COMP7012
IT Project Management
Lab Exercise 4

Today's Lab exercise focuses on one of a project's financial feasibility.

1. Calculate the Net Present Value (NPV) for each of the projects A, B, and C shown in below Table using each of the discount rates 8%, 10%, and 12%. For each of the discount rates, decide which is the best project. What you can conclude from these results? Do not engage in a "copy-and-paste" exercise *(30 mins)*

Table 3.5   *Three estimated project cash flows*

Year	Project A (£)	Project B (£)	Project C (£)
0	− 8,000	− 8,000	− 10,000
1	4,000	1,000	2,000
2	4,000	2,000	2,000
3	2,000	4,000	6,000
4	1,000	3,000	2,000
5	500	9,000	2,000
6	500	−6,000	2,000
Net Profit	4,000	5,000	6,000

Project A   **Discount factor = 8%**

Year	Project cash flow	Discount factor 8%	Discounted cash flow
0	-8,000	1.000	-8,000
1	4,000	0.9259	3,703.6
2	4,000	0.8573	3,429.2
3	2,000	0.7938	1,587.6
4	1,000	0.7350	735.0
5	500	0.6806	340.3
6	500	0.6302	315.1
			2,978 – 8,000 = -5,022
Net Profit	4,000		
			NPV = £-5,022

Project A   **Discount factor = 10%**

Year	Project cash flow	Discount factor 10%	Discounted cash flow
0	-8,000	1.0000	-8,000
1	4,000	0.9091	3,636.4
2	4,000	0.8264	3,305.6
3	2,000	0.7513	1,502.6
4	1,000	0.6830	683.0
5	500	0.6209	310.45
6	500	0.5645	282.25
			9,720.3 - 8000 = 1720.3
Net Profit	4,000		
			NPV = £1720.3

Project A   **Discount factor = 12%**

Year	Project cash flow	Discount factor 12%	Discounted cash flow
0	-8,000	1.000	-8,000
1	4,000	0.8929	3,571.6
2	4,000	0.7972	3,188.8
3	2,000	0.7118	1,423.6
4	1,000	0.6355	635.5
5	500	0.5674	283.7
6	500	0.5066	253.3
			9,356.5 - 8,000 = 1356.5
Net Profit	4,000		
			NPV = £1356.5

Project B   **Discount factor = 8%**

Year	Project cash flow	Discount factor 8%	Discounted cash flow
0	-8,000	1.000	-8,000
1	1,000	0.9259	925.9
2	2,000	0.8573	1,714.6
3	4,000	0.7938	3,175.2
4	3,000	0.7350	2,205.0
5	9,000	0.6806	6,125.4
6	6,000	0.6302	3,781.2
			17,927.3–8,000= £9,927.3
Net Profit	5,000		
			NPV = £9,927.3

Project B   **Discount factor = 10%**

Year	Project cash flow	Discount factor 10%	Discounted cash flow
0	-8,000	1.0000	-8,000
1	1,000	0.9091	909.1
2	2,000	0.8264	1,652.8
3	4,000	0.7513	3,005.2
4	3,000	0.6830	2,049.0
5	9,000	0.6209	5,588.1
6	6,000	0.5645	3,387.0
			16,591.2–8,000=8591.2
Net Profit	5,000		
			NPV = £8,591.2

Project B   **Discount factor = 12%**

Year	Project cash flow	Discount factor 12%	Discounted cash flow
0	-8,000	1.000	-8,000
1	1,000	0.8929	892.9
2	2,000	0.7972	1,594.4
3	4,000	0.7118	2,847.2
4	3,000	0.6355	1,906.5
5	9,000	0.5674	5,106.6
6	6,000	0.5066	3,039.6
			15,387.2–8000=7,387.2
Net Profit	5,000		
			NPV = £7,387.2

Project C   **Discount factor = 8%**

Year	Project cash flow	Discount factor 8%	Discounted cash flow
0	-10,000	1.000	-10,000
1	2,000	0.9259	1,851.8
2	2,000	0.8573	1,714.6
3	6,000	0.7938	4,762.8
4	2,000	0.7350	1,470.0
5	2,000	0.6806	1,361.2
6	2,000	0.6302	1,260.4
			12,420.8-10,000= 2,420.8
Net Profit	6,000		
			NPV = £2,420.8

Project C   **Discount factor = 10%**

Year	Project cash flow	Discount factor 10%	Discounted cash flow
0	-10,000	1.0000	-10,000
1	2,000	0.9091	1,818.2
2	2,000	0.8264	1,652.8
3	6,000	0.7513	4,507.8
4	2,000	0.6830	1,366.0
5	2,000	0.6209	1,241.8
6	2,000	0.5645	1,129.0
			11,715.6-10,000=1,715.6
Net Profit	6,000		
			NPV = £1,715.6

Project C   **Discount factor = 12%**

Year	Project cash flow	Discount factor 12%	Discounted cash flow
0	-10,000	1.000	-10,000
1	2,000	0.8929	1,785.8
2	2,000	0.7972	1,594.4
3	6,000	0.7118	4,270.8
4	2,000	0.6355	1,271.0
5	2,000	0.5674	1,134.8
6	2,000	0.5066	1,013.2
			11,070-10,000=1,070
Net Profit	6,000		
			NPV = £1,070

Project B is the best project because the **Net Present Value** is higher than the other projects & initial payment is lower than **Project C** and same as **Project A**

Project B

8% discount	10% discount	12% discount
NPV = **£9,927.3**	NPV = **£8,591.2**	NPV = **£7,387.2**

2. A new Assets Tracking System, ATS, for CIT could be developed at a cost of €150,000. The estimated net operating costs and estimated net benefits over *seven years of operation are listed below (1 hour):*

Year	Estimated Net Operating Costs (€)	Estimated Net Benefits (€)
0	150,000	0
1	4,000	22,000
2	6,000	29,000
3	7,500	38,000
4	10,500	50,000
5	13,000	61,000
6	16,000	68,000
7	18,000	75,000

▪ What would the *payback-period be for this proposed investment?*

Year	Estimating Net Operating Costs (€)	Estimated Net Benefits (€)	Actual Profit after paying operating costs **Estimated benefit – operational cost**
0	150,000	0	0
1	4,000	22,000	22,000 – 4,000 = 18,000
2	6,000	29,000	29,000 – 6,000 = 23,000
3	7,500	38,000	38,000 – 7,500 = 30,500
4	10,500	50,000	50,000 – 10,500 = 39,500
5	13,000	61,000	61,000 – 13,000 = 48,000
6	16,000	68,000	68,000 – 16,000 = 52,000
7	18,000	75,000	75,000 – 18,000 = 57,000

Our Net operating Cost year 0 = **150,000**

Year 1 profit = **18,000**
Year 2 profit = **23,000**
Year 3 profit = **30,500**
Year 4 profit = **39,500**
Year 5 profit = **48,000**

= €159,000 (More than initial cost of the project in year 5)

We have got more profit than our initial cost in year 5 so our Payback-period is Year 5

- What is the *return-on-investment, ROI, for this proposed investment?*

Year 1 profit = **18,000**
Year 2 profit = **23,000**
Year 3 profit = **30,500**
Year 4 profit = **39,500**
Year 5 profit = **48,000**
Year 6 profit = **52,000**
Year 7 profit = **57,000**

= **268,000** (this is the actual profit)

Profit - initial cost
268,000 – 150,000 = 118,000

Net profit = 118,000 in 7 years
Annual net profit = 118,000/7

Annual net profit = **16,857.14**

Return of investment (ROI)

$$ROI = \frac{\text{Average Annual profit}}{\text{Total investment}} \times 100$$

$$ROI = \frac{16,857.14}{150,000} \times 100$$

ROI = 11.23% = 11%

- What is the *net present value, NPV, of this proposed investment, if the* current discount rate is 5.0%?

Discount rate = 5%

Year	Project cash flow	Discount factor 5%	Discounted cash flow
0	-150,000	1.000	-150,000
1	18,000	0.9524	17,143.2
2	23,000	0.9070	20,861
3	30,500	0.8638	26,345.9
4	39,500	0.8227	32,496.65
5	48,000	0.7835	37,608
6	52,000	0.7462	38,802.4
7	57,000	0.7107	40,509.9
			213,767.05 -150,000= 63,767.05
Net Profit	€118,000		
			NPV = €63,767.05

Note: Use the version control tool, *git,* to maintain a secure, searchable history of your Project Charter artefact's evolution.