ANALISA TEKNOEKONOMI RUMAH POTONG AYAM HALAL DI PEKANBARU

TUGAS AKHIR

Dianjurkan Sebagai Salah Satu Syarat Untuk
Memperoleh Gelar Sarjana Teknik Pada Program
Studi Teknik Industri

oleh :

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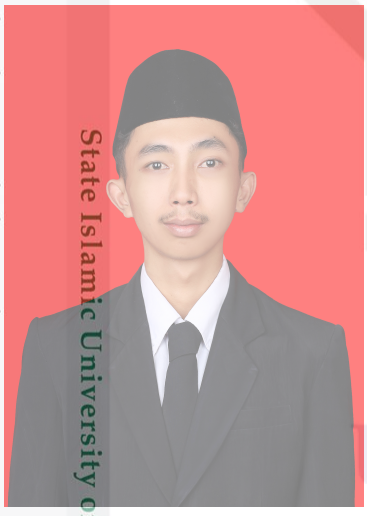

PROGRAM STUDI TEKNIK INDUSTRI
FAKULTAS SAINS DAN TEKNOLOGI
UNIVERSITAS ISLAM NEGERI SULTAN SYARIF KASIM RIAU
PEKANBARU
2024

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Tugas Akhir Program Studi Teknik Industri Fakutas Sains dan Teknologi Universitas Islam Negeri Sutan Syarif Kasim Riau yang tidak dipublikasikan ini terdaftar dan tersedia di Perpustakaan Fakultas Sains dan Teknologi Universitas Islam Negeri Sultan Syarif Kasim Riau, dan terbuka untuk umum dengan ketentuan bahwa hak cipta ada pada penulis. Referensi kepustakaan diperkenankan dicatat, tapi pengutipan dan peringkasan hanya dapat dilakukan seizin penulis dan harus disertai dengan kebiasaan ilmiah untuk menyebutkan sumbernya.

Memperbanyak atau menerbitkan sebagian atau seluruh Tugas Akhir ini haruslah memperoleh izin dari Dekan Fakultas Sains dan Teknologi Univesitas Islam Negeri Sultan Syarif Kasim Riau. Perpustakaan yang meminjamkan Tugas Akhir ini untuk keperluan anggotanya harus mengisi nama dan tanda tangan peminjaman dan tanggal pinjam.

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TECHNOECONOMIC ANALYSIS OF HALAL CHICKEN SLAUGHTERHOUSE IN PEKANBARU

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INTRODUCTION

The need for halal products is an impact of the increasing level of public awareness, especially Muslim consumers of Islamic laws and regulations in their lives. Islam teaches that the economic system covers all aspects of the economy, but currently it seems that the Islamic economic system is identical to the concept of finance and banking. The economic system in Islam which covers all aspects can be proven by reality, one of which is the guarantee of Muslim consumers (halal certification)(Ilyas et al., 2023).

As the population grows, the need for halal food increases. The Central Bureau of Statistics (BPS) in 2021 reported that the demand for broiler chicken was 16,977,970 kg and increased in 2021 to 17,317,530 kg. The consumption of broiler meat is the largest compared to the consumption of other types of meat. As the population increases, the need for halal food increases and the opportunity for halal-certified chicken slaughter is getting bigger.

Most of the chicken slaughterhouses in Pekanbaru have not been registered with the Halal Product Guarantee Agency (BPJPH). RPAs that have not been registered with BPJPH are mostly Micro, Small and Medium Enterprises (MSMEs). BPJPH states that there are only 12 RPAs that have been halal certified (Anggraini, interview, August 16, 2023).

Of the 12 halal-certified RPAs in Pekanbaru, 4 halal-certified RPAs were selected as a reference to determine the Ideal RPA.

Based on observations that have been made in several chicken slaughterhouses in Pekanbaru, chicken slaughterhouses in Pekanbaru that have been certified halal have several differences with chicken slaughterhouses that have not been certified halal. Chicken slaughterhouses that are halal certified have characteristics such as slaughtering by saying Basmalah and slaughtering is done by cutting the respiratory tract, digestive tract and arteries with a sharp knife. Then the halal-certified slaughterhouse has its own chicken slaughterhouse for blood collection from the chicken slaughter process.

Based on the results of interviews with several owners of chicken slaughterhouses that have not been halal certified in Pekanbaru, the reason the RPA is not halal certified is because there are still many people in Pekanbaru who consume chicken produced by RPAs that are not halal certified. Then the additional costs required to make the RPA certified caused some RPAs not to take care of the halal certificate. Nevertheless, it is recommended that all RPAs in Pekanbaru should have a halal certificate in order to have a greater opportunity to attract consumers.

The technoeconomic study aims to provide an overview of the technical, economic and environmental aspects of the feasibility of the plant to produce halal chicken. The technoeconomic analysis calculation aims to determine the cost of goods produced (HPP), the Break Event Point (BEP) value and the Payback Period (PBP) value when the production process in the chicken slaughterhouse takes place. The results of this technoeconomic study are expected to provide answers to the feasibility of producing slaughtered chicken in halal chicken slaughterhouses (Hardiansyah, et al. 2023).

The techno-economic analysis will certainly help or provide an overview to chicken slaughterhouse owners in Pekanbaru to find out the information needed to make chicken slaughterhouses halal certified.

Of the 12 halal-certified RPAs in Pekanbaru, 4 halal-certified RPAs were selected as a reference to determine the Ideal RPA. The 4 RPAs are UD. Melati Broiler, Ikhwan RPA, Lafina RPA and Zidan RPA. The 4 selected RPAs use relatively the same cost components and initial investment tools such as chicken cages, chicken feeders, gloves, sapatu boots, aprons, slaughter knives, cutting knives, blood and feather collection tanks, chicken storage tanks after slaughter, chiling tanks, 3kg LPG gas, iron stoves, chicken feather plucking machines, chicken washing tubs, chicken draining tables, slaughter tables, 20kg analogh scales, 10kg hanging scales, waste bins, cleaning tools.

The 4 RPAs selected for study have different initial investment costs. Where the difference in initial investment costs is due to different places, times and quality of materials. The 4 RPAs that have been studied also have different Overhead cost depreciation costs because they have different locations, locations and needs.

Table 1. Cost Components of Already Researched RPAs

RPA Name	Cost (IDR)
Initial Investment Cost	
UD. Melati Broiler	31.155.000
RPA Ikhwan	30. 469.000
RPA Lafina	31.713.000
UD Zidan	33.703.000
Depreciation Cost	
UD. Melati Broiler	1.920.000
RPA Ikhwan	2.160.000
RPA Lafina	2.192.000
UD Zidan	2.240.000
***Overhead* Cost**	
UD. Melati Broiler	86.280.000
RPA Ikhwan	38.400.000

RPA Lafina	67.592.000
UD Zidan	84.980.000

The Ideal RPA that will be studied takes the best data from the 4 RPAs that have been studied previously in terms of initial investment costs, depreciation costs and overhead costs that are effective and efficient in terms of price, place, and basic RPA needs.

LITERATURE REVIEW

Poultry Slaughterhouse

Poultry slaughterhouse based on SNI 01-6160-1999 is a building designed and built to meet the technical requirements and used as a place for slaughtering chickens for public consumption which is engaged in the service of slaughtering live chickens that are further processed Slaughtered Poultry is any type of bird that is farmed and utilized for food, including chickens, ducks, turkeys, geese, pigeons and quails.

Poultry Slaughterhouse Location Requirements

Based on SNI 01-6160-1999 these requirements include:

1. Does not conflict with the General Plan of Spatial Planning (RUTR), the local Plan, Detailed Spatial Planning (RDTR) and/or the City Region Section Plan (RBWK).
2. Not located in a densely populated part of the city and located lower than residential areas, not causing environmental disturbance or pollution.
3. Not near metal and chemical industries, not in flood-prone areas, free from smoke, odors, dust and other contaminants.
4. Have sufficient land for the development of a Poultry Slaughterhouse.

Meanwhile, according to (Directorate Team of Veterinary Society, 2021), the location of the Abattoir-U must meet the following requirements:

1. In accordance with the Regional Spatial Plan (RTR) and Detailed Spatial Plan (RDTR) of the area designated as an agribusiness or industrial area
2. Not located in areas prone to flooding, prone to landslides and areas that can contaminate poultry meat (landfills, metal and chemical industries smoke, odor, dust and other contaminants)
3. Does not cause environmental disturbance and pollution (has WWTP in accordance with the scale of slaughtering)
4. Access to sufficient clean water for poultry slaughtering and cleaning and disinfection activities (minimum clean water requirement of 10 liters/head)
5. Road access is available according to road class that can be used for poultry transportation and poultry carcass transportation.
6. Close to rivers and sewers that are permitted for liquid waste disposal that have reached wastewater quality standards.

Law Number 33 of 2014 concerning Halal Product Guarantee.

Law Number 33 of 2014 concerning Halal Product Guarantee straightforwardly explains what norms to fulfill a product called a halal product, in this law only provides certainty and certainty for the Muslim population. To obtain halal products, every product is marketed and spread in Indonesia, on the grounds that different laws and guidelines identified with halal products do not provide legal guarantees and certainty, especially for animal products, as described in Articles 7 and 8 of Law No. 2014, where the Halal Product Guarantee Agency, the Indonesian Ulama Council and the Halal Examining Agency, namely assisting services or institutions that are potentially reliable,.

BPJPH with the government affairs department in the field of agriculture cooperates for assurance in slaughterhouses and animal needs, as well as animal meat regulations,

veterinary management of animal products and food divisions, quality assurance systems, and the safety of agricultural products (Law No. 33, 2014).

Technoeconomics

Technoeconomic studies include decision making, which is constrained by a number of problems, especially in providing optimal choices from many possible alternatives. Technoeconomic studies are intended to be used as a decision-making tool (Herdhiansyah, Saleh, and Alwi 2023).

Decision making in technoeconomic studies is divided into two categories, namely finance and technology. To ensure the financial factors will be evaluated using several metrics, namely Net Present Value (NPV), Benefit Cost Ratio (BEP), Internal Rate of Return (IRR), Payback Period (PP), and Break Even Point (BEP) (Herdhiansyah, Saleh, and Alwi 2023).

Cost

Mulyadi (2015) states that in a broad sense, costs are sacrifices of economic resources, measured in units of money, that have occurred or are likely to occur for certain purposes. In a narrow sense, cost can be interpreted as a sacrifice of economic resources to obtain assets (Pomantow, Tinangon, and Runtu 2021).

Firdaus Dunia et al. (2018) state that the definition of costs is expenses or the value of sacrifices to obtain goods and services that have benefits for the future. Hansen and Mowen (2016) state that costs are cash or cash equivalent values sacrificed to obtain goods or services that are expected to provide current or future benefits to the organization (Pomantow, Tinangon, and Runtu 2021).

Production Cost

Definitions of costs from several economists are as follows: According to Mulyadi (2013), “cost is a sacrifice of economic resources measured in units of money that has occurred or is likely to occur for a specific purpose.” Meanwhile, according to Supriyono (2014), “cost is the acquisition price that is sacrificed or used in order to obtain income and will be used as a deduction from income.” (Rozi and Shuwiyandi 2022).

According to Hansen and Mowen (2013), “costs are cash sacrificed to obtain goods or services that are expected to provide current or future benefits to the organization”. The object of determining costs is made in order to identify whether a cost is included in the cost price category or is an expense (Rozi and Shuwiyandi 2022).

RESEARCH METHOD

Calculation of Cost of Goods Manufactured

Cost of Goods Manufactured is a set of costs during the production process, during the production process itself there are raw material costs, employee costs to make the product, and also costs outside of raw materials and employees or commonly referred to as overhead costs. There are two types of overhead costs, namely variable and fixed overhead (Fadli and Rizka ramayanti 2020). The following cost data used can be seen in Tables 2 - 3.

Table 2. Raw Material Cost.

Cost Component	Needs/Year (kg)	Cost per kilogram (IDR)	Total Cost (IDR)
Chicken	156,000	22,000	3,432,000,000
Feed	936	16,500	15,444,000
Total			3,447,444,000

Table 3. Factory Overhead Costs.

Production Equipment	Cost (IDR)
Electricity	600,000
Depreciation	1,600,000
Building Rental	14,400,000
Hygiene	240,000
Workforce	36,000,000
Machine Maintenance	780,000
Engine fuel	6,240,000
Total	**59,860,000**

Break Event Point Calculation

Break Even Point is a situation where the company in its operations does not make a profit and also does not suffer losses or in other words the total cost is equal to the total sales so that there is no profit and no loss (Jayanti and Hartanti 2019).

$$\text{BEP (unit)} = \frac{Fixed\ cost}{Hlling\ price\ per\ unit - Variable\ cost\ per\ unit}$$

$$\text{BEP (currency)} = \frac{Fixed\ cost}{1-(variable\ cost\ per\ unit/sales\ price\ per\ unit)}$$

Payback Period Calculation

Payback period is a method of how long an investment will return or the period required to recoup investment expenditures using cash flow (Lubis et al. 2023). The criteria for the feasibility of investment acceptance using the payback period method is that an investment is declared feasible if the payback period is shorter than the maximum payback period (Abuk and Rumbino 2020).

$$\textit{Payback periode} = \frac{\text{Initial investment}}{\text{Net Cash / Year}} \text{ x 1 year}$$

Net Present Value

A method to calculate the difference between the value of an investment and the present value of future net cash receipts. In calculating the present value, it is necessary to first determine the relevant interest rate (Hasugian, Ingrid, and Wardana 2020).

$$NPV = \sum \frac{A_t}{(1+r)_t} - I_0$$

Description :
I_0 = initial investment value
A_t = net cash flow in period t
r = *discount rate*
t = period (project life)

RESULT

The Ideal RPA production target is 13,000kg/month, with 26 working days a month. Thus the estimated production is approximately 156,000kg/year. **TABLE 4** shows that the selling price of 1 kg of chicken is Rp. 25,000. In the 4 RPAs that have been

studied previously, the price of 1 kg of chicken is sold at Rp. 25,000 - Rp. 28,000. This means that the ideal RPA is able to compete with other RPAs.

Table 4. Unit Selling Price

Cost Component	Total Cost (IDR)
Raw Material Cost	3,447,444,000
Factory Overhead Costs	59,860,000
Labor Cost	36,000,000
Total	3.543.304.000
Production Cost	22.352
Profit Margin (10%)	2.253
Unit Selling Price	24.785

TABLE 5 shows that the production target of 156,000 kg obtained BEP of 17,943 kg or gross revenue of Rp. 448,275,862. This calculation is based on fixed costs, variable costs and selling price. This means that until 17,943 kg is sold, the profit margin covers the operational costs generated before reaching the profit point. Furthermore, the value of 17,943 kg is smaller than the production target in a year of 156,000 kg, indicating that BEP is obtained in year 2 of sales.

Table 5 *Break Event Point*

Cost Component	Total Cost
Fixed Cost	
Permanent employees	36.000.000
Depreciation	1.600.000
Building rent	14.400.000
Total	52.000.000
Non-fixed costs	
Raw material cost	3.432.000.000
Additional costs	100.000
Electricity	600.000
Total	3.536.866.000
Cost of chicken/kg	22.000
BEP (IDR)	448.257.862
BEP (Unit)	17.943

The Payback Period is calculated using the annual cash flow obtained from the projected profit and loss over the assumed 5-year business period. Therefore, the revenue for the next 10 years is calculated assuming an annual revenue increase of 10%. **Table 6** shows the estimated annual revenue. In addition, the projected profits and losses from the income are also accounted for by the 30% tax that has been regulated in the HPP Law No.7 of 2021.

Table 6. Estimated Revenue per Year

Year	Revenue	Value (IDR)
1	Revenue 85%	Rp. 3,315,000,000
2	Revenue 95%	Rp. 3,705,000,000
3	Revenue 105%	Rp. 4,095,000,000
4	Revenue 115%	Rp. 4,485,000,000
5	Revenue 125%	Rp. 4,875,000,000
Total Average Revenue/Year		Rp. 4,095,000,000

Table 7 shows the projected profit and loss in 5 years. The cash flow is then realized based on the projected net profit. Since the amount is not the same each year, it needs to be found each year by considering the initial investment cost.

Table 7. Projected RPA profit-loss calculation

	Year to (IDR)					Amount (IDR)	Average (IDR)
	1	2	3	4	5		
Revenue	3,315,000,000	3,705,000,000	4,095,000,000	4,485,000,000	4,875,000,000	20,475,000,000	4,095,000,000
Cost Operational	3,500,044,000	3,500,044,000	3,500,044,000	3,500,044,000	3,500,044,000	7,500,220,000	3,500,044,000
Gross Profit	-185,044,000	-204,956,000	594,956,000	984,956,000	1,374,956,000	2,564,868,000	512,973,600
Before Tax							
30% tax	-129,530,800	-143,469,200	416,469,200	689,469,200	. 962.469.200	832,938,400	208,234,600
Net Profit	-55,513,200	-97,486,800	178,486,800	295,486,800	412,486,800	733,460,400	146,692,080

Table 8 shows the resulting initial investment costs of the required production equipment.

Table 8. Initial Investment Cost

No	Production Equipment	Cost (IDR)

1	Chicken Coop	1,000,000
2	Chicken Feed Bin	160,000
3	Gloves	120,000
4	Boots	300,000
5	Apron	150,000
6	Slaughter Knife	80,000
7	Cutting Knife	320,000
8	Chicken blood and feather collection tank	200,000
9	Chicken holding tank after slaughter	540,000
10	Chiling Tub	2,500,000
11	3kg LPG gas	720,000
12	Iron stove	455,000
13	Chicken feather plucking machine	10,000,000
14	Chicken washing tub	200,000
15	Chicken Draining Table	3,000,000
16	Cutting Table	5,000,000
17	20kg analogh scale	300,000
18	10kg hanging scale	25,000
19	Garbage Tub	1,500,000
20	Cleaning Tools	100,000
	Total	**26,670,000**

Table 9 shows the payback period obtained for 2 years. Therefore, this RPA obtained a net profit in year 2, covering operational costs, taxes and investment costs. This shows that the investment value is good or feasible because the payback period is obtained before the assumed business duration of 5 years.

Table 9. *payback period*

Year	Net profit (IDR)	Depresiasi	Cash flow (IDR)	Cumulative cash flow (IDR)
1	-55.513.200	1.600.000	-53.913.200	-53.913.200
2	-97.486.800	1.600.000	-95.886.800	-149.800.000
3	178.486.800	1.600.000	180.086.800	30.286.800
4	295.486.800	1.600.000	297.086.800	327.373.600
5	412.486.800	1.600.000	414.086.800	741.460.400

The interest rate used in this study is based on the average Credit Base Rate of corporate Conventional Commercial Banks published by the Indonesian Financial Services Authority in December 2023, which is 9%. Data processing shows a positive NPV value of Rp. 488,484,186. This means that the net present value of the next 5 years if projected to the present is considered good because the NPV value> 0. NPV calculation using an interest rate of 9% as follows **Table 10**.

TabLE 10. *Net Present Value*

Year	Cash flow (IDR)	Interest rate (%)	Present value (IDR)
0	-26.670.000		
1	-53.913.200	9	-26.670.000
2	-95.886.800	9	-149.800.000
3	180.086.800	9	30.286.800
4	297.086.800	9	327.373.600
5	414.086.800	9	741.460.400
Net present value			488.484.186

CONCLUSION

Based on the results and discussion, the cost of production obtained amounted to Rp.22,352 / kg and the selling price amounted to Rp. 24,785 / kg with a desired margin of 10%. The BEP Unit obtained is Rp. 17,943 and the BEP Rupiah is Rp. 448,275,862. Payback period obtained for 2.4 years. This value is feasible because it is smaller than the assumption of a business period of 5 years. NPV with an interest rate of 9% for 5 years also shows a positive value of Rp. 488,484,186. From the data obtained, it can be concluded that the ideal RPA can be used as a reference for RPA-RPA to make their RPA into a halal-certified RPA.

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