Development of Blockchain-based Web Application to Improve Raw Material Supply Chain Traceability: Case of Stingray Leathercraft

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Revision after the Thesis Defense on 12 July 2023

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.

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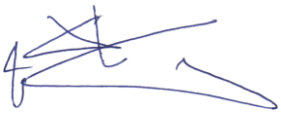

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ABSTRACT

DEVELOPMENT OF BLOCKCHAIN-BASED WEB APPLICATION TO IMPROVE RAW MATERIAL SUPPLY CHAIN TRACEABILITY: CASE OF STINGRAY LEATHERCRAFT

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This study develops a web application using Ethereum blockchain to trace stingray leather products in the supply chain. The study aims to build the web application and evaluate its advantages, disadvantages, and cost feasibility. The frontend of the web application is developed using the scaffold-eth template and deployed to the IPFS network. The web application undergo testing that includes unit and functional testing. The smart contract is deployed on the Sepolia Testnet and the web application on IPFS nodes. Gas usage cost data is collected for cost analysis which evaluates smart contract deployment and function execution expenses. Comparison of the web application with blockchain and non-blockchain versions is compared, highlighting differences in architecture, flow, and user interaction. Furthermore, advantages and disadvantages of the web app is evaluated in this study. The research shows that blockchain enhances supply chain transparency but incurs costs. Based on the UMKM scenario in this study, the monthly cost of the supply chain web application using the Ethereum blockchain does not exceed thirty percent of UMKM with a monthly revenue of $10,000 (≈ Rp. 149,538,500) which could be considered feasible if the supply chain web application is to be used as a main component of their business.

Keywords: Blockchain Web Application, Ethereum Blockchain, Supply Chain Traceability, Stingray Leathercraft

DEDICATION

I dedicate this work to my friends, my family, who have supported me from the start, and my own country, Indonesia . May this study be beneficial to humanity as a whole.

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TABLE OF CONTENTS

Page

LIST OF FIGURES

Figures Page

LIST OF TABLES

Tables Page

LIST OF EQUATIONS

Equations Page