

1. Operations Engineering & Management

# **IMPROVING FEASIBILITY OF CANTEEN X**

**A THESIS**

**Submitted in Partial Fulfillment of the Requirements for the Degree of  
Bachelor of Engineering in Industrial Engineering**



**CLARA PRESILIA VIJATI**

**181410029**

**INTERNATIONAL INDUSTRIAL ENGINEERING PROGRAM  
DEPARTMENT OF INDUSTRIAL ENGINEERING  
FACULTY OF INDUSTRIAL TECHNOLOGY  
UNIVERSITY OF ATMA JAYA YOGYAKARTA  
2022**

# HALAMAN PENGESAHAN

Tugas Akhir Berjudul  
IMPROVING FEASIBILITY OF CANTEEN X

yang disusun oleh

Clara Presilia Vijati

181410029

dinyatakan telah memenuhi syarat pada tanggal 13 September 2022

Dosen Pembimbing 1	: The Jin Ai, S.T., M.T., D.Eng.	Keterangan Telah Menyetujui
Tim Penguji		
Penguji 1	: The Jin Ai, S.T., M.T., D.Eng.	Telah Menyetujui
Penguji 2	: Fransiska Hernina Puspitasari, S.T., M.T.	Telah Menyetujui
Penguji 3	: F. Edwin Wiranata, S.Pd., M.Sc.	Telah Menyetujui

Yogyakarta, 13 September 2022

Universitas Atma Jaya Yogyakarta

Teknologi Industri

Dekan

ttd.

Dr. A. Teguh Siswanto, M.Sc.

Dokumen ini merupakan dokumen resmi UAJY yang tidak memerlukan tanda tangan karena dihasilkan secara elektronik oleh Sistem Bimbingan UAJY. UAJY bertanggung jawab penuh atas informasi yang tertera di dalam dokumen ini

## DECLARATION OF ORIGINALITY

I, the undersigned below:

Name : Clara Presilia Vijati

NPM : 181410029

Hereby declare that my final project entitled "Improving Feasibility of Canteen X" is the result of my research in the 2021/2022 Academic Year which is original and does not contain plagiarism from any work.

If in the future there is a discrepancy with this statement, then I am willing to be prosecuted and processed in accordance with the applicable provisions.

Thus this statement is made truthfully.

Pangkalan Kerinci, 26 August 2022



Clara Presilia Vijati

## **DEDICATION PAGE**

“Sometimes in life, you do not always feel like you would make it, but that does not mean you cannot make it”

### **My Father and Mother**

Who have provided moral and material support as well as endless prayers for my success. I may not always express my affection for you both, but I can assure that you two hold a special place in my heart. Thank you for everything you've done for me.

### **Pak The Jin Ai**

Thank you for your dedication and guidance throughout the process of doing my final project, I am really grateful for having you as my supervisor.

### **Meldy and Laras**

Having a friendship with you guys makes me happy every day. Thank you so much for enriching my life with so many pleasant memories and joyful moments.

### **TIKI 2018 Classmates**

Thank you, Chika, Sean, Gurion, Adrian, Jacinta, David, and Carlo, for all the memories we've shared together. I wish you guys nothing but the best.

## RESEARCH APPROVAL

Kepada:

Dekan Fakultas Teknologi Industri  
Universitas Atma Jaya Yogyakarta  
Jl. Babarsari No.43 Yogyakarta

Dengan Hormat,

Sehubungan dengan adanya pengajuan penelitian mahasiswa dengan judul "Improving Feasibility of Canteen X" maka saya selaku pemilik kantin menerangkan bahwa mahasiswa berikut:

Nama Mahasiswa : Clara Presilia Vijiati  
NPM : 181410029  
Program Studi : Teknik Industri Internasional  
Fakultas : Teknologi Industri

Diperkenankan untuk melakukan penelitian di kantin saya.

Demikian surat keterangan ini dibuat untuk dapat dipergunakan sebagaimana mestinya.

Atas perhatiannya saya ucapkan terima kasih.

Pekanbaru, 8 September 2021



Damayanti S.

## ACKNOWLEDGMENT

Praise and gratitude to the presence of God, who has given His grace and gifts so that I can complete the final project. The preparation of this report aims to fulfill the requirements to obtain a bachelor's degree in Industrial Engineering from the University of Atma Jaya Yogyakarta.

Besides, I would like to express the deepest gratitude to those who have been involved in the process of finishing this final project report, namely:

1. The owner of Canteen X that let me do research on the business.
2. Dr. Teguh Siswanto, M.Sc. as the Dean of Faculty of Industrial Technology in Universitas Atma Jaya Yogyakarta.
3. Ririn Diar Astanti, S.T., M.MT., Dr. Eng. as the Head of the Industrial Engineering Department.
4. Lenny Halim, S.T., M.Eng. as the Head of the Industrial Engineering Study Program and my academic adviser.
5. Indah Sepwina Putri S.T. M.Sc. as the Head of the International Industrial Engineering Program.
6. The Jin Ai, S.T., M.T., D.Eng. as my supervisor who has been so dedicated in guiding me in doing the final project.

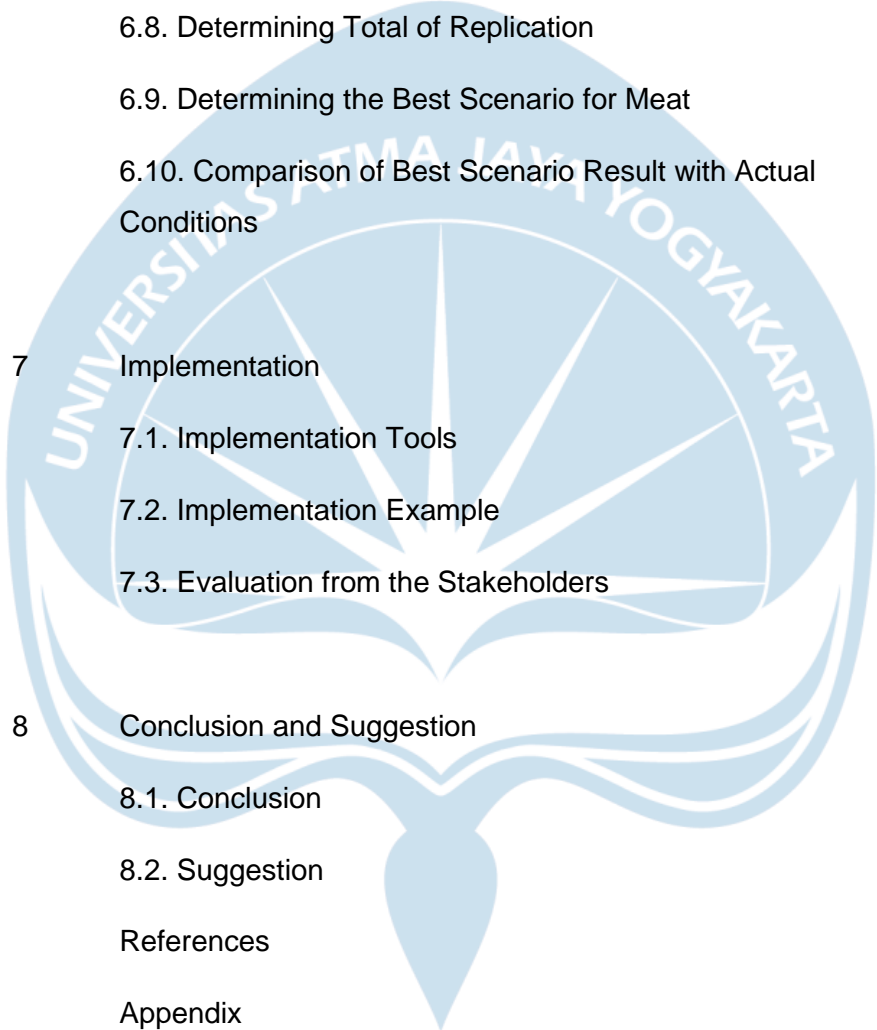
Lastly, realizing that there are many mistakes made in this report, I am very expecting criticism and advice from the reader to complement all the shortcomings and mistakes of this final project. Besides, I hope readers can gain knowledge after reading this final project.

## TABLE OF CONTENTS

CHAPTER	TITLE	PAGE
	Cover	i
	Approval Statement	ii
	Declaration of Originality	iii
	Dedication Page	iv
	Research Approval	v
	Acknowledgment	vi
	Table of Content	vii
	List of Tables	x
	List of Figures	xiii
	List of Appendices	xv
	Abstract	xvi
1	Introduction	
	1.1. Background	1
	1.2. Problem Formulation	3
	1.3. Research Objective	3
	1.4. Scope of Problem	3
2	Literature Review and Basic Theory	4
	2.1. Previous Research	4
	2.2. Basic Theory	6

3	Research Methodology	16
	3.1. Research Type	16
	3.2. Research Procedure	16
	3.3. Ethical Code	21
	3.4. Problem Uniqueness	21
	3.5. Modern Technology Used	21
4	Alternative Solution Method	
	4.1. Method to Choose Alternative Solution	22
	4.2. Choosing the Suitable Inventory Control Method	26
	4.3. Interdependence Among Stakeholders	26
5	Determining Inventory Policy	27
	5.1. Product List and Selling Price	27
	5.2. Sales Data	27
	5.3. Inventory Cost	29
	5.4. Modelling	32
	5.5. Input Modelling	33
	5.6. Research Standard	34
6	Prototype and Testing	35
	6.1. Model Verification	35
	6.2. Validation	38
	6.3. Chicken Inventory Simulation Scenario	39





	6.4. Determining Total of Replication	45
	6.5. Determining the Best Scenario for Chicken	46
	6.6. Comparison of Best Scenario Result with Actual Conditions	46
	6.7. Meat Inventory Simulation Scenario	49
	6.8. Determining Total of Replication	49
	6.9. Determining the Best Scenario for Meat	56
	6.10. Comparison of Best Scenario Result with Actual Conditions	56
7	Implementation	58
	7.1. Implementation Tools	58
	7.2. Implementation Example	58
	7.3. Evaluation from the Stakeholders	60
8	Conclusion and Suggestion	
	8.1. Conclusion	61
	8.2. Suggestion	61
	References	62
	Appendix	64

## LIST OF TABLES

Table 3.1. Budget Estimation	21
Table 4.1. Intensity of Importance	23
Table 4.2. Weight Value	23
Table 4.3. Weight Value Divided by Average	24
Table 4.4. Employee Readiness	24
Table 4.5. Employee Readiness Divided with Average	24
Table 4.6. Budget	24
Table 4.7. Budget Divided with Average	25
Table 4.8. Operational	25
Table 4.9. Operational Divided with Average	25
Table 4.10. Matrix Result and Weight Criteria Matrix	25
Table 5.1. Price List	27
Table 5.2. Weight Needed for a Single Portion	27
Table 5.3. Sales Data in March	28
Table 5.4. Required Chicken and Meat	29
Table 6.1. Verification of Stock on Hand, Order Decision, Unmet Demand, and Order Placement P Model	35
Table 6.2. Verification of Stock on Hand, Order Decision, Unmet Demand, and Order Placement Q Model	37
Table 6.3. Validation Result for Chicken Sales using t-test Hypothesis	38
Table 6.4. Validation Result for Meat Sales using t-test Hypothesis	39
Table 6.5. Possible Combination of Decision Variable Scenario 1	40
Table 6.6. Possible Combination of Decision Variable Scenario 1	41
Table 6.7. Simulation Scenario 1, Period = 5 Days	42

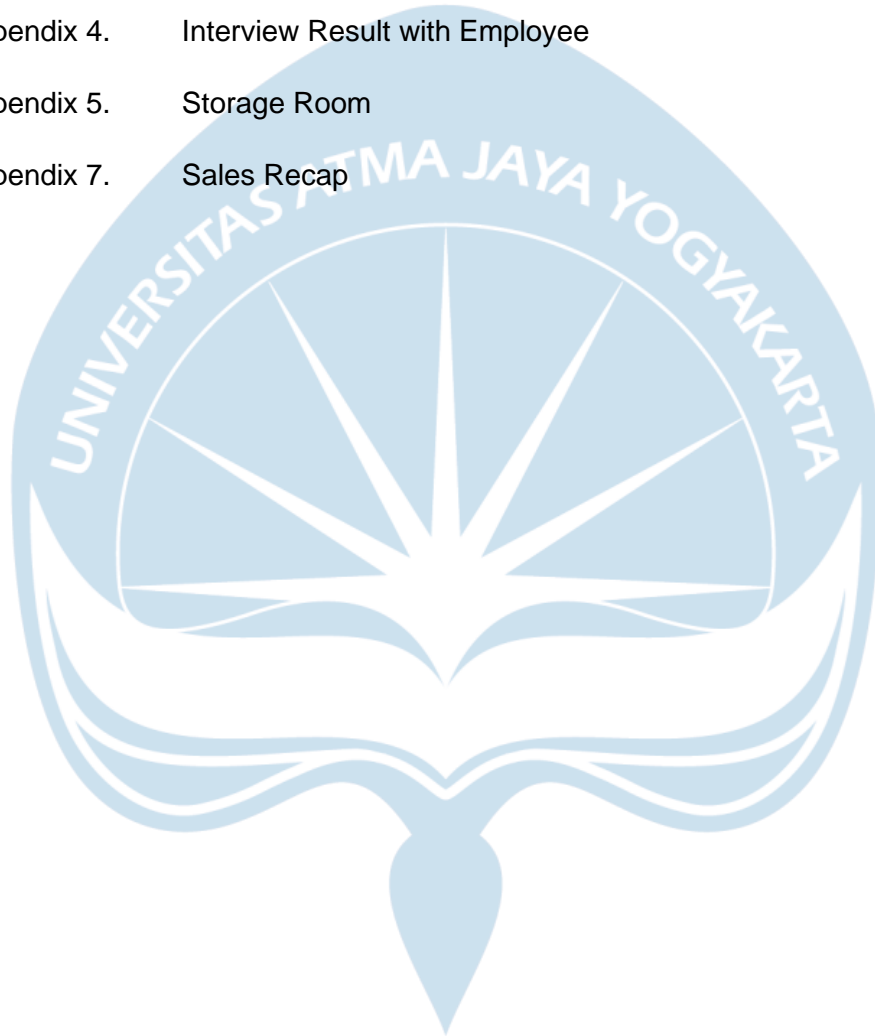
Table 6.8. Simulation Scenario 1, Period = 6 Days	43
Table 6.9. Simulation Scenario 2, ROL = 69	44
Table 6.10. Simulation Scenario 2, ROL =75	45
Table 6.11. Comparison of Total Inventory Cost from Simulation and Actual	46
Table 6.12. Possible Combination of Decision Variables	48
Table 6.13. Possible Combination of Decision Variables	49
Table 6.14. Simulation Scenario 1, Period = 4	50
Table 6.15. Simulation Scenario 1, Period = 5	51
Table 6.16. Simulation Scenario 1, Period = 6	52
Table 6.17. Simulation Scenario 1, Period = 7	53
Table 6.18. Simulation Scenario 2, ROL = 10	54
Table 6.19. Simulation Scenario 2, ROL = 15	55
Table 6.20. Simulation Scenario 2, ROL = 20	56
Table 6.21. Comparison of Total Inventory Cost from Simulation and Actual	57

## LIST OF FIGURES

Figure 2.1 Reorder Point Curve	11
Figure 2.2 Input Analyzer Main Menu	13
Figure 2.3 Input Analyzer After Data Import	14
Figure 3.1 Preliminary Research Flowchart	16
Figure 3.2 Ideate and Selection Solution Flowchart	18
Figure 3.3 Prototype Stage Flowchart	19
Figure 3.4 Solution Implementation Flowchart	20
Figure 5.1 Kaisar Triseda 250 RX	30
Figure 5.2 Canteen X	31
Figure 5.3 GEA AB 336 330 Liter	31
Figure 5.4 Distribution Data of Chicken Demand	33
Figure 5.5 Distribution Data of Meat Demand	34
Figure 6.1 Calculation Result of the Actual Total Inventory Cost (Chicken)	46
Figure 6.2 Calculation Result of the Actual Total Inventory Cost (Meat)	57
Figure 7.1 Layout of the Spreadsheet	58
Figure 7.2 Trials for Chicken	59
Figure 7.3 Trials for Meat	59

## LIST OF APPENDICES

	PAGE
Appendix 1. Interrelationship Diagram	64
Appendix 2. List of Interview Questions	65
Appendix 3. Interview Result with Owner	66
Appendix 4. Interview Result with Employee	67
Appendix 5. Storage Room	68
Appendix 7. Sales Recap	70



## ABSTRACT

Canteen X is currently facing problems related to its income. During the first year of opening, Canteen X managed to get the highest profit of Rp.30,000,000.00 per month. However, as time goes by, many competitors show up, and the price of goods increases, making the profit gained by the Canteen decrease. These competitors also operate under the auspices of the company. Now Canteen X can only get a profit of around Rp.7,000,000.00. This canteen spent Hundreds of millions of rupiahs on the cost. Moreover, this canteen also experienced Rp.6,413,000 lost last September. The highest loss experienced by Canteen X was when they lost Rp.20,000,000.00. Because of this loss, the employees said that they did not get their salaries fully. The owner of the canteen was repeatedly attempting not to continue the business and switching to another business that might be more profitable. But at this time, the owner has not found another business that can be run and still hopes that this business can still be run. For that, improvement of Canteen X's feasibility to increase its profit will be conducted.

There are two alternatives that become considerations to solve the problem, which are labour management and inventory control. Further observation and interviews are conducted in advance. Multi-criteria decision analysis method is used to choose the best solution, and the result, inventory control, is the best solution. The methods used in this research are the Continuous Review Method and the Periodic Review Method, with the simulation done using Microsoft Excel software. These two methods are chosen because the methods can solve inventory problems for independent materials, whereas the materials are chicken and meat.

The results of this study are the quantity and period of the order of chicken and meat so that it can minimize the total inventory cost. Based on the simulation carried out for chicken, the best result is by applying the P model with six days period and TSL of 269 kg. Meanwhile, for meat, the best result is by applying the P model with six days order period and TSL of 40 kg. With the new inventory policy simulation, there is 21% of the money saved compared to the current inventory policy, and there is 45% of the money saved for meat.

**Keywords:** Periodic and Continuous Review, inventory control, simulation, inventory cost