

**SINGLE-BOARD-COMPUTERS AS A SUSTAINABLE ALTERNATIVE TO PCS
FOR INVENTORY AND CATALOGUE SYSTEMS IN INDONESIAN SMES**

By

Nabhan Yahya Anuz
12202027

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Faculty of Engineering of Information Technology



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

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STATEMENT BY THE AUTHOR

Name of Student : Nabhan Yahya Anuz
Student ID : 12202027
Faculty : Engineering & Information Technology
Study Program : Information Technology - Technopreneur
Date of Defense : 11 July 2026
Thesis Title : SINGLE-BOARD-COMPUTERS AS A SUSTAINABLE ALTERNATIVE TO PCS FOR
INVENTORY AND CATALOGUE SYSTEMS IN INDONESIAN SMES

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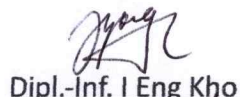


Nabhan Yahya Anuz

(Name of Student)

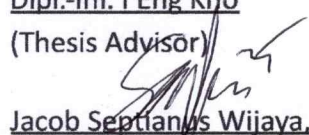
Approved by:

Date: 25 June 2026



Dipl.-Inf. I Eng Kho

(Thesis Advisor)



Jacob Septianus Wijaya, M.Kom

(Thesis Co-Advisor)

Acknowledged by:

Date: 25 June 2026

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

(Dean of Faculty of Engineering & Information Technology)

ABSTRACT

SINGLE-BOARD-COMPUTERS AS A SUSTAINABLE ALTERNATIVE TO PCS FOR INVENTORY AND CATALOGUE SYSTEMS IN INDONESIAN SMES

By

Nabhan Yahya Anuz
Dipl.-Inf. I Eng Kho
Jacob Septianus Wijaya, M.Kom

SWISS GERMAN UNIVERSITY

This research evaluates the viability of an affordable retail automation system for local businesses by deploying an integrated Inventory Management and Point of Sale application on low-cost single-board computer hardware. Developed using an agile methodology, the system pairs a React frontend with a lightweight FastAPI backend. While benchmarking on an Orange Pi 5 and a standard laptop demonstrated that the microservice software architecture is highly computationally efficient for daily retail workloads, empirical findings revealed that operational performance is deeply constrained by environmental and hardware vulnerabilities.

The physical evaluation highlights severe operational risks, specifically block-level storage corruption and high maintenance overhead (OpEx) caused by a lack of native power-loss protection and automated driver registries on unhardened SBC configurations. Furthermore, because the local servicing ecosystem across Indonesian districts is strictly limited to commodity x86/Windows platforms, hardware or kernel faults on alternative architectures lead to total system paralysis. Thus, despite the innovation of modern open-source stacks, sustainable adoption relies heavily on the technical resilience of the user environment, making standard or refurbished x86 laptops a more economically viable choice for long-term business continuity.

Keywords: Orange Pi 5 Pro, Single Board Computers, Point of Sale, Operational Expense, ARM, x86

DEDICATION

I dedicate this work to the future growth in the Indonesian industry



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I have found my coursework throughout the Information Technology program to be stimulating and thoughtful, providing me with the tools with which to explore both past and present ideas and issues.



TABLE OF CONTENTS

Table of Contents	2
STATEMENT BY THE AUTHOR	4
ABSTRACT	5
DEDICATION	6
ACKNOWLEDGEMENTS	7
List of Tables	8
List of Figures	9
CHAPTER 1 - INTRODUCTION	10
1.1. Background	10
1.2. Problem Statement	10
1.3. Research Objectives	10
1.4. Research Questions	11
1.5. Hypothesis	11
1.6. Significance of the Study	11
1.7. Scope and Limitations	11
CHAPTER 2 - LITERATURE REVIEW	12
2.1. Theoretical Perspectives	12
2.2. Review of Previous Studies	12
2.3. Research Gap and Novelty	16
CHAPTER 3 - RESEARCH METHODS	18
3.1.0 Materials and Equipment	18
3.1.1 Data Collection Methods	18
3.1.2 Tools	18
3.2.0 System Design	19
3.2.1. Power Consumption & Sustainability	19
3.2.2. Hardware Performance and Capability Analysis	19
3.2.3. Memory Configuration	20
3.2.4. Review of Hardware	21
3.2.5. Theoretical and Operational Assessment Framework	24
3.3. Diagrams and Design	24
CHAPTER 4 - RESULTS AND DISCUSSIONS	33
4.1. Initial Evaluation	33
4.2 Performance Footprint and Resource Utilization Analysis	33

4.3 Current Results Analysis	34
4.1.1. Functional & Workflow Verification	42
4.1.2. Integrity & Validation Checks	42
4.2. Data Analysis	42
4.2.1. Proposed Quantitative Indicators	42
4.2.2. Analytic Logic & Interpretation	42
4.3. Expected Outcome	43
4.4. Discussion	43
4.4.1. Research Question 1: How does Orange Pi and traditional PC perform in inventory and catalogue tasks?	43
4.4.2. Research Question 2: What are the cost and energy consumption differences between the two platforms?	44
4.4.3. Research Question 3: What are the barriers and opportunities for adopting digital inventory/catalogue systems in Indonesian building material stores?	44
CHAPTER 5 - CONCLUSION	46
5.1. Summary	46
5.2. Recommendation	46
REFERENCES	47
Appendices	50
CURRICULUM VITAE	60



LIST OF TABLES

Table	Page
Table 1. Research Comparison Table	16
Table 1. cont. Research Comparison Table	17
Table 3. Low Cost Computing Benchmark Comparison Table	26



LIST OF FIGURES

Figure	Page
Figure 3.1. Proposed Architecture Diagram	29
Figure 3.2. Proposed Sequence Diagram	30
Figure 3.3. Proposed Inventory Catalogue Use Case Diagram	30
Figure 3.4. Research Methodology Diagram	31
Figure 3.5. System Operation Activity Diagram	32
Figure 3.6. Switch to Performance Mode	33
Figure 3.7. Disable all startup apps	34
Figure 3.8. Disable Windows Update Services	35
Figure 3.9. Disable Notifications	35
Figure 3.10. HWiNFO Logging	36
Figure 4.1. CPU Usage Prelim Test (Source: Compiled by Author)	39
Figure 4.2. CPU Power Draw Prelim Test (Source: Compiled by Author)	39
Figure 4.3. Memory Usage Prelim Test (Source: Compiled by Author)	40
Figure 4.4. CPU Usage Secondary Testing (Source: Compiled by Author)	41
Figure 4.5. CPU Power Usage Secondary Testing (Source: Compiled by Author)	41
Figure 4.6. Memory Usage Secondary Testing (Source: Compiled by Author)	42
Figure 4.7. IO Usage Secondary Testing (Source: Compiled by Author)	43
Figure 4.8. CPU Usage Third Test (Source: Compiled by Author)	44
Figure 4.9. CPU Power Usage Third Test (Source: Compiled by Author)	44
Figure 4.10. Memory Usage Third Test (Source: Compiled by Author)	45
Figure 4.11. CPU Usage Third Test (Source: Compiled by Author)	46
Figure 4.12. CPU Usage Fourth Test (Source: Compiled by Author)	46
Figure 4.13. CPU Power Usage Fourth Test (Source: Compiled by Author)	46
Figure 4.13. CPU Power Usage Fourth Test (Source: Compiled by Author)	47
Figure 4.14. IO Usage Fourth Test (Source: Compiled by Author)	48
Figure 5.1. Health Check	57
Figure 5.2. Get Products	58
Figure 5.3. Create SKU	58
Figure 5.4. SKU Duplication	59
Figure 5.5. Get Products	59
Figure 5.6. Create Stock Movement	60
Figure 5.7. Stock Out Beyond Available	60
Figure 5.8. Create Sale Transaction Valid	61
Figure 5.9. Create Sale Transaction Invalid	61
Figure 5.10. List Transactions	62
Figure 5.11. Product Inventory	62

Figure 5.12. Dashboard Inventori	63
Figure 5.13. Daftar Inventori	63
Figure 5.14. Daftar Inventory 2	64
Figure 5.15. Daftar Inventory 3	64
Figure 5.16. Daftar Inventory 4	65
Figure 5.17. Point of Sale	65
Figure 5.18. Point of Sale (Riwayat Transaksi)	66

