CHAPTER I
INTRODUCTION

1.1. Background

In today's era of digitalization and automation, cashless transactions have become an important part of economic activity, especially in countries that are increasing its financial inclusion through various technological innovations. In Indonesia, the use of *Electronic Data Capture* (EDC) at SPBU Pertamina is part of this initiative, with the aim of increasing efficiency and customer convenience and reducing dependency on cash. However, the optimal performance of EDC devices is highly dependant on the stability of the telecommunications network which connects them to banking data centers or financial service providers. This dependence makes EDC devices vulnerable to network disruptions, especially in areas with inadequate or unstable telecommunications infrastructure.

According to several studies, the stability of telecommunication networks is still a challenge in several regions in Indonesia, especially in areas far from urban centers and large cities, where infrastructure limitations impact connection speed and quality [1][2]. This has a direct impact on EDC devices which often experience problems in processing transactions in real-time, causing disruptions to customer service. These network disruptions have the potential to increase waiting times, disrupt vehicle flow, and ultimately reduce customer satisfaction and public trust in digital payment systems [3].

This condition indicates an urgent need to implement a more reliable system in maintaining the continuity of EDC services at SPBU. One potential solution is the development of a telecommunications-based failover system, a mechanism that allows EDC devices to switch to a backup or alternative network when the main network is disrupted. This failover technology has been proven in several studies as an effective approach in ensuring the continuity of services in various sectors, especially in sectors that prioritize real-time transactions such as banking and retail [4][5].

Implementation of a failover system on EDC devices at SPBU can reduce the risk of transaction disruptions and improve operational efficiency. In addition, research shows that with a failover system, post-network disruption recovery time can be shortened, which ultimately improves the reliability and satisfaction of service users [6]. This is in accordance with several studies that state that failover can significantly improve system stability, especially in dense or limited networks [7].

Based on this background, this study aims to develop a telecommunications-based failover system to minimize disruptions to EDC devices at SPBU Pertamina. This solution is expected to have a positive impact on the quality of service and performance of the transaction system, which ultimately supports the goals of digital transformation and increasing financial inclusion in Indonesia.

1.2. Problem Formulation

The following is a formulation of the problem raised by the author in developing a telecommunications-based failover system to reduce transaction disruptions on EDC devices at SPBU Pertamina:

1. How can a telecommunications failover system be designed to overcome network disruptions at EDC devices at SPBU?
2. How effective is the failover system in reducing transaction disruptions on EDC devices at SPBU Pertamina?
3. What are the factors that affect the reliability and performance of a failover system in an SPBU environment?

1.3. Objectives and Benefits

This study aims to develop a telecommunications-based failover system on EDC devices at SPBU Pertamina to ensure reliable transaction continuity, even when network disruptions occur. In addition, this study will also look at the effectiveness of the failover system in reducing the frequency and duration of transaction disruptions on EDC devices, as well as identifying factors that affect

the reliability and performance of the failover system in the SPBU environment. The expected benefits of this study are:

1. With a reliable failover system, it is hoped that SPBU Pertamina will be able to maintain smooth EDC transactions, reduce the risk of failed transactions, and increase customer satisfaction through stable services.
2. The automatic failover system will minimize downtime in EDC device operations when network disruptions occur, thereby increasing the productivity and efficiency of SPBU.
3. The results of this study can be a reference for other companies in the industry that require a failover system on network-based transaction devices, especially in sectors in need of continuous operations.
4. This research is also expected to contribute to the development of telecommunications-based failover systems, especially in the application in EDC devices, which can be the basis for the development of technology in the wider network field.

1.4. Scope of Problem

In this research, the scope of problem that has been determined is as follows:

1. This research will only focus on the development of a telecommunications-based failover system for EDC devices used at SPBU Pertamina.
2. This research is conducted under normal operational environmental conditions, where the EDC machine operates inside an SPBU and is connected to a standard telecommunications network.
3. This research does not take into account extreme conditions, such as natural disasters or major network disruptions.
4. The assumption used in this study is that the proposed failover system will have sufficient access to existing telecommunications infrastructure, including internet and cellular networks that support EDC device connections.
5. This research will focus on technical factors that affect the reliability and performance of failover systems, such as network quality, system response time, and hardware configuration. Non-technical factors, such as user behavior and operational management, will not be analyzed in depth.

1.5. Research Methods

This research is conducted using the following structured approaches and methods:

1. The initial stage of this research begins with the collection and review of appropriate literature, including books, journals, and scientific articles on failover systems, telecommunications technology, and EDC device applications.
2. Data will be collected through direct observation at one of Pertamina's SPBU to determine the frequency and duration of transaction disruptions on EDC devices.
3. The collected data will be analyzed. This analysis will include testing hypotheses related to the effectiveness of the failover system in reducing transaction disruptions.
4. Based on the analysis results, the next stage is the design of a telecommunications-based failover system. The system design will include technical specifications, flowcharts, and system architecture to ensure effective integration with existing EDC devices.
5. The designed system will be tested using a simulation to evaluate performance. This simulation aims to predict how the system will function in real situations and identify potential problems that may arise.

1.6. Implementation Schedule

The following is a planned schedule for implementing the Final Assignment which includes the stages that need to be carried out, the duration of each stage, and *milestones*:

Table 1.1 Schedule and *Milestones*.

No.	Step Description	Duration	Milestone
1	Literature Study and Data Collection	3 weeks	Literature study report completed.
2	Data analysis	2 weeks	Data analysis results completed.
3	Failover System Design	2 weeks	Block Diagram and system

			specification is completed.
4	Component and Hardware Selection	1 week	List of components used is compiled.
5	System Implementation	1 month	System prototype completed.
6	Testing and Simulation	2 weeks	Report of test and simulation result completed.
7	Compilation of Final Assignment Report	2 weeks	Final Assignment Report is finished.
8	Final Project Presentation	1 weeks	Presentation completed.