

Assignment

The Allied Group

Student Full Name

Institutional Affiliation

Course Full Title

Instructor Full Name

Due date

The Allied Group

What is each project's payback period? Provide a detailed explanation of how you calculated the payback period for each.

The payback period is the time that an investment takes to produce enough revenue to recover the original cost. Since organizations prefer investing in projects that repay themselves within a short period, the payback period helps businesses to budget for their capital and select the most suitable projects (Sinaga et al., 2023). Hence, the payback period helps investors to determine whether an investment is desirable or not.

Table 1

Cash flows for the packaging machine

Years	Cash Flow	Cumulative Cash Flow
0	-\$14,000	-14000
1	\$4,100	-9900
2	\$3,300	-6600
3	\$2,900	-3700
4	\$2,200	-1500
5	\$1,200	-300

In the case of Allied Group, the payback period for the packaging machine exceeds 5 years. This means that the projected cash flows would not have paid back the initial cash invested in the project within 5 years because there will be a remaining balance of \$300 as shown in the cumulative cash flows column. In this case, there will be no profit earned within the first five years. Hence, to recoup the initial investment fully, the machine should be in operation for more than 5 years.

Table 2

Cash flows for the modeling machine

Years	Cash Flow	Cumulative Cash Flow
0	-\$12,000	-\$12,000
1	\$3,200	-\$8,800
2	\$2,800	-\$6,000
3	\$2,800	-\$3,200
4	\$2,200	-\$1,000
5	\$2,200	\$1,200

In the fifth year, the payback period will exceed the initial investment of 12,000. Although the machine will be required to generate \$1,000 to cover the first investment, the projected investment will be \$2,200. Hence, the payback period will be $4 + (1,000/2,200) = 4.45$ years. Based on the above calculations, the Allied Group should invest in the molding machine because it has a shorter payback period.

What is the NPV for each project? Provide a detailed explanation of how you calculated the payback period for each.

$$NPV = \sum_{t=0}^n \frac{Ct}{(1+r)^n}$$

Where;

NPV = net present value

Ct = cash flow at the time t

r = discount rate = 15%

t = time

Table 3

Net present value for the packaging machine

Year	Cash Flow	Present Value
0	-\$14,000	-\$14,000.00
1	\$4,100	\$3,565.22
2	\$3,300	\$2,495.27
3	\$2,900	\$1,906.80
4	\$2,200	\$1,257.86
5	\$1,200	\$596.61
NPV		-\$4,178.24

Initial cash flow: $-14,000 / (1.15)^0 = -14,000.00$

Cash flow for year 1: $4,100 / (1.15)^1 = 3,565.22$

Cash flow for year 2: $3,300 / (1.15)^2 = 2,495.27$

Cash flow for year 3: $2,900 / (1.15)^3 = 1,906.80$

Cash flow for year 4: $2,200 / (1.15)^4 = 1,257.86$

Cash flow for year 5: $1,200 / (1.15)^5 = 596.61$

$$\text{NPV} = -14,000 + (3,565.22 + 2,495.27 + 1,906.80 + 1,257.86 + 596.61)$$

$$= \text{-\$4,178.24}$$

Table 4

Net present value for the molding machine

Year	Cash Flow	Present Value
0	-12000	-\$12,000.00
1	3200	\$2,782.61
2	2800	\$2,117.20
3	2800	\$1,841.05
4	2200	\$1,257.86
5	2200	\$1,093.79
NPV		-\$2,907.50

Initial cash flow: $-12,000 / (1.15)^0 = -12,000.00$

Cash flow for year 1: $3200 / (1.15)^1 = 2782.61$

Cash flow for year 2: $2800 / (1.15)^2 = 2117.20$

Cash flow for year 3: $2800 / (1.15)^3 = 1841.05$

Cash flow for year 4: $2200 / (1.15)^4 = 1257.86$

Cash flow for year 5: $2200 / (1.15)^5 = 1093.79$

NPV = $-12,000 + (2782.61 + 2117.20 + 1841.05 + 1257.86 + 1093.79)$

= -\$2,907.50

Using the net present value method, the Allied Group should invest in the molding machine because it has a smaller net present value.

What is the IRR for each project? Provide a detailed explanation of how you calculated the internal rate of return (IRR) for each.

The internal rate of return is used in financial analysis to estimate the profitability of a potential investment. Usually, the metric is used in capital budgeting to show the expected returns from a given investment (Sinaga et al., 2023). The IRR makes the present value of the expected cash flows equal to zero. Using trial and error, the IRR for the packaging machine is 0.5% while for the molding machine is 4%.

For the packaging machine, the IRR is 0.5%.

At 0.5%;

$$\text{NPV} = [4100 / (1.005)] + [3300 / (1.005)^2] + [2900 / (1.005)^3] + [2200 / (1.005)^4] + [1200 / (1.005)^5] - 14000 = -\$469$$

For the modeling machine, the IRR is 4%.

At 4%;

$$\text{NPV} = (3,200 / 1.04) + [2,800 / 1.04^2] + [2,800 / (1.04)^3] + [2,200 / (1.04)^4] + [2,200 / (1.04)^5] - 12,000 = -\$156.33$$

Although the outcomes from these calculations are not equal to zero, they are closer. Hence, these are the most suitable IRRs for the respective investments.

References

Sinaga, A. S., Sari, M. M., Hutasuhut, A. A., Zahara, S. T., Amanda, A., Fitri, A., & Caesario, M. A. (2023). Comparison of capital budgeting methods: NPV, IRR, Payback Period. *World Journal of Advanced Research and Reviews* 19(2):1078-1081. DOI:10.30574/wjarr.2023.19.2.1483.