Feasibility Analysis of a Roof Tile Factory Business Using a Capital Budgeting Approach

Famelga Clea Putri[1]

[1]Department of Industrial Engineering, Universitas Indraprasta PGRI, Indonesia

ABSTRACT

Natural content that supports the need for raw materials and materials needed is provided by the nature around us, such as various plants, soil, water, natural stones, and others. Most of them can be further processed into raw materials for construction products, such as roof tiles and other infrastructure facilities. The financial feasibility aspect is important considering that the business can be categorized as a project, which requires a long payback period based on the accounting period. During this time period there are various things that are full of uncertainty which are influenced by the rate of inflation and bank interest rates, so that the value of investments issued and the income or money obtained now will be different from the value of money in the future, which is called with the value of time rather than money. It is hoped that the analytical tool will be able to provide consideration, input and anticipation for the future of the roof tile manufacturing unit project by paying attention to capital budgeting, which can then be analyzed from a financial aspect through payback period (PP), net present value (NPV), profitability index (PI) and internal rate of return (IRR). In the roof tile manufacturing business, the PBP is 1 year, 8 months, 6 days faster than the maximum period of 8 years of the project value, positive NPV of IDR 536,821,468, PI of 2,841 greater than number 1 and IRR of 14,835 greater than the cost value of capital 12%. As a basis for decision making through a capital budgeting approach through financial analysis.

*Corresponding Author

Name: Famelga Clea Putri
E-mail: famelgacle@gmail.com

INTRODUCTION

The need for materials to support the implementation of development in various sectors is increasing from time to time. By building more complete infrastructure and supporting facilities, it will also support local and national economic growth. Natural ingredients that support the need for raw materials and materials needed are provided by the nature around us, such as various plants, soil, water, natural stones, and others. Most of them can be further processed into raw materials for construction products, such as roof tiles and other infrastructure facilities.

Overall, various means are needed to meet all these needs, starting from land, equipment and initial production capital. This requires a fairly large investment value. Sources of investment capital are obtained from loan capital and company capital. Most of the capital is obtained from loans (credit) from banks or third parties with the consequence of increasing the cost of capital. The cost of capital will reduce the amount of income that must be received and this will also affect the company's proceeds during the period when the credit is embedded in the company so that care and careful consideration is needed by looking for a credit portfolio whose interest is as low as possible so as to contribute to the most efficient cost of capital. Investments whose value is very large for small-scale companies require accuracy in analyzing their feasibility.

This will be related to cooperative relationships and an extensive product marketing network in addition to meeting the needs of orders from customers considering that the results of product marketing will greatly influence the cash-in received by the company, therefore if marketing does not experience significant obstacles, then the next analysis is feasibility from a financial aspect. The financial feasibility aspect is important considering that the business can be categorized as a project, which requires a long payback period based on the accounting period. During this period of time there are various things that are full of uncertainty which are influenced by the rate of inflation and bank interest rates, so that the value of investments issued and the income or money obtained now will be different from the value of money in the future, which is called with the value of time rather than money. In financial management, to take into account this uncertainty, the value of money in the future can be calculated now by paying attention to the discount factor aspect or the present value of money obtained now for the future.

The discount factor can be determined by taking into account inflation and current bank interest rates, using the present value (PV) table. then the future value of money can be calculated now. Another feasibility that needs attention is the rate of return on investment value. The rate of return on investment is calculated from the positive present value as a greater indicator of feasibility which is usually calculated from the level of the project's ability to return the investment value by a certain percentage, which is called the internal rate of return (IRR) method. Another method that can be used to complete the next feasibility analysis is the profitability index (PI), namely by comparing the present value of planned future net cash inflows with the present value of investments that have been implemented with The measure of feasibility is the ratio of present value cash in to present value cash out. It is said to be feasible if the PI value is greater than the number 1 (one).

By using these various analytical tools, it is hoped that we will be able to provide consideration, input and anticipation for the future of the roof tile manufacturing unit project by paying attention to capital budgeting, which can then be analyzed from a financial aspect through payback period (PP), net present value (NPV) , profitability index (PI) and internal rate of return (IRR).

RESEARCH METHODS

The steps for preparing research are as follows:
1. Identification stage Field studies carried out during research at the Roof Tiles Factory. In this stage, an introduction and understanding of the costs required by the company is carried out.
2. Background of the Problem The background to this research is that the financial conditions at the roof tile factory are not well organized and there is no proper bookkeeping. This causes income each month to be uncertain.

3. Literature Study A literature study was carried out to look for theories regarding the preparation of capital budgeting at the Tile Factory which includes calculating cash flow, payback period, net present value and provitability index. Apart from that, at this stage references will also be made related to this final assignment. These references include journals, theses, etc.

4. Data Collection At this stage, data will be collected related to this final assignment. The data needed in this research are:
   a. Need for funding sources/financial aspects
   b. Project cash flow
   c. Product processing time

5. Data Processing The data processing steps in this research are:
   a. Payback Period (PBP)
   Payback Period is the time period required to return all capital used in the initial investment.
   b. Net Present Value (NPV)
   Net Present Value is the difference between the present value of proceeds and the PV of initial investment (I) during its economic life at a certain discount rate. To calculate the NPV discount rate it is based on the cost of capital (minimum required rate of return).
   c. Profitability index (PI)
   Profitability index is the ratio between PV of cash inflow and PV of investment. If the PI result is less than 1 then the proposed project is declared unfeasible.
   d. Conclusions and recommendations
   From the analysis that has been carried out, the next step is to draw conclusions to answer the objectives of the research and provide suggestions to the company for research development.

RESULTS AND DISCUSSION

1. Payback Period (PBP)
   The payback period shows how long it takes to return the investment value by dividing the total initial investment by the total proceeds per year. In this tile making unit, the maximum proceeds taking into account its economic life are estimated to be 8 years.
   Next, calculating PBP with the assumption that proceeds are constant per year, the PBP can be calculated as follows:
   Total initial investment = IDR 291,500,000
   Total proceeds = IDR 166,744,800
   PBP = 291,500,000/166,744,800 x 12 months = 20.9 (1 year, 8 months, 6 days)
   By paying attention to the PBP results mentioned above for 1 year, 8 months, 6 days while the maximum proceeds from the roof tile factory is 5 years, the rate of return on the investment value is faster than the maximum value of the proceeds so that this project is feasible to run.

2. Net Present Value NPV
   Net present value pays attention to the net present value based on the future time value of money to be valued at the present time. This will be obtained from the difference between the present value of proceeds and the present value of initial investment by taking into account the economic age and a certain discount rate.
   In a roof tile factory, this is based on the interest rate on loans from capital which is partly funded by the loan capital used to open the business. The loan interest rate is used as the basis for determining the discount factor as a determinant of present value. The annual loan interest rate is known to be 12 percent, so this interest rate is used to calculate the discount factor (df) or present value. The economic life of the project is estimated at 8 years. The proceeds obtained are assumed to be constant throughout the economic life of the project, namely IDR 166,744,800 per year, so the present value value can be used in the annuity discount factor

table (present value of annuity) with the calculations below.

Total initial investment = 291,500,000

Total proceeds = 166,744,800

Discount rate/r = 12% Term/n = 8 years

So, for df=12%, n=8, the PV of annuity in the table = 4.9676

The NPV calculation becomes:

NPV = (166,744,800 x 4.9676) – 291,500,000 = 828,321,468 – 291,500,000 = 536,821,468

The results of this calculation show a positive NPV value of IDR 53,682,168, so it is financially feasible to run.

3. Profitability Index (PI)

By using the 12% discount rate mentioned above, the profitability index (PI) can be calculated by comparing the PV of Cash Inflow with the PV of Initial Investment. From the results of the NPV calculation above, the following results were obtained:

PV of Cash Inflow = 828,321,468

PV of Initial Investment = 291,500,000,

so:

PI = (PV of Cash Inflow)/(PV of Investment)=828,321,468/291,500,000=2,841

The profitability index (PI) results obtained were 2.841, meaning it was greater than number 1, so this roof tile factory was feasible to run.

4. Internal Rate of Return (IRR)

The internal rate of return calculates the interest rate that equates the present value of the value of the proceeds. IRR is used as a benchmark for the level of a project's ability to produce proceeds that are equal to the initial investment and then compared to the level of cost of capital. To obtain this value, an interpolation approach is carried out by calculating positive NPV with negative NPV, so that a certain discount factor will be obtained which produces an NPV value equal to zero, with the formula:

$IRR = \sum_{(t=0)}^{n} + \text{(Net Cash Inflow)}/((1+r)^2)=0$

IRR = Internal Rate of Return

N = last expected number

$\sum_{(t=1)}^{n}$ = the amount of discounted cash flow at the end of the year.

From the NPV calculation above, a positive NPV of 53,682,168 is obtained, with a discount factor (DF) of 12%. If a DF of 17% is used with a PV of Annuity table = 4.2072, a negative NPV will be obtained as below.

NPV = 291,500,000 - (166,744,800 x 4.2072) = 291,500,000 – 701528723 = -410,028,723

Thus, the IRR for a roof tile factory business can be calculated as follows:

Positive NPV = 536,821,468 = 12%

Negative NPV = -410,028,723 = 17%

IRR = 12%+[536,821,468/(536,821,468-(-410,028,723)) x(17%-12%)] = 12% + (0.567 x 5%) = 12% + 2.835% = 14.835%

The results of the IRR calculation for the tile factory obtained an IRR value of 14.835 percent, greater than the interest rate used for the cost of capital from the initial investment of 12 percent, so that the tile factory project was feasible to run.

CONCLUSION

The results of the financial analysis obtained from calculating the payback period, net present value, profitability index and internal rate of return, as a basis for calculations in capital budgeting (capital budgeting) in the roof tile making business show that the PBP is 1 year, 8 months, 6 days faster than the period maximum 8 years of project value, positive NPV of IDR 536,821,468, PI of 2,841 greater than number 1 and IRR of 14,835 greater than the cost of capital value of 12%.

By paying attention to the results of these quantitative values as a basis for decision making using a capital budgeting approach through financial analysis, the business of making roof tiles is financially "WORTH IT" to run.

ACKNOWLEDGMENT

REFERENCES

1] Titik, 2005., *Analisa Kelayakan Usaha Perkebunan Karet Melalui Pendekatan Capital Budgeting Pada PT Perkebunan Nusanatara IX Getas,* Salatiga.

[2] A. Senderovich, M. Weidlich, A. Gal, and A. Mandelbaum, "Queue mining–predicting delays in service processes," in *International Conference on Advanced Information Systems Engineering*, 2014, pp. 42–57.

[3] Dhaiban, A.K., Comparison between Linear Programming Model and Optimal Control Model of Production–Inventory System, *Current Science*, 112(9), 2017, pp. 1855-1863.

[4] H. Fitria, D. H. Widyaningrum, R. Malik, N. I. Safutra, and Y. Herdianzah, "Optimization Of Chicken Feed Production Using Goal Programming Method At PT. Japfa Comfeed Indonesia Tbk. Unit Makassar," *J. Ind. Syst. Eng. Manag.*, vol. 1, no. 1, pp. 1–5, Mar. 2022, doi: 10.56882/jisem.v1i1.3.

[5] Husnan,Suad, Suwarsono, 2000., *Studi Kelayakan Proyek*, YKPN, Yogyakarta.

[6] J. Abbas, "Impact of total quality management on corporate sustainability through the mediating effect of knowledge management," *J. Clean. Prod.*, vol. 244, p. 118806, Jan. 2020, doi: 10.1016/j.jclepro.2019.118806.

[7] Umar, Husain, 2009., *Studi Kelayakan Bisnis;Teknik Menganalisisi Kelayakan Bisnis Secara Komprehensif*, Gramedia jakarta.

[8] S. Supriyadi, G. Ramayanti, and A. C. Roberto, "Analisis Kualitas Produk dengan Pendekatan Six Sigma," in *Prosiding SNTI dan SATELIT 2017*, 2017, pp. 7–13.

[9] Moeljadi, 2006., *Manajemen Keuangan Pendekatan Kuantitatif dan kualitatif*, Bayumedia,Malang.

[10] Jumingan, 2009. *Studi Kelayakan Bisnis; Teori dan Pembuatan Proposal Kelayakan*, Bumi Aksara, Jakarta.