

**AIR-1 Notes**

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**Handwritten notes by**



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## Project Management

1. Basics of Project Management
2. Project Initiation
3. Risk Management
4. Project Execution, Monitoring and Closing
5. Project Financing

- Project is a temporary endeavour undertaken to create a unique product, service or result
- Each project is temporary because it has a definite beginning and a definite end.
- A project is not a continuous ongoing activity.
- A project is unique because some aspects related to the project will be specific to that project only.

⇒ Project Management - It is the application of knowledge, skills, tools and techniques to the project activities to meet project requirements.

→ It has increasingly become significant because:

- 1) Many projects are large and complex which require a lot of coordination and communication with the suppliers, sponsors, government agencies etc.
- 2) Large amount of money may be involved in the project.
- 3) There is risk and uncertainty involved.
- 4) The market situation is dynamic and the prices of various inputs continuously fluctuate.
- 5) Management of stakeholders is required.
- 6) There is increased competition and increased focus on meeting the client's requirements.

## ⇒ Features/characteristics of a project

### 1) Change

→ Projects can be considered as agents of social change.

### 2) Temporary

### 3) Unique

4) Risk → Because each project is unique.

5) Requirement of effective communication & coordination with various stakeholders.

6) Multi-functional → as it requires involvement of people from different departments.

7) There should be a defined objective so as to avoid any confusion and conflict at a latter stage.

8) Sub-contracting - A specialized knowledge or work force may be required for a very small duration. Hence they may be outsourced to another agency.

9) Made to order -

10) Life Cycle - Each project has a life cycle irrespective of its scope and cost → Initiation, planning, execution, closing.

## ⇒ Comparison of operations and projects

1) Both require planning, execution and control and both are subjected to constraints of time cost and quality.

2) Projects are temporary while operations are continuous activities.

3) While projects have unique outputs, operations result in similar products.

4) Projects involve more risk whereas operations involve less risk.

5) Management of projects is more difficult in comparison to operations.

6) Projects involve wide variety of skills whereas operations require limited skills.

7) Projects involve many outside agencies whereas operations require relatively few outside agencies.

⇒ Project stakeholder - It refers to an individual, group or organization who may affect, be affected by, or perceive itself to be affected by a decision, activity or outcome of a project.

→ Stakeholders can be of 2 types:

- 1) Internal Stakeholders → Project Manager, team manager, Sponsors etc
- 2) External Stakeholders → Govt regulating bodies, local people, suppliers, external funding agencies.

OR

- 1) Positive Stakeholders - They have a positive view about the project and are likely to be benefitted by the project's outcome.  
→ They help in successful completion of the project.
- 2) Negative Stakeholders - They have a negative opinion about the project and are likely to be negatively impacted. They may present hurdles in successful completion of the project. Hence, they need to be managed and taken into confidence by effective communication and coordination.

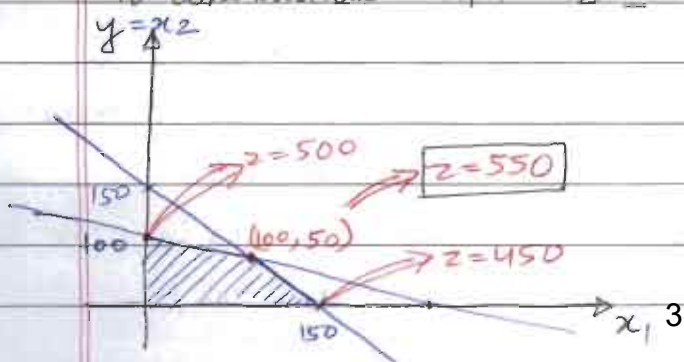
⇒ Project constraints

→ Time, Cost & Scope → universal constraints.

→ Resources, Quality → other constraints.

→ These are the limiting factors or the boundaries within which the project should be completed.

Q. The objective function  $Z = 3x_1 + 5x_2$  is to be maximized subject to constraints  $x_1 + 2x_2 \leq 200$ ,  $x_1 + x_2 \leq 150$  and  $x_1, x_2 \geq 0$



## ⇒ Types of organizations:

### ① Functional Organization

- The organization is divided into specialized departments with each department performing one type of function.
- The functional manager will have full authority regarding decision making, allocation of funds, resources etc. in that particular functional domain.
- The position of Project Manager either does not exist or if it exists, he will have limited powers and will act more as a coordinator.
- The decision making is slow and there is poor inter-departmental communication and coordination.
- At any point of time, a department may have one or more no. of projects, hence the project oriented focus is missing. There is no one person responsible for the project as a whole.
- The functional manager may adopt analytical approach rather than systems approach.

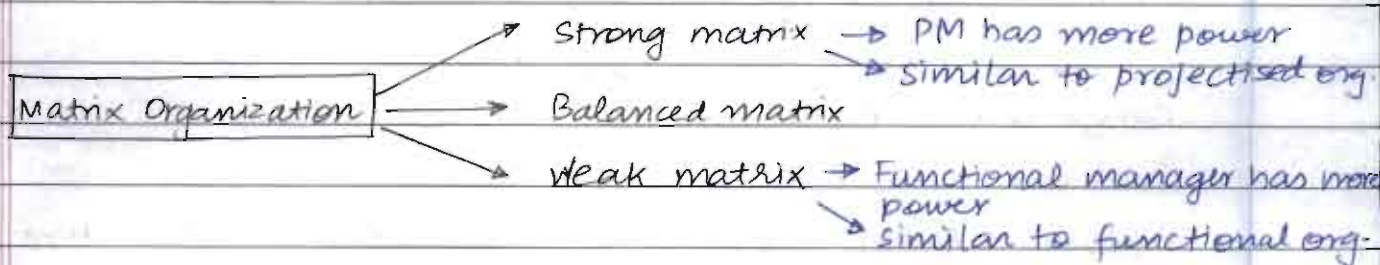
### ② Projectised Organization

- Here the PM has full authority to take decisions and allocate resources.
- Either there will be no functional manager or if he/she exists, he/she will have very limited powers.
- It leads to fast decision making and fast completion of projects.
- The PM uses systems approach.
- The PM can directly communicate with the top management and hence there are shorter communication channels.
- Employees may become less loyal to the organization because once the project is complete they may lose their jobs.
- Project team forms a separate identity which results in high level of motivation for the employees [non-monotonous work]

- It creates an internal rift in the organization because the project team members feel that they are more important to the organization in comparison to other employees of parent org. [Projectities]

### ③ Matrix Organization

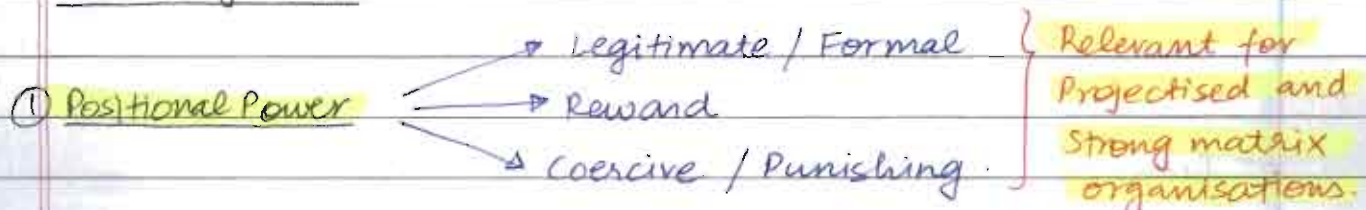
- It is a mixture of the projectised type of org structure and functional type of org structure.
- There are 2 chains of command, one on the functional lines and other on the project lines.
- Hence, there might be some practical difficulties in reporting to 2 bosses. Thus, there must be clear communication and division of power to avoid any confusion and conflict.



### ⇒ Project Manager

- A PM is an individual with the authority, responsibility and accountability for managing a project to achieve the desired objectives.
- PM should have skills related to leadership, communication, motivation, decision making, team making, conflict resolution, negotiation, Human Resource Management, time management, budgeting, political and social awareness

### ⇒ Powers of a PM



(a) Legitimate/Formal Power - The team members will obey the instructions of the PM because they know that he has the authority to issue such orders.

(b) Reward Power - The project manager can reward the team members/subordinates monetarily/non-monetarily if they perform well.

(c) Coercive/Punishing Power - The team members will obey the PM because they may be punished if they do not perform well.

→ The positional powers need a pre-justification before their use. But in case of emergency, they can be used without approval and subsequently the post justification may be given.

② Personal Power

- Referent
- Expert

(a) Referent Power - It is due to the respect and admiration of the subordinates.

(b) Expert Power - It is based on the skill, knowledge, experience & expertise of the PM.

⇒ Project Management Office (PMO)

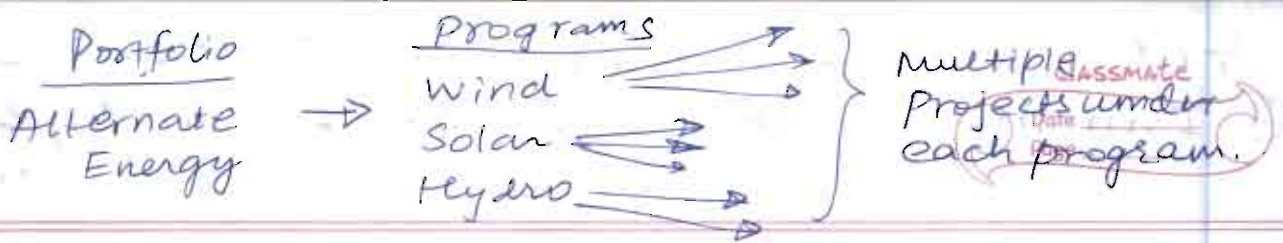
→ This is a group of individuals who are responsible for centralised and coordinated management of the projects.

PMO

- Supportive → Low degree of control over projects → Weak matrix
- Controlling → Moderate degree of control → Balanced matrix
- Directing → High degree of control → Projectised, Strong matrix.

↑ functional

→ Project, Program, Portfolio management



⇒ Program - It is a group of related projects managed in a coordinated way to obtain the benefits and control which is not available from managing them individually.

→ Programme management leads to better utilisation of resources, minimised resource constraints, reduced conflicts b/w projects, good communication and coordination b/w projects and overall improvement in the organization's performance.

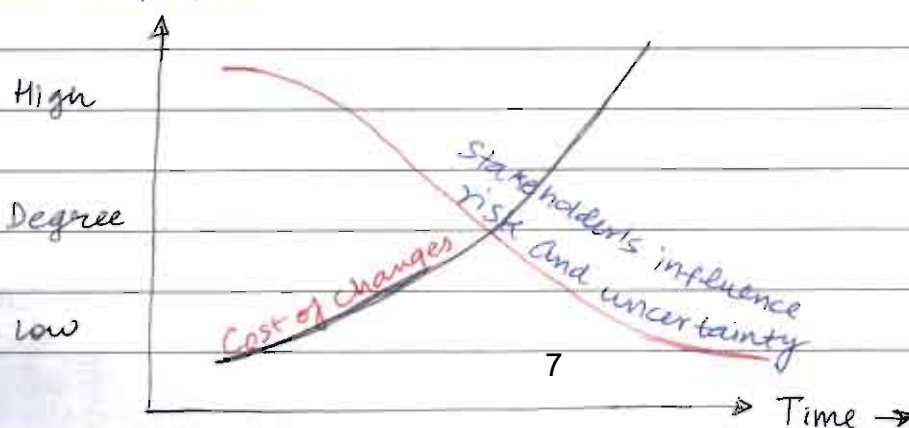
⇒ Portfolio management - A portfolio is a group of related or non-related programs or projects. Portfolio management will have a larger scope than the programme management.

→ The portfolio management helps in achieving the strategic objectives of the organization, ~~private~~ prioritization of the works and optimization of organization's performance.

### ⇒ Project Lifecycle

- ① Initiation → o/p Project charter
- ② Planning → o/p Project Management Plan
- ③ Execution → o/p Accepted deliverables to client.
- ④ Closing → o/p archived documents → Both Physical and financial closure.

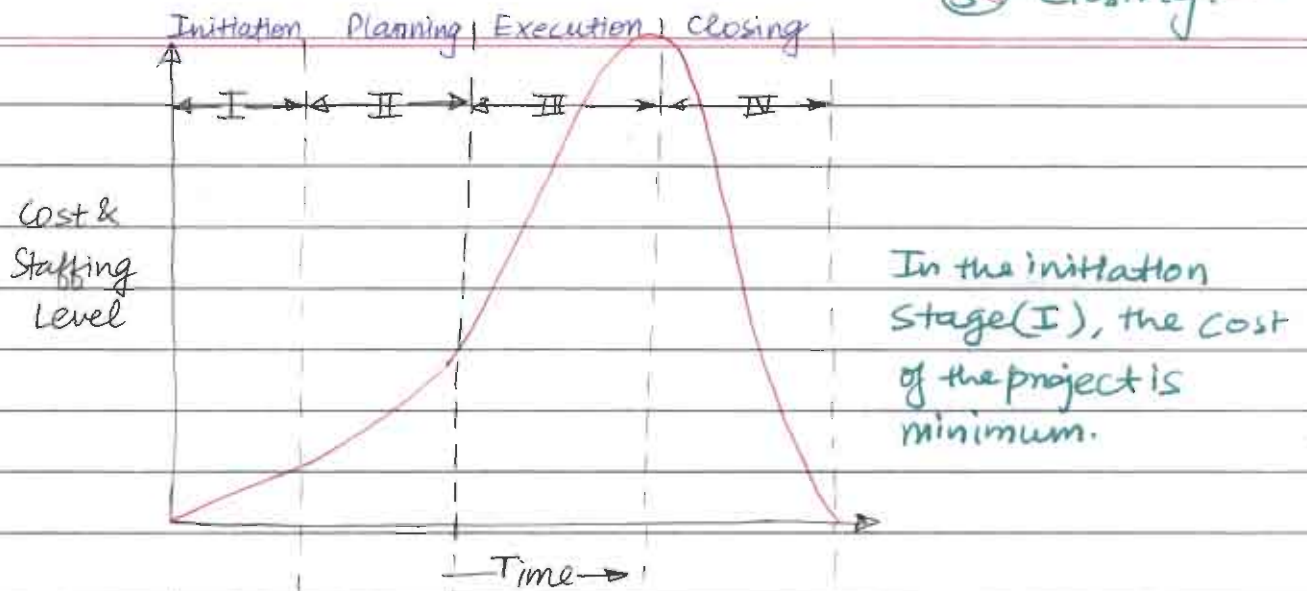
→ Irrespective of the scope, cost and complexity, any project goes through a series of stages during its life which are collectively called the project lifecycle. It helps in better management and control over the projects



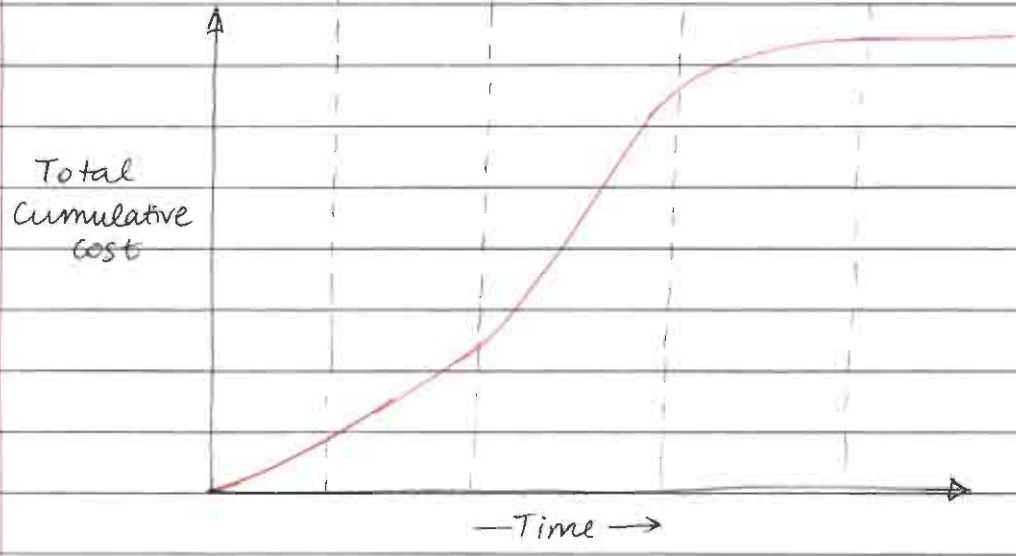


47 Project processes → divided into 5 process groups

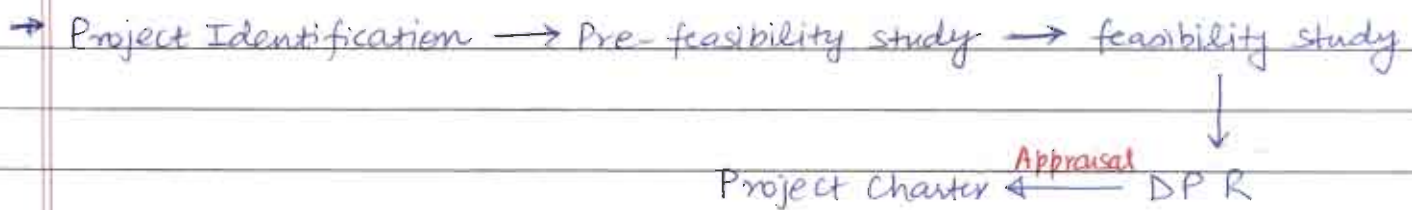
- ① Initiating, ② Planning ③ Executing ④ Monitoring & Control ⑤ Closing.



In the initiation stage (I), the cost of the project is minimum.

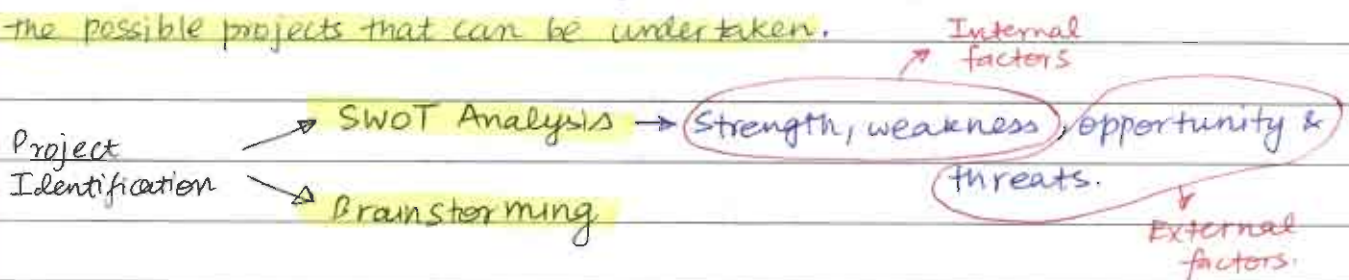


Chapter 2 - Project Initiation



⇒ Project Identification

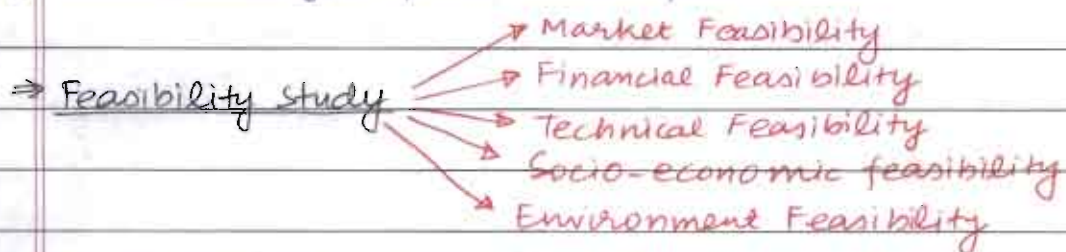
- The process of project management starts with the project identification
- At this stage, the project authority generates various ideas about the possible projects that can be undertaken.



→ Pre-feasibility analysis or Preliminary filtration or **Prima-facie analysis**

→ Most of the identified projects are screened out and eliminated at this stage. The decisions are made on the basis of the following factors:

- 1) Whether sufficient funds are available
- 2) whether the demand is high and stable
- 3) Whether the project is adequate from the locational aspects
- 4) Whether there are any major problems related to environment or land acquisition.
- 5) Whether there is too much competition
- 6) whether the performance of existing industries is encouraging.
- 7) whether the govt policies are favourable.

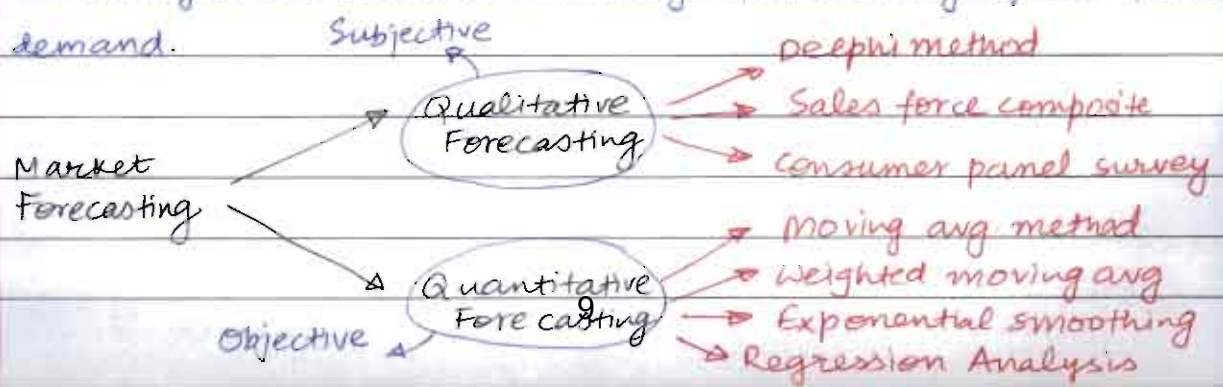


→ If the project is selected on the basis of pre-feasibility report then the practicality of the proposed project is further examined in greater detail in the feasibility study.

① Market Feasibility

→ It includes the current market analysis, existing competition, anticipated future market growth and the potential size of the market that can be captured.

→ The analysis is carried out through forecasting of the future demand.



## Qualitative Forecasting

- Qualitative methods will be used when the past data is not available, a brand new product is to be launched, or when the forecasting has to be done for long time period.
- The Qualitative forecasting is based on personal judgement, intuition and experience. Hence, it is subjective in nature.

### (a) Delphi Technique

- It is an iterative process which employs a group of experts to obtain forecasts.
- The interaction b/w the experts takes place through a coordinator.
- The coordinator obtains the forecasts from all the experts and each of the experts whose estimate is at either extremes, are asked to give a justification for their forecast which is then circulated to all the experts.
- Based on this additional information, experts may revise their original forecast.
- This process is repeated many times so that a consensus forecast is reached.

### (b) Sales force method

- All the members of the sales team of the company are asked to estimate the likely sales in their respective areas.
- These estimates are combined at the regional and national level to obtain the overall forecast.

### (c) Consumer Panel Survey

- The company uses the consumers on the consumer panel for obtaining the forecasted demand. These consumers are assumed to be representative of the actual consumers in the market.

Quantitative Forecasting(a) Moving Average method

Year	Sales (Cr)
1	50
2	60
3	70
4	50
5	70

3 year moving average

$$\rightarrow F_6 = \frac{D_3 + D_4 + D_5}{3} = \frac{190}{3} = 63.33$$

4 year moving average

$$F_6 = \frac{D_2 + D_3 + D_4 + D_5}{4} = \frac{250}{4} = 62.5$$

→ This method averages the data of few recent periods while ignoring the older observations.

→ Equal weightage is assigned to all the periods selected for averaging.

(b) Weighted moving average method

→ The highest weight is assigned to the most recent value and progressively smaller weights are assigned to the preceding values.

→ 3 year weighted moving avg

$$F_6 = \frac{3 \times 70 + 2 \times 50 + 1 \times 70}{6}$$

→ 4 year weighted moving avg

$$F_6 = \frac{4 \times 70 + 3 \times 50 + 2 \times 70 + 1 \times 60}{10}$$

(c) Exponential Smoothing

$$F_t = F_{t-1} + \alpha (D_{t-1} - F_{t-1})$$

 $\alpha$  = smoothing constant

Q

 $\alpha = 0.4$ 

Year	( $D_t$ ) Demand	( $F_t$ )
1	70	70
2	60	70
3	80	66
4	90	71.6
5	11?	

Forecasting → Assume  $F_1 = D_1 = 70$

$$F_2 = F_1 + \alpha (D_1 - F_1) = 70$$

$$F_3 = F_2 + \alpha (D_2 - F_2) = 66$$

$$F_4 = F_3 + \alpha (D_3 - F_3) = 71.6$$

$$F_5 = F_4 + \alpha (D_4 - F_4) = 78.96$$

(\*) Regression Analysis → most commonly used in the project initiation stage.

$$y = a + bx$$

$$\rightarrow \sum y = an + b \sum x \quad x \neq \sum x$$

$$xy = ax + bx^2$$

$$\rightarrow \sum xy = a \sum x + b \sum x^2 \quad x \neq \sum x^2$$

~~$$\rightarrow n \sum y = a n^2 + b n \sum x$$~~

~~$$\rightarrow n \sum xy = a n \sum x + b n \sum x^2$$~~

$$\sum y \cdot \sum x = an \sum x + b (\sum x)^2$$

$$n \sum xy = a n \sum x + b n \sum x^2$$

$$b = \frac{n \sum xy - \sum x \cdot \sum y}{n \sum x^2 - (\sum x)^2}$$

$$a = \frac{\sum y - b \sum x}{n}$$

Take  $\sum x = 0$

$$\text{Then } \rightarrow b = \frac{\sum xy}{\sum x^2}$$

$$\& a = \frac{\sum y}{n}$$

Q-

Year	Sales (in crores)	Deviation from 2016
2014	50	-2
2015	60	-1
2016	70	0
2017	50	1
2018	70	2
	(y)	(x)

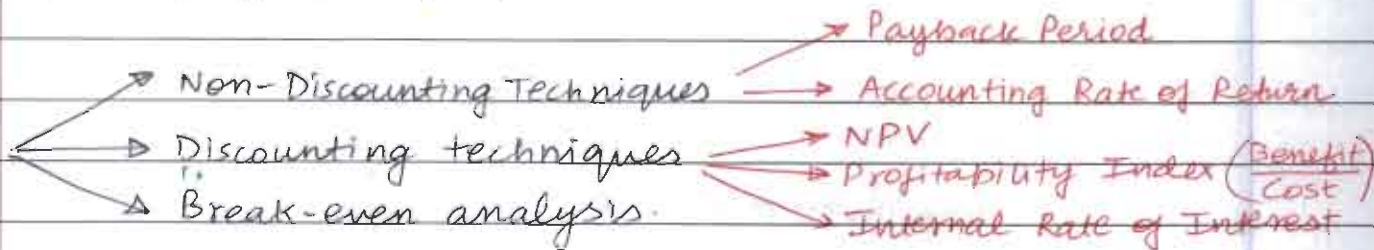
$$b = \frac{\sum x \cdot y}{\sum x^2} = \frac{30}{10} = 3, \quad a = \frac{300}{5} = 60$$

$$\text{So, } y = 60 + 3x$$

$$y \Big|_{@x=3} = 60 + 9 = 69$$

## ② Financial Feasibility

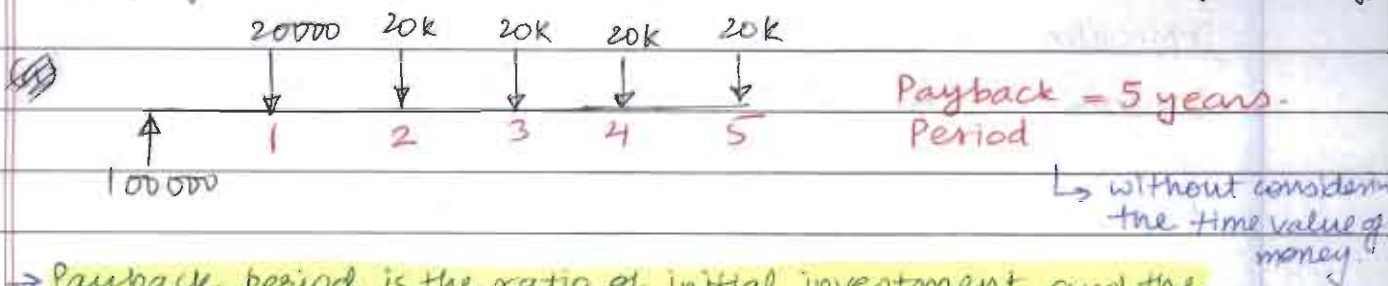
→ It ~~assesses~~ <sup>assesses</sup> the feasibility of a proposed project by evaluating the various costs and thus making forecasts of the future profitability of the investment.



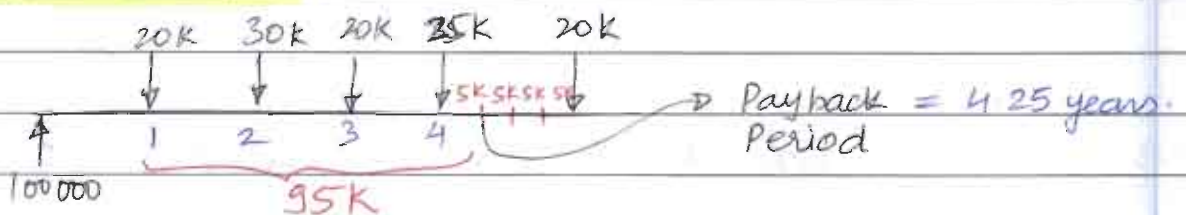
→ The non-discounting techniques do not consider the time value of money whereas the discounting techniques take into consideration, the time value of money.

### (a) Payback Period

→ It is the time taken by a company to recover the initial cost of the project. (without considering the time value of money)



→ Payback period is the ratio of initial investment and the annual cash flow.



→ The projects having lower pay back period may be preferred over the projects having higher payback period.

→ If the payback period of the project is lower than the expected payback period, then the project may be selected.

$$(b) \text{ Accounting Rate of Return} = \frac{\text{Average income}}{\text{Avg. investment}} \quad \text{OR} \quad \frac{\text{Average income}}{\text{Initial investment}}$$

$$\text{Average Investment} = \frac{\text{Initial investment} + \text{Salvage value}}{2}$$

$$= \frac{I+S}{2}$$

Q- If the initial investment is Rs 3 lacs and the life of investment is 5 years - with the following cash flows  
Rs 90K, Rs 90K, Rs 120K, Rs 90K, Rs 150K  
Then what will be the ARR based on initial investment and average investment. Assume that the asset has a no salvage value after 5 years.

	1 <sup>st</sup>	2 <sup>nd</sup>	3 <sup>rd</sup>	4 <sup>th</sup>	5 <sup>th</sup>
Cash Flow	90K	90K	120K	90K	150K
Depreciation	60K	60K	60K	60K	60K
Income	30K	30K	60K	30K	90K

$$\text{Average income} = 48K \Rightarrow \text{ARR} = \frac{48}{300} = 16\%$$

$$\Rightarrow \text{ARR} \left| \begin{array}{l} \text{based} \\ \text{on avg} \\ \text{investment} \end{array} \right. = \frac{48}{300/2} = 32\%$$

Q- A machine is expected to generate cash saving of Rs 50000/year for 5 years. Salvage value is 40% of the original cost. If ARR based on initial investment is 20%, then what will be the cost of 2 such machines.

$$0.2 = \frac{50000 - 0.12x}{x} \Rightarrow x = \frac{50000}{0.32}$$

$$\Rightarrow 2x = 312500$$