IS221: Project Management

WEEK-03: Project Selection

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Project Selection Models

- The selection of the right project for future investment is a crucial decision for the long-term survival of your company.
- The selection of the wrong project may well precipitate project failure leading to company liquidation.
- **A numeric model**: is usually financially focused and quantifies the project in terms of either time to repay the investment (payback or return on investment)
- **nonnumeric models**: look at a much wider view of the project considering items from market share to environmental issues.
- The main purpose of these models is to aid decision-making leading to project selection.

Project Selection :points to consider

- Realism
- Capability
- ease of use
- flexibility and
- low cost.

Project Selection Models

The following sub-headings indicate the type of questions to ask:

- Will the project maximize profits?
- Will the project maximize the utilization of the workforce?
- Will the project maintain market share, increase market share or consolidate market position?
- Will the project enable the company to enter new markets?
- Will the project improve the company's image?
- Will the project satisfy the needs of the stakeholders and political aspirations?
- Is the project's risk and uncertainty acceptable?
- Is the project's scope consistent with company expertise?

Payback Period

- The payback period for a project is the initial fixed investment in the project divided by the estimated annual cash inflows from the project.
- The ratio of these quantities is the number of years required for the project to repay its initiate fixed investment.

Example

Assume a project costs $100,000 to implement and has annual net cash inflows of $25,000.

Then Payback period = $100,000/$25,000 = 4 years.

Return on Investment (ROI)

- technique which does look at the whole project is return on investment (ROI).
- This method first calculates the average annual profit, which is simply the project outlay deducted from the total gains, divided by the number of years the investment will run.
- The profit is then converted into a percentage of the total outlay using the following equations:

$$\text{Avarage Annual profit} = \frac{\text{Total Gian} - \text{Total Outlay}}{\text{No. of Years}}$$

$$\text{Return on Investment (ROI)} = \frac{\text{Avarage Annual profit} \times 100}{\text{Original Investment}}$$

Return on Investment (ROI)

Machine selection Example

Year	Cash-flow Machine A	Cash-Flow Machine B
0	($35,000)	($35,000)
1	$20,000	$10,000
2	$15,000	$10,000
3	$10,000	$15,000
4	$10,000	$20,000
Total gains	**$55,000**	**$55,000**

$$Profit(A) = \$55,000 - \$35,000 = \$20000$$

$$\text{Annual Profit} = \$20.000/4 = \$5,000 \text{per year (same for both machines)}$$

$$\text{Return on Investment (ROI)} = (\$5.000 \times 100)/(\$35,000) = 14\%$$

Return on Investment (ROI)

- although machine A and machine B have different cash-flows, their profit and return on investment come out the same.
- To address this short-coming of both return on investment and payback period, the time value of money must be considered using a discounted cash-flow technique.

Discounted Cash-Flow (DCF)

- The discounted cash-flow (DCF) technique takes into consideration the time value of money

Example

a $100 today will not have the same worth or buying power as a $100 this time next year.

- There are two basic DCF techniques which can model this effect,
  1. Net-Present-Value (NPV) and
  2. Internal-Rate of Return (IRR).

Net-Present Value (NPV)

To assist the understanding of NPV let us first look at compound interest which is commonly used in saving accounts.

Example

If we invest $100 at 20% interest, after one year it will be worth $120 and after two years compounded it will be worth $144.

Now NPV is the reverse of compound interest.

Net-Present Value (NPV)

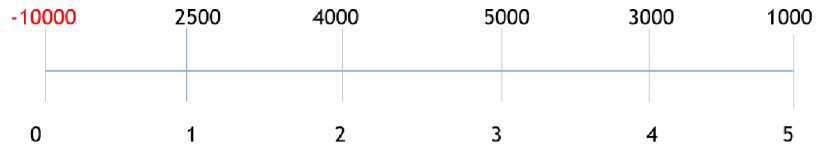
Net-Present value (NPV)

If you were offered $120 one year from now and the inflation and interest rate was 20%, working backwards its value in todays terms would be $100. This is called the present value, and when the cash-flow over a number of years is combined in this manner the total figure is called the **Net-Present value (NPV)**.

If NPV>0 Accept the project

Net-Present Value (NPV)

Cash-out Flow



$$NPV = -10000 + \frac{2500}{(1+0.06)} + \frac{4000}{(1+0.06)^2} + \frac{5000}{(1+0.06)^3} + \frac{3000}{(1+0.06)^4} + \frac{1000}{(1+0.06)^5} = 3239$$

0.06=> Discount Rate

NPV>0 Accept Project

Internal Rate of Return (IRR)

- The Internal Rate of Return (IRR) is the discount rate that makes the net present value (NPV) of a project zero.

- If r=0.08 ==➔ Discount rate

$$NPV = -100 + \frac{130}{(1+R)} = 0 \quad R = 0.3$$

- If R>r Accept the project

Nonnumeric models-Scoring Models

- a useful tool to help put things into a more clear, objective view To create a weighted scoring model, the following steps are applied:
  - Identify the criteria important to the decision process
  - Assign a weight to each criterion based on its relative importance in the decision (ideally, so they all add up to 100%)
  - Assign numerical scores to each criterion for all of the options being considered.
  - Calculate the weighted scores by multiplying the weight for each criterion by its score and adding the resulting values.

Nonnumeric models-Scoring Models

		Requirement score		
Criteria	Weight	A	B	C
X	50%			
Y	30%			
Z	20%			
Weighted Scores	100%			

		Requirement score		
Criteria	Weight	A	B	C
X	50%	70	45	40
Y	30%	40	85	30
Z	20%	40	80	50
Weighted Scores	100%	55	64	39

References

- **R. Burke,** ***Project Management: Planning and Control Techniques*****.** wiley, 5th ed., 2013.
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- **C. Petersen,** ***The Practical Guide to Project Management*****.** bookboon, 2017.