
PROJECT
MANAGEMENT
BUDGET
RESOURCES
TASKS
METHODOLOGY
SYSTEMS
CONTROL
PROJECTS
QUALITY
PLAN
CHAIN
ANALYSIS
RISK
CHANGE
SOFTWARE
SCOPE
PLANNING
COST
GOALS
DESIGN
SYSTEM
DEVELOPMENT
ACTIVITIES
TIME
CONTROLLING
BASED

Organization

- **Definition:** A social unit of people that is structured and managed to meet a need or to pursue collective goals.
- Projects cannot be run in isolation
- They have to operate in a broad organizational environment

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Project organization

- Challenges to Organizing Projects
  - The uniqueness and short duration of projects relative to ongoing longer-term organizational activities
  - The multidisciplinary and cross-functional nature of projects creates authority and responsibility dilemmas.
- Choosing an Appropriate Project Management Structure
  - The best system balances the needs of the project with the needs of the organization

THE PROJECT ORGANIZATION STRUCTURE

- Each **project** has its unique **characteristics** and the design of an **organizational** structure should consider
- ✓ The **organizational** environment,
- ✓ the **project characteristics** in which it will operate, and
- ✓ The level of authority the **project** manager is given.

THE PROJECT ENVIRONMENT



Project Organogram

- The structure of project organization is important for the smooth functioning of the project.
- There are three main types of project organizations in practice:
  - Functional project organization
  - Pure Project organization
  - Matrix

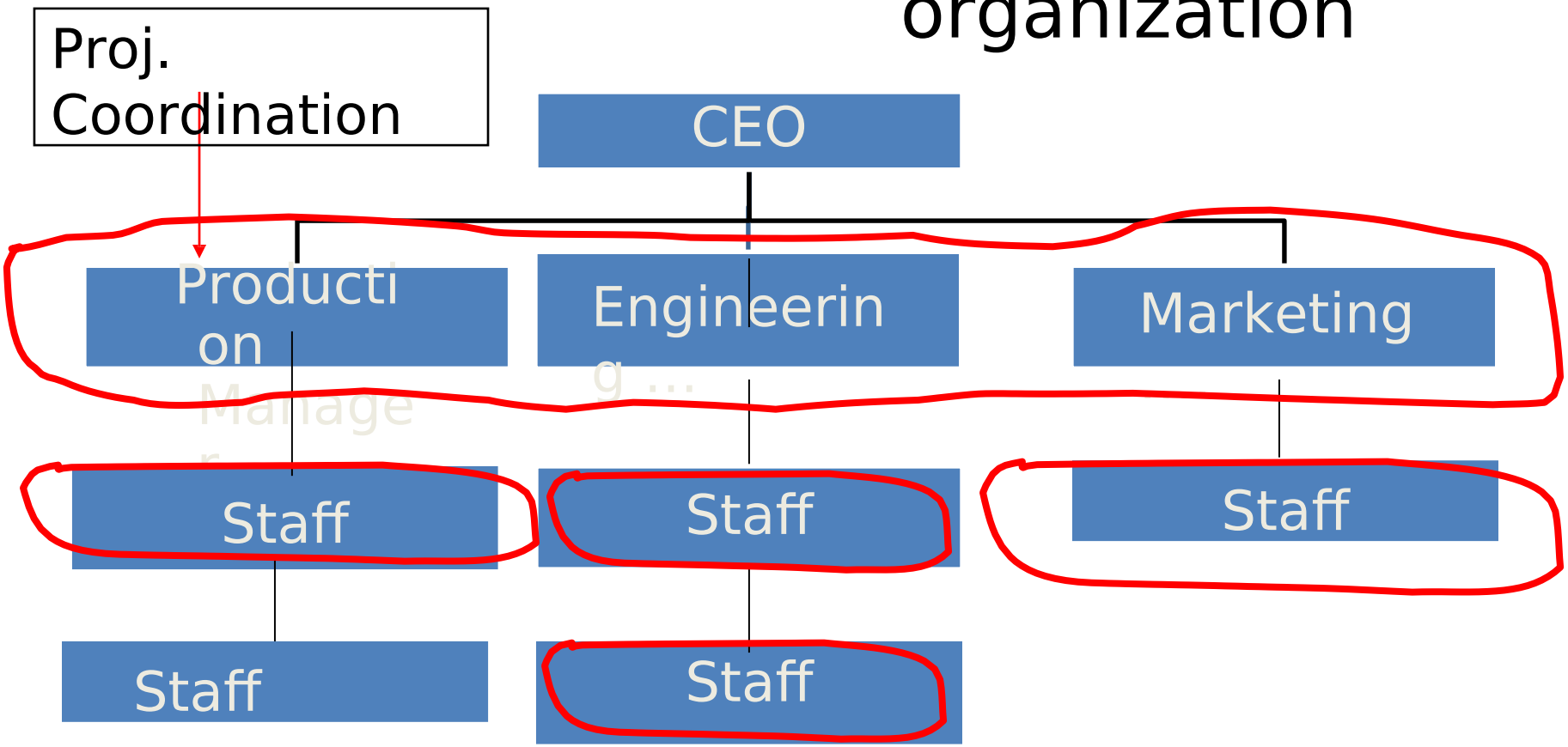
Project Management Structures

Organizing Projects: Functional organization

- It uses functional units of the parent organization as home for the project
- Different segments of the project are delegated to respective functional units.
- Coordination is maintained through normal management channels.
- Used when the interest of one functional area dominates the project or one functional area has a dominant interest in the project's success.

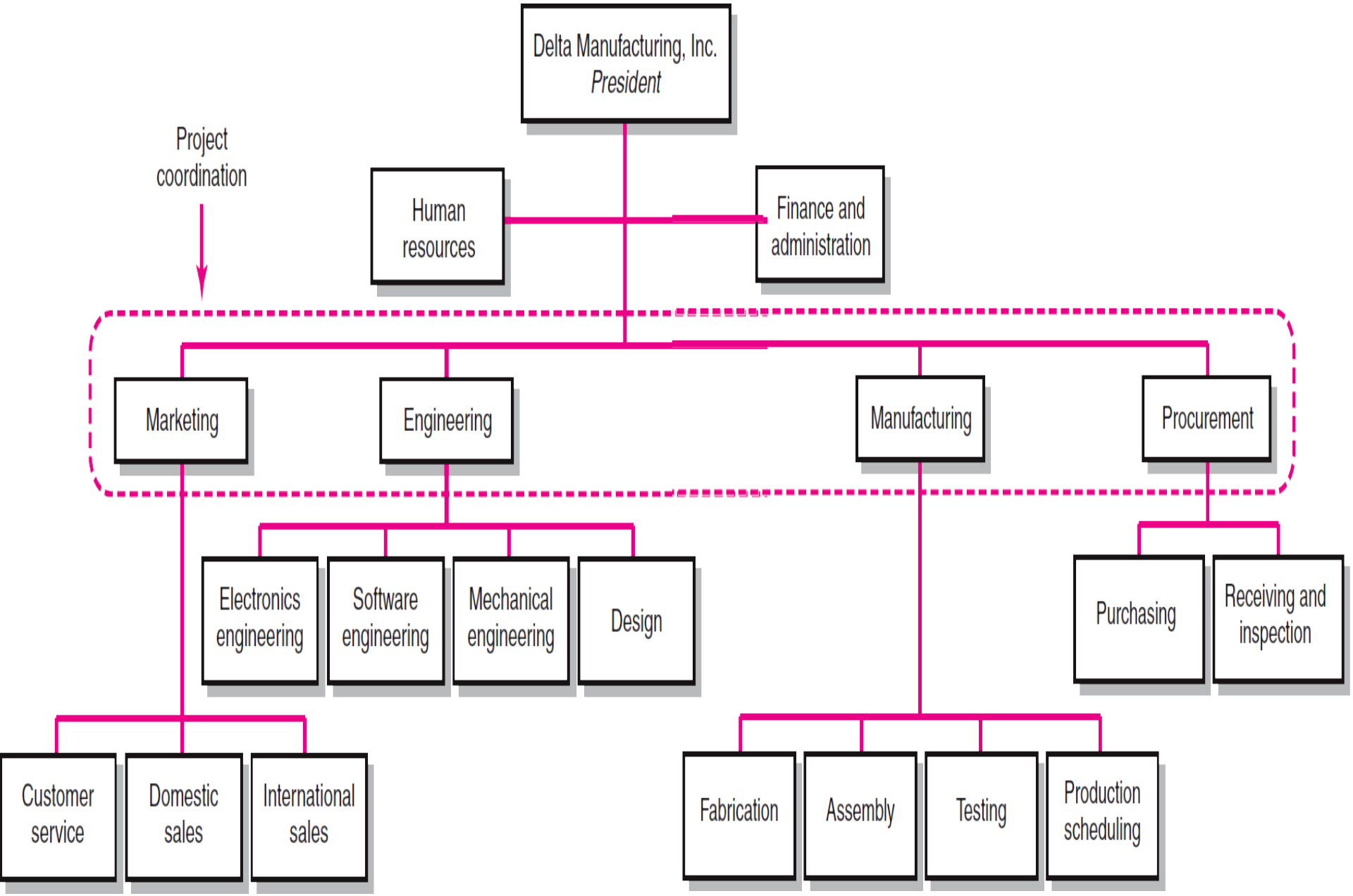
Cont'd

1. The Project as part of the functional organization



The circled boxes represent staffs engaged in the project

Functional Organizations



Cont’d

Characteristics	Functional Org Structure
Project Mgr’s Authority	Little
Resource Availability	Little
Who controls project budget	Functional Manager
Project Mgr’s Role	Part-time
Project Mgr Admin Staff	Part-time

Functional Organization of Projects

Advantages

1. No Structural Change
2. Flexibility in the use of staff
3. In-Depth Expertise & an expert can be used by many projects
4. Knowledge sharing is easy
5. Individual development

Disadvantages

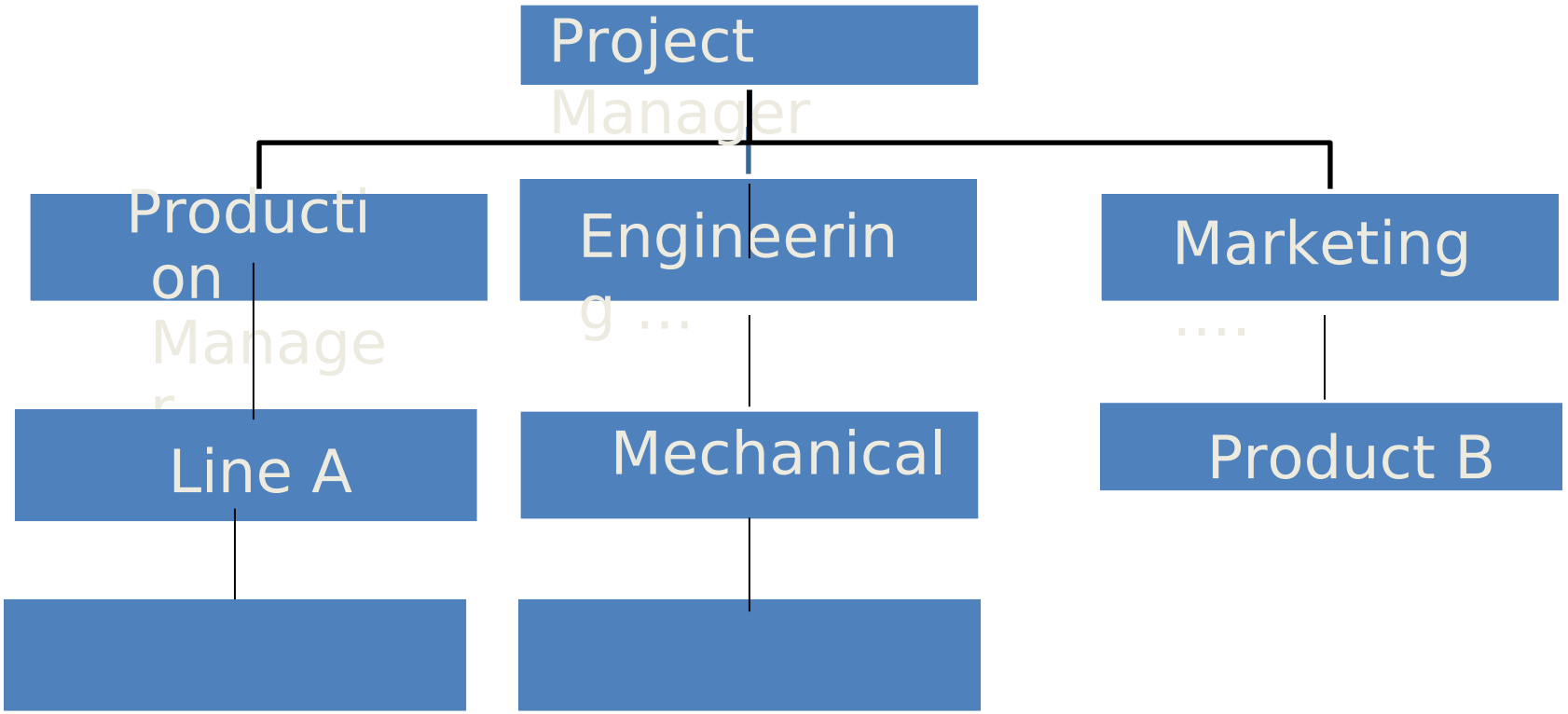
1. Less focus on the project
2. Problem of shared responsibility/ lack of ownership
3. Poor Integration/ lack of coordinated effort
4. Slow and Sub-optimization of the project
5. Weak individual motivation

Project Management Structures (cont'd)

2.Organizing Projects: Pure Project/ Projectized organization

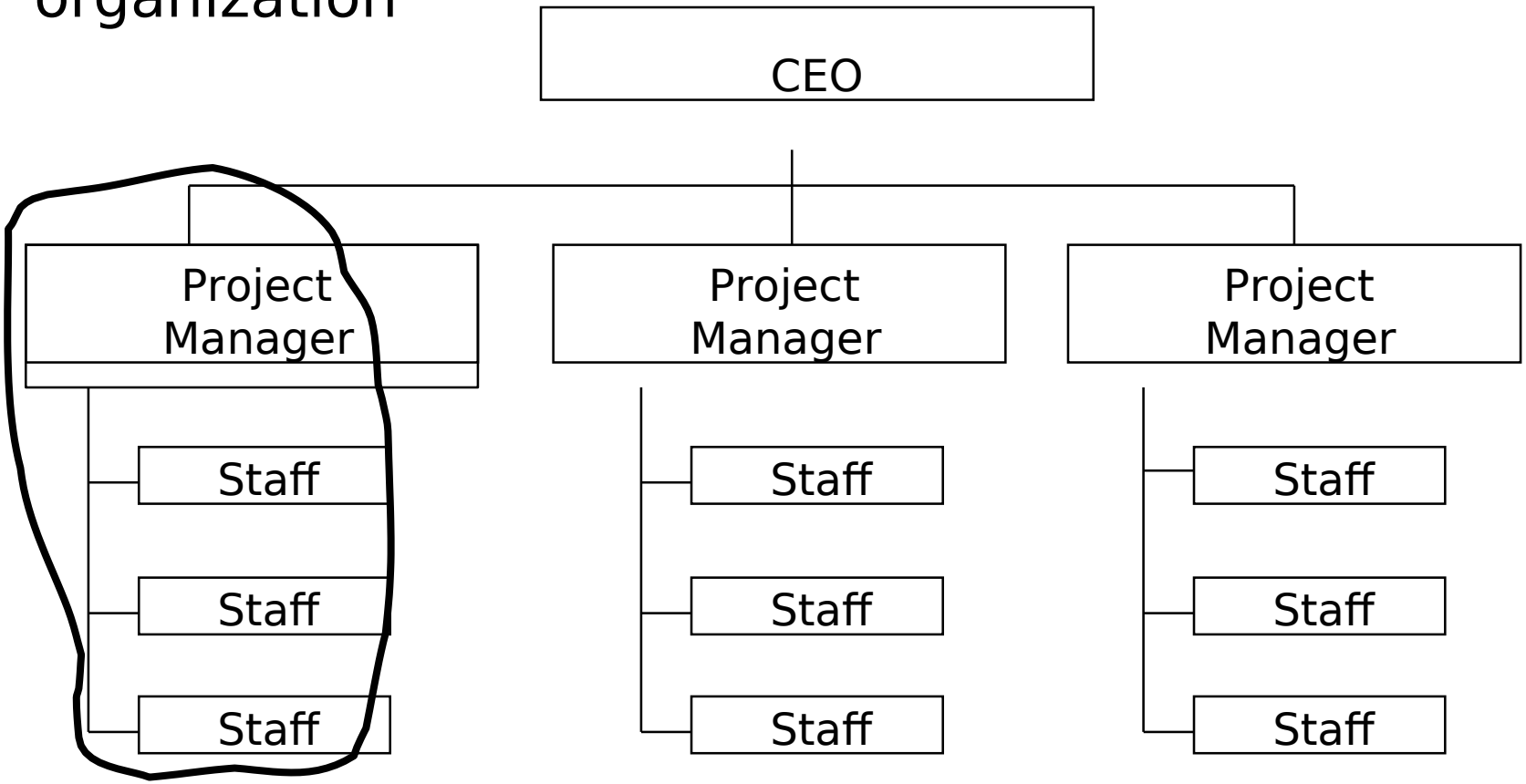
- Dedicated Teams
- Teams operate as separate units under the leadership of a full-time project manager.
- In a ***projectized*** organization where projects are the dominant form of business, functional departments are responsible for providing support for its teams.

Pure project organization



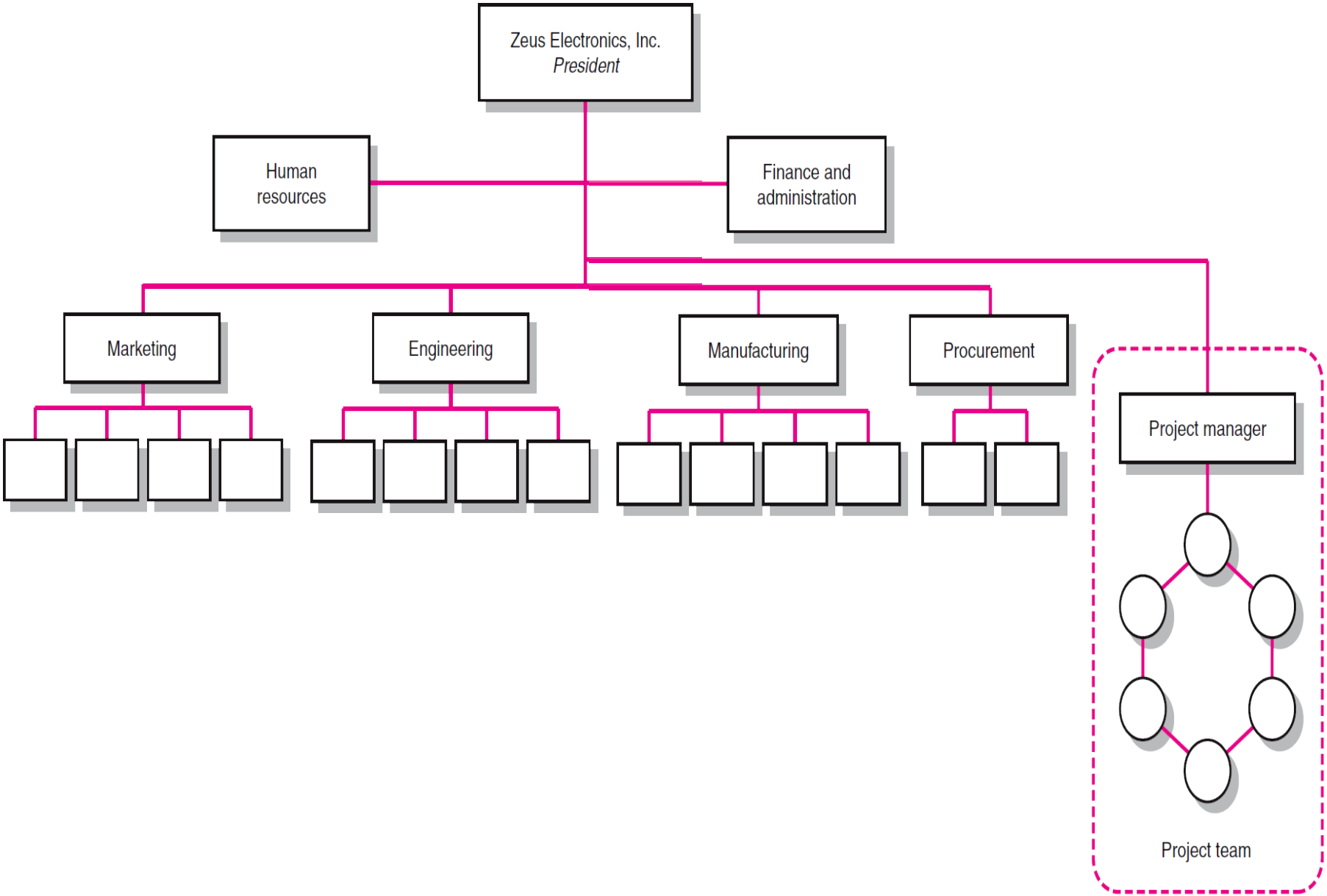
Cont'd....

Pure Project/Projectised organization



(Circled boxes represent staff engaged in project activities.)

Dedicated Project Team



Cont’d

Characteristics	Projectized Org Structure
Project Mgr’s Authority	High to Almost Total
Resource Availability	High to Almost Total
Who controls project budget	Project Manager
Project Mgr’s Role	Full-time
Project Mgr Admin Staff	Full-time

Cont'd

- **Advantages**
  1. Simple and short communication
  2. PM will have full responsibility & authority
  3. Fast decision making and unity of command
  4. Cohesive and tends to support holistic approach
  5. Cross-Functional Integration

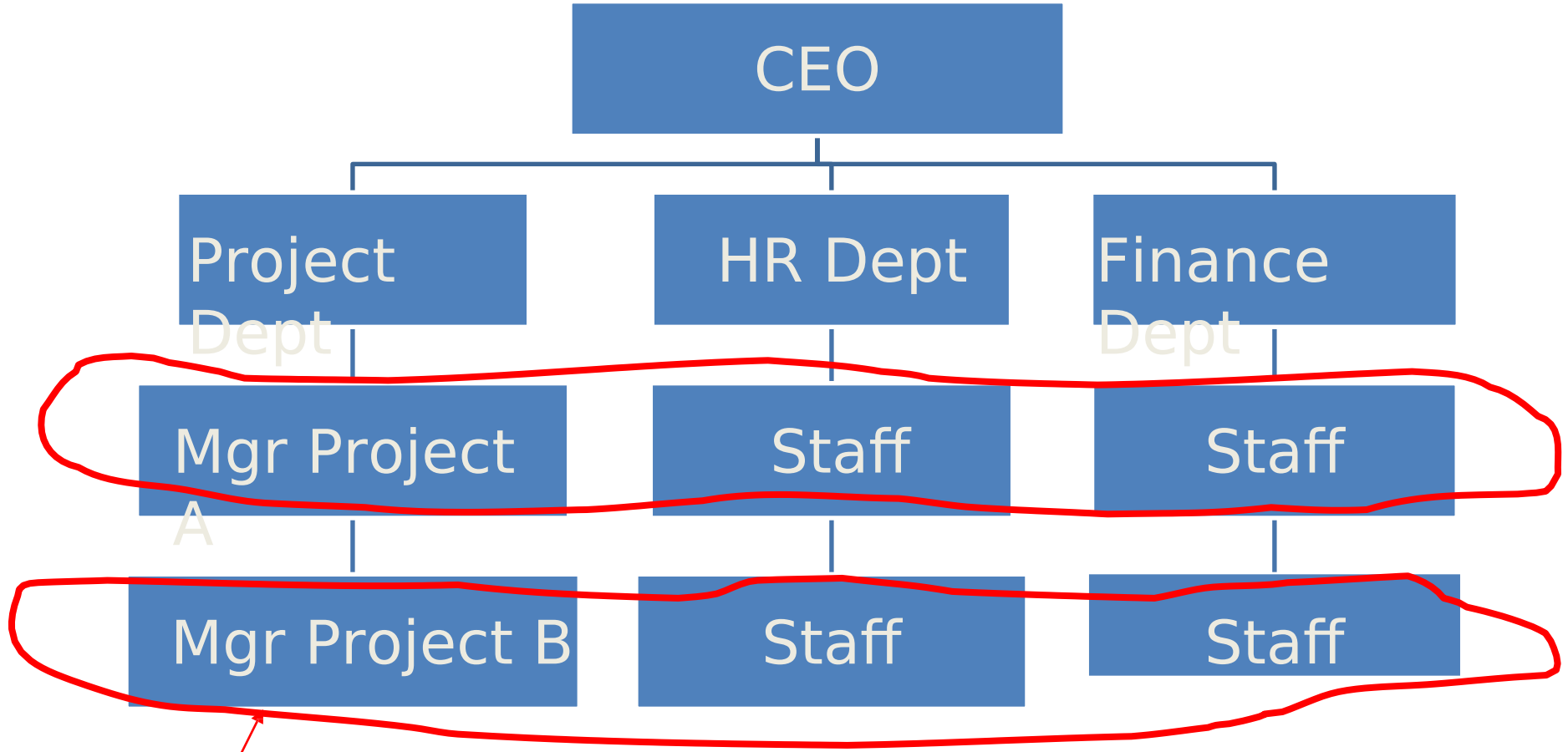
- **Disadvantages**
  1. Expensive
  2. Effort duplication
  3. Creates inconsistency in the application & procedure of the parent company
  4. Distort the staff relationship with parent: problem of "projectitis"…"WE"
  5. The worry of "life after the project"

3.Organizing Projects: Matrix Structure

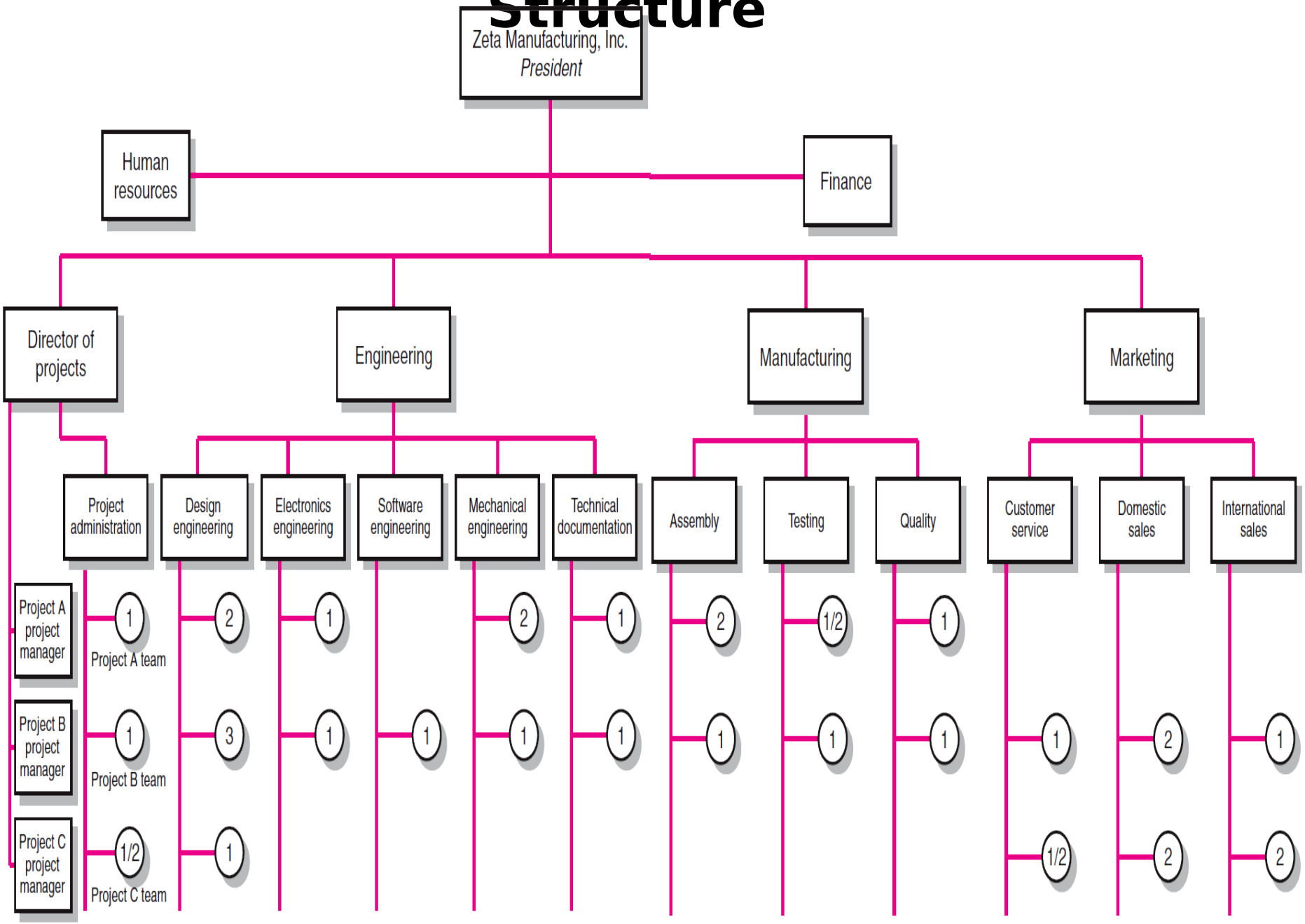
- **Hybrid organizational structure** (matrix) is overlaid on the normal functional structure.
  - Two chains of command (functional and project)
  - Project participants report simultaneously to both functional and project managers.
- Matrix structure ***optimizes the use of resources.***
  - Allows for participation on multiple projects while performing normal functional duties.

Cont'd....

Matrix Project organization



Matrix Organization Structure



Cont'd....

Characteristics	*Strong Matrix* Org Structure
Project Mgr's Authority	Moderate to High
Resource Availability	Moderate to High
Who controls project budget	Project Manager
Project Mgr's Role	Full-time
Project Mgr Admin Staff	Full-time

Project Organization: Matrix Form

- Disadvantages
  1. No unity of command
  2. Dysfunctional Conflict/ Infighting
  3. Stressful/A tough job to balance all project at the HQ
  4. This may slow the decision making process
- Advantages
  1. Efficient
  2. Flexible/Reasonable access to staff
  3. Strong Project Focus
  4. Easier Post-Project Transition/No problem of “life after project”

Cont'd....

Mixed Project organization

- A mix of both Functional & Pure is the usual practice in project organization

"Matrix management works, but it sure is difficult at times. All matrix managers must keep up their health and take Stress-Tabs."(Larson and Gray, 2011: 65)

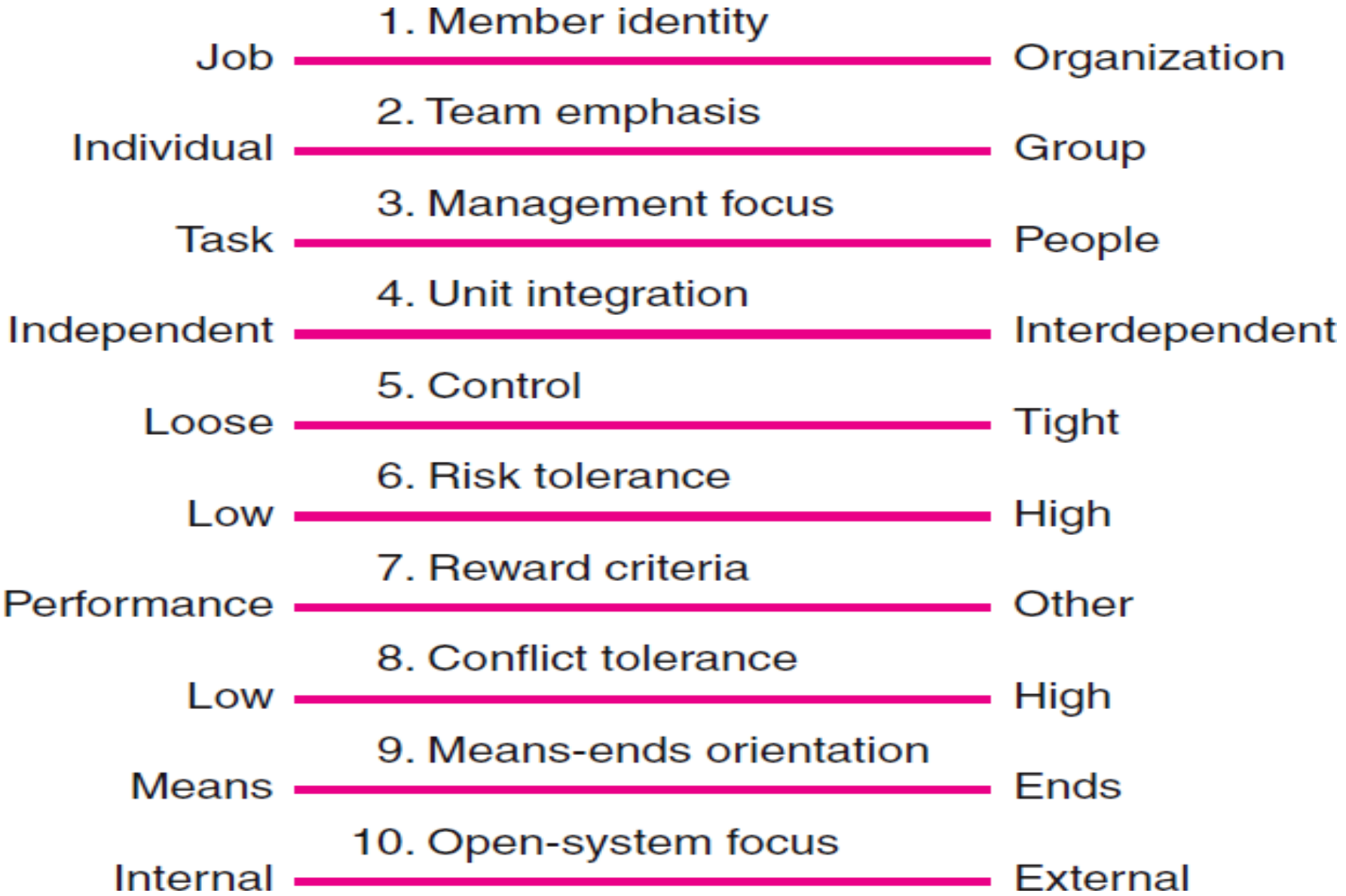
Organizational Culture

Organizational Culture Defined

- A system of shared norms, beliefs, values, and assumptions which bind people together, thereby creating shared meanings.

- The "personality" of the organization that sets it apart from other organizations.
  - ✓ Provides a sense of identify to its members.
  - ✓ Helps legitimize the management

Key Dimensions Defining an Organization's Culture



Cultural Dimensions of an Organization Supportive of Project Management



Organizational Culture Diagnosis

Power Corp.

I. Physical Characteristics:
Architecture, office layout, décor, attire

Corporate HQ is 20 story modern building—president on top floor. Offices are bigger in the top floors than lower floors. Formal business attire (white shirts, ties, power suits, . . .). Power appears to increase the higher up you are.

II. Public Documents:
Annual reports, internal newsletters, vision statements

At the heart of the Power Corp. way is our vision . . . to be the global energy company most admired for its people, partnership, and performance.

Integrity. We are honest with others and ourselves. We meet the highest ethical standards in all business dealings. We do what we say we will do.

III. Behavior:
Pace, language, meetings, issues discussed, decision-making style, communication patterns, rituals

Hierarchical decision making, pace brisk but orderly, meetings start on time and end on time, subordinates choose their words very carefully when talking to superiors, people rarely work past 6:00 p.m., president takes top performing unit on a boat cruise each year . . .

IV. Folklore:
Stories, anecdotes, heroines, heroes, villains

Young project manager was fired after going over his boss's head to ask for additional funds.

Stephanie C. considered a hero for taking complete responsibility for a technical error.

Jack S. was labeled a traitor for joining chief competitor after working for Power Corp. for 15 years.

Discussion

Discuss the implication of parent company's organizational culture on project performance.

Project Identification and Preparation / Project Appraisal

Introduction

- Project identification is the initial phase of the project
- development cycle.
  - It begins with the conceiving of ideas or intentions to set up a project.
  - These ideas are then transformed into a project.
- The objective is to identify investment opportunities which are feasible and promising that demand further examination and appraisal
- Project ideas are generated through different sources like customers, competitors, and employees. Sometimes they are discovered

Who Identifies Projects? How?

Project ideas or investment opportunities (or project ideas) may come from individuals and institutions in the society that include

–Unions/ cooperatives: Producers organizations, Customer, trade unions

–Product marketing organizations;

–Public and private sector companies(local/multinational);

–Government ministries, authorities, agencies,..

–Aid agencies, NGOs and self-aid associations- Local or international

–Local governments and regional states

How Project Ideas Come About?

– Observation of existing opportunities and problems is the major sources. Other important sources /mechanisms include:

- Monitoring the environment: Economic, Technological, Social…
- Polices review and opportunity studies made by central government ministries;
- Sectorial strategies and sub-sectorial programs of technical ministries (like health, agriculture, tourism, education, industry, etc);
- Surveys conducted by local governments and

- **Sources of Project Ideas**
- Project ideas…. Where to find???

- Sources of project ideas can be categorized into two:
  - Micro level sources
  - Macro level sources

Major sources of project Ideas

- Major Macro Sources:
  - Federal/Central or Regional Governments development plans
  - Bilateral and Multilateral Agreements
  - International Development Agencies
  - Technical specifications
  - Entrepreneurs
- Government is the major source of project ideas in developing countries. Reasons:
  - Has the necessary resources to undertake opportunity studies
- (conduct survey, studies, and reviews);
  - Better access to data and information;

sources of project Ideas.....

- Micro Sources of project ideas
- Micro level sources of project ideas include the
- community, organizational units, households, customers or intended beneficiaries and technical specialists.

Approaches to project identification

There are two major approaches to project identification

(a)Top-down approach

(b)Bottom-up approach

Screening Potentially Promising Ideas

- Screening Criteria:
  - Compatibility with the promoter
  - Consistency with government priorities
  - Availability of inputs
  - Adequacy of market
  - Reasonableness of costs
  - Acceptability of risk level
- Eliminate (screen out) project proposals that:
  - Are technically unsound and risky
  - Have no market for their outputs
  - Have inadequate supply of inputs
  - Are very costly in relation to the expected benefits
  - Assume an overambitious sales and profitability

Project Preparation / Project Appraisal

Introduction

- Project preparation (pre-feasibility & feasibility studies) involves assessment of key aspects of a project in order to arrive at definitive conclusions about a project.
- This is the study of a proposed project to indicate whether the proposal is attractive enough to justify more detailed preparation
- Is an in depth or detail investigation of development
- Pre-feasibility study is a preliminary study undertaken to determine if it would be worthwhile to proceed to the feasibility study stage or not

Cont’d

- Pre-feasibility study cover review of the following main fields (components) of a

project at a smaller scale:

  - Project background and scope of project (basic ideas or strategies)
  - Market analysis and marketing concept
  - Raw materials and supplies
  - Location, site and environment
  - Engineering and technology
  - Organization and overhead costs
  - Human resources and training requirements and costs
  - Project implementation, schedule and budgeting
  - Financial analysis and investment appraisal
  - Economic analysis/ impact of the above factors

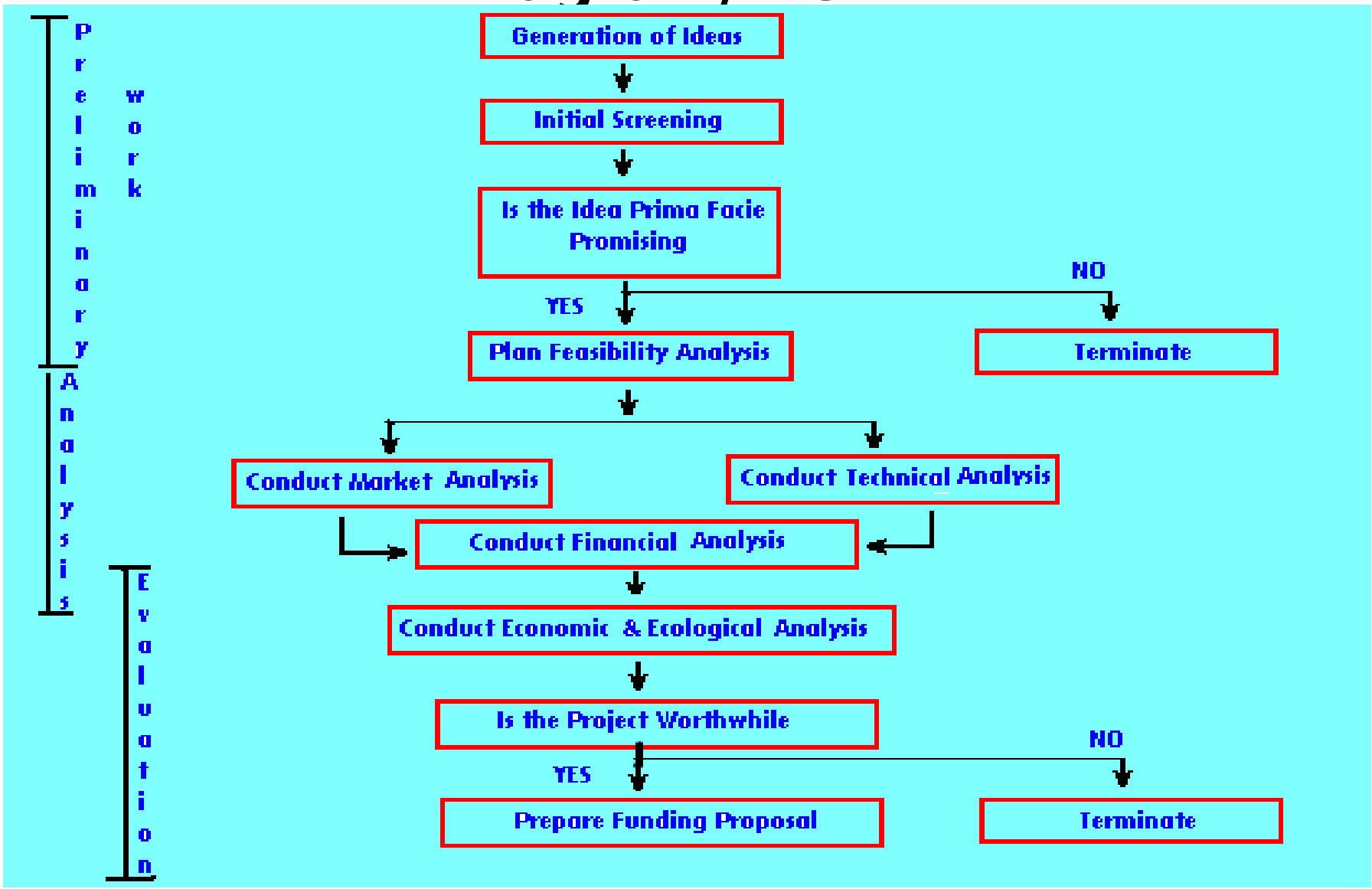
This processes can be bypassed if a well-prepared and

Feasibility Study

What is a feasibility study?

A feasibility study is an examination of a project idea that helps to answer" Should we proceed with the proposed project idea? Is it a viable business venture?"

Feasibility Study: A Schematic Diagram/View



Components of a Feasibility Study

1.Description of the Business: The **product or services** to be offered and how they will be delivered.

2.Market Feasibility : Includes a description of the industry , current market, anticipated future market potential ,competition, sales projections, potential buyers, etc.

3.Technical Feasibility: Details how you will deliver a product or service (i.e. **materials, labor, transportation**, where your business will be located, **technology** needed, etc.).

Components of a Feasibility Study…

4.Financial Feasibility: Project show how much **start-up capitals** needed, **sources of capital** , **returns on investment** ,etc.

5. Conclusions: Discusses how the business can succeed. Be honest in your assessment because investors won't just look at your conclusions they will also look at the data and will question your conclusions if they are unrealistic.

Data Sources for a Feasibility Assessment

- Data required for a feasibility study can come primarily from primary and/or secondary sources
  - Primary data include formal surveys and interviews
    - Collection of primary data can be expensive and time consuming
  - Secondary data include industry and trade publications,

statistics of industry associations, government agency reports and central statistical authority publications

Reporting Format

- The report is expected to contain the following particulars:

A. **Executive Summary:**

- Summary of the findings in the feasibility study.
- It outlines:
  - project background,
  - critical data & information used,
  - major outcomes,
  - relevant conclusions & recommendations
- Short & Precise: focuses on core findings.
- Prepared in line with the structure of the body of the feasibility stud
y

Reporting **Format…**

The following details are contained in the body of the study

B. **Content:**

- Project Background & History
- Market and Demand Analysis
- Raw Materials & Supplies Aspects
- Location, Site, and Environmental Impacts
- Engineering and Technology Aspects
- Organization and Management Issues
- Human Resource Aspects & Requirements
- Financial Analysis and Appraisal (total investment cost, COGS,

operating & financial costs, and financial benefits)

Reporting Format…

- Overall Economic Impacts/Appraisal (SCBA) of the project
- Project Financing
- Project Implementation Schedule

Note:

- Key assumptions, schedules, worksheets, computations, etc should be included at the end of the report.
- The Feasibility Report should be detailed enough to provide

all relevant information, fact, and/or

Market and Demand Analysis

1. Situational analysis and specification of objectives
2. Collection of secondary information
3. Conduct of market survey
4. Characteristics of the market
5. Demand forecasting
6. Market planning



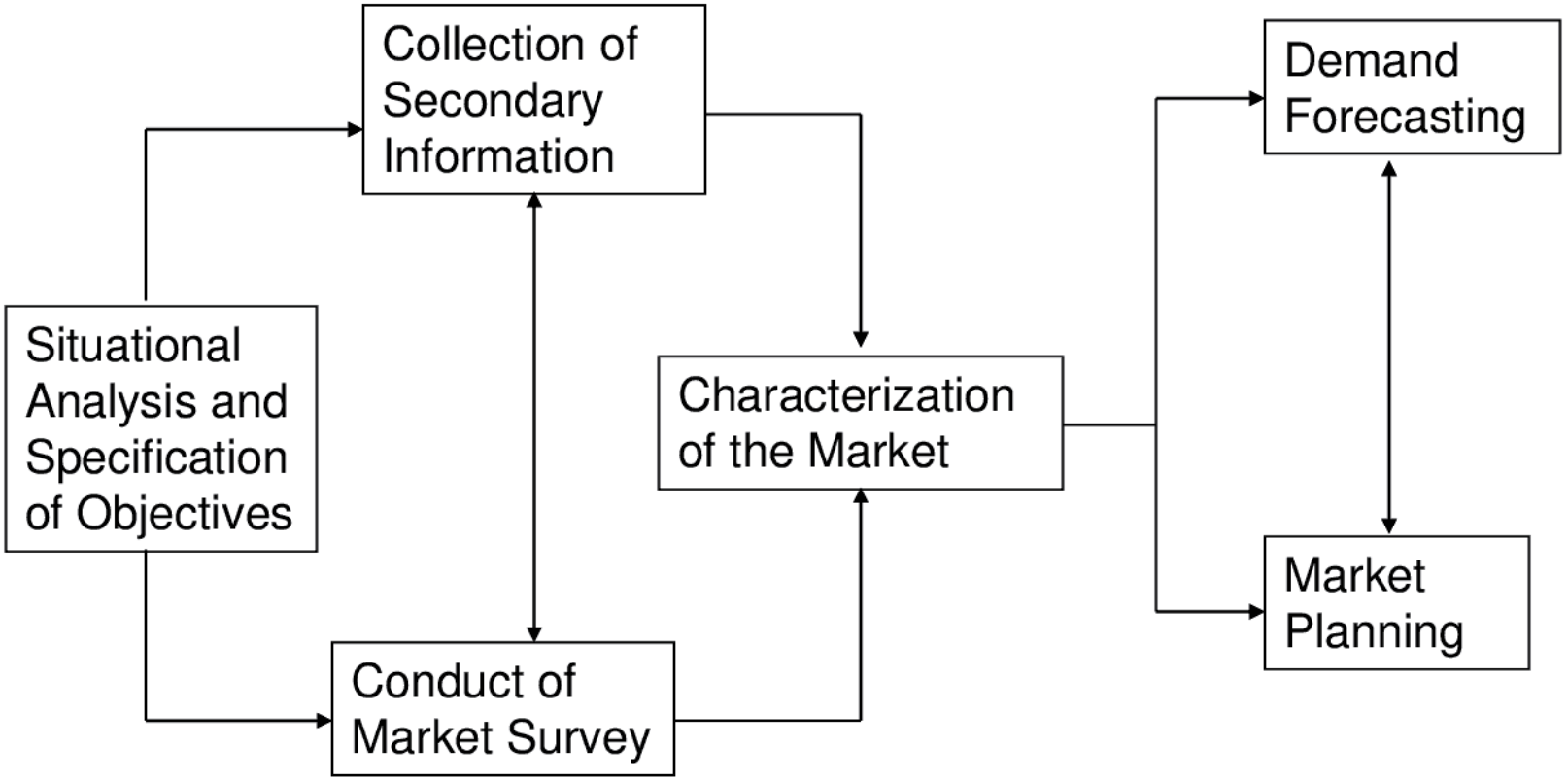
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Market And Demand Analysis

- The potential size of the market,
- The market share likely to be captured &
- The benefits, in monetary terms (cash inflows) associated with the market.

Market and Demand Analysis

Inter-relationships



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SITUATIONAL ANALYSIS AND SPECIFICATIONS OF OBJECTIVES

- Get a "feel" for the relationship between the product and it's market, the project analyst may informally talk to customers, competitors, middlemen and other in the industry.
- Look at the experience of the company to learn about the purchasing power of customer, action & strategies of competitors.
- ***The objectives of market & Demand analysis, to answer the following question : (for air coolers)***

✓ Who are the buyers of air cooler?

✓ What is the total current demand for air coolers?

✓ What price will the customer be willing to pay for the improved air cooler.

✓ What price & warranty will ensure its acceptance?

✓ What are the prospects of immediate sales? etc.

1. Market and Demand Analysis:

Characterization of the market:

- Based on the information gathered from secondary sources and through the market survey, the market for the product/service may be described in terms of the following:-
  - ✓ Effective demand in the past and present
  - ✓ Methods of distribution and sales promotion
  - ✓ Price
  - ✓ Consumer
  - ✓ Supply and competition
  - ✓ Government policy

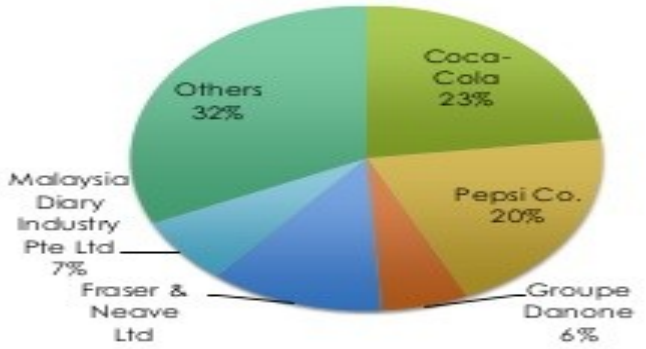
Demand Analysis

- Market potential of a product or service is the estimated maximum total sales revenue of all supplies of a product or service in a market during a certain

Introduction

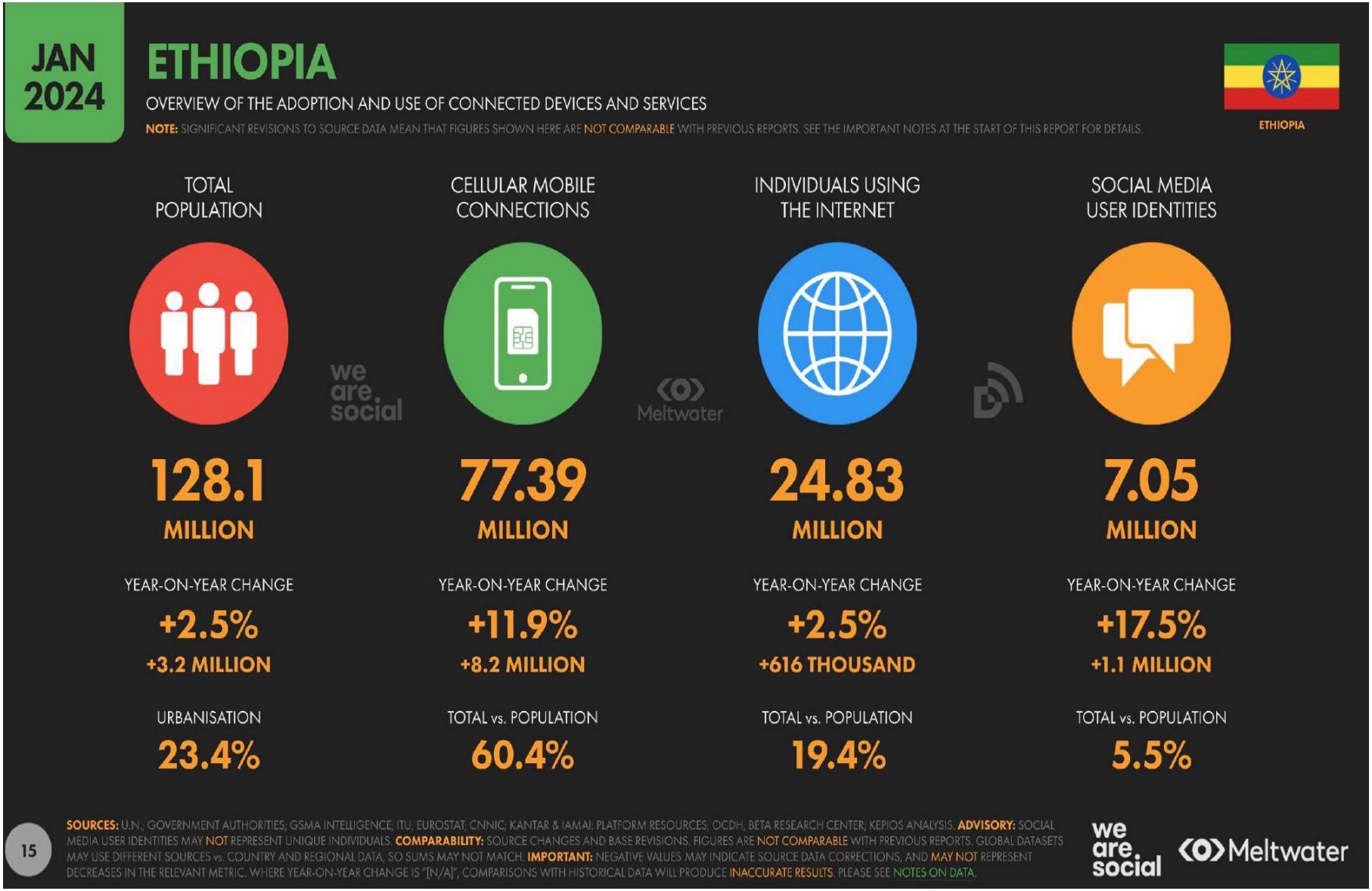
- Definition of soft beverage.
- In 2018, the global beverages industry is forecasted to have a volume of 994.1 billion litres, an increase of 25.1% since 2013.
- Shift from matured to emerging markets.
- Soft drinks is the largest segment of the global beverages industry, accounting for 34.4% of the industry's total value.
- Carbonates is the largest segment of the soft drinks market in Singapore, accounting for 55.8% of the market's total value.
- Key Player: Coca Cola, F&N.

Market Share



Source: Euromonitor International, Soft Drink Industry

Digital Ethiopia



Demand Analysis

- Estimating **demand-supply gap** has been the technique for estimating market potential.
- The process starts with estimating demand in future and then comparing the same with present supplies and prospective new suppliers.
- A **positive demand-supply gap** favors the market potential and vice versa.

Demand forecasting techniques

- Demand forecasting is a crucial aspect in gap analysis.
- There are various **quantitative and qualitative methods used for forecasting** in different situations.

Demand forecasting

Qualitative

- Jury opinion
- Delphi

Statistical

- Weighted moving average
- Moving average
- Regression (time series)
- Exponential smoothing

Ft+1= @St+(1-@)ft

Others

- Lead lag analysis
- Survey
- Chain ratio +

Jury of Executive Opinion

- ☑ Involves small group of high-level experts and managers
- ☑ Group estimates demand by working together
- ☑ Combines managerial experience with statistical models
- ☑ Relatively quick
- ☑ 'Group-think'



Jury of Executive opinion

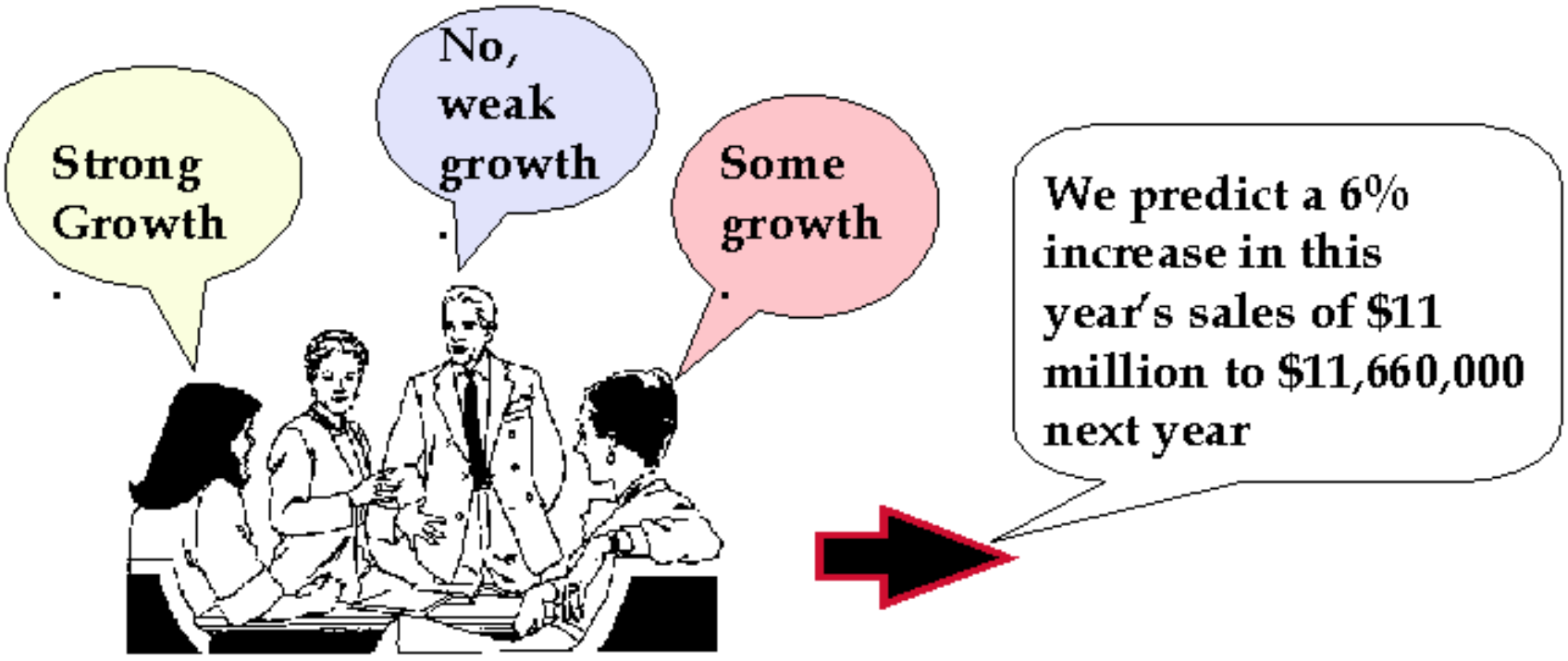
- Specialist & experts are consulted who have knowledge of the industry being examined

- Committee members came together and discuss forecasts and agree one of the estimates or come up with a new estimate for whole company.



Judgement: Jury of Executive Opinion

- Based on experience and intuition of executives



Qualitative Techniques

2. **Delphi Technique:**

- Delphi technique is drawing upon the group's expertise by getting individual submissions, **without the drawback of face-to-face meeting.**
- It is a systematic and interactive (though no direct interaction is involved) forecasting method which is based on the outcomes of responses of panels of experts.
- **It sometimes may require more than two rounds of questionnaires.**
- Finally, the experts converge in their opinion without any direct interaction.

Delphi defined as….

- An "organized method" for collecting views and information pertaining to a specific area;
- A method that allows dialogue between geographically separated experts while serving an effective means for learning;
- Gathering a group of experts to forecast events and assess complex issues;
- Collective human intelligence;
- A process of exploring… assessing… and evaluating.

Advantages..

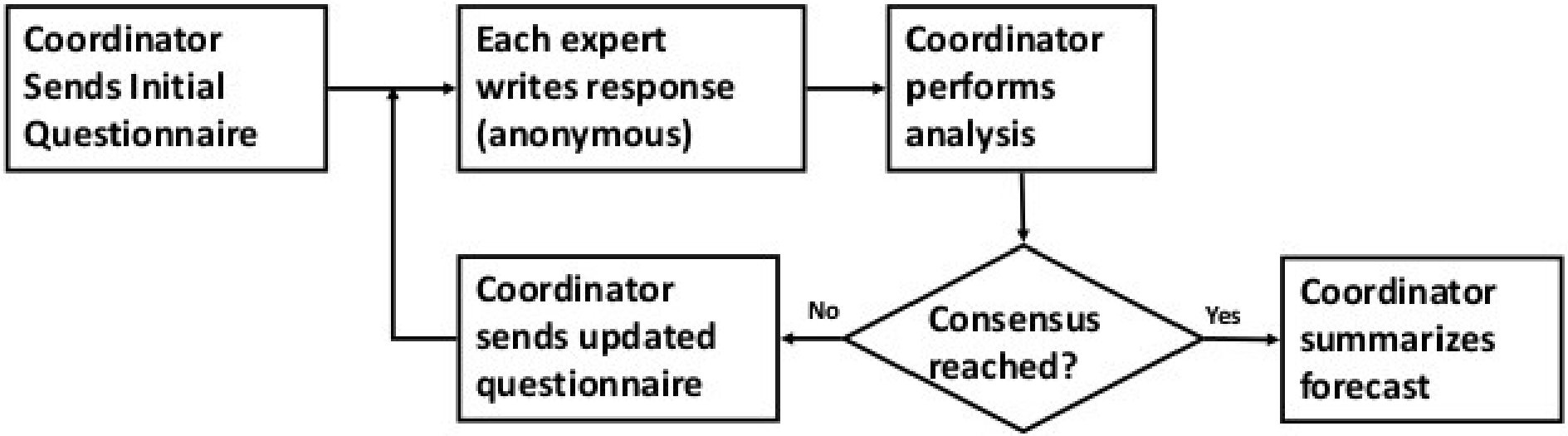
- Opportunities for large number of people to participate;
- Focus is on “ideas” rather than “individuals”;
- Anonymity for participants which make contributions of ideas a safe activity;
- Opportunities for participants to reconsider their opinions;
- Allows for identification of priorities.

Delphi Method

1. Choose the experts to participate. There should be a variety of knowledgeable people in different areas.
2. Through a questionnaire (or E-mail), obtain forecasts (and any premises or qualifications for the forecasts) from all participants.
3. Summarize the results and redistribute them to the participants along with appropriate new questions.
4. Summarize again, refining forecasts and conditions, and again develop new questions.
5. Repeat Step 4 if necessary. Distribute the final results to all participants.

Delphi Method

- Approach



II. Technical Analysis

- Provides the basis for all other forms of project design and analysis because a technically unfeasible project must be either revised or abandoned.
- Is concerned with the detailed technical aspects of a project including product design, plant layout and capacity and input requirements.
- The broad purpose of technical analysis is

(a) To ensure that the project is technically feasible in the sense

that the inputs required to set up the project are available,

Importance/ questions of technical feasibility

- What type of equipment and technology will the business need? What are the costs involved? This includes both the initial purchase and installation costs of the equipment as well as the operational costs of running the equipment.
- Who are the potential suppliers of this equipment? Where are they located? What sort of service and warranties do they provide? How long will it take to acquire the equipment and begin operations?
- Based on the projected business volume, how much raw product will be required? What are the quality specifications?

Importance/questions of technical feasibility…

- What are the possible locations for the project? What size of facility is needed? What are the costs of the building? Does the proposed location have adequate access to infrastructures and services such as major highways, railways, and utilities? Will the project owner build its own facility, or purchase an existing location?
- Where will the facility be located relative to the customers? Who will be responsible for the transportation of goods between the facility and the market? What are the transportation costs

Technical Analysis…

The following are basic issues/ components of TA

1.Production Program and Plant Capacity

2.Input (Raw Materials & Supplies) Study

3.Location, Site Studies and EIA

4.Engineering & Technology Study

5.Organizational and HRM study

Assignment

- **Write a short note not exceeding 8 pages about Market and Demand (Commercial) analysis and the different demand forecasting techniques.**

- **Submission date: April 30, 2024**
- **Note: Copying Directly from each other will unswervingly nullify your work**.

Financial Feasibility Analysis

Can the project earn a satisfactory return on the investment made? The study basically looks at how much cash is needed, where it will come from , and how it will be spent and what will be the return.



Financial Analysis:

- Since reliable cost estimates are **fundamental** to the appraisal of an investment project it is necessary to check carefully **all cost items** that could have a significant impact on financial feasibility.
- Cost estimates cover:-

✓ Initial investment cost

✓ Cost of production

✓ Marketing and distribution costs

✓ Plant and equipment replacement costs

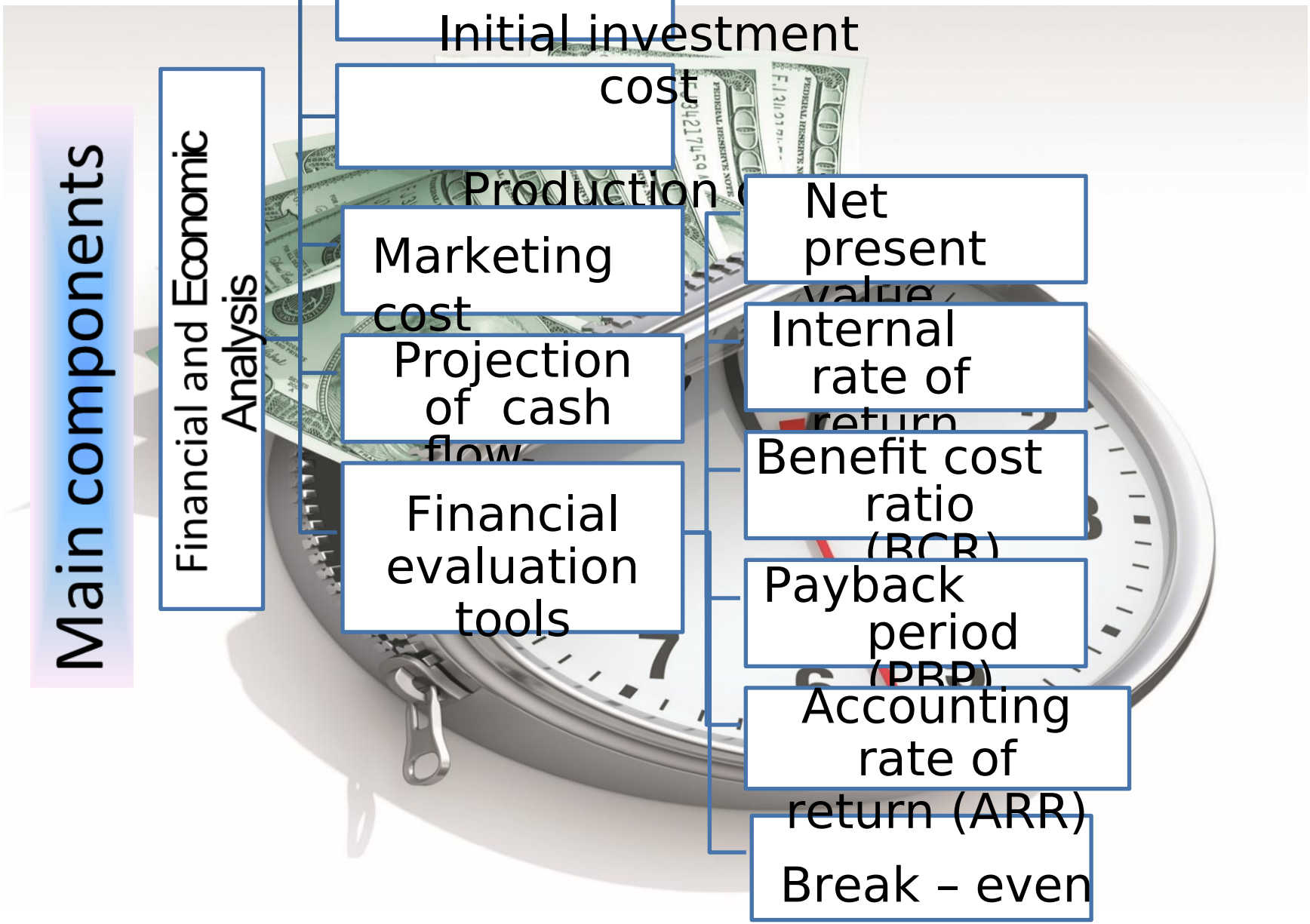
✓ Working capital requirements

Project preparation –Financial Analysis

- Study made to ascertain the financial **viability** of the proposed project

- Objectives are to determine, analyze and interpret all the **financial consequences** of an investment that may be relevant to and significant for the **investment and financing decisions.**

I. Fundamentals of Financial Estimates



Main components

Financial and Economic Analysis

- Initial investment cost
- Production cost
- Marketing cost
- Projection of cash flow
- Financial evaluation tools
  - Net present value
  - Internal rate of return
  - Benefit cost ratio (BCR)
  - Payback period (PBP)
  - Accounting rate of return (ARR)
  - Break – even

Financial Analysis…..

Questions of financial feasibility

- What are the total start up costs required in order to begin operations? For instance, what are the capital costs of the land, plant and equipment , and other start-up costs such as legal costs?
- What are the operating costs involved? These include the daily costs involved in running the business, such as wages, rent, utilities, and interest payments on outstanding debt. These will determine the cash flow requirements of the decision maker.

Financial Analysis.....

- Based on the estimated demand, what are the decision maker ’s **revenue projections**? How will the decision maker determine its pricing arrangements?

- Based on the estimated revenues and costs, what is the **projected profit(loss**) of the decision maker ? What is the break-even point?

Fundamentals of Financial Analysis

1. Objective & Dimensions of Financial Analysis

Main Objective:

- To ensure the financial viability of the industrial project for the private investor.
- Dimensions of Analysis:
  - Investment cost estimation
  - Revenue estimation
  - Estimation of production costs & expenses
  - Projected profitability analysis and financial position
  - Cash flow estimation & evaluation
  - Financial ratio analysis
  - Means of financing & cost of capital
  - Uncertainty/risk analysis (breakeven point, sensitivity analysis, scenario analysis)
  - Debt repayment (loan amortization) schedule, depreciation

Financial Evaluation Criteria

Steps Involved:

- Identify the estimated **costs & benefits** (cash flows) of the project.
- Assess the riskiness of the project and calculate the **cost of capital.**
- Compute the criteria of merit and judge whether the **project is good or bad.**

Financial Evaluation…

Discount Rate

- Refers to the cost of capital to project implementation & realization.
- Market price of capital may be used as the cost of capital.
- The discount rate is the rate of return used in a discounted cash flow analysis to determine the present value of future cash flows.
- What is the appropriate discount rate to use for a project? Many companies use their weighted average cost of capital (WACC)

Equity and Debt Financing: A project financed by mix of debt and equity funds.

Fundamentals …

/eighted Average Cost of pital (WACC) used as the appropriate financial discount rate

WACC = (Debt% x Net Cost of Debt) + (Equity% x Cost of Equity)

Exampl
e:

Total project cost	B500,000
Fund 1: (Loan-50%)	250,000
Cost of capital (15%)	
Fund 2: (loan-40%)	200,000
Cost of capital (18%)	
Fund 3: (Equity(10%)	50,000
Cost of capital (10%)	

WACC = (50%x15%)+(40%x18%)
+(10%x10%)
= (0.075)+(0.072)+(0.01) = 15.7%

Financial Evaluation…

There are two board categories of important investment financial appraisal criteria that can be used to evaluate **project cash f** **accept/reject decision**

$$FV = PV \times (1 + i)^n$$

$$PV = FV / (1 + i)^n$$

- **"Discounting" Criteria**
- **"Non-Discounting" Criteria**

Financial Evaluation…

Each of these criteria have advantages & limitations.
Decisions should be made in light of risk & uncertainty of future conditions.

Discounting Criteria:

- **Net Present Value (NPV)**
- **Profitability Index (PI)**
- **[Benefit-Cost Ratio (BCR),**
- **Internal Rate of Return (IRR)**

Non-Discounting Criteria:

- **Payback Period (PBP)**
- **Accounting/Average Rate of Return (ARR)**
- **Break-even analysis**

Net present value (NPV)

- Definition of net present value
  - ✓ is the **algebraic sum** of the discounted values of the expected incremental **positive** and **negative** **net cash flows** for a project over the project's anticipated lifetime
  - ✓ Measures the change in wealth created by the project.

Net Present Value (NPV)…

$$NPV = \frac{CF_0}{[1+K]^0} + \frac{CF_1}{[1+K]^1} + \cdots \frac{CF_n}{[1+K]^n}$$

$$\text{Or } NPV = \sum_{t=0}^{n} \frac{CF_t}{[1+K]^t}$$

- where:
  - NPV = Net present value
  - CF_t = Cash flows at the end of year t (t = 0, 1… n)
  - n = Economic life of the project
  - k = Cost of capital (i.e., the discount rate)
- The above formula can be re-written as:

$$NPV = \frac{B_0 - C_0}{[1+r]^0} + \frac{B_1 - C_1}{[1+r]^1} + \frac{B_2 - C_2}{[1+r]^2} + \cdots \frac{B_n - C_n}{[1+r]^n}$$

Net Present Value (NPV)…

$$\text{Or } NPV = \sum_{t=0}^{n} \frac{(B_t - C_t)}{[1+r]^t}$$

- where:
  - B_t= represent project benefits in period t
  - C_t = represent project costs in period t
  - r = the financial or economic discount rate
  - n = no. of years the project provides economic benefits
- NPV can be described as the difference between the sum of the present value of costs (cash outflows) and the sum of the present value of benefits (cash inflows).
- When the cash flows exhibit conventional pattern, it may simply mean that:

NPV = PV of Cash Inflows - Initial Investment Cost

NPV…

Example: XYZ Enterprise's Capital Project

$$\text{Discount Factor} = \frac{1}{(1 + \text{Discount Rate})^{\text{Period}}}$$

- Initial Investment – 20,000
- Estimated Life – 5 years
- Scrap Value -1,000

Year	Cash flow	Discount factor @10%	Present Value
0	(20,000)	1	(20,000)
1	5,0000	.909	4,545
2	10,000	.826	8,260
3	10,000	.751	7,510
4	3,000	.683	2,049
5	2,000	.621	1,242
5	1,000	.621	621

- PV of Net Cash Inflows =24,227
- NPV = PV of Net Cash Inflows –Cash Outflows
- = 24,227 –20,000
- NPV = 4,227
- NPV is Positive (+ ve) The Project is ACCEPTED.

Net Present value

Decision Rule

The NPV **represents the surplus funds** (after funding the investment) earned on the project, therefore:

- If the NPV > 0 – the project is financially viable, i.e. **accepted.**
- If the NPV = 0 – the project breaks even.
- If the NPV < 0 – the project is not financially viable, i.e. **rejected.**

If the company has **two or more mutually exclusive projects** under consideration it should **choose** the one with the **highest NPV**.

The **NPV gives the impact** of the project **on shareholder wealth**.

Net Present value - Calculation

- An organization is considering a capital investment in the new equipment
- The company's cost of capital is 9%.
- Calculate the NPV of the project to assess whether it should be undertaken

Year	Cash flow ($0	Discounted factor at 9%	PV ($)
0	(240,000)	1.000	
1	80,000	0.917	
2	120,000	0.842	
3	70,000	0.772	
4	40,000	0.708	
5	20,000	0.708	

Decision

- The PV of cash inflows exceeds the PV of cash outflows by **$29,760,** which means that the project will earn a **DCF** return in excess of 9%, i.e. it will earn a surplus of $29,760 after paying the cost of financing.
- It should therefore be undertaken.

Net Present value - Calculation

- ✓ Important decision issues under the NPV are:
  a. Indicate When to accept or reject projects
  b. Evaluate and Select project (s) under a budget constraint
  c. Compare and decide on mutually exclusive projects
  d. Choose between highly profitable mutually exclusive projects with different lengths of life

et Present Value Criterion

a. When to Reject or accept? Case of independent or mutually exclusive Projects & no financial constraint or no capital rationing

Rule 1:

"Do not accept any project unless it generates a positive net present value when discounted by the opportunity cost of funds"

Examples:

Project A: Present Value Costs $2 million, NPV + $140,000

Project B: Present Value Costs $10 million, NPV - $100,000

Project C: Present Value Costs $4 million, NPV + $200,000

Project D: Present Value Costs $6 million, NPV - $50,000

Result:

- ✓ For independent projects only projects A and C are acceptable. The country/business is made worse off if

et Present Value Criterion

b. When You Have a Budget Constraint?

Rule: *"Within the limit of a fixed budget, choose that subset of the available projects which maximizes the net present value"*

Example: Budget constraint of $4 million and 4 projects with positive NPV:

Project E:	Costs $1 million, NPV + $60,000
Project F:	Costs $3 million, NPV + $400,000
Project G:	Costs $2 million, NPV + $150,000
Project H:	Costs $2 million, NPV + $225,000

Result:

Combinations FG and FH are impossible, as they cost too much. EG and EH are within the budget, but are dominated by the combination EF. which has a

Possible Combin.	Budget	Invest	NPV
1.E & F	**4**	**4**	**460**
2 E & G	4	3	

Possible Combin.	Budgt	Invst	NPV
4.F & G	**4**	**5**	**550**
5 G & H	4	4	

et Present Value Criterion

c. When You Need to Compare Mutually Exclusive Projects?

Rule: *"In a situation where there is no budget constraint but a project must be chosen from mutually exclusive alternatives, we should always* ***choose the alternative that generates the largest net present value"***

Example:

Assume that we must make a choice between the following three mutually exclusive projects:

- ✓ Project I: PV costs $1.0 million, NPV $300,000
- ✓ **Project J: PV costs $4.0 million, NPV $700,000**
- ✓ Projects K: PV costs $1.5 million, NPV $600,000

Result:

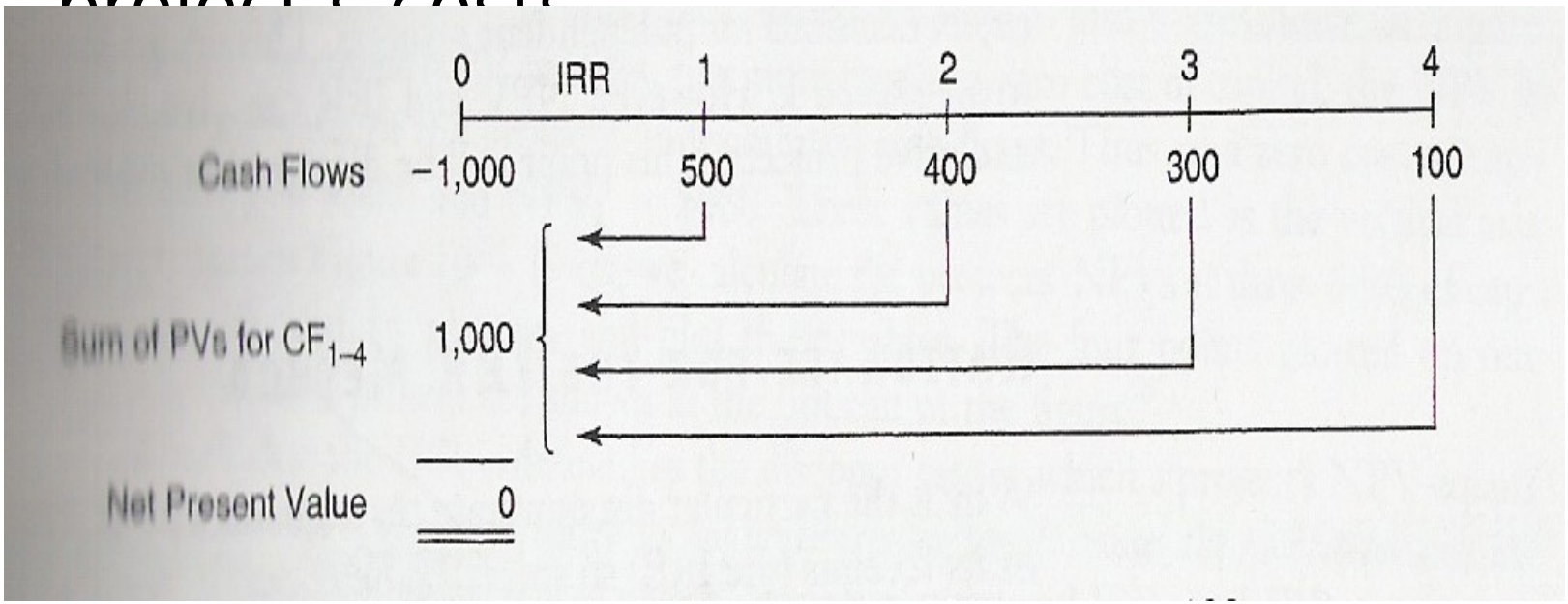
Projects J should be chosen because it has the largest NPV.

dvantages and disadvantages of NPV

Advantages	Disadvantages
▪ Considers the time value of money ▪ Is an absolute measure of return ▪ Is based on cash flows not profits ▪ Considers the whole life of the project ▪ Lead to maximization of	▪ It is difficult to explain to managers ▪ It requires knowledge of the cost of capital ▪ It is relatively complex.

What is IRR?

- The discounted rate that equates the present value of a project's expected cash inflows to the present value of the project's costs



Internal Rate of Return (IRR)

1. Nature of the Criterion

- IRR is the discount rate at which the present value of cash inflows is equal to the present value of cash outflows.
- Discount rate that makes project's NPV zero.
- Discount rate that equates the present value of future cash flows with the initial investment.
- IRR is the value of **r** in the following equation:

$$\text{Initial Investment} = \sum_{t=1}^{n} \frac{CF_t}{(1+r)^t}$$

Where:

- CF_t= represents cash flow at the end of year t
- r=the initial rate of return (IRR)

Internal rate of return (IRR)

- **IRR** is the discount rate (r) at which the present value of benefits are just equal to the present value of costs for the particular project
- The formula for IRR

$$\sum_{i=0}^{t} \frac{B_t - C_t}{(1+r)^t} = 0$$

- The IRR (r) is the discount rate at which the **NPV is zero**.

Internal rate of return (IRR)

Common uses of IRR:

- If the IRR is larger than the cost of funds then the project should be undertaken
- Often the IRR is used to rank mutually exclusive projects. The highest IRR project should be chosen
- An advantage of the IRR is that it only uses information from the project

Internal Rate of Return…

The procedure used to calculate the IRR is the same as the one used to calculate the NPV.

In the NPV calculation, we assume that the discount rate (meaning the cost of capital) is known and hence, determine the NPV.

In the IRR calculation, we set the NPV equal to zero and determine the discount rate that satisfies this condition.

IRR represents the exact profitability of the project.

- The calculation of IRR involves trial & error.
- The same kind of table can be used for the calculation of NPV and IRR.
- An iterative process (using either table of present values or a suitable computer program) finds the solution.
- "Interpolation'' as a technique can be used to approximate the IRR for a project.

Internal rate of return (IRR)

Decision Rule
Projects should be **accepted** if their **IRR is greater than the cost of capital**.

Steps in calculating the IRR using linear interpolation
1. Calculate two NPVs for the project at two different costs of capital. One NPV must be negative, and another one is positive. 2. Using the following formula to find the IRR:

$$\text{IRR} = \text{L} + \frac{N_L}{N_L + |N_H|} \times (H - L)$$

where:

L = Lower rate of interest

H = Higher rate of interest

N_L = NPV at lower rate of interest

N_H = NPV at higher rate of interest

Internal rate of return (IRR)

EXAMPLE

A potential project's predicted cash flows give a NPV of $50,000 at a discount rate of 10% and –$10,000 at a rate of 15%.

Calculate the IRR.

Solution:

$$\text{IRR} = 10\% + \frac{50{,}000}{50{,}000 + 10{,}000} \times (15\% - 10\%) = 14.17\%$$

IRR

Example:

- The cash flows of a certain project is given below:
- What is the IRR of this project? (Assume that the discount rate is 12%).

Year	**0**	**1**	**2**	**3**	**4**
CF	(100,000)	30,000	30,000	40,000	45,000

Internal Rate of Return…

3. Interpretation of the IRR

- IRR is the maximum interest that a project could pay for the resources used if it has to recover the initial investment, the subsequent operating costs, and still break-even.
- The rationale for this method is that the IRR on a project is its expected rate of return.
- If IRR>Cost of capital =Accept the project
  - It increases the shareholders wealth
- If IRR<Cost of capital=Reject the project
  - Imposes an unnecessary cost on current shareholders.
  - The return from the project will not cover even the cost of capital.

dvantages and disadvantages of IRR

Advantages	Disadvantages
▪ Considers the time value of money ▪ Is a percentage and therefore easily understood ▪ Uses cash flows not profits ▪ Considers the whole life of the project ▪ Means a firm selecting projects where the IRR exceeds the cost of capital should increase shareholders' wealth.	▪ It is not a measure of absolute profitability. ▪ Interpolation only provides an estimate and an accurate estimate requires the use of a spreadsheet program ▪ It is fairly complicated to calculate

Profitability Index or Benefit-Cost Ratio

- The profitability index is an index that attempts to identify the **relationship between the costs and benefits** of a proposed project through the use of a ratio calculated as:

$$\text{PV of future cas} = \frac{\text{PV of Future Cash Flows}}{\text{Initial Investment}}$$

- ***A ratio of 1.0 … le measure on the index, as any value lower than 1.0 would indicate that the project's PV is less than the initial investment.***
- As values on the profitability index increase, so does the financial attractiveness of the proposed project.

Explanation:

- Profitability index is actually a modification of the net present value method. While present value is an absolute measure (i.e. it gives as the total dollar figure for a project), the profitability index is a relative measure (i.e. it gives as the figure as a ratio).

Example

- **Question**: Company X is undertaking a project at a cost of $50 million which is expected to generate future net cash flows with a present value of $65 million. Calculate the profitability index.
- **Solution:**
  Profitability Index = PV of Future Net Cash Flows / Initial Investment Required
- Profitability Index = $65M / $50M = 1.3
- Net Present Value = PV of Net Future Cash Flows − Initial Investment Required.
- Net Present Value = $65M-$50M = $15M.
- The information about NPV and initial investment can be used to calculate profitability index as follows:
- Profitability Index = 1 + (Net Present Value / Initial Investment Required)
- **Profitability Index** = 1 + $15M/$50M = **1.3**

Payback Period

- It is one of the most popular and widely used method.
- It is defined as the number of years required to recover the original cash outlay invested in a project .
- The payback period can be calculated using the following formula:

PBP = Total Investment / Annual Cash Flow

A. Payback Period

Example:

- If a project has an investment of Br. 60,000 and annual cash inflow is Br. 15,000 per year for 10 years. Compute the PBP?
- ✓ PBP = 60,000/15000= 4 years.

Payback Period ...

- When the project's cash flows are not uniform, the payback period is computed as follows:

$$PBP = years\ before\ full\ recovery + \frac{Un-recovered\ cost}{Cash\ flow\ during\ the\ next\ year}$$

- **Example:** What is the payback period of a project that involves initial cash outlay of Birr 600,000 and generates annual cash inflows of Birr 100,000, Birr 150,000, Birr 150,000, Birr 100,000, and Birr 200,000 respectively over a five year perio

$$PBP = 4 + \frac{100{,}000}{200{,}000} = 4.5\ years\ or\ 4\ year\ and\ 6\ months$$

- Firms using this criterion generally specify the maximum acceptable payback period.
- The acceptable payback period is usually derived from past experience with similar projects.
- Projects with a payback period equal to or less than the specified period are deemed worthwhile.

Tsegabrhan Mekonen (PhD)

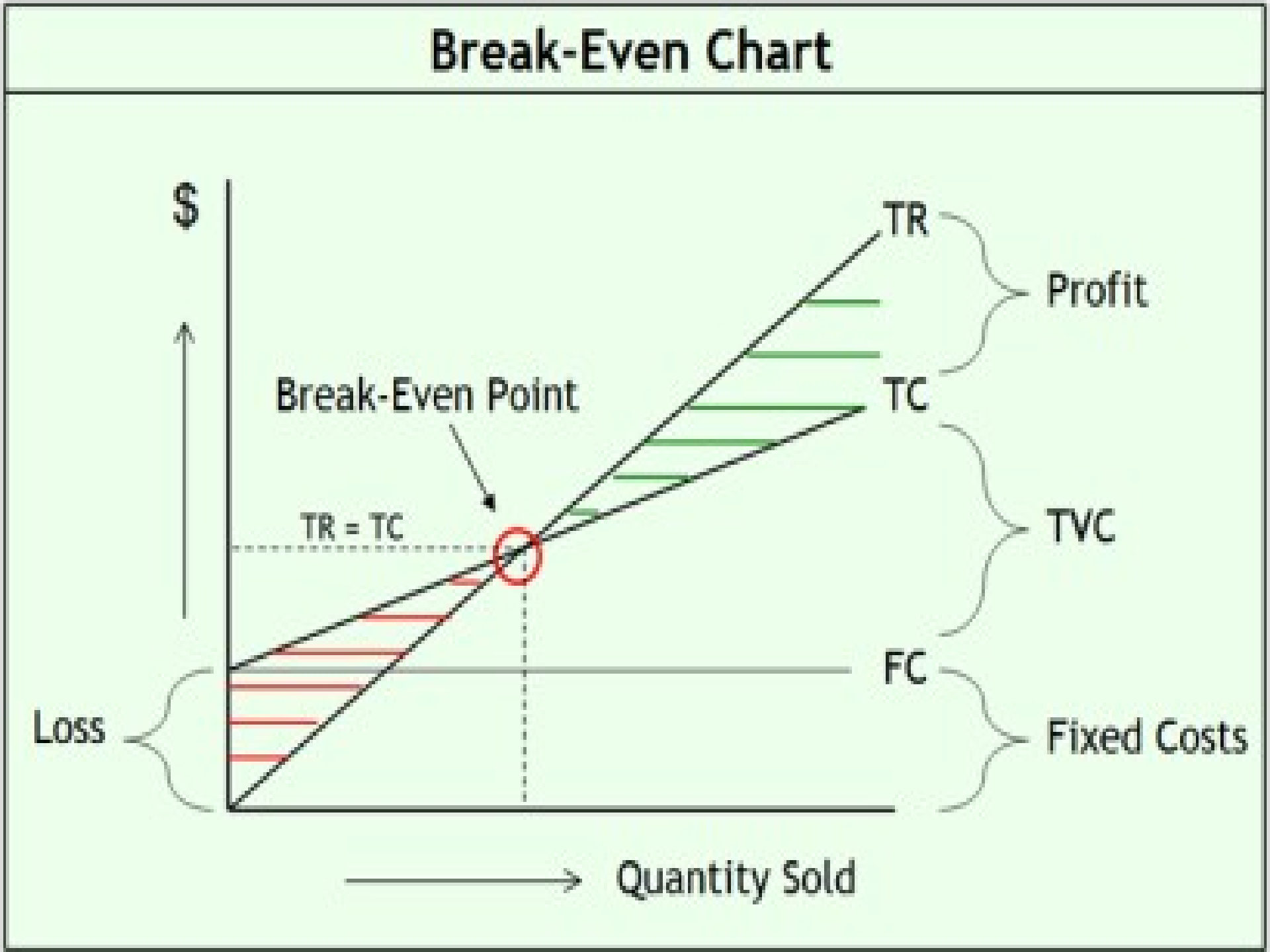
Break-even Analysis

- A financial manager will also be interested in knowing how much should be produced and sold at a minimum to ensure that the project does not "lose money".
- The minimum quantity at which loss is avoided is called the break-even point.
- Break-even point may be defined in accounting terms or financial terms.

Break even analysis

- This determines minimum quantity to be produced and sold to avoid losses.
- BEP (Break even point) is the point at which there is no loss or profit to the company. It can be expressed either in terms of production quantity or revenue level depending on how the company states its cost equation.

Break-Even Chart



Accounting rate of return (ARR)

- This is also known as return on capital employed (ROCE) or return on investment (ROI).

Decision rule
If the expected **ARR** for the investment is **greater than** the **target or hurdle rate** then the project should be **accepted**.

Accounting Rate of Return…

- Ratio of annual net profit (NP) on capital.
- This ratio is often computed only for one year, generally a year of full production.
- This ratio can be computed either for the total investment outlay (K) or for the equity capital (Q).
- The simple rate of return (R%) on total capital invested (K) is computed as:

$$R(\%) = \frac{NP + I}{K} * 100 \qquad where: I = Interest\ Expense$$

- The simple rate of return (RE%) on equity capital paid (Q) is computed as:

$$R(\%) = \frac{NP}{K} * 100$$

Average investment = 38,000Birr
Annual depreciation = 16,000Birr

	Year 1	Year 2	Year 3	Year 4
Income before depr. & taxes	**40,000**	**42,000**	**36,000**	**50,000**
Less: Annual depreciation	**16,000**	**16,000**	**16,000**	**16,000**
Income before taxes	**24,000**	**26,000**	**20,000**	**34,000**
Less: Income taxes (40%)	**9,600**	**10,400**	**8,000**	**13,600**

Average net profit = (14,400 + 15,600 + 12,000 + 20,400)/4
= 15,600 Birr

Hence, ARR = Average Annual net profit / Average cost of investment = 15,600 / 38,000 = 0.41 or 41%.

Guideline:

- The higher the ARR, the better is the project.
- Projects having ARR equal to or greater than a pre-specified rate of return can be accepted.

Project Financing



A feasibility study would serve little purpose if it was not backed by a reasonable assurance that resources were available for a project if the conclusions of the study proved positive and satisfactory.

A preliminary assessment of project financing possibilities should be made before a feasibility study is undertaken.

Project Financing

- The main sources include equity, debt and **government grants**.
- Financing from these alternative sources have **important** implications on project's overall cost, cash flow, ultimate liability and claims to project incomes and assets.

Source of Project Finance

Sources are Equity, Loan financing , Leasing and Incentives

General

- General financing pattern for an industrial project:
  - Cover the initial capital investment by equity and long-term loans to varying extent.
  - Finance the minimum net working capital requirement using long-term capital.
  - Meet subsequent WC requirements by additional short-term & medium-term loans from banks.
- In situations where institutional capital is scarce & available only at high cost, equity capital covers the initial capital investment and net working capital.

General...

- Maintain appropriate balance between long-term debt and equity.
  - The higher the proportion of equity, the lesser will be the debt service obligations and hence, the higher the gross profit before tax (EBT).
  - The higher the proportion of loan finance, the higher the interest payable on liabilities and hence, the lesser the gross profit before tax (EBT).
- Carefully assess the implications of alternative patterns & forms of financing in every project.

1. Equity

How Can We Raise Equity Funds?

- Equity can be raised by issuing two types of shares: Ordinary Shares and Preference Shares.
- Preference Shares:
  - Usually carry a dividend at least partly independent from profit, without or with only limited voting rights.
  - Can be convertible to common shares.
  - Can entitle cumulative or non-cumulative dividend.
  - Can be redeemable or non-redeemable, with the redemption period varying between 5 and 15 years.
- Dividends on ordinary shares, with full voting rights, depend on the profitable operation of the company.

2. Loan Financing

- Financial institutions and commercial banks provide loans that represent recurrent borrowings.
- Loans are very important sources for financing:
  - New projects
  - Expansion & modernization projects
  - Replacement investments
- It is relatively easy for a sound project to obtain loans.

Loan Financing…

. Leasing

Instead of borrowing, it is sometimes possible to lease plant equipment or even complete production units.

Productive assets could be borrowed on a long-term basis – through a lease contract.

- The lessor grants the lessee the right to use an asset in return for periodic lease rental payments.
- Usually requires an initial down payment and periodic payments (often annual rents) – lease fee.

4. Incentives

Government units or agencies may provide financial support in various forms:

- Seed capital assistance provided at nominal rate of interest in order to enable the promoters meet their contribution to the project.
- Capital subsidy provided by regional or local governments in order to attract industries to certain locations (less developed, backward, or marginalized areas).
- Provisions for deferring payment of taxes, partial or full exemption of taxes for a certain period (such as sales tax), etc.

Group assignment (3 or 5 members in a group) – Feasibility study

- **Identify project ideas. One member would contribute two project ideas. Out of 4 ideas in a group, screen and select one viable project idea considering the following points:**
- **Preferably, the project idea has to be business oriented 1 mill up to 5 mill. Birr**
- **The information/data for the feasibility study of the project should be available and easily accessible**

- **You can complete the feasibility study of the project idea in three weeks from the start of the assignment**
- **For the study of feasibility of the project idea, do not forget to include the essential components :**
- **provide product description,**
- **conduct market and demand analysis, develop marketing strategy,**
- **Conduct technical, environmental and financial analysis**
- **conduct risk and uncertainty analysis.**

The End

