

**Design and Development for an IOT Based
Outdoor Air Quality Monitoring Device**

By

Jehoshaphat Sutikno
12007005

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SWISS GERMAN UNIVERSITY
The Prominence Tower
Jalan Jalur Sutera Barat No. 15, Alam Sutera
Tangerang, Banten 15143 - Indonesia

Revision after the Thesis Defense on July 10, 2024

STATEMENT BY THE AUTHOR

I hereby declare that this submission is my own work and to the best of my knowledge, it contains no material previously published or written by another person, nor material which to a substantial extent has been accepted for the award of any other degree or diploma at any educational institution, except where due acknowledgement is made in the thesis.



Jehoshaphat Sutikno

Student

July 22, 2024

Date

Approved by:

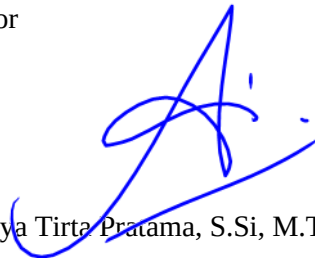


Dr. Tanika D. Sofianti, S.T., M.T.

Thesis Advisor

July 23, 2024

Date



Dr. Eng. Aditya Tirta Pratama, S.Si, M.T.

Thesis Co-Advisor

July 23, 2024

Date

Dr. Maulahikmah Galinium, S.Kom, M.Sc.

Dean

Date

Jehoshaphat Sutikno

ABSTRACT

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By

Jehoshaphat Sutikno
Dr. Tanika D. Sofianti, S.T., M.T., Advisor
Dr. Eng. Aditya Tirta Pratama, S.Si, M.T., Co-Advisor

SWISS GERMAN UNIVERSITY

Air pollution is a serious issue in Indonesia as seen in the Upper Respiratory Track Infection (URTI) outbreak in 2023. In response, policies have been put in place by government bodies in Indonesia to reduce vehicular and carbon emissions. Despite this, studies and past reports show that the lack of documentation and testing hinders the effectiveness of these policies. This study was conducted in order to develop a portable Air Quality Monitoring (AQM) device that can be used to document and test said policies. The AQM device is developed using a combination of DMADV, Product Design and Development (PDD), and Quality Function Deployment (QFD). The proposed device is capable of detecting CO₂, PM_{2.5}, and PM_{10.0}, utilizing solar power, and transferring data to a dashboard via WiFi. A feasibility study comparing production plans was conducted in place of a market launch. The feasibility study recommends the implementation of a chase production plan. The chase production plan reached the development cost Break-even Point (BEP) and has higher net profits compared to the level production plan in all three scenarios. Development of the device using PDD is considered successful and the device is deemed feasible for commercialization.

Keywords: Air quality, IoT, Product Design and Development, Feasibility study.

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DEDICATION

I dedicate this work to my late father.
For it was through his teachings and departure that I am who I am today.

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