



DP IB Business Management: SL



Your notes

3.7 Investment Appraisal

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- * Simple Payback Period
- * Average Rate of Return (ARR)



Your notes

Simple Payback Period

Introduction to Investment Appraisal

- Investment appraisal involves comparing **the expected future cash flows of an investment with the initial expenditure** on that investment
- A business may want to analyse
 - How soon** the investment will recoup the initial outlay
 - How profitable** the investment will be
- Before an investment can be appraised key data will need to be collected, including
 - Sales forecasts
 - Fixed and variable costs data
 - Pricing information
 - Borrowing costs
- The collection and analysis of this data is likely to **take some time**
 - It requires **significant experience** to interpret the data appropriately **before the investment appraisal can take place**
- Two methods **used to appraise the value of an investment**, include:
 - The simple payback period
 - The average rate of return (ARR)

Simple Payback Period

- The payback period is a calculation of the **amount of time** it is expected an investment will **take to pay for itself**
- Where **net cash flows** are expected to be **constant over time**, the payback period can be calculated using the formula

$$\frac{\text{Initial Outlay}}{\text{Net Cash Flow per Period}} = \text{Years / Months}$$





Your notes

Worked Example

1. Simple Payback Calculation

Gomez Carpets is considering an investment in a new storage facility at a cost of \$200,000. It expects additional net cash flow of \$30,000 per year as a result of the investment.

Calculate the Payback period for the investment. [3]

Answer:

Step 1 - Substitute the values into the formula

$$\frac{\$ 200,000}{\$ 30,000} = 6.67 \text{ years [1 mark]}$$

Step 2 - Convert the outcome to years and months

6 years

0.67 years = 8.04 months [1 mark]

Payback period = 6 years and 8 months [3 marks for the correct answer]



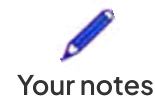
Worked Example

2. Payback calculation for varying cash flow over time

Hammer and Son provides a household repairs service that has recently employed a new handywoman who requires her own van. The new van will be purchased for \$32,000

The net cash flows are expected to vary over the five years following its purchase and are shown in the table below.

Year	Net cash Flow (\$)	Cumulative Cash Flow (\$)
0	(32,000)	(32,000)
1	14,000	(18,000)
2	10,000	(8,000)
3	6,000	(2,000)
4	3,000	1,000



5	2,000	3,000
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Calculate the payback period for the van. [4]

Answer:

Step 1 – Identify the final year where the cumulative cash flow is negative

In this case, the cumulative cash flow figure is -\$2,000 at the end of Year 3

This is the remaining amount (outlay) outstanding. [1 mark]

Step 2 – Calculate the monthly net cash flow for the next year (year 4)

$$\$3,000 \div 12 \text{ (months)} = \$250 \text{ [1 mark]}$$

Step 3 – Divide the remaining amount outstanding by the monthly net cash flow

$$\$2000 \div \$250 = 8 \text{ months [1 mark]}$$

Step 4 – Identify the payback period

In this case the Payback period is 3 years and 8 months [1 mark]

Evaluation of the Payback Method

Advantages	Disadvantages
<ul style="list-style-type: none"> It is a simple method to calculate and understand It is particularly useful for businesses where cash flow management is vital Businesses can identify the point at which an investment is paid back and contribute positively to cash flow It is also useful when new technology is introduced regularly Businesses purchasing equipment can calculate whether an investment 'pays back' before an upgrade is available 	<ul style="list-style-type: none"> It provides no insight into the profitability of investments Payback only considers the total length of time to recover an investment Neither the timing nor the future value of cash inflows is considered This method may encourage a short-termism approach Potentially lucrative investments may be dismissed as they take longer to pay back than alternatives



Your notes

Average Rate of Return (ARR)

Average Rate of Return (ARR)

- The Average Rate of Return compares the average **profit** per year generated by an investment with the value of the **initial capital cost**
- The average rate of return is calculated using the formula and is **expressed as a percentage**
 - This makes it easy to **compare different investment options**

$$\frac{(\text{total returns} - \text{capital cost}) \div \text{years of use}}{\text{capital cost}} \times 100$$



Worked Example

Creative Frames, a small artwork framing business based in Bermuda, is considering an investment of \$40,000 in new machinery. Megan, the business owner, believes that total returns over a 6-year period will be \$76,000

Calculate the Average Rate of Return of the proposed investment. [4 marks]

Answer:

Step 1 - Deduct the capital cost from the total returns

$$\$76,000 - \$40,000 = \$36,000 \quad [1 \text{ mark}]$$

Step 2 - Divide the outcome by the number of years of use

$$\$36,000 \div 6 \text{ years} = \$6,000 \quad [1 \text{ mark}]$$

Step 3 - Substitute the values into the formula

$$= \frac{6,000}{40,000} \times 100 \quad [1 \text{ mark}]$$

$$= 0.15$$

Step 4 - Multiply the outcome by 100 to find the percentage

$$0.15 \times 100 = 15\% \quad [1 \text{ mark}]$$

Evaluation of Average Rate of Return (ARR)



Your notes

Advantages	Disadvantages
<ul style="list-style-type: none">ARR considers all of the net cash flows generated by an investment over timeARR is easy to understand and compare the percentage returns with each other	<ul style="list-style-type: none">As it depends on an average of cash flows it ignores the timing of those cash flowsThe opportunity cost of the investment is ignored as values are neither expressed in real terms nor adjusted for the impact of interest rates and time

Limitations of using Investment Appraisal

- Each of the investment appraisal techniques **relies upon forecasted future cash flows** which may **lack accuracy**
 - Managers compiling cash flow forecasts may lack experience or may be biased towards a particular investment
 - Incomplete past data may make forecasting imprecise or mean that **confidence** in the data used to compile the forecast is limited
- Longer-term forecasts** used to predict **returns on investments** are particularly **prone to inaccuracy** for a variety of reasons
 - Unexpected increases in **costs**
 - The arrival of **new competitors**
 - Changes in **consumer tastes**
 - Uncertainties arising as a result of economic growth or **recession**
- Factors other than the cost of investment and the return on investment are not considered
 - Business finances and availability of external finance to fund the investment
 - The overall **corporate objectives**
 - Potential for positive **public relations** or meeting **social responsibilities**