

## CHAPTER I INTRODUCTION

### I.1 Background

Telkom University (Tel-U) is an educational institution dedicated to being a world-class university that plays an active role in the advancement of information technology-based research. It was founded in 2013. Telkom University also has a mission to provide high-quality education facilities, as demonstrated by a number of accomplishments, including being ranked first among Indonesian private universities by the Ministry of Technology, Science, and Higher Education of the Republic of Indonesia (Kemristekdikti). Telkom University has a 55-hectare campus, 800 lecturers, 28.789 students, and about 48.806 alumni. Telkom University has a 59 percent international accreditation and 130 study groups. Telkom University also has seven faculties, 32 study programs, and a 71.87 percent accreditation program, as shown in figure I.1.

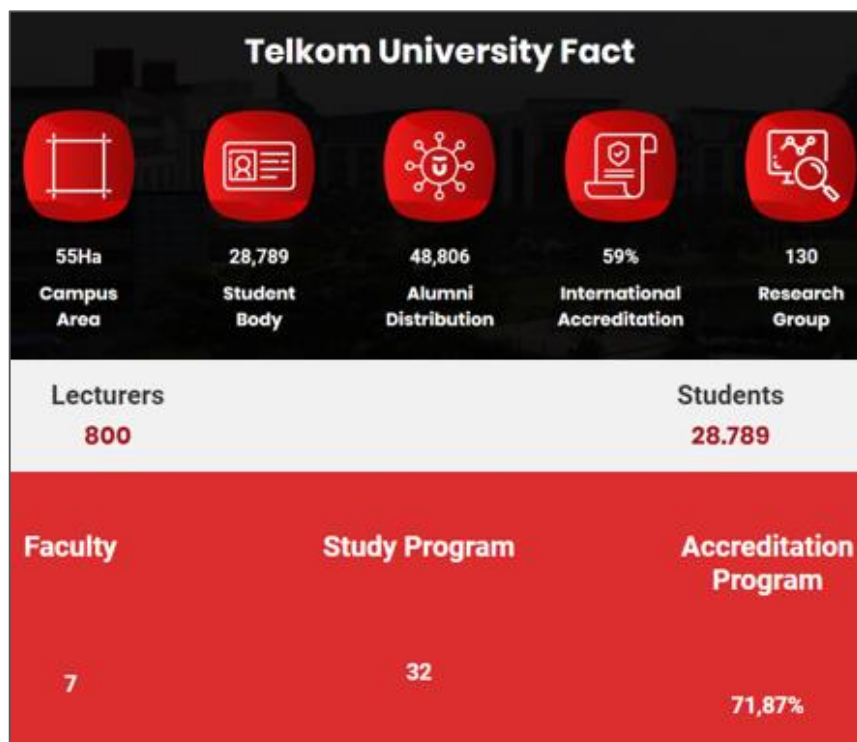


Figure I.1. Data of Telkom University Facts 2020

Because the number of students grows every year, the author wishes to conduct this research which focuses on Telkom University's Faculty of Industrial Engineering, which has a study program that aims to produce graduates with a deep understanding of aspects of integrated systems and industrial engineering as well as good competence.

There are 3544 industrial engineering students, 129 lecturers, and four study programs: Bachelor of Industrial Engineering, Bachelor of Logistic Engineering, Bachelor of Information System, and Master of Industrial Engineering, with a total of 15 student laboratories.

In addition to the aforementioned clarification, the faculty of Industrial Engineering also offered several facilities and places that could assist students in conducting their activities in a smooth and comfortable manner. Despite the presence of these facilities and locations, some of them seem to be inadequate for students, lecturers, and others, as there is still a shortage of permanent drinking water refilling space in the hall or in some corners around the faculty building.

This condition can be seen in particular in the Industrial Engineering faculty building, which lacks a dispenser or vending machine that allows students to refill their water bottles. There are a few water dispensers, but they are only for lecturers, campus employees and laboratories in faculty of Industrial Engineering as a result, they must procure it and purchase it outside of the faculty house or in canteen, which is quite a distance away. And they only buy a few plastic bottles per day, which does not help to minimize plastic waste.

A comprehensive approach is needed to develop a suitable automated dispenser product to address these issues, and one of them is to use the Pahl and Beitz approach. The Pahl and Beitz approach, according to Kannengiesser and Gero (2017), is frequently used as a framework for locating specific designs and as a guide for translating design goals into design solutions. When the designer already knows the task that will be assigned to the product, the Pahl and Beitz approach is used.

As a result, the IoT device for automated dispenser will be built in order to reduce plastic waste in terms of assisting the tumbler campaign for students in minimizing plastic waste. It will also include cashless payment, making it easier to use and track. With this issue, there have been many previous studies, such as in the form of a final project or a report, but there have also been many that have not. However, since it employs a particular process or design, this issue has remained unsolved. As a result, based on the problems found, this researcher invented a new method and included an electronic payment for the design of the product.

## **I.2. Problem Formulation**

Based on the foregoing, the research problem in this final project is to develop a model for Automated Dispenser that includes an ergonomic design for customer comfort and safety, as well as a hygiene product design based on the pahl and beitz method.

## **I.3. Research Purpose**

The aim of this final project, according to the problem formulations, is to design Automated Dispenser using the pahl and beitz method, as well as an ergonomic and hygiene design with duo gallon technology to provide user comfort and safety.

## **I.4. Research Limitation**

According to the above-mentioned problem, there are some research limitations, including:

1. The established dispenser only provides water at room temperature for both hot and cold and using manual to replace the gallons.
2. The research focuses on the Dispenser design that uses top and bottom loading of gallons.
3. The research did not go into detail about the cost analysis of the dispenser's specifications.

4. The research was conducted using Solidworks software and ANSYS Workbench 19.0
5. Simulation analysis in ANSYS Workbench 19.0 software only focuses on the body of the dispenser.
6. The research carried out is only up to the design, simulation, and analysis stages.
7. Research only analyzes the ability of the dispenser.
8. An average load of 19 liter gallons is used in the force simulation.

### **I.5. Research Benefit**

Automated Dispenser design would help to reduce the amount of plastic waste by reducing the amount of plastic bottles purchased outside of campus. And this Automated Dispenser has two compartments that can accommodate two gallons at the same time. It will enable students to access quickly and easily.

### **I.6. Writing System**

#### **CHAPTER I INTRODUCTION**

In chapter I explains about the introduction of the research with includes of background of research, problem formulation, objective of research, limitations of research, and benefits of research.

#### **CHAPTER II LITERATURE REVIEW**

For this chapter includes of several relevant literatures that related to this research for helping the research to solve the problems needed.

#### **CHAPTER III METHODOLOGY FOR PROBLEM SOLVING**

In this chapter, describes about the conceptual model which given the concept for this research to use for solving the problems. And also about systematic of problem solving.

#### **CHAPTER IV INTEGRATED SYSTEM DESIGN**

This chapter describes the data obtained from the main objective function

of product design. Data processing was carried out by methods in accordance with Pahl and Beitz product design methods.

#### **CHAPTER V EVALUATION AND ANALYSIS OF DESIGN RESULTS**

This chapter describes an analysis of the final results of each stage of product design carried out in Chapter IV.

#### **CHAPTER VI CONCLUSIONS AND SUGGESTIONS**

In this chapter, conclusions are given from the results of the research conducted, along with suggestions given to further researchers as solutions to problem solving in subsequent research.