

4.	Deliveries are made on normal days and demand is stable.

1.5 BENEFITS OF RESEARCH

Every research must have benefits that can be felt by related parties. With this research, the author wants to provide the following benefits:

1.	Academic Aspect

The results of this research are expected to increase understanding of customer interest in using expedition services, especially at Indah Cargo Logistics. Besides that, the results of this study are also expected to contribute as a literature reference for further research.

2.	Practical Aspect

The results of this research are expected to produce useful and applicable information for users of expedition services, especially users of the Indah Cargo Logistics expedition.