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FINANCIAL FEASIBILITY STUDY OF FISH PROCESSING FACTORY OF PT XYZ

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Abstract. *PT XYZ specializes in fish processing, which includes collection until the whole cleaning process and trading activities. In order to support Indonesian government goals to enlarge the export of Indonesia fisheries product in 2019, PT XYZ supports all applicable processes and regulation set by the Indonesian government. To obtain one of the requirements, that is Hazard Analysis Critical Control Points (HACCP) certificates, PT XYZ needs to have its own fish processing factory. However, the company need to assess the feasibility of this new fish processing factory investment project, which requires a huge investment. The aim of this paper is to analyze the financial feasibility using capital budgeting method and risk assessment in capital budgeting using sensitivity analysis and Monte Carlo simulation. The result of this research will be the feasibility analysis of the investment project, whether the project is feasible to be executed or not, and recommendation for the company as a consideration in deciding the investment project.*

Keywords: *Financial Feasibility; Capital Budgeting; Risk in Capital Budgeting*

INTRODUCTION

Indonesia is a country that is very rich in natural products. Indonesia managed to export various types of commodities to other countries. As the largest archipelago state in the world which has more than 17,000 islands, Indonesia is abundant for its marine resources, which make them rely on protein from the ocean to feed its population. The marine and fisheries sector is expected to be the dominant sector for economic growth in Indonesia. In 2019, fisheries commodities come to be an influential export contributor for the country, it ranked in 19th from 50 non-oil and gas commodities. Fisheries commodities contribute 2.02% for Indonesia export in 2019, which slightly increase from the previous year, 1.98% contribution in 2018 (Badan Pusat Statistik, 2019). However, fisheries GDP growth was decreasing from 5.7% in 2017 to 5.2% in 2018 (Badan Pusat Statistik, 2019). The government of Indonesia highly encourages the development of fish processing and canning industry. The government focuses on quadrupling its fisheries production and export in 2019 for development. This goal leads the government to strengthen regulation related to fisheries commodities, especially for the export area. The government has issued various policies to support the proliferation of the industry at the same time upholding the principles of sustainable fishing. Indonesian government oblige all fish processing units to commence fulfilling the requirements set by the government through *Badan Karantina Ikan Pengendalian Mutu dan Keamanan Hasil Perikanan* (BKIPM).

PT XYZ is a processor and exporter of Indonesia seafood products. PT XYZ specializes in fish processing, which includes collection until the whole cleaning process and trading activities. In order to support Indonesian government goals to enlarge the export of Indonesia fisheries product in 2019, PT XYZ supports all applicable processes and regulation set by the Indonesian government. To obtain one of the requirements, that is Hazard Analysis Critical Control Points (HACCP) certificates, PT XYZ needs to have its own fish processing factory. Based on the interview, the Board of Directors wants to know the feasibility of this investment project and its risk. The boards want to take the right step when they make decisions because after all the one of the company's purpose is to maximize shareholder's wealth. Therefore, this study aims to determine whether the investment project is feasible or not.

LITERATURE REVIEW

A financial feasibility study is an analytical tool for evaluating the operating performance and financial condition of the investment and forecasting for the future (Fabozzi & Peterson, 2003). Applies the same with a feasibility study, financial feasibility study also needs to be conducted before developing the investment project. It can prevent the waste of valuable time and loss when determining early that the investment project proposal is not financially worthy (Hofstrand & Mary, 2009). The feasibility study can be analyzed by several basic business analysis tools, one of them is capital budgeting which useful to analyzing changes that will have continuing effects for long-run, and the impact will vary over time (Christensen, 2000).

Capital budgeting is the process of planning and monitoring the reinvestment and continuing investment of the company. In any capital investment, there is a commitment to the company's funds into a project that will return the invested funds or some portion

of the funds during future periods. In evaluating a capital expenditure proposal, there are several techniques that classified into six. Academics generally divided them into "naïve" or "sophisticated" based on their theoretical rigour. The first three techniques that incorporate the concept of the discounted cash flows (DCF) are net present value (NPV), internal rate of return (IRR), and Profitability Index (PI), which are typically classified into sophisticated techniques. While the next three techniques are payback period, discounted payback period and accounting return on investment (AROI), which are typically classified as naive techniques (Freeman & Hobbes, 1991). However, the research will only use NPV, PI, IRR, payback period, and discounted payback period as the techniques in an environment certainty (Gitman & Zutter, 2015).

Net Present Value (NPV) is one of the DCF techniques to evaluate the investment project proposal. NPV is the difference between the present value of future cash inflows and outflows generated by the investment project, including the initial capital investment. It used to calculate the profitability of a projected investment project (Gitman & Zutter, 2015). The variation of NPV is called Profitability Index (PI). It is the ratio of the present value of future net cash flows to the initial cash outflow. The NPV and PI give the same signal (Horne & Jr, 2008). On the other hand, Internal Rate of Return (IRR) known as the discount rate that makes NPV of all cash inflows of a project equal to zero because the present value of cash inflows equals with the initial investment. It is the return rate that the company will earn if it invests in the project. It is needed to calculate IRR as a good complement to NPV. The payback period is explaining the required time for the company to recover its initial investment in a project, as calculated from cash inflows. It is commonly used to evaluate the investment project proposal (Gitman & Zutter, 2015). However, the payback period does not explicitly consider the time value of money. The discounted payback period is a superior version of payback period because it incorporates the time value of money (Lin, 2011). To give a more accurate estimate on when the firm can expect a return from its investment, the discounted payback period can be used for calculation.

In determining the expected return on investments project for investors, the weighted average cost of capital (WACC) needs to be calculated. The WACC is the expected cost of its various type of capital, debt and equity, weighted to include the relative share of debt and equity in the total capital structure. The company's WACC is generally speaking required return for the whole firm (Gitman & Zutter, 2015).

In the capital budgeting, it assumed a level of risk of the investment projects for the firm has the same level. In other words, it assumed that all projects are equally risky, and the acceptance of any project would not change the company's overall risk (Gitman & Zutter, 2015). In real situations, investment projects often have a different level of risk since they are not equally risky (Horne & Jr, 2008). Risk in capital budgeting is defining the uncertainty surrounding cash flows that will generate in the future by the investment project. To be precise, it is the degree of variability of cash flows. The project with a broad range of possible cashflows is riskier than the narrow one, and vice versa. To asses project risk and return fully, the variability issue needs to be considered. Simulation analysis can be used to deal with the project risk issue (Gitman & Zutter, 2015). This research will use Monte Carlo simulation as the method has been widely used for decades. Monte Carlo simulation often used in capital budgeting and investment decisions (Kwak & Ingall, 2007). The simulation will show a clearer representation of possible future cash flow of the project (Baker & English, 2011). Thus, the Monte Carlo simulation analysis need to entail a sensitivity analysis as a peculiar and critical value (Saltelli, Tarantola, Campolongo, & Ratto, 2004).

METHODOLOGY

This research is categorized as applied research which gathers information to assess the feasibility of a project and its acceptability in the long run. The primary data gathered by an in-depth interview with PT XYZ to ensure a greater level of depth of understanding of PT XYZ condition. To support the in-depth interview, secondary data collected from PT XYZ.

The data analysis of this research divided into five stages. The first stage is constructing pro forma financial statement without the replacement project which breaks down into determining the assumption of each account in financial statements without the replacement project then constructing pro forma income statement, balance sheet, and cash flows for the next 10 years. Last, calculate capital budgeting cash flow without the replacement project results in generating the FCFF without the replacement project. The second stage is constructing pro forma financial statement with the replacement project which breaks down into determining the assumption of each account in financial statements with replacement project then constructing pro forma income statement, balance sheet, and cash flows for the next 10 years. After that, the WACC with the replacement project will be calculated and ended with calculating capital budgeting cash flow with the replacement project, results in generating the FCFF with the replacement project.

The third stage is calculating the incremental FCFF. It can be obtained by subtracting the FCFF with replacement project and FCFF without replacement project. To evaluate the replacement project proposal, the feasibility analysis needs to be done in stage 4 to know whether the project is feasible to go or not. To assess the feasibility, several techniques need to be calculated. This research

will use NPV, PI, IRR, payback period, and discounted payback period to assess the feasibility of replacement project proposal. The result of incremental FCFF will be needed to assess the project. Although in stage 4, the replacement project proposal can be evaluated based on the NPV, PI, IRR, payback period, and discounted payback results, the risk issue needs to be considered. Simulation analysis can be used to deal with the project risk issue. In the last stage, Monte Carlo simulation analysis will be run to provide an excellent basis since it allows them to see a continuum of risk-return trade-offs rather than a single-point estimate.

FINDINGS AND ARGUMENT

The initial investment will take place at the time when the expenditure is made, at time zero. It represents the required fund to establish the factory. The total value of the initial investment cost amounts to Rp 4,994,870,720.00. The composition of the cost can be clustered into investment in building, plant, equipment, furniture, and fixtures. The company will use 100% debt, taking a loan from a bank to fulfil all the fund needed in the investment as its financing strategy.

Scenario A

PT XYZ currently only have one revenue streams, which is frozen fish sales. Under Scenario A, it represents the condition of the company, which only have one product as their revenue. Based on this Scenario, the data will be analyzed using the stages, as stated in methodology. PT XYZ used 100% debt to fund the factory project. The total debt will be the same as the initial investment that is IDR 4,994,870,720.00. The company will have long-term debt by applying for a bank loan with the interest rate of 11.75% and tenor of 10 years while the corporate tax rate is 38%. Therefore, the cost of debt after tax is 7.29% by multiplying the cost of debt with (1-corporate tax rate).

The method that used to calculate the cost of equity is the Capital Asset Pricing Model (CAPM) approach. To figure out the cost of equity, it requires to realize the risk-free rate, the beta of the company, and the expected return of the market. To defined the risk-free rate value, it obtained from IBPA 10 Years Government Bond. The beta of the company obtained from the benchmark company, DSFI.JK, since PT XYZ is a private company which does not have any stocks issued to the public. The return of the market calculated from the daily return of Jakarta Composite Index in the past ten years. Based on these, the risk-free rate is 8.14%, the levered beta of the company is 1.59, and the market return is 14.82%. Based on the components, the cost of equity is 16.07% by calculating using the CAPM formula. Therefore, the weighted average cost of capital (WACC) of PT XYZ is 14.77% with a weight of 14.80% debt and 85.20% equity.

Based on the assumption and the data described above, the incremental FCFF after the investment project can be calculated. The incremental FCFF will be explained in table 1 below.

Table 1: PT XYZ Incremental Free Cash Flow to the Firm Projection Calculation - Scenario A

	2018	2019E	2020F	2021F	2022F	2023F	2024F	2025F	2026F	2027F	2028F
FCFF without replacement project	(32,551)	7,926	4,822	5,451	6,123	6,908	7,858	8,951	10,137	11,556	66,784
FCFF with replacement project	(27,556)	7,181	4,260	4,781	5,384	6,079	6,877	7,790	8,834	10,023	65,777
Incremental FCFF	**(4,995)**	**745**	**562**	**670**	**739**	**829**	**981**	**1,161**	**1,303**	**1,533**	**1,007**

in a million IDR unless otherwise stated

The NPV can be calculated using the discounted FCFF using WACC of 14.77% as the discount rate. The result of the net present value is IDR (630,178,498.71) with the PI of 0.87. The negative NPV and PI lower than 1 indicates the project is not feasible to be executed since it will be projected to give a negative return in the next 10 years. Moreover, the results of IRR is 13.23%, which is lower than its WACC. Based on the overall result under Scenario A, it shows that the project is not feasible to be executed. There is no need for going further to the risk analysis since the project is not feasible to be executed by the company based on capital budgeting techniques. However, to seek another great opportunity for the company, another Scenario needs to be built. Looking back to the production capacity of the new factory, it turns out the company have not yet maximized their factory production capacity. PT XYZ can maximize their factory production capacity by generating other revenue streams since the factory production capacity is much higher than the quantity of frozen fish. Based on this situation, there will be another Scenario to be analyzed.

Scenario B

To maximize company production, PT XYZ can generate other revenue streams besides frozen fish sales. The company can offer its whole-cleaned process service to other companies in the fishery industry. Based on the interview with the company, there are still many other companies in the industry that do not have their factory. They need to use third parties when it comes to the

whole-cleaning process for their product. PT XYZ has great opportunities to enter the market and take part in the market share. Scenario B will represent PT XYZ is generating other revenue streams, that provides whole-cleaned processing service to the market. Therefore, PT XYZ will have two revenue streams that are frozen fish sales and whole-cleaned processing service. Based on this Scenario, the data will be analyzed using the same stages as before.

The WACC of Scenario B will remain the same as Scenario A since there are no changes in the capital structure. The WACC is 14.77% with 7.29% cost of debt after tax and 16.07% cost of equity. Based on the assumption and the data described above, the incremental FCFF after the investment project can be calculated. The incremental FCFF under Scenario B will be explained in table 2 below.

Table 2: PT XYZ Incremental Free Cash Flow to the Firm Projection Calculation - Scenario B

	2018	2019E	2020F	2021F	2022F	2023F	2024F	2025F	2026F	2027F	2028F
FCFF without replacement project	(32,551)	8,101	5.970	6,854	7,784	8,869	10,166	11,661	13,312	15,131	72,617
FCFF with replacement project	(27,556)	7,181	4,260	4,782	5,384	6,079	6,877	7,790	8,834	10,023	65,776
Incremental FCFF	**(4,995)**	**920**	**1,710**	**2,072**	**2,400**	**2,790**	**3,289**	**3,871**	**4,478**	**5,108**	**6,841**

in a million IDR unless otherwise stated

The NPV can be calculated using the discounted FCFF using WACC of 14.77% as the discount rate. The result of the net present value is IDR 8,868,198,450.02 with the PI of 2.78. The positive NPV and PI higher than 1 indicate the project is feasible to be executed since it will be projected to give a positive return in the next 10 years. The IRR, payback period, and the discounted payback period is calculated. The results of IRR is 27.10% while the payback period and the discounted payback period is 3.38 years and 4.23 years.

Risk Analysis: Sensitivity & Simulation Analysis

Under Scenario B, the result of feasibility analysis shown that the project seems feasible to be executed since all result met the criteria. However, to assess project risk and return fully, Monte Carlo simulation analysis will be executed. To execute the Monte Carlo simulation analysis, the sensitivity analysis will be conducted first to find the sensitive variable. In Monte Carlo simulation analysis, the sensitive variable defined as the assumption variables.

The result of sensitivity analysis, tornado chart of Scenario B, can be seen in Figure 1. Based on the top 10 variables, there is the only one that can be classified as sensitive variable since the NPV swing is higher than its input variable. However, since there is only one sensitive variable, the assumption variable in Monte Carlo simulation analysis will be defined by its sensitive variable and closest sensitive variable. The variables used are COGS process fee without replacement and COGS process fee with replacement. These variables defined as the assumption variable in Monte Carlo simulation analysis while the net present value defined as the forecast variable.

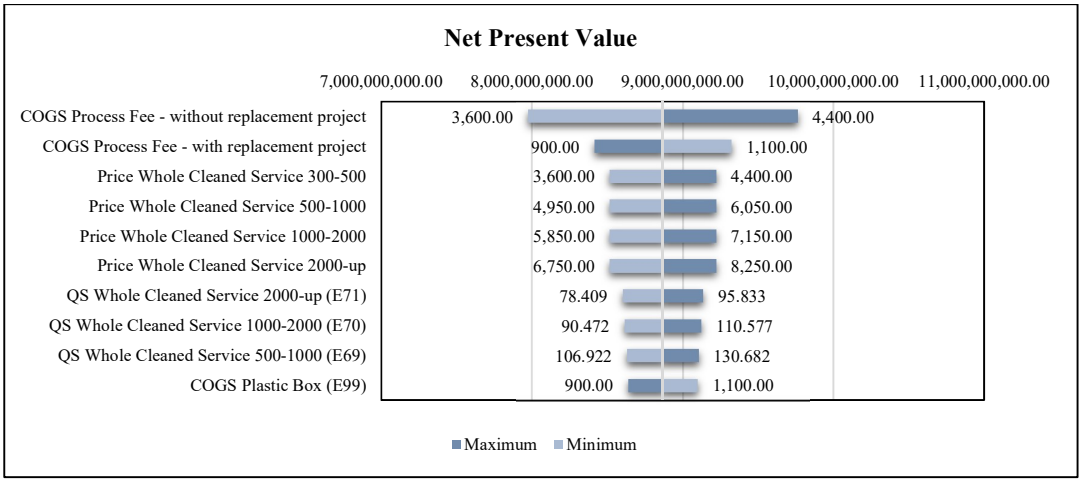

Figure 1: Tornado Chart - Scenario B

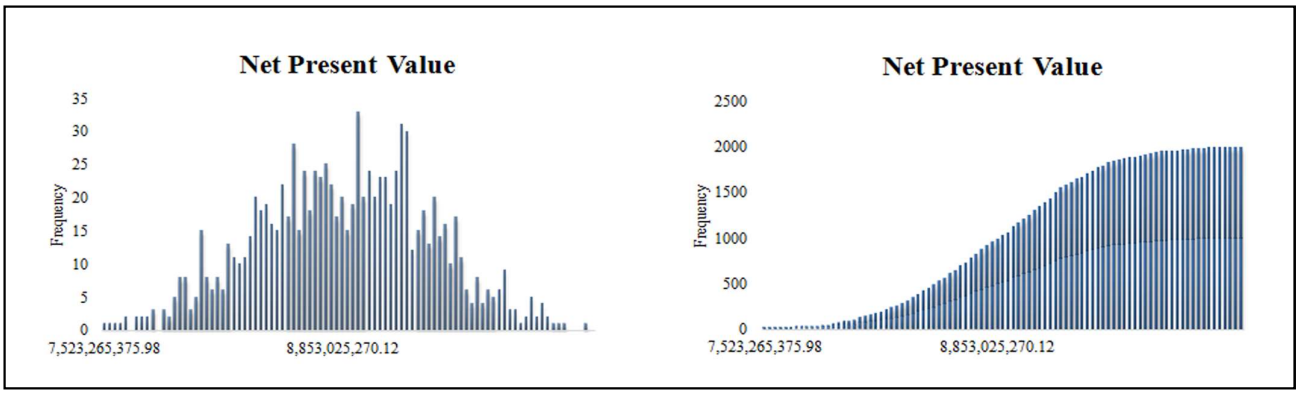

Figure 2: Monte Carlo Simulation - Scenario B

The Monte Carlo simulation analysis run for 1,000 trials with two assumption variables, as stated before, and one forecast variable that is the net present value. The Monte Carlo simulation analysis result can be seen in figure 2. The analysis results in 100% accumulated probability of NPV higher than 0 with base case NPV of IDR 8,868,198,450.02 and standard error of the mean in IDR 15,699,582.92. Based on this result, it can conclude that based on Scenario B, the replacement investment project of PT XYZ that is building a new fish processing factory has very low risk. Following the risk analysis, its ultimate purpose is to prepare for risk mitigation. Based on the sensitivity result, there are two sensitive variables which are the COGS process fee without replacement and COGS process fee with replacement. To mitigate the risk, the company can maintain the COGS process fee with replacement at IDR 1,000 or lower.

CONCLUSIONS

Based on the result, it can conclude that under Scenario B, the replacement investment project of PT XYZ that is building a new fish processing factory has the feasibility to be executed since all the criteria are met. It strengthens by the result of there is only one sensitive variable. However, the Monte Carlo simulation analysis run using its sensitive variable and the closest sensitive variables which results in the project has 100% accumulated probability of NPV higher than 0. This means that the fish processing factory has very low risk since there is only one actual sensitive variable after all the Monte Carlo simulation with one sensitive variable and closest variable also result in 100% accumulated probability of NPV higher than 0.

The results recommended PT XYZ to the executed replacement investment project. However, PT XYZ must maximize the production capacity utilization by executing Scenario B, which generates new revenue streams for the company by provides whole-cleaned processing service to the third parties. Otherwise, the project is not feasible to execute. If the company execute Scenario A, without generating new revenue streams, PT XYZ will face loss since all the capital decision techniques are not met the criteria. To mitigate the risk, the company can maintain the COGS process fee with replacement at IDR 1,000 or lower.

The research also found that in investment for this industry must consider the maximization of the production capacity since it is an important key. Without a maximization, the company will be at risk. This conclusion derived from the sensitive variable, which is the COGS process fee without replacement project and the result of Scenario A when the company have not maximized their production capacity. Looking back, under perfect competition market which the company is a price taker, if the company attempts to charge even a tiny amount more than the market price, it will unable to make any sales. Therefore, a maximization of the production capacity plays an important role here.

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