

BD20303 ADVANCED FINANCIAL MANAGEMENT

SECTION 2

GROUP ASSIGNMENT

Case Study : Capital Budgeting (Too Hot to Handle)

GROUP NO. 6

Prepared to : Dr DG SAFRINA AG BUDIN

Bil	Name	Matric no.
1	NIGELL TIMATHY LEVY	BB23110826
2	MUHAMAD ARMAN MIRZAN BIN ABDUL GANI	BB23110854
3	NUR FATIHAH BINTI RAMLEE	BB23110795
4	NURHANIZA AMIRAH BINTI HAMSI	BB23110629
5	NUR FARAHIN BINTI PANGIS	BB23110872

Introduction

In corporate finance, capital budgeting decisions play a huge part in determining the long-term financial health and strategic direction of a company or a business. In this case study, we will evaluate Jenny's future decision in evaluating potential investments or projects to determine wether it aligns with the firm's financial goals or not. In the book of Jordan, Ross, Westerfield and Jaffe, effective capital budgeting requires thorough analysis of projected cash flow, risk factors and the application of appropriate financial metrics which in our case involve Net Present Value, Internal Rate Of Return and Payback Period which in the questions will be referred to as NPV, IRR, and PP mostly.

This case study focuses on evaluating two types of tanning equipment, dome tanning bed and a standard tanning bed. The goal is to determine which option offers the best ratios under different scenario which is 100 percent as the best case, 80 percent as the most likely case and 50 percent as the worst case. Incorporating the insights from Ross et al, we understand that the objective of financial management within corporate finance is making the best investment decision that generates positive cash flow and increase the firm's value.

To explain the company's crisis, there are several factors related to it. First of all is the uncertainty of market demand which in our case tanning salon's profitability depends heavily on customer occupancy rates which fluctuates because of the everchanging customer preference, the next one is the operations costs which in this case involves electricity and maintenance for tanning equipment. These costs directly impact profitability as the cost difference between dome and tanning bed must be paid attention to forecast the expenses.

1. Develop operating cash flow forecasts for the relevant lives of each type of tanning equipment using 100% (best case), 80% (most likely case), and 50% (worst case) occupancy estimates for each tanning option. Assume straight-line depreciation and a tax rate of 30%.

Best Case (100%)

Category	Dome	Tanning Bed
# Hours per month (43h x 4	172	172
weeks)		
# Clients serviced per hour	4	3
Capacity utilization	100%	100%
Total sessions possible /	688	516
month		
Charge per session	\$3.00	\$3.00
Operating Costs		
Electricity use / session	\$0.50	\$0.30
Bulb use / session		
Cost of one set of bulbs	\$1,056.00	\$420.00
Bulb life (hours)	1300	1300
Number of sessions per set	1300	5200
Cost per session	\$0.20	\$0.11
Additional revenue from		
lotion sales		
Revenue from sale of each	\$10.00	\$10.00
bottle		
Number of sessions per	10	10
bottle		
Revenue per session from	\$1.00	\$1.00
lotion sales		
Lotion cost per session	\$0.50	\$0.50
Total revenue per session	\$4.00	\$4.00
Total cost per session	\$1.20	\$0.91

Contribution margin per	\$2.80	\$3.09
session		
Monthly revenues	\$2,752.00	\$2,064.00
Monthly operating costs	\$827.72	\$468.37
Monthly advertising costs	\$500.00	\$500.00
Monthly EBITDA	\$1,424.28	\$1,095.63
Monthly depreciation (over	\$138.33	\$50.00
60 months)		
Monthly operating cash	<u>\$1,308.50</u>	<u>\$781.94</u>
<u>flow</u>		
Annual operating cash flow	<u>\$12,461.98</u>	<u>\$9,383.30</u>

MOST LIKELY CASE (80%)

Category	Dome	Tanning Bed
# Hours per month (43h x 4	137.6	137.6
weeks)		
# Clients serviced per hour	4	3
Capacity utilization	80%	80%
Total sessions possible /	550	413
month		
Charge per session	\$3.00	\$3.00
Operating Costs		
Electricity use / session	\$0.50	\$0.30
Bulb use / session		
Cost of one set of bulbs	\$1,056.00	\$420.00
Bulb life (hours)	1300	1300
Number of sessions per set	1300	5200
Cost per session	\$0.20	\$0.11
Additional revenue from		
lotion sales		

Revenue from sale of each	\$10.00	\$10.00
bottle		
Number of sessions per	10	10
bottle		
Revenue per session from	\$1.00	\$1.00
lotion sales		
Lotion cost per session	\$0.50	\$0.50
Total revenue per session	\$4.00	\$4.00
Total cost per session	\$1.20	\$0.96
Contribution margin per	\$2.80	\$2.04
session		
Monthly revenues	\$2,201.60	\$1651
Monthly operating costs	\$662.17	\$396.92
Monthly advertising costs	\$500.00	\$500.00
Monthly EBITDA	\$1,039.43	\$754.28
Monthly depreciation (over	\$138.33	\$50.00
60 months)		
Monthly operating cash	<u>\$769.10</u>	<u>\$542.99</u>
flow		
Annual operating cash flow	<u>\$9,229.18</u>	<u>\$6,515.93</u>

WORST CASE (50%)

Category	Dome	Tanning Bed
# Hours per month (43h x 4	86	86
weeks)		
# Clients serviced per hour	4	3
Capacity utilization	50%	50%
Total sessions possible /	344	258
month		
Charge per session	\$3.00	\$3.00
Operating Costs		

Electricity use / session	\$0.50	\$0.30
Bulb use / session		
Cost of one set of bulbs	\$1,056.00	\$420.00
Bulb life (hours)	1300	1300
Number of sessions per set	1300	5200
Cost per session	\$0.20	\$0.11
Additional revenue from		
lotion sales		
Revenue from sale of each	\$10.00	\$10.00
bottle		
Number of sessions per	10	10
bottle		
Revenue per session from	\$1.00	\$1.00
lotion sales		
Lotion cost per session	\$0.50	\$0.50
Total revenue per session	\$4.00	\$4.00
Total cost per session	\$1.20	\$0.91
Contribution margin per	\$2.80	\$2.04
session		
Monthly revenues	\$1,376.00	\$1,032.00
Monthly operating costs	\$413.86	\$248.08
Monthly advertising costs	\$500.00	\$500.00
Monthly EBITDA	\$462.14	\$283.92
Monthly depreciation (over	\$138.33	\$50.00
60 months)		
Monthly operating cash	<u>\$356.00</u>	<u>\$213.75</u>
flow		
Annual operating cash flow	<u>\$4,379.99</u>	<u>\$2,564.95</u>

2. Calculate and comment upon the accounting, cash, and financial break-even sales for the dome unit and the tanning bed unit.

Break Even Analysis	Dome	Bed
Revenue per session (including lotion sales)	\$4	\$4
Variable cost per session		
Electricity	\$0.50	\$0.30
Bulb	\$0.20	\$0.11
Cost of lotion	\$0.50	\$0.50
Total variable cost per session	\$1.20	\$0.91
Annual fixed costs		
Advertising cost in yellow pages	\$6,000	\$6,000
Annual depreciation (5 years)	\$1,660.00	\$600.00
Accounting Break-even = (fixed cost +	-\$2,739.00	-\$2,134.00
depreciation)/(revenue – variable cost)		
Cash Break-Even = (Fixed Cost/ (Revenue -	-\$2,145.00	-\$1,940.00
Variable Cost)		
Financial Break-Even = (Fixed Cost + OCF when	-\$2,720.00	-\$2,202.00
NPV=0)/ (Revenue – Variable Cost)		
Outlay	(\$8,300)	(\$3,000)
Life (years)	\$8.00	\$5.00
Present value annuity factor at 11%	\$5.16	\$3.71
OCF at which NPV = 0 (OCF = initial	\$1,607.12	\$809.67
outlay/PVIFA)		
Financial Break Even (FBE)	2,720	2,202
Average Daily Customers (sessions) needed to	10.460832	8.469739
Break-Even (= FBE/Days = 260)		
Number of days saloon operates during the year	260	260

3. Calculate the net present value, payback period, and the traditional IRR for each tanning option under the various scenarios. What do the decision rules indicate?

FOR NPV :

Dome Unit

Metrics	Best Case	Most Likely Case	Worst Case
Estimated Life	8	8	8
(years)			
Initial Outlay	\$(8,300)	\$(8,300)	\$(8,300)
Cost of Capital	11%	11%	11%
Annual Operating	\$12,461.98	\$9,229.18	\$4,379.99
Cash Flows			
Present Value of	\$64,360.21	\$47,664.36	\$22,620.57
Cash Flows (Years 1-			
8)			
<u>Net Present Value</u>	<u>\$56,060.21</u>	<u>\$39,364.36</u>	<u>\$14,320.57</u>

Tanning Bed

	Best Case	Most Likely Case	Worst Case
Estimated Life	5 years	5 years	5 years
Initial Outlay	-\$3,000	-\$3,000	-\$3,000
Cost of Capital	11%	11%	11%
Annual Operating	\$9,383.30	\$6,515.93	\$2,564.95
Cash Flows			
Present Value of	\$34,767.12	\$24,142.89	\$9,503.70
Cash Flows			
<u>Net Present Value</u>	<u>\$31,767.12</u>	<u>\$21,142.89</u>	<u>\$6,503.70</u>

FOR IRR AND PAYBACK PERIOD :

Dome Unit

Year	Best Case	Most Likely Case	Worst Case
0	\$(8,300)	\$(8,300)	\$(8,300)
1	\$12,461.98	\$9,229.18	\$4,379.99
2	\$12,461.98	\$9,229.18	\$4,379.99
3	\$12,461.98	\$9,229.18	\$4,379.99
4	\$12,461.98	\$9,229.18	\$4,379.99
5	\$12,461.98	\$9,229.18	\$4,379.99
6	\$12,461.98	\$9,229.18	\$4,379.99
7	\$12,461.98	\$9,229.18	\$4,379.99
8	\$12,461.98	\$9,229.18	\$4,379.99
IRR	<u>150%</u>	<u>111%</u>	<u>51%</u>
Payback Period	<u>0.67</u>	<u>0.90</u>	<u>1.89</u>

Tanning Bed

Year	Best Case	Most Likely Case	Worst Case
0	\$(3,000)	\$(3,000)	\$(3,000)
1	\$9,383.30	\$6,515.93	\$2,564.95
2	\$9,383.30	\$6,515.93	\$2,564.95
3	\$9,383.30	\$6,515.93	\$2,564.95
4	\$9,383.30	\$6,515.93	\$2,564.95
5	\$9,383.30	\$6,515.93	\$2,564.95
IRR	<u>217%</u>	<u>167%</u>	<u>81%</u>
Payback Period	<u>0.32</u>	<u>0.46</u>	<u>1.17</u>

SUMMARY

Dome Unit

Metrics	Best Case	Most Likely Case	Worst Case
Estimated Life	8	8	8
(years)			
Initial Outlay	\$(8,300)	\$(8,300)	\$(8,300)
Cost of Capital	11%	11%	11%

:

9

Annual Operating	\$12,461.98	\$9,229.18	\$4,379.99
Cash Flows			
Present Value of	\$64,360.21	\$47,664.36	\$22,620.57
Cash Flows			
<u>Net Present Value</u>	<u>\$56,060.21</u>	<u>\$39,364.36</u>	<u>\$14,320.57</u>
Internal Rate of	<u>150%</u>	<u>111%</u>	<u>51%</u>
<u>Return</u>			
Payback Period	<u>0.67</u>	<u>0.90</u>	<u>1.89</u>
(years)			

Tanning Bed

Metrics	Best Case	Most Likely Case	Worst Case
Estimated Life	5	5	5
(years)			
Initial Outlay	\$(3,000)	\$(3,000)	\$(3,000)
Cost of Capital	11%	11%	11%
Annual Operating	\$9,383.30	\$6,515.93	\$2,564.95
Cash Flows			
Present Value of	<u>\$34,767.12</u>	<u>\$24,142.89</u>	<u>\$9,503.70</u>
<u>Cash Flows</u>			
<u>Net Present Value</u>	<u>\$31,767.12</u>	<u>\$21,142.89</u>	<u>\$6,503.70</u>
Internal Rate of	<u>217%</u>	<u>167%</u>	<u>81%</u>
<u>Return</u>			
Payback Period	<u>0.32</u>	<u>0.46</u>	<u>1.17</u>
(years)			

For the Dome Unit, the financial metrics across all scenarios indicate a promising investment opportunity. In the Best Case scenario, the investment is highly attractive with an NPV of \$56,060.21, an IRR of 150%, and a rapid payback period of 0.67 years, suggesting robust profitability and a swift return on investment. Even in the Worst Case scenario, with an NPV of \$14,320.57 and an IRR of 51%, the project exceeds the cost of capital, albeit with a longer payback period of 1.89 years, making it a feasible but less compelling option.

Similarly, the Tanning Bed presents a strong investment case, particularly in the Best Case scenario, which boasts an NPV of \$31,767.12, an extraordinarily high IRR of 217%, and a very short payback period of 0.32 years, indicating extremely quick and substantial financial gains. Even in the Most Likely and Worst Case scenarios, the investment remains viable, with all metrics exceeding the required cost of capital, although the attractiveness diminishes as the potential returns and speed of investment recovery decrease in less favorable condition

4. Can Jenny evaluate this business project by assuming just a one-time purchase? Why or why not? What other evaluation methods should Jenny use?

No, Jenny should not evaluate the business project by assuming just a one-time purchase because this approach is does not evaluate other important factors meaning it neglects important financial dynamics. A one-time purchase evaluation focuses only on initial sales and disregards long-term factors such as ongoing operational costs, customer retention, and potential for repeat business. This limited perspective can lead to an inaccurate understanding of the project's true value and financial health.

To gain a comprehensive understanding of the project's viability, Jenny should employ a range of financial evaluation methods. Net Present Value (NPV) and Internal Rate of Return (IRR) are essential for assessing the long-term profitability and efficiency of the project by considering future cash flows. Additionally, Payback Period and Profitability Index (PI) can provide insights into the project's risk and return, helping to determine how quickly the initial investment can be recouped and the overall attractiveness of the investment. she should not evaluate this business proposal using a one-time purchase assumption. Since the dome unit is considerably more expensive than the bed, and lasts for 3 years longer, a traditional NPV would not reflect the fact that the tanning bed would have to be replaced after 5 years and would tend to be biased Jenny should consider using either the Replacement Chain Method or the Equivalent Annual Annuity Method for evaluating these two mutually exclusive projects.

Replacement Chain Method in Jenny's case would help by comparing the projects over a time frame ensuring that the lifespans of the assets are also taken into account. EAA on the other hand converts NPV into annualized cash flow, allowing a direct comparison with the annual profitability. So, To summarize Jenny might want to consider both

	Dome	Bed
Traditional NPV	\$56,060.21	\$31,767.12
Best Case	\$39,364.36	\$21,142.89
Most Likely Case	\$14,320.57	\$6,503.70
Worst Case	8	5
Life	11%	11%
Cost of Funds	\$10,854.86	\$8,573.63
Equivalent Annual Annuity		
at 11%		
Best Case (PVIFA=5.16		
and PVIFA=3.71)		
Most Likely Case	\$7,622.06	\$5,706.26
Worst Case	\$2,772.87	\$1,755.28

5. If you decide to use the replacement chain method, how does the calculation and decision change?

The replacement chain method is a capital budgeting decision model that compare two or more mutually exclusive capital proposals with unequal lives. This method takes into consideration the different life spans of alternative plans, as well as their expected cash flows. Instead of comparing projects directly, this method evaluates each project against the next best alternative. In the replacement chain analysis, the Equivalent Annual Annuity (EAA) approach is one of the methods used in capital budgeting to compare mutually exclusive project with unequal lives.

Based on the table above, the replacement method show that the dome unit is clearly superior to the tanning bed. Due to the unequal lives, it is evident that the EAA would be the evaluation method of choice.

6. What are some externalities, side effects, and other relevant issues that could affect the decision?

When evaluating a project or investment decision, it is essential to consider various externalities, side effects and other relevant issues. Some of the consideration that need to take into account that can affect decisions is environment in a big sense. Therefore, some analysis needs to analyse political factors, technological factors and environmental factors as well. Negative externalities occur when an economic activity imposes cost on unrelated third parties. For example, salon operations, such as chemical treatments and hair dyeing, can lead to environmental pollution. Therefore, proper waste disposal and eco-friendly practices are essential to mitigate this negative externality. Salons also can generate noise that affects neighboring businesses or residents. Noise reduction measures are crucial to maintain good relations with the community. Negative externalities also can lead to market inefficiencies, as the price of goods or services does not account for these costs. Moreover, the location also needs to be considered because some of the customer would not prefer to go a salon or tanning location that is far from the urban area. This will lead to loss of customers and also the loss of business from using the space for either of the units.

7. Based on your analysis, which of the two units is "too hot to handle?" Why?

Based upon our analysis, the Tanning Bed is too hot to handle. This is because eventhough it is cheap initially, it is less productive and has a short lifespan compared to Dome. The difference in operating costs of the Tanning Bed unit, is the lower electricity usage per session and cheaper light bulb replacement costs. Dome's higher capacity utilization and the larger number of sessions it can handle per month contribute to more revenue potential. Dome's total revenue(TR) per session is also higher meaning the contribution margin is higher. In summary, while the Tanning Bed presents a lower upfront cost and operating expenses, the Dome's higher revenue potential and longer economic life make it a more lucrative option, assuming there is no significant barrier in customer acceptance. Therefore, if the clientele is not an issue, the Dome is likely the better investment, making the Tanning Bed "Too Hot to Handle" only under very specific circumstances where it significantly outperforms in customer retention and satisfaction.

CONCLUSION

Based on the comprehensive analysis conducted in this case study, the dome tanning bed emerges as the superior investment choice over the standard tanning bed after considering the NPV, IRR, PP, economic life and consideration of externalities

To explain further, in terms of NPV, dome consistently shows a higher NPV accross all scenarios(best case, most likely case and worst case) which indicates that it is expected to generate more value over it's lifespan compared to tanning bed. In terms of IRR, dome unit have better IRR in most scenario meaning it has better returns on investment relative to the cost of capital. Both units have short payback periods but dome unit also achieves payback faster in all scenarios which implies that it is able to quickly recover over initial investments. This reduces risk overall. As for the economic life, dome unit also have a longer lifespan meaning that the cost of replacement are lower compared to tanning bed. Overall, this generates a higher revenue potential as larger number of sessions per month also translates into more revenue meaning more profits. While both units have externalities like operational costs, Dome's higher contribution margin outweigh these concerns but not tanning bed.

The important lesson learned that is learned from this is the importance of comprehensive financial analysis. As in our case, we learned that the use of capital budgeting tools like NPV, IRR and Payback Period is important in decision making because it evaluates the long-term profitability while also keeping in check with the risks associated. The next lesson learned is that strategic long-term thinking, as when evaluating projects with unequal life spans like dome and tanning bed require a strategic approach like involving Replacement Chain Method Or Equivalent Annual Annuity Method.

References

Ross, S. A., Westerfield, R. W., Jaffe, J., & Jordan, B. D. (2022). Part II: Valuation and Capital Budgeting. In *Corporate Finance* (13th ed., Chapters 4-7, pp. 85-180). McGraw Hill.

- Fernando, J. (2024, May 31). Net Present Value (NPV): what it means and steps to calculate it. Investopedia. <u>https://www.investopedia.com/terms/n/npv.asp</u>
- Vipond, T. (2023, November 29). *Internal Rate of Return (IRR)*. Corporate Finance Institute. <u>https://corporatefinanceinstitute.com/resources/valuation/internal-rate-return-irr/</u>
- Sydle. (2024, June 25). *Financial health of a company: How can you take care of it? Tips and tools*. Blog SYDLE. <u>https://www.sydle.com/blog/financial-health-of-a-company-625efed361423f655c6ab6b9</u>
- GoCardless. (2022, April 26). How to calculate the payback period. *Definition & Formula | GoCardless*. <u>https://gocardless.com/guides/posts/how-to-calculate-payback-period/</u>

Appendices

12

Capital Budgeting

Too Hot to Handle

When Jenny opened her full-service salon and day spa three years ago, she knew that she would have to make some difficult choices regarding the hiring and firing of qualified professionals such as cosmetologists, estheticians, nail technicians, and massage therapists. However, she was confident that her salon management training at Palace Beauty College, coupled with her industry experience as a stylist, would serve her well.

And serve her well they certainly did! Within three years of starting her own business, and after a few setbacks, she had managed to assemble a team of 10 salon professionals, all extremely motivated, people-oriented, self-driven individuals who worked hard at retaining their clients and drumming up retail sales. Of course, Jenny had put in place an incentive plan, which the stylists found to be challenging, yet lucrative. Jenny's salon revenues had grown significantly each year to their current annual level of \$500,000. On average, the salon serviced about 40 customers per day with an average ticket of \$50.

However, over the past year or so a number of new salons and nail spas had opened up in the city. Competition had become much more severe, and customers were being swayed by numerous discount coupons. Jenny was well aware that her current sales growth rate of 10% would not continue for very long.

At the suggestion of some of her regular clients, she decided to explore the possibility of expanding her service offerings to include tanning booths. 48 She figured that such an addition would complement her current salon business by offering customers the opportunity to come in for 15 to 30 minutes and have a worthwhile tanning experience, or better still to enjoy a relaxing tan instead of waiting out in the lounge.

As Jenny began exploring the various costs and investments required, she realized that she had very little knowledge about the tanning business. What appealed to her the most was that the revenues from the tanning business would be all hers to keep, unlike the other salon services where she paid the salon professional a commission of up to 50% of the revenue generated from the services rendered. What was most confusing to Jenny was whether she should go in for the tanning dome unit or the relatively cheaper tanning bed.

"Call that toll free number that's listed on the Wolff Tanning Systems Catalog", said her ever-resourceful husband, Greg, who worked as a sales representative for a chemical company. "It always works for me," he added. After many hours of agonizing over the issue, Jenny finally gave in and made the call.

The salesman, Andrew, who answered the call was extremely helpful, courteous, and convincing. "Tanning is a great complement to a salon and spa," he said. "We have shipped many units to salons all over the country, and they seem to be doing pretty well."

"Let's say I do start the tanning service at my salon, Andrew. Should I go in for the less expensive tanning bed or the more expensive tanning dome?" asked Jenny, eager to sort out her dilemma. "Well," responded Andrew, "Each unit has its own pros and cons. The bed costs considerably less than the dome, but it takes longer for an equivalent tan per session. The dome on the other hand, costs more, but it does the job faster, provides for a complete body and facial tan, and lasts longer."

"Do you have a comparison chart showing the approximate costs, features, and revenue potential of each option, Andrew?" asked Jenny. "Absolutely," said Andrew. "I would be happy to email you a copy right now, if you like." "That would be great!" said Jenny, "It would certainly help me make an informed decision. As you can see, Andrew, I really want to figure out which of these two units is too hot to handle!"

Case 12 Too Hot to Handle

Exhibit 1

	Relevant Informatio	on
Salon Hours:	Sunday, Monday	Closed
	Tuesday-Thursday	9 AM – 7 PM
	Friday	9 AM – 5 PM
	Saturday	9 AM – 2 PM
Advertising Costs	\$300 per month (Yellow Pages ad)	
	\$200 per month (other	advertisements)
Jenny's after-tax cost of funds:	11% per year depreciation	
Method:		Straight line over 5 years tax
Rate:		30%

50

Exhibit 2

Andrew's Email

From: AndrewSymonds <ASymonds@Wolff Tanning Systems.com

Sent: Thursday, February, 10 20XX 11:45 AM

To: Jennyc@salonspa.net

Re: Tanning equipment comparison chart

Dear Jenny,

As per our conversation, I am attaching a comparison table showing the relative costs and features of the dome and bed units. Please call our toll- free number if you need any more information. We look forward to doing business with you.

	Dome Unit	Tanning Bed
Cost (including shipping)	\$7800	\$2800
Setup cost	\$500	\$200
Electricity cost per session	\$0.50	\$0.30
Number of sessions/hour	4	3
Number of bulbs needed	48	28
Cost per bulb	\$22	\$22
Bulb life	1300 hours	1300 hours
Unit life	8 years	5 years
Suggested price/visit	\$3	\$3
Space requirement	9 ft. \times 5ft, \times 5ft, 10 ft. \times 10 ft. room	
Other income		
Tanning lotion	1 bottle/10 sessions	
Profit per sale	\$5	