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Module: Accounting and Finance

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Introduction

The company Gaea limited is a specialist bakery that has been actively working with various clients including catering companies and many event organizers. The company has a strategy of working on innovative products to increase its product line to avoid the threat of competition. The company has considered two options which are as follows,

- To halt the production of Dream ice-cream and move onto a different product called “Heat Ice-Cream”.
- The company will continue the production of Dream Ice-Cream and will also launch Heat Ice-Cream side by side using various strategies.

The first part revolves around the calculations of both options which includes net present value, internal rate of return and sensitivity of NPV to the selling price for both the options. Moreover, then there will be a discussion based upon various factors that eventually affects the decision to the investment. Furthermore, a detailed analysis will be conducted in the report along with giving recommendations to the company’s management and other parties.

Investment decisions must be made to maximize shareholder value, and capital budgeting decisions must be related to the company’s overall strategic plan. Capital budgeting must be combined with strategic planning, because too much investment or insufficient investment will have a serious impact on the company’s future. If the company invests too much in fixed assets and overestimates its potential growth, it will incur unnecessary heavy expenses, thereby reducing its return on investment (Beck, Raj and Britzelmaier, 2013).

Net Present Value

The net present value is used by most of the companies and is widely used by many financial analyst. The NPV evaluates the cash flow of the project at discounting factor (Cost of Capital) over the useful life of the project to identify whether the project should be accepted or not. Whenever the project has a positive net present value, the project should be undertaken but the decision is based on various other factors (Žižlavský, 2014).

Internal Rate of Return

The IRR is a rate used by the companies when the net cash flow of the company is equivalent to the initial cost for starting up the project. This IRR is mostly used by the financial analyst to

evaluate the cost-benefit analysis of the investment project. The project should be accepted only if the IRR is higher (Mellichamp, 2017). The project should be accepted when the IRR is higher than the cost of capital which is 10% in this particular question and the IRR is higher than the cost of capital in both options.

Analysis and Presentation

Option 1 Calculation

Year	Net Cash Flow	Discount Factor (10%)	Discounted Cash Flow
Year 0	(32,500)	1	(32,500)
Year 1 - 2021	54,000	0.909	49,091
Year 2 - 2022	96,000	0.826	79,339
Year 3 - 2023	138,000	0.751	103,681
Year 4 - 2024	96,000	0.683	65,569
Year 5 - 2025	54,000	0.621	33,530
		Net Present Value	298,710
		Internal Rate of Return	214.32%

The above calculation comprises of net present value and the internal rate of return for option 1. The net present value was calculated using the discount factor (10% given in question) and calculation the net cash flow after deducting the variable and fixed cost from the sales revenue. The net cash flows were discounted to find the net present value. The NPV for this option 1 is positive that is 298,710 which shows that the company should go for this option as NPV is considered the most optimal form of capital appraisal technique. This option also has a higher internal rate of return which also proves that this option will be beneficial for the company.

Option 2 Calculation

Year	Inflow	Outflow (Redundancy)	Net Cash Flow	Discount Factor (10%)	Discounted Cash Flow
Year 0		6000	(188,500)	1	(188,500)
Year 1 - 2021	51,404	4800	46,604	0.909	42,367
Year 2 - 2022	82,553	4800	77,753	0.826	64,259

Year 3 - 2023	114,171	2400	111,771	0.751	83,975
Year 4 - 2024	79,964		79,964	0.683	54,617
Year 5 - 2025	52,692		52,692	0.621	32,718
				Net Present Value	89,435
				Internal Rate of Return	26.41%

The above table shows the calculation for option 2 for the net present value and the internal rate of return. This option is a bit technical and involves more calculation as this option is basically the extension to the product line. This option requires an initial investment worth 188,500 which is a break down for 150,000 machinery and 32,500 for research and development. The operating profit for both heath and dream Ice-Cream was calculated individually after deducting the variable and fixed cost. As per the information given in option 2, capital allowances were reduced and then added back after the corporate tax was deducted. The redundancy payments were also reduced from the cash inflow to get the discounted cash flow after applying the 10% discount factor. The net present value for option 2 was 89,435 while the internal rate of return was 26.41%. This option is also beneficial for the company as it shows a positive NPV and a higher IRR but eventually lower than the option 1.

Sensitivity Analysis

The sensitivity analysis is the financial model used by many companies as well as investors to highlight the impact on the target variables due to the change in the variables whether known or un-known. Here the known variable is the selling price of the product/ice-cream and the net present value is the target variable (Borgonovo and Plischke, 2016). The calculation will include the impact on the net present value by changing the selling price per unit for the ice-cream in case of both options for the Heat Ice-Cream only.

	Option 1		
	10.5 per unit	11.5 per unit	12.5 per unit
Net Present Value	235,148	298,710	362,272

It can be seen from the above table that the calculation was done to find the net present value for three different selling price per unit. The original price as given in the case was 11.50 per unit and the net present value calculated using this price was 298,710. When the price was changed to 10.5 per unit, the net present value was 235,148 showing a fall in NPV by 21% whereas when the selling price was increased to 12.5 per unit then the NPV increased by 21% to reach to 362,272. So, here the NPV sensitivity is 21% which has been calculated for both ways that are increase and decrease in the selling price.

	Option 2		
	10.5 per unit	11.5 per unit	12.5 per unit
Net Present Value	42,242	89,435	136,628

The above table shows the sensitivity analysis for option 2 which is the impact of selling price on the NPV. When the selling price was reduced to 10.5 so the NPV fall by 53% reaching 42,242 whereas when the price was increased from 11.5 to 12.5 per unit then the NPV also increased by 53% reaching 136,628. So, this shows that the option 2 has a NPV sensitivity of 53%.

Factors affecting Investment Decisions

There are many factors which affects the decisions of the investment/project. The capital appraisal techniques are used differently in every industry. There are certain factors which impacts the decision making of the directors to undertake the project or not. Firstly, the level of competition is very important in evaluating the investment appraisal technique (Guo, Li and Chen, 2017). As Gaea Ltd has faced immense competition for their Dream Ice-Cream, so it is also possible that there might be great competition after a certain time impacting the profitability of the new options suggested by the company.

Secondly, capital intensity is very crucial in this food/baking industry as the companies need to adopt to the technological change due to the fact that the machinery used in this industry might become obsolete or even redundant (Kauffman, Liu and Ma, 2015). If the competition increases then the Gaea Ltd will need to do more research and development to develop strategies to gain greater market share.

Moreover, the organization size is a factor which eventually evaluates and also highlights the investment appraisal technique. The size of the organization and amount of capital required has a

direct/positive relationship which shows that if the organization gets bigger then the capital required will be more (Dobre, 2010). Gaea Ltd being a specialist bakery can increase its operations and the amount required at that time for the initial investment might have a different net present value as well as internal rate of return.

Thirdly, moving into a new market for Heat Ice-Cream can also prove to be negative step as factors like demand and consumer taste can either prove for the company to be negative as well positive. The demand factor is very important as the Ice-Cream can have seasonal demand which can eventually affect the sales of the Gaea Ltd negatively. In addition, launching the new product in its current product line and the consumer didn't like the taste of the product which can even impact the sales of the previous products. So, there is a higher risk involve in these options which needs to be considered as well and these are longer projects (5 years) and the demand can change any moment (Olaniyan et al, 2020).

Lastly, the interest rate is essential for every new project as the interest rate can fluctuate which can impact the Gaea Ltd decision to undertake the project. If the Gaea Ltd goes for option 2 and as it can be seen that it requires more amount then option 1, so Gaea Ltd might take a loan and in the near future there is a chance that the interest rates might fluctuate impacting the net present value as well as the internal rate of return (Ilano, 2012).

Why NPV is better?

In my opinion, the NPV is the best capital appraisal technique that can be used to analyze the profitability of the project. It is very easy to use and understand as it is the difference between the cash inflow and outflows. The company should use this technique as it is essential for business, and it highlights the survival and growth of the project appropriately in simpler terms and takes time factor into consideration as well.

IRR can be utilized for the purpose of capital budgeting as it can help towards measuring as well as comparing profitability or productivity of different investment projects. IRR of an investment can be calculating through equating it by the means of discount rate at which NPV of costs would equal value of costs of the investment. However, there are various drawbacks to IRR as well. It ignores the actual value of the benefits gained from the project meaning small project with higher IRR will be preferred over a large project with comparably lower IRR. Another disadvantage using IRR is it assumes cash flows are invested at the same rate which is practically not valid. Project

with negative cash outflows between the tenors will result in multiple IRR for the same project which becomes very confusing for the managers.

Recommendations

It is recommended to the Gaea Ltd as an advisor that the company can go forward with any of the options as it is giving a positive net present value and a higher internal rate of return than the cost of capital. The NPV is very high in option 1 where the company is launching a new product and discontinuing the previous product, so the company in this case need to consider for other factors as discussed above. There is a higher risk attached to the new product being completely new to the consumer. This option doesn't even requires a machinery, it has an initial cost of only 32,500 while on the other hand, option 2 by going along with new as well as old product the sales can get impacted and even requires machinery worth 150,000 thus increasing the startup cost for the product. So, the company can evaluate its options based on the net present value and the factors that can necessary to impact the investment decisions.

Conclusion

To conclude, it can be said that the company having a strategy of working on innovative products to increase its product line to avoid the threat of competition. Investment decisions must be made to maximize shareholder value, and capital budgeting decisions must be related to the company's overall strategic plan. The NPV for this option 1 is positive that is 298,710 which shows that the company should go for this option as NPV is considered the most optimal form of capital appraisal technique. The net present value for option 2 was 89,435 while the internal rate of return was 26.41%. The company should use NPV technique as it is essential for business, and it highlights the survival and growth of the project appropriately in simpler terms and takes time factor into consideration as well.

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Appendices

Option 1

	2021	2022	2023	2024	2025
Sales of Heat Ice-Cream	12,000	18,000	24,000	18,000	12,000
x Sales Per Unit	11.50	11.50	11.50	11.50	11.50
Sales Revenue	138,000	207,000	276,000	207,000	138,000
Less: Variable Cost (4.50 per kg)	(54,000)	(81,000)	(108,000)	(81,000)	(54,000)
Contribution	84,000	126,000	168,000	126,000	84,000
Less: Fixed Cost	(30,000)	(30,000)	(30,000)	(30,000)	(30,000)
Net Profit/Net Cash Flow	54,000	96,000	138,000	96,000	54,000

Year	Net Cash Flow	Discount Factor (10%)	Discounted Cash Flow
Year 0	(32,500)	1	(32,500)
Year 1 - 2021	54,000	0.909	49,091
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Year 3 - 2023	138,000	0.751	103,681
Year 4 - 2024	96,000	0.683	65,569
Year 5 - 2025	54,000	0.621	33,530
		Net Present Value	298,710
		Internal Rate of Return	214.32%

Option 2

	2021		2022		2023		2024		2025	
	Heat	Dream	Heat	Dream	Heat	Dream	Heat	Dream	Heat	Dream
Sales (in Kg)	9,600	4,800	16,200	3,600	22,800	2,400	18,000	-	12,000	-
Sales (Per Unit)	11.5	9.6	11.5	9.6	11.5	9.6	11.5	9.6	11.5	9.6
Sales Revenue	110,400	46,080	186,300	34,560	262,200	23,040	207,000	-	138,000	-
Less: Variable Cost (Per Unit)	4.5	5.5	4.5	5.5	4.5	5.5	4.5	5.5	4.5	5.5
Less: Variable Cost	-43,200	-26,400	-72,900	-19,800	-102,600	-13,200	-81,000	-	-54,000	-
Contribution Margin	67,200	19,680	113,400	14,760	159,600	9,840	126,000	-	84,000	-

	-	-	-	-	-	-	-	-	-	-
Less: Fixed Cost	30,000	-2,000	30,000	-2,000	30,000	-2,000	30,000	-	30,000	-
Operating Profit	37,200	17,680	83,400	12,760	129,600	7,840	96,000	-	54,000	-

	2021	2022	2023	2024	2025
Combined Operating Profit	54,880	96,160	137,440	96,000	54,000
Less: Capital Allowances	- 37,500	- 28,125	- 21,094	- 15,820	- 47,461
Income Before Tax	17,380	68,035	116,346	80,180	6,539
Corporate Tax Rate	- 3,476	- 13,607	- 23,269	- 16,036	- 1,308
Net Income	13,904	54,428	93,077	64,144	5,231
Add: Capital Allowances	37,500	28,125	21,094	15,820	47,461
Cash Inflow	51,404	82,553	114,171	79,964	52,692

Year	Inflow	Outflow (Redundancy)	Net Cash Flow	Discount Factor (10%)	Discounted Cash Flow
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Sensitivity for Option 1

	Option 1		
	10.5 per unit	11.5 per unit	12.5 per unit
Net Present Value	235,148	298,710	362,272

Sensitivity for Option 2

	Option 2		
	10.5 per unit	11.5 per unit	12.5 per unit
Net Present Value	42,242	89,435	136,628