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Analysis of the Financial Feasibility of Producing an Instant Drink Mixed with Siamese Orange Peel Extract and Cinnamon Extract

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A B S T R A C T

Instant drinks are now increasingly being consumed. Because its practical to consume it. However, many herbal drinks are also chosen to maintain a healthy body. One of the herbal ingredients that can be used is Siamese orange peel and cinnamon. The two ingredients are extracted and dried with a spray dryer, and the powder obtained is added with stevia sugar (1:3), then packaged in 2 grams/sachet. Feasibility analysis is needed to determine whether this instant drink is feasible if used as a production business. From several financial aspects, the Break Event Point (BEP) receipt was IDR 68,480,496, the BEP production volume was 5,707 boxes, and the BEP price was IDR 8,965/box. Then, the eligibility criteria used are Net Present Value (NPV) obtained at IDR 13,049,296 (NPV>0), Internal Rate of Return (IRR) 16.59% (IRR>interest rate), Net Benefit Cost Ratio (Net B/C) 1.23 (Net B/C>1), and Payback Period (PP) 1 year and 4 months (PP<age of business).

1. INTRODUCTION

1.1. Research Background

Instant drinks are now increasingly popular because they are practical to consume. The use of Siamese orange peel and cinnamon is because these two ingredients have bioactive components that are very beneficial for health. Next, it is mixed with cinnamon to increase the antioxidant content and enrich the product's taste. Instant drink products with high antioxidant levels can help support the immune system because antioxidants can play a role in improving the body's immune system [1].

This instant drink is made using encapsulation technology. The protective role of encapsulation technology is to form a membrane or wall material around the droplets or particles of the encapsulated material [2]. The encapsulation uses the spray drying method and 10% maltodextrin as the coating. This instant drink is also expected to become a functional drink, whereas functional food must have the function of providing health benefits and also satisfy the senses, such as delicious taste, attractive aroma, and colour [3]. So, a mixture of encapsulated Siamese orange peel extract and cinnamon will be mixed with stevia sugar. The reason is that Siamese orange peel contains naringin, which gives it an astringent and bitter taste [4]. Meanwhile, cinnamon covers the astringent taste with a warm and spicy taste. So, stevia sugar is used as a sweetener, providing the consumer with sensory satisfaction. Stevia sugar used is 25% of the total product weight. The product is packaged in a weight of 2 grams per sachet.

A financial feasibility analysis was conducted to determine whether this instant drink's production was feasible in large quantities. The financial feasibility aspects used are Break Event Point (BEP), Net Present Value (NPV), Internal Rate of Return (IRR), Net Benefit Cost Ratio (Net B/C) and Payback Period (PP).

1.2. Literature Review

Instant powder drink is a beverage product that is in powder form, easily soluble in water, has a short rehydration time, and is practical in serving [5]. The benefits of this feasibility analysis are to avoid the risk of loss, make planning easier, make things easier, carry out work, make it easier to supervise, and facilitate control [6]. Research related to the feasibility analysis of instant drinks was also carried out by Saida, Nurhayati, and Ruriani on

instant herbal coffee products with several feasibility aspects, namely Net Present Value (NPV), Internal Rate of Return (IRR), Net Benefit Cost Ratio (Net B/C), Payback Period (PP), and Break Event Point (BEP). This research used an interest rate of 15% and found that instant herbal coffee production was feasible [7].

1.3. Research Objective

This research aimed to determine whether or not the investment plan is feasible for running the business. This feasibility analysis is the calculation of economic feasibility in the form of estimates using several approach methods, namely the Break Event Point (BEP), Net Present Value (NPV), Internal Rate of Return (IRR), Net Benefit Cost Ratio (Net B/C), and Payback Period (PP). It is assumed that the business period is 5 years, with the investment funds used at the start of the business being a loan from Bank Mandiri with an interest rate of 6%. Then, it is assumed that each packaging box is sold for IDR 11,000 with sales of 48 boxes/day. 1 box contains 10 sachets, and 1 sachet contains 2 grams of instant drink powder. Production is carried out with 1 worker with a working time of 20 days/month and is carried out 100% until the 5th year.

2. MATERIALS AND METHODS

2.1. Production of instant drink

Siamese orange peel and cinnamon are extracted using the infusion method. Each ingredient is extracted with water (1:5). The extraction process is done by boiling for 15 minutes. After extraction, the water extract is filtered using filter paper and a filtrate is obtained. Next, the two filtrates were mixed (1:1), and 10% maltodextrin was added, then homogenized with homogenizer for 1 hour (600 rpm). After that, dry it with a spray dryer. The encapsulated powder is weighed at 1.5 grams and mixed with 0.5 grams of stevia sugar, then packaged in aluminium foil packaging and placed in a box containing 10 sachets/box.

2.2. Cost Analysis

2.2.1 Revenue Analysis

Revenue from sales is the total bill to customers for items sold [8].

$$TR = P \times Q$$

$$\text{Revenue} = TR - TC$$

Information:
TR = Total Revenue
TC = Total Cost
P = Price
Q = Quantity

2.3. Financial Eligibility Criteria

2.3.1 Break Event Point (BEP)

Break event point (BEP) analysis is used by business actors in making decisions [8]. This analysis is used to determine the relationship between the selling price of a product and sales volume which will later be used to determine production tolerance so as not to experience losses or know when it will make a profit.

$$\text{BEP receipt} = \frac{\text{TFC}}{1-\frac{TVC}{TR}}$$

$$\text{BEP production volume} = \frac{\text{TC}}{\text{P}}$$

$$\text{BEPprice} = \frac{\text{TC}}{\text{Total production}}$$

Information:
TFC = Total Fixed Cost
TVC = Total Variable Cost

2.3.2 Net Present Value (NPV) Analysis

NPV is the difference between revenue and costs that estimate the benefits of the planned business [10]. NPV is calculated using the following formula:

$$\text{PV} = \sum_{t=i}^{n} \frac{(\text{Bt}-\text{Ct})}{(1+i)^t}$$

Information:
t = Age of business
i = Interest rate
Bt = Benefit in year t
Ct = Cost in year t

The NPV criteria is that if NPV > 0, the business is worthy of continuing its activities. If NPV < 0, then the business is not worth continuing, and if NPV = 0, then the business breaks even; that is, the benefits obtained are only enough to cover production costs.

2.3.3 Internal Rate of Return (IRR) Analysis

IRR is a discount rate that equates the Present Value (PV) of cash flows with the PV of investment. This IRR investment criterion guides a project in being selected if the IRR > provides a profit. The decision-making criteria on IRR is that the business can be accepted if the IRR is greater than the comparable interest rate [10]. Comparative interest rates can come from bank interest rates and must still be adjusted to the risks that must be faced. IRR can be calculated using the formula:

$$\text{IRR} = i_1 + \frac{NPV_1}{(NPV_1 - NPV_2)}(i_2 - i_1)$$

Information:
i_1 = Discount Rate that produces NPV+
i_2 = Discount Rate that produces NPV-
NPV_1 =Net Present Value is positive
NPV_2 = Net Present Value is negative

2.3.4 Net Benefit Cost Ratio (Net B/C)

Net benefit-cost ratio (Net B/C) compares positive net benefits and negative net benefits. This analysis aims to determine the amount of income compared to expenses during the business's life. A business is feasible if the Net B/C Ratio generated in developing the business is greater than one. Mathematically, the formula used to calculate the Net B/C Ratio is as follows:

$$\text{Net B/C} = \frac{\sum=1\frac{\text{Bt}-\text{Ct}}{(1+i)\text{t}}}{\sum=1\frac{\text{Bt}-\text{Ct}}{(1+i)t}} \text{ untuk } \frac{[\text{Bt}-\text{Ct}]>0}{[Bt-Ct]<0}$$

Information:
Bt = Benefit in the t year
Ct = Cost in t year
i = Discount rate (percent)
t = Year

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2.3.5 Payback Period (PP) Analysis

The payback period shows how long (in years) an investment will return. The payback period shows the comparison between the "initial investment" and the annual cash flow [10], with the following general formula:

PP = (Investment Value)/Proceed

If the payback period is less than a predetermined period, then the business is accepted; if it is more than a predetermined period, it is rejected.

3. RESULT AND DISCUSSION

3.1. Cost Analysis

3.1.1 Investment Cost

Investment costs are initial expenses incurred when running a business in the first year, where the quantity is relatively large and cannot be used up in one production period [11]. The investment costs for this instant drink business are 5 years as the planned life of the production business. The cost components included in the investment category in this business are machine and non-machine equipment for producing instant drinks. The total investment cost for producing this instant drink is IDR 90,850,000. In investment, depreciation costs are also calculated**.** Depreciation is an allocation process acquisition price and is not an appraisal process [12]. The depreciation method used in this analysis is the straight-line method. The investment depreciation value is IDR 4,988,867 each year.

3.1.2 Cost Components and Cash Flow

The cost component consists of investment costs and operational costs. Operational costs consist of worker salary, depreciation, and investment maintenance costs, fixed costs, variable costs, and instalments issued annually with a Minimum Activate Rate of Return (MARR) of 6% per year, which is paid over 5 years. Fixed costs are business expenses that do not depend on the level of goods or services produced by the business. These expenses are related to time. At the same time, variable costs generally change according to business volume. Because the greater the sales volume, the greater the costs must be incurred [13].

The variable costs are raw materials (cinnamon, stevia sugar, water, maltodextrin), packaging (sachets and boxes), stove gas, and electricity. In one year of production, raw materials are needed: 130 kg of cinnamon and Siamese orange peel, 58 kg of stevia sugar, 1.3 L of water, and 108 kg of maltodextrin. This is calculated based on the yield obtained in making instant drink powder. Siamese orange peel is not included in the variable cost calculation because It is obtained from Siamese orange plantation waste, so it does not require costs.

Then, revenue is all income from a business during one period calculated from sales [14]. This instant drink business is assumed to produce 100% every year until the 5th year, where every year, it is assumed that there will be sales of 11,520 boxes. The selling price for instant drinks is IDR 11,000/box. The revenue of the instant drink business is IDR 126,720,000. Cost components can be seen in Table 1.

Table 1. Instant Drink Business Component Cost per year

Cost components	Cost (IDR)
Fixed cost	
- Worker salary	1,500,000
- Depreciation	4,988,867
- Maintenance cost	1,818,000
- Instalments	19,260,200
Total fixed cost	27,567,067
Total variable cost	
- Production cost	75,708,414
Total variable cost	75,708,414
Total operational cost	103,275,481

(source: processed data)

Cash flow is a financial flow that is prepared to show changes in cash during a certain period and provide reasons for these changes by showing where the sources of cash come from and their uses. Cash flow is calculated by subtracting cash inflow from cash outflow each year. Cash flow can be seen in Table 2.

Table 2. Cash Flow

Description	Year 1 (IDR)	Year 2 – 5 (IDR)
Revenue	126,720,000	126,720,000
Expense		
Investment	90,850,000	
Operational Cost	103,275,481	103,275,481
Profit	-67,405,481	23,444,519

(source: processed data)

Through the cash flow, information will be obtained on the profits obtained each year in a certain period. Based on Table 2, it is known that in the first year, there was no profit. This happens because the first year is the year the investment is procured. So, it requires no profit to be gained.

3.1.3 Business Capital Loans

To start an instant drink business, need to borrow quite a lot of business capital, because it requires quite expensive equipment and machines. The planned size of the business capital loan is 100% sourced from the People's Business Credit from Bank Mandiri in 2024. The capital loan installments can be seen in Table 3.

Table 3. Instant Drink Business Credit Repayment Schedule

Year	Amount of Credit	Installment Principal	Interest (6%)	Amount of Installament
0	92,745,000	-	-	-
1	72,680,000	18,170,000	1,090,200	19,260,200
2	54,510,000	18,170,000	1,090,200	19,260,200
3	36,340,000	18,170,000	1,090,200	19,260,200
4	18,170,000	18,170,000	1,090,200	19,260,200
5	-	18,170,000	1,090,200	19,260,200

(source: processed data)

3.2 Break Event Point (BEP)

BEP determines the volume and production value limits for a business to reach the break-even point, meaning that a business is not in a profit or loss position. In designing a product, a guideline is needed to guide management in making decisions related to costs and prices. Break-even analysis compares costs and prices for various designs before product specifications are determined. This is because costs have a very large influence on prices. With break-even analysis, we can first test the feasibility of a product [15]. BEP is carried out in a projected analysis of how many items will be produced and how much money must be produced to reach

the break-even point regarding return on capital. BEP calculations are based on several components:

Total operational cost = Rp 103,275,481
Fixed cost = Rp 27,567,067
Variable cost = Rp 75,708,414
Investment cost = Rp 90,850,000
Price = Rp 11,000
Revenue = Rp 126,720,000
Production = 11,520 boxes

The results of the BEP calculation can be seen in Table 4. The table shows that this instant drink business will reach the BEP when revenue reaches IDR 68,480,496 with a production volume of 5,707 boxes and a minimum selling price of IDR 8,965.

Table 4. BEP calculation results

Tolerance	BEP
Receipt	IDR 68,480,496
Production	5,707 boxes
Price	IDR 8,965

(source: processed data)

3.3 Financial Feasibility Analysis

3.3.1 Net Present Value (NPV)

The net present value is a method used to compare the present value of cash inflows net (proceeds) with the present value of an expenditure investment (outlays). Therefore, to calculate investment feasibility using the NPV method, data on initial cash outflows, future net cash inflows, and the desired minimum rate of return are required. If the NPV calculation result is positive, it means that the investment will provide higher returns than the investment with the desired minimum rate of return. On the other hand, if the NPV is negative, the investment will provide lower returns than the rate of return minimum return is desired, so the investment should be rejected [16]. The NPV calculation can be seen in Table 5.

Table 5. The NPV calculation

Profit (IDR)	Discount Factor (6%)	Present Value (IDR)
-67,405,481	0.94	-63,590,076
23,444,519	0.89	20,865,538
23,444,519	0.84	19,684,470
23,444,519	0.79	18,570,255
23,444,519	0.75	17,519,108
	NPV	**13,049,296**

(source: processed data)

Based on the calculations in Table 5 above, the production of this instant drink has an NPV value of IDR 13,049,296. In the first year, a negative net benefit value is obtained because all investment costs are calculated and charged in the first year so that the value of the benefits obtained cannot yet cover the number of costs incurred, while in the second year to the 5th year, the net value is obtained positive benefit because the following year does not cover investment costs so the costs incurred are smaller, so the net benefit value obtained is greater than the costs issued.

3.3.2 Internal Rate Return (IRR)

To obtain the IRR value, the NPV1 and NPV2 values must be calculated using the trial and error method until the IRR value is between the positive NPV value and the negative NPV value; the NPV is equal to zero [17]. To determine whether or not the instant drink business is feasible, as a basic benchmark for comparison, the applicable bank interest rate is set at 6% and the calculated interest rates determined are 10% and 30%. The following is the IRR calculation of the investment plan made for instant drink production:

Table 6. The IRR calculation

Year	Profit (IDR)	NPV_1	NPV_2
1	-67,405,481	-61,277,710	-51,850,370
2	23,444,519	19,375,635	13,872,496
3	23,444,519	17,614,214	10,671,151
4	23,444,519	16,012,921	8,208,577
5	23,444,519	14,557,201	6,314,290
Total		6,282,263	-12,783,854

(source: processed data)

$$IRR = i_1 + \frac{NPV_1}{(NPV_1 - NPV_2)} (i_2 - i_1)$$
$$IRR = 10\% + \frac{6,282,263}{(6,282,263 - (-12,783,854))} (30\%-10\%)$$
$$IRR = 10\% + 0.3295 (20\%)$$
$$IRR = 10\% + 6.59\%$$
$$IRR = 16.59\%$$

In this way, IRR obtained from the calculation is 16,59%. Based on the IRR value obtained, this value is greater than The MARR value determined by the company is 6%. Therefore, it can be said that the investment value spent by this instan drink business is feasible. Because of the interest rate that is used for calculations, the entire difference in the value of cash inflows in the project operating year will result in the amount of cash equal to the amount of project investment is greater than MARR. So, the investment plan for instant drink production is very feasible.

3.3.3 Net Benefit Cost Ratio (Net B/C)

The Net B/C ratio is used to measure how much benefit can be received from each investment made during the economic life of the project [17]. Net B/C Ratio is a comparison number between the benefit stream's present value divided by the cost stream's present value. The Net B/C Ratio calculation is carried out to see how much profit is obtained from each business expenditure. The business is profitable or worth running if the Net B/C value exceeds 1 (Net B/C>1). Net B/C calculation can be seen below:

$$\text{Net B/C} = \frac{\text{Present value of revenue}}{\text{Present value of expenditure}}$$
$$\text{Net B/C} = \frac{533,790,739}{435,033,896}$$
$$\text{Net B/C} = 1.23$$

Based on the calculation results of the Net B/C ratio using a discount factor of 6%, a value of 1.23 was obtained, meaning that this instant drink business benefits 1.23 from every cost incurred to produce instant drinks. In other words, every IDR 1.00 spent will generate a profit of IDR 1.23, and this instant drink business is financially feasible because the net benefit-cost ratio is >1.

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3.3.4 Pay Back Period (PP)

The Payback Period is the period required to return the entire capital of an investment, which is calculated from net profit. The payback period for this business is 1 year and 4 months, meaning that it takes 1 year and 4 months to return the initial business investment after the business has started. a business is worth establishing if the payback period is faster than the planned life of the business. This shows that establishing this instant drink business is feasible. The Payback calculation can be seen below:

$$\text{PP} = \frac{\text{Total initial investment}}{\text{First year profit}} \text{ x 12 months}$$

$$\text{PP} = \frac{90{,}850{,}000}{-67{,}405{,}481} \text{ x 12 months}$$

PP = 16 months = 1 year and 4 months

The payback Period (PP) is the period for returning the initial costs. The faster the return, the more attractive the alternative is compared to other alternatives. The advantages of the payback period method is easy to use and calculate, useful for choosing which investment has the fastest recovery period, the capital recovery period can be used as a risk uncertainty prediction tool in the future, and the fastest recovery period carries more risks small compared to the relatively longer recovery period [18].

4. CONCLUSION

This instant drink, a mixture of Siamese orange peel extract and cinnamon, is worthy of being a business. The selling price of IDR 11,000/box is relatively low but can return business capital and provide profits. Based on financial feasibility criteria, the Net Present Value (NPV) obtained was IDR 13,049,296 (NPV>0), Internal Rate of Return (IRR) 16.59% (IRR>interest rate), Net Benefit Cost Ratio (Net B/C) 1.23 (Net B/C>1), and Payback Period (PP) 1 year and 4 months (PP<age of business). So, based on financial feasibility criteria, this instant drink business can be run with the assumed budget plan.

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