

# Chapter 1

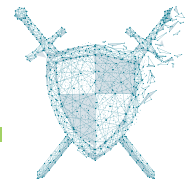
# Traditional vs Strategic Cost Management

## 1. Traditional vs Strategic Cost Management

	Traditional Cost Management	Strategic Cost Management
<b>Time Span</b>	Short term concept	Long term concept
<b>Focus</b>	Internal	Both internal and external
<b>Cost Driver Concept</b>	Based on volume of the product.	Each value activity has a separate cost driver. So, not based on volume but on activities associated with the manufacturing of the product.
<b>Objective</b>	Allocation of cost, Cost control and cost reduction and Variance reporting	Achieve sustainable competitive advantage through Cost leadership or product differentiation.
<b>Cost Reduction</b>	Primary objective is cost reduction.	Primary objective is cost containment -cost reduction and value improvement at the same time.
<b>Approach</b>	Risk - averse.	Risk taking and ability to adapt itself with changing environment.

### Limitations of Traditional Cost Management

- Focuses on **managing cost**. It does not work effectively in today's business environment.
- It has **internal focus** and does not look at the external factors of competition market growth, customer requirement, etc
- A **broad cost reduction program** can lead to inferior quality which might drive away the customers resulting in lower sales and profitability
- The **expectations of modern customers** are quite different and excessive focus on cost reduction may impact the quality of product and services and alienate the customers.
- It **relies on accounting data excessively** which can be misleading as it does not consider dynamics of marketing and economics
- There is a **limited focus on review and improvisation** of existing processes and activities
- Traditional cost management is a **reactive approach**



## 2. Main Objective of Strategic Cost Management

Sustainable Competitive Advantage

- **Michael E Porter** - 1985 - 'Competitive Advantage'

## 3. Necessity of Strategic Cost Management

- Formal **strengthening the strategic position** of the company
- Clear **understanding** of the company's **cost** structure - to gain sustainable competitive advantage
- **Managerial use** of cost information to implement & monitor strategies
- Overall recognition **of cost relationships** (interlink) among the activities

## 4. Two ways of Achieving Sustainable Competitive Advantage or Superior Performance

Strategy	How to achieve it	Strategic Actions once achieved
<b>Product Differentiation</b>	<ul style="list-style-type: none"> <li>• Quality (Q)</li> <li>• Innovation (I)</li> <li>• Responsiveness or Service (S)</li> </ul> <p><b>Risk of Product Differentiation -</b></p> <ul style="list-style-type: none"> <li>• Works only when customers are <b>not price sensitive</b>,</li> <li>• Competitors may replicate, So patent it</li> </ul> <p><b>Pricing</b></p> <ul style="list-style-type: none"> <li>• Skimming the cream strategy or Premium Pricing</li> </ul>	<ul style="list-style-type: none"> <li>• Increase price until it just offsets the cost of improvement in customer benefits, thus maintaining current market share; or</li> <li>• Price below the "full premium" level in order to build market share.</li> </ul>

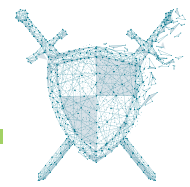


<p><b>Cost Leadership or Low Cost</b></p> <p>↓</p> <p><b>for Price sensitive market</b></p>	<ul style="list-style-type: none"> <li>• Access to low-cost raw materials;</li> <li>• Innovative process technology;</li> <li>• Low-cost access to distribution channels or customers;</li> <li>• Superior operating management.</li> <li>• Exploiting economies of scale in some markets.</li> <li>• Bulk Purchases - JIT</li> <li>• Standardisation</li> <li>• Learning experience from other products</li> </ul> <p><b>Risk of cost leadership -</b></p> <ul style="list-style-type: none"> <li>• Competitors will also reduce the price. So, need to sustain low price with profitability,</li> <li>• Quality;</li> </ul> <p><b>Pricing</b></p> <ul style="list-style-type: none"> <li>• Variable Cost Pricing</li> </ul>	<ul style="list-style-type: none"> <li>• Charge a lower price than its competitors for its product or services in order to gain market share and still maintain current profitability; or</li> <li>• Match with the price of competing products or services and increase its profitability.</li> </ul>
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## # Key Ratios -

Fixed Cost Ratio, Contribution Ratio - If both the ratios are higher, the company is pursuing product differentiation strategy.

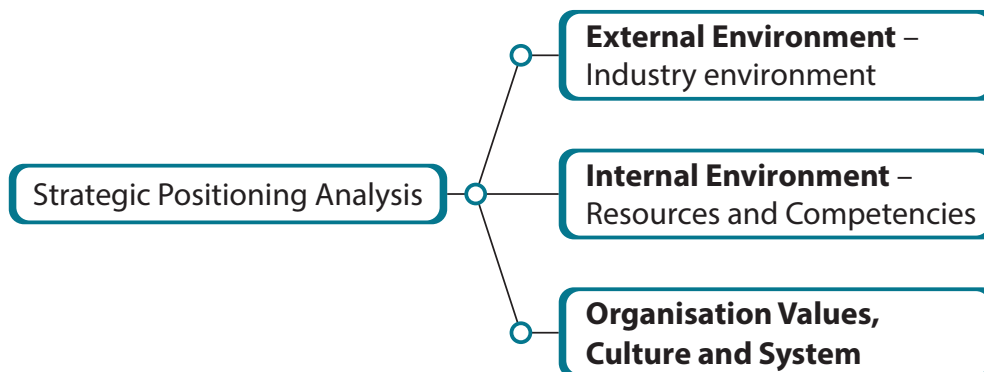
#	Scope/Scale of Strategy	Competitive Advantage can be obtained through	
		Lower Cost	Uniqueness
Competitive Scope can be	Broad Target (Industry Wide)	Overall Low <b>Cost Leadership</b>	<b>Differentiation</b>
	Narrow Target (Particular Segment)	Cost <b>Focus</b>	<b>Differentiated Focus</b>



## 5. Components of Strategic Cost Management

### A. Strategic Positioning Analysis

Strategic Positioning Analysis is concerned with impact of **external and internal environment** on the **overall strategy** of a company. It is important to take account of the future and to assess whether the current strategy is a suitable fit with the strategic position.



### B. Cost Driver Analysis

On the basis of apportioning the cost	On the basis of managing the cost
<ul style="list-style-type: none"> <li>• <b>Resource Cost Driver</b> - to apportion the cost of cost centres to activities. E.g. Floor area to apportion the rent cost.</li> <li>• <b>Activity Cost Driver</b> - to apportion the cost of activities to the products. E.g. Machine hours to apportion the Machining cost.</li> </ul>	<ul style="list-style-type: none"> <li>• <b>Structural Cost Driver</b> - the volume of which are determined from the scale of operation, complexities and technology.</li> <li>• <b>Executorial Cost Driver</b> - the volume of which are determined from the management style of doing the business, plant layout efficiency, product configuration, linkage with suppliers and customers.</li> </ul>

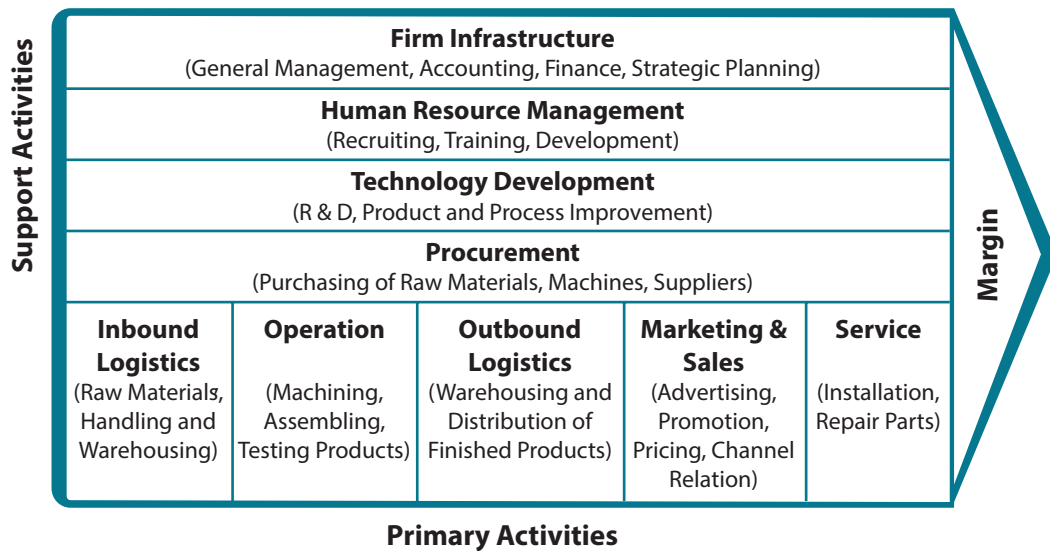
### C. Value Chain Analysis

- Michael Porter

# **Value** - What customer wants and is willing to pay for.

# **Value Chain** - Linkage of several activities (primary and support) that transforms raw material into finished good.

# **Value Analysis** - Identifying the value added and non value added activities to eliminate the non value adding activities without compromising the quality.



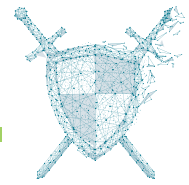
## Benefits of Value Chain Analysis

- (1) Identify **non-value adding** activities
- (2) **Cost relationships** among different activities
- (3) Identify **core competencies**
- (4) Enhance **profitability** using core competencies
- (5) **Vertical linkage** analysis
- (6) Improves **perceived value**
- (7) Develop **performance metrics**
- (8) Ways to do **cost leadership** and **differentiation**
- (9) Suggest **other techniques** that can be implemented in the organisation like ABC, BPR, Benchmarking, Outsourcing, etc

## Cost Reduction Opportunities in Primary Activities of Value Chain

- (1) **Inbound logistics** - JIT purchase
- (2) **Operations** - Production scheduling, efficiency
- (3) **Outbound logistics** - Optimum utilisation of delivery vehicles, shortest route, EDI System
- (4) **Marketing and sales** - Digital marketing, Website sales
- (5) **Service** - Tutorials, Redesign for ease of use

# Each of the initiatives has its own advantages & disadvantages along with the requirement of their implementation.



## Limitations of Value Chain

- **Time** consuming and **expensive**
- **Complex**
- Not beneficial in **short term**
- Not suitable for **service industries**
- Ignores importance of relationships between staffs & customers

The benefits of a value chain will always exceed its cost and time in the long term. Hence, it is worth doing such analysis.

For service industries, a new form of value chain analysis has been formulated named **Value Shop Model**.

## 6. Strategic Framework for Value Chain Analysis

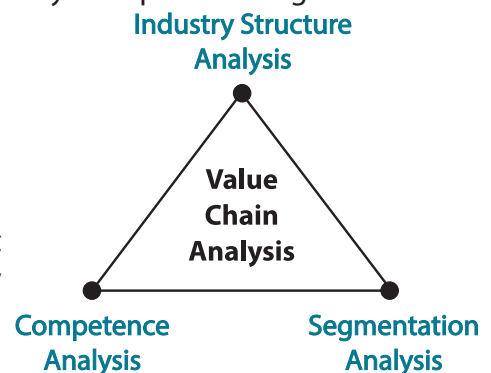
Value Chain analysis requires internal information (for internal value chain) and external information (for industry value chain). The Value Chain analysis requires strategic framework for organising varied information.

The following three are generally accepted:

### A. Industry Structure Analysis

#### Porter's Five Forces Model

Ever-changing or dynamic external forces that may affect a company's goal. Hence, a company needs to evaluate their impact on its strategy on a **continuous basis**.



Forces	Determinants of power	
1. <b>Bargaining power of Buyers</b>	Buyers are concentrated	High
	High volume purchased by buyers	High
	Cost of switching by them is low (standardised products)	High
2. <b>Bargaining power of Suppliers</b>	Input is important to the buying firm	High
	Very few suppliers	High
	Input is not replaceable	High
	Control over value chain/supply chain	High
	Suppliers of other factors not available	High
3. <b>Threat of substitutes</b>	Multiple substitutes available or not	High
	Can be from within or outside the industry	High



4. <b>Threat of new entrants</b>	Huge capital investment	Low
	High level of skills - learning curve	Low
	High Regulations	Low
	Sophisticated technologies	Low
	High economics of scale	Low
5. <b>Threat of intensity of competition/ competitive rivalry</b>	Firms of equal size and Slow Market Growth	High
	Over Capacity in the industry	High
	No differentiation in goods	High
	High exit barriers	High
	High fixed cost	High

# **Porters' forces** - Bargaining power of suppliers and buyers can be also applicable for internal buy/sell transactions within the group. But, there is no point of having internal competition to make one win & other loose. If transfer is strategically vital, H.O. can dictate, else negotiation should be quick.

#### # **Can IT strategy counter five forces?**

- (1) **Rivalry** – strong network with customers can be built using IT
- (2) **New entrants** - latest technology creates high entry barrier skilled personnel to be kept updated
- (3) **Suppliers** - E procurement and automated inventory management
- (4) **Customer**-e-commerce
- (5) **Substitute**-computer aided manufacturing or computer aided designing leads to shorter lead time hence less dependent on substitutes

#### # **Porter's Three Generic Forces and use of IT**

- (1) **Overall Cost Leadership** - inventory management and reducing its cost
- (2) **Differentiation** - online ordering, distribution, brand image
- (3) **Focus** - target a buyer group in a niche segment and see what they need. If they need low-cost then provide. If they need differentiation then provide. Use information technology to gain customer insights

### PESTEL Analysis

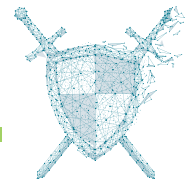
Political, Economical. Social, Technological, Environmental and Legal.

## B. Core Competence Analysis

A **distinctive capability** of an organisation, as against its competitors, that gives a **competitive advantage**.

#### (1) **Two ways to achieve it**

- **Distinctive** or unique skill or a resource
- Technical **knowhow**



## (2) Three tests to identify it

- **End product** benefits
- Access to wide variety of **markets**
- Difficult for competitors to **imitate**

## (3) Two sources to achieve it

### • Resources

Factors that enable a company to create value for customers. They can be tangible (land, buildings, inventory, machinery, money etc) or intangible (employee's skills, brand, patent, technology etc.). The **more difficult a resource is to imitate**, the more valuable is the resource for the company.

### • Capabilities

Capabilities refer to the company's **ability to co-ordinate resources and put them to productive use**. Availability of resources by themselves does not guarantee core competency and success. Capabilities stem from organisational structure, processes and control systems.

## (4) Applying value chain approach to core competencies for competitive advantage

### • Validate core competencies in current businesses

Continuously evaluate strengths.

### • Leverage competencies to the value chains of other existing businesses

An excellent distribution network in one business can be used to launch another product.

### • Use core competencies to reconfigure the value chains of existing businesses

Reconfigure the value chain to improve payoffs. Otherwise, competitors may exploit opportunities.

### • Use core competencies to create new value chains

An organisation can seek new customers by developing new value chains.

## C. Segmentation Analysis

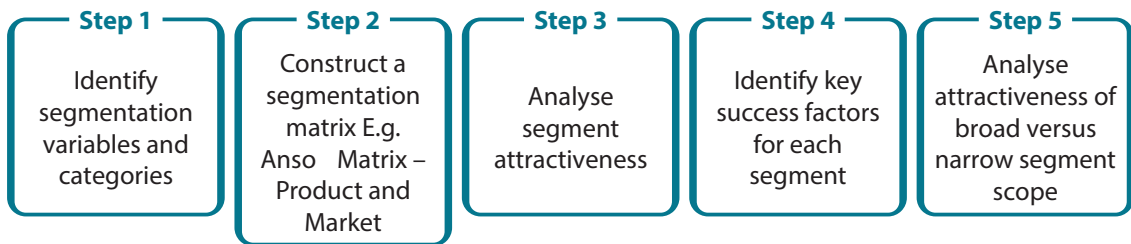
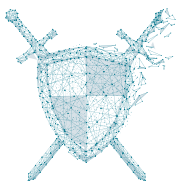
### What it is

A single industry might be a collection of different market segments. Motor vehicle industry, for example, can be seen as a composite of tyre, glass, battery, metals etc.

### Objective

A firm may use this information to decide **to exit** the segment, **to enter** a segment, **reconfigure** one or more segments, or embark on **cost reduction/differentiation** programs.





## 7. Value Chain approach for assessing competitive advantage

### A. Internal Cost Analysis

#### Steps

- (1) Identify the firm's **value-creating processes**
- (2) Determine the **portion of the total cost** of the product or service **attributable** to each value creating process
- (3) Identify the **cost drivers** for each process
- (4) Identify the **links** between processes
- (5) Evaluate the **opportunities** for achieving relative cost advantage

Using the value chain approach, a company goes beyond simple across-the-board cuts and attempts to **lower cost and improve efficiency within each value-creating process.**

### B. Internal Differentiation Analysis

The focus is on improving the value perceived by customers on the companies' products and service offering. The firms must identify and analyse the value creating process and carry out a differentiation analysis.

#### Steps

- (1) Identify the customer's **value creating processes**
- (2) Evaluate **differentiation strategies** for enhancing customer value
- (3) Determine the **best sustainable differentiation strategies**

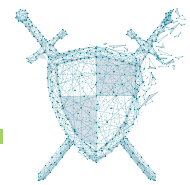
### C. Vertical Linkage Analysis

A vertical linkage analysis includes all upstream and downstream activities throughout the industry. The analysis encompasses activities beginning at source of raw material and ending at the final delivery of products to the customers.

A company might not carry out all activities in the entire value chain of an industry.

Hence, it might not be in a position to obtain information relating to costs and revenues for each process being carried out in the industry

However, **such information is necessary** for a firm to carry out a vertical linkage



analysis.

**Vertical Linkage can be linked with Vertical Integration -**

- Forward Integration (Own or Control the Distributors or Retailors) or
- Backward Integration (Own or control the supplier)

## Forward Integration

### Conditions for gaining synergy

Beneficial only if there can be a **synergy** effect in terms of -

1. **Financials** - Valuation or NPV
2. **Strategy or Values** must be same (e.g. differentiation or cost focus)
3. **Management skill** must be there to handle two product lines
4. **Manage transfer pricing policy** - synchronise the nest interest of the divisions
5. Increase in **Customer base**
6. Manage **bottlenecks**

### Advantages and Disadvantages

Advantages	Disadvantages
Increase in <b>profits</b>	<b>Diversion</b> of management focus
<b>Effective control</b> over market and pricing	Increased <b>working capital</b> if there is a capacity mismatch
<b>More close to customers</b> and their requirements	Manage <b>more product lines</b>
<b>Brand Building</b>	Difference in <b>core strategies</b>
	<b>Employee Resistance</b> to change or collaborate
	Increased <b>operational risk</b> - to earn profits from the new business
	Increased <b>financial risk</b> - investment in acquisition



## Ansoff Matrix - Product and Market

A framework to evaluate the product and market to assess the need of vertical or horizontal integration.



## 8. Vision, Mission and Objectives of SCM

### Key Questions

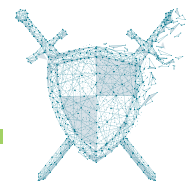
- Why does the company exist?
- What kind of products/services will the company offer?
- Which is the primary market for its offering?
- What type of customers does the company seek to target?
- What is the area of operation (geographies)?

## 9. Value Shop Model/ Value Chain of Service Industries

**Mr. James. D. Thompson, 1967.** - For Service Organisation that offers customisation.

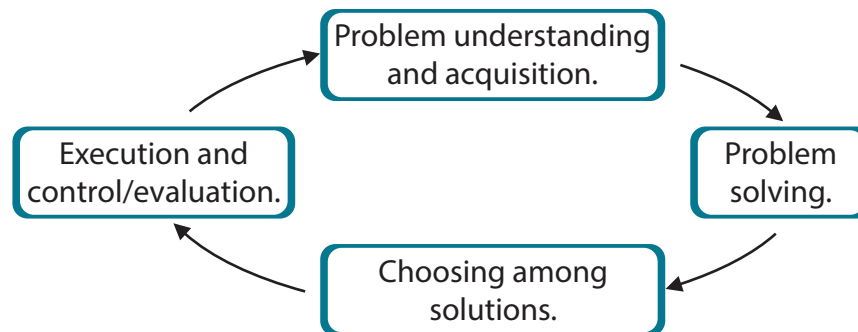
**In 1998 Mr. Charles B. Stabell and Mr. Oystein D. Fjeldstad** in their research work properly defined the concept of 'Value Shop'.

In value shop principle, no value addition takes place. It **only deals with the problem**, figure-out the main area requires its service and finally comes with the solution.



It mobilises resources (People, Knowledge, Capital) to solve specific problems. It is an iterative process.

The model has the **same support activities as Porter's Value Chain** but the primary activities are described differently and they are -



## 10. Role of Management Accountants in SCM

From traditional expertise in cost allocation and analysis, now a management accountant should be **skilled with all modern** costing and analysis techniques such as Activity Based Costing, Life Cycle Costing, Target Costing, Value Chain Analysis, Business Process Reengineering, etc.

He should also **collaborate** with engineering, production, marketing, distribution and service professionals to focus on the strengths, weaknesses, opportunities and threats identified in the value chain analysis results.

The management accountant **enhances** the firm's value and demonstrates the value of the finance staff to the firm's growth and survival.

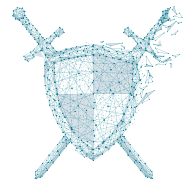
## 11. IT System- Implementation

Issues	Advantages
1. Lack of IT resources - team, seniors, softwares	1. Competitive Advantage
2. Setup and running costs	2. Stakeholders satisfaction - Transparency, real time
3. Technophobia	Precautions
4. Lack of customer interest	1. Cost of failures - Control expenses
5. Securities	2. Rivalry - Stay upto date



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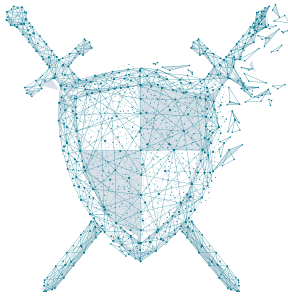


# CA Final SCMPE Saviour Revision



## Our Authorised Partners

Sl. No.	Name	City
1	Sharp Education	Ahmedabad
2	Mundhra Classes	Ajmer
3	National Academy of Commerce	Allahabad
4	Class at door	Alwar
5	Elite Coaching Academy	Aurangabad
6	Vision Academy	Aurangabad
7	Lecture Adda	Bengaluru
8	Jiloka Institute	Bhagalpur
9	Exam Nation	Delhi
10	Ace Classes	Dhanbad
11	Padhaiwale Educational Services	Dhanbad
12	Shikshavilla	Guwahati
13	Virtouso Classes	Hazaribagh
14	Admadtech	Indore
15	CA Study	Indore
16	Fast Education	Indore
17	Smart Learning Destination	Indore
18	Virtual Tree	Indore
19	Agrasen Classes	Jamshedpur
20	Commerce Academy	Jharsuguda
21	Lecturewala	Jodhpur
22	Royal Commerce Classes	Kanpur
23	Ulrn	Kolkata
24	Zeroify	Kolkata
25	Royal Commerce Classes-Lucknow	Lucknow
26	Vsmart	Maharashtra
27	Edugyan Smartech	Mohali
28	Reliable Classes	Mumbai
29	Apna Mentor	Muzaffarnagar
30	Conferenza.in	Nagpur
31	Lecturearc .in	Nagpur
32	Atharva Accounting Academy	Nashik
33	Excell Education	New Delhi
34	Make my delivery	New Delhi
35	COC Education Pvt. Ltd.	Noida
36	D-cent Educational services	Noida
37	Alfresco Educational Institute	Patna
38	AS Foundation	Pune
39	Buy Test Series	Pune
40	Edusmart	Raiganj
41	Advance Commerce Academy	Ranchi
42	Bright Brains	Rishikesh
43	Paathshala	Rourkela
44	Fortune CA	Sambalpur
45	The Professional Hub	Shillong
46	Career Academy	Siliguri
47	Pass CA CS CMA Education Services	Sundargarh
48	Tinsukia Professional Coaching Centre	Tinsukia
49	Laddha Professional Academy	Udaipur



# Total Quality Management

## 1. What is TQM

**TQM** is a process of **increasing awareness** on quality in **all** resources and relationships **within the organization**.

It includes everyone in the organisation from all levels of management, all workers, all process & all aspects concerning customer satisfaction.

### Two Basic Principles

- Getting things right first time
- Continuous improvement

### Before implementation of TQM

- Check **current reality** - do not go ahead if fund base is unstable, weak administrative systems, lack of managerial skills, poor employee morale exists in the organisation

### Criticisms of TQM

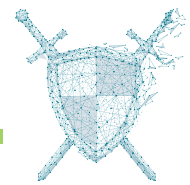
- Focus on **documentation** and ill measurable outcomes
- Emphasis on **quality assurance**, rather than improvement
- **Internal focus** is not matching with customer orientation
- **Not for service industries** as they do not follow industry best practices. The new move in service industries is TQS-Total Quality Service

## 2. Cost of Quality

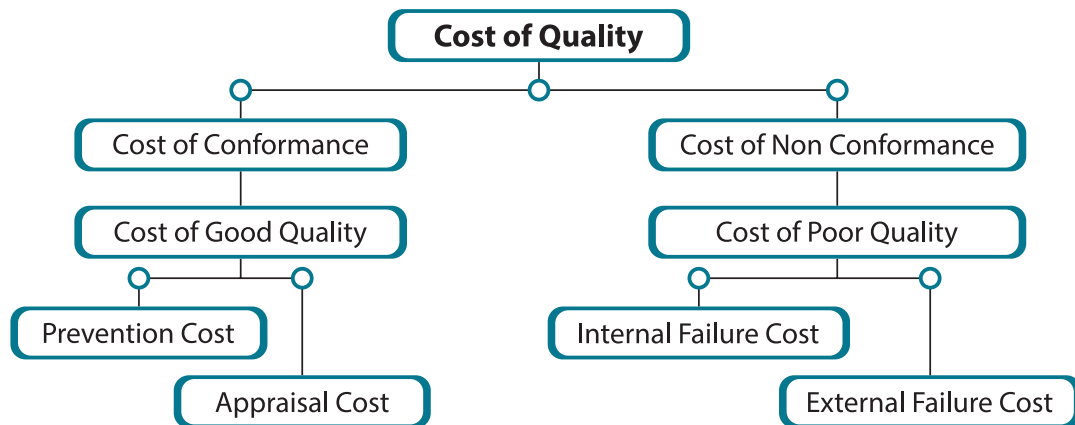
- **Philip Crosby and Joseph Juran.**

It is the difference between the actual cost of producing, selling and supporting products/ services and the equivalent cost if there were no failures during production/usage by customers = **Cost with no failures – Current Cost.**





### 3. Four types of Cost of Quality



Types of Cost	Point of Incurrence	Examples
Prevention Costs	Before actual production	Training, Quality Circles, Replacement of machines, Supplier Screening, Re engineering
Appraisal Costs	All Stages - before sales	Inspection Cost, Quality Review / Audit Cost, Product acceptance, Process acceptance
Internal Failure Costs	Before delivery	Reinspection, Retesting, Rework Cost, Scrap Cost, Repairs, Downtime, Discount on defective sales
External Failure Costs	After delivery	After Sale Service, Warranty Replacement, Revenue loss.

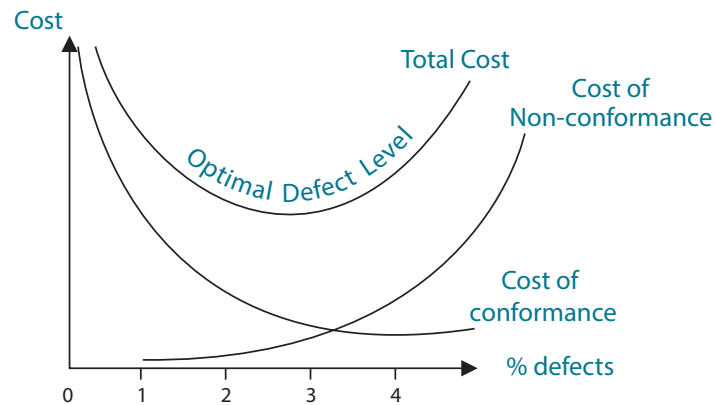
# **Raw Material Inspection** - Prevention Cost or Appraisal Cost (Prefer)

# **Quality Audit** - Prevention Cost (Prefer) or Appraisal Cost

### 4. Optimal Cost of Quality

It is generally accepted that an increased expenditure in prevention and appraisal is likely to result in a substantial reduction in failure costs. Because of the trade off, there may be an **optimum operating level** in which the **combined costs are at a minimum**.

Hence it is further argued that striving for zero defects is not good for the economic interest of the company.



- # Eliminating defects is very costly. Hence reduce it and continuously improve.
- # There is an **inverse relationship** between cost of conformance and cost of non-conformance. Hence, the term, Quality is **free**.
- # **Ways to reduce non-conformance cost can be : TQM** (staff cooperation, improvement in all processes, prevention and appraisal with a limit on COQ) and **TPM** (to keep equipments in top working condition). Use this to advise on incurring the cost of quality.
- # Cost of Quality can be computed in terms of -
  - (a) **Effort** - E.g. Hours of Rework - 1,000 hrs
  - (b) **Absolute Amount** - E.g. Rework Cost (Hrs × Rate/hr)

## 5. Prevention, Appraisal and Failure Model

The prevention, appraisal, and failure (PAF) model is the most widely accepted method for measuring and classifying quality costs. Follow this process.

1. Gather some basic information about the number of failures in the system

**Failure Data**

2. Apply some assumptions to that data in order to quantify the data

**Quantify**

3. Chart the data based on the four elements listed above and study it

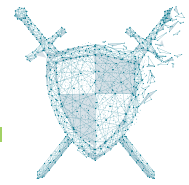
**Chart – in 4 categories**

4. Allocate resources to combat the weak-spots.

**Reduce weaknesses**

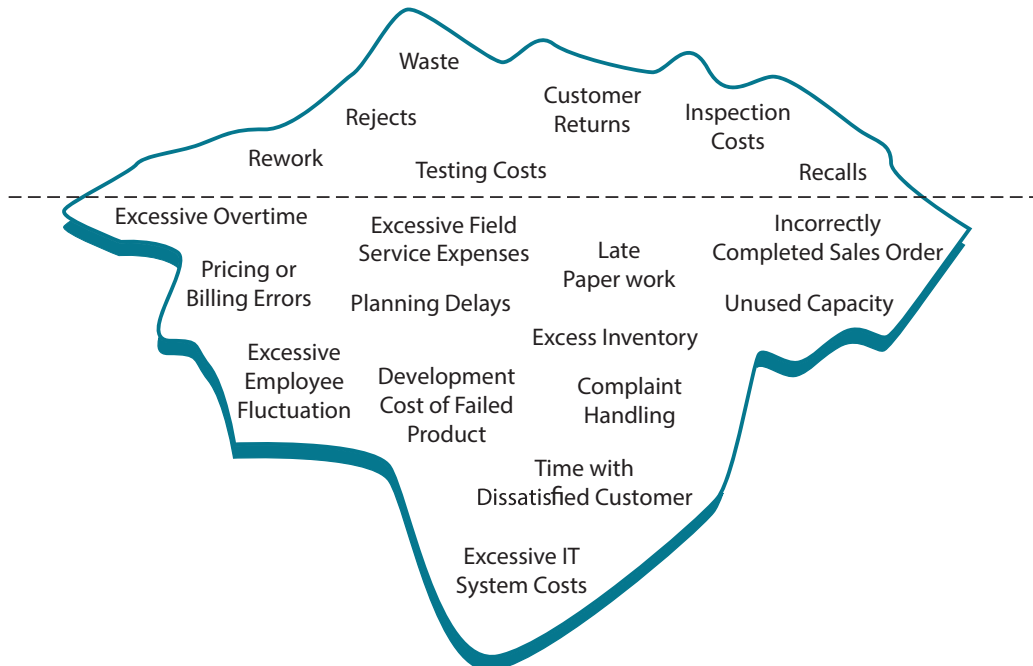
5. Do this study on a regular basis and evaluate your performance

**Continuously improve**



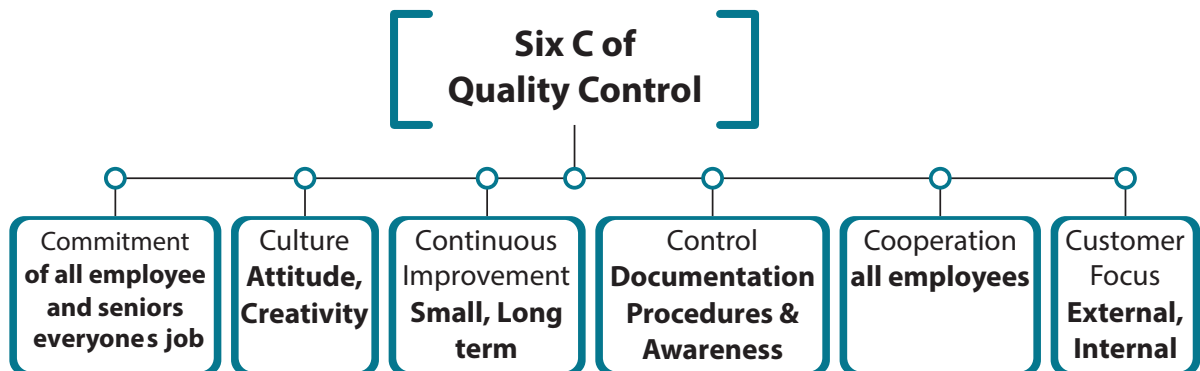
## 6. The Iceberg Model

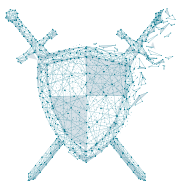
Many of the costs of quality are **hidden** and thus making it difficult to identify by formal measurement systems.



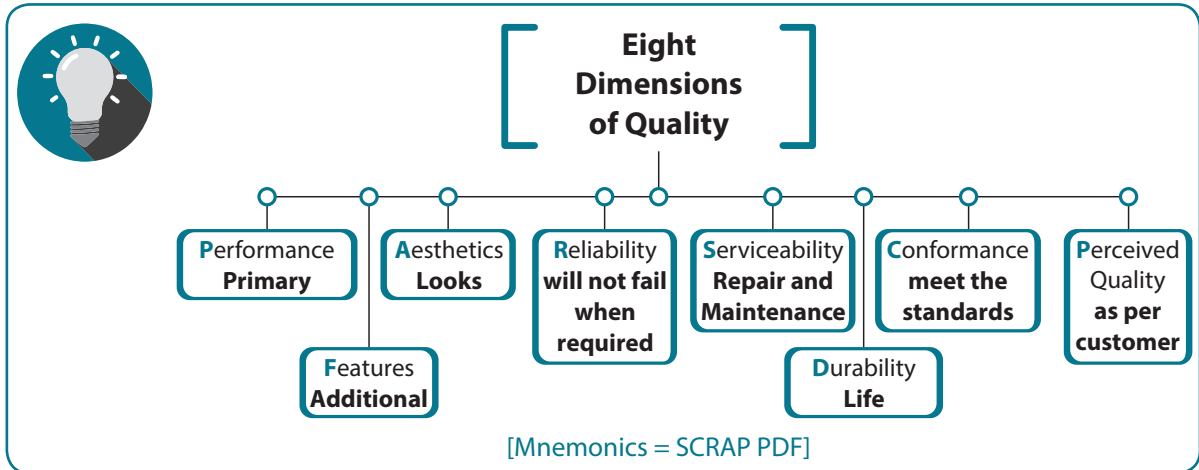
Only a **minority** of the costs of poor and good quality **is obvious** - appear above the surface of the water. The reduction of cost under water has a huge scope. If we identify and improve these costs, the costs of doing business will significantly reduce.

## 7. Six C of Quality Control





## 8. Eight Dimensions of Quality



## 9. Deming's 14 point Methodology

Father of Quality Evolution – Mr. Deming

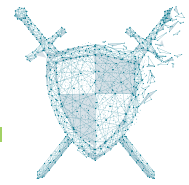


15% Quality problems	Worker's error
85% Quality Problems	Processes, Systems & Poor management

- Create constancy of purpose for **improving products and services**. (Long term quality) (P)
- Adopt the **new philosophy**. (Customer first) (P)
- Cease dependence on **inspection** to achieve quality. (build quality into the process) (I)
- End the practice of awarding business on price alone; instead, **minimize total cost** by working with a **single supplier**. (Consistency, analyse total cost – not just initial cost) (S)
- Improve** constantly and forever every **process** for planning, production and service. (PDCA/ Kaizen) (P)
- Institute **training** on the job. (reduces variation, learn from one another) (T)
- Adopt and institute **leadership**. (don't just supervise) (L)
- Drive out **fear**. (allow to share ideas, make them feel valued, seniors approachable) (F)
- Break down **barriers** between staff areas. (internal customers, team work) (B)
- Eliminate **slogans, exhortations** and **targets** for the workforce. (clear expectation, praise people) (S)



**Quota Wale  
(Workmen) ne PPP  
Ki Sahi mein Faad  
di. STIL BEE?**

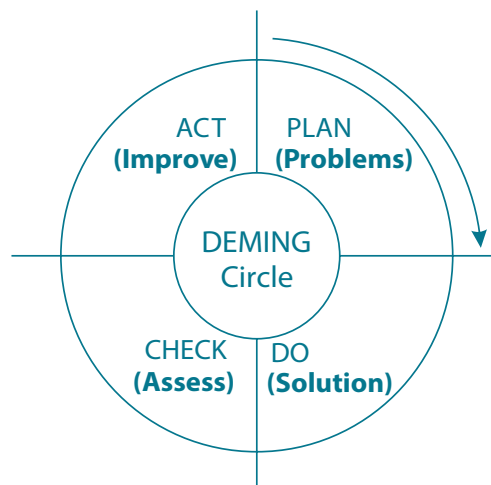


- (k) Eliminate **numerical quotas** for the workforce and numerical goals for management. (provide support to achieve quality, measure process rather than people) **(Q)**
- (l) Remove barriers that rob people of **pride of workmanship**, and eliminate the **annual rating or merit system**. (don't rate everyone, treat them same) **(W)**
- (m) Institute a vigorous program of **education** and self-improvement for everyone. (prepare them for future change) **(E)**
- (n) Put **everybody** in the company to work accomplishing the **transformation**. (involve each person, analyse each step) **(E)**

## 10. PDCA Cycle

### - Deming's Cycle or Shewhart Cycle

- It consists of four steps - **Plan (P), Do (D), Check (C) and Act (A)**.
- A method for continuous improvement



## 11. Business Excellence Models

Business Excellence (BE) is a philosophy for developing and **strengthening the management systems and processes** of an organization **to improve performance and create value for stakeholders**.

The essence of this approach is to **develop quality management principles** that increase the overall **efficiency** of the operation, minimize **waste** in the production of goods and services, and help to increase **employee loyalty** as a means of maintaining **high standards** throughout the business by achieving excellence in **everything that an organization does** (including leadership, strategy, customer focus, information management, people and processes).

- # Excellence cannot be attained if the staffs are forced to meet the norms. They must believe in management. Effective leadership is required.



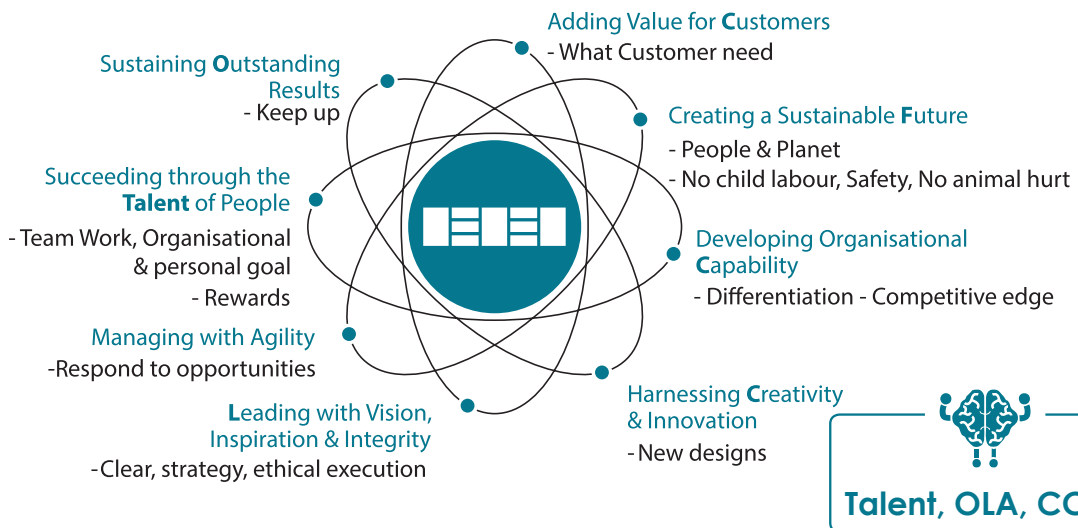
## Business Excellence Models existing around the world

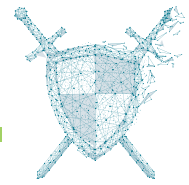
- European Foundation of Quality Management Excellence Model (EFQM)
- Baldrige Criteria for Performance Excellence
- Singapore BE Framework
- Japan Quality Award Model
- Australian Business Excellence Framework

### A. EFQM Excellence Model

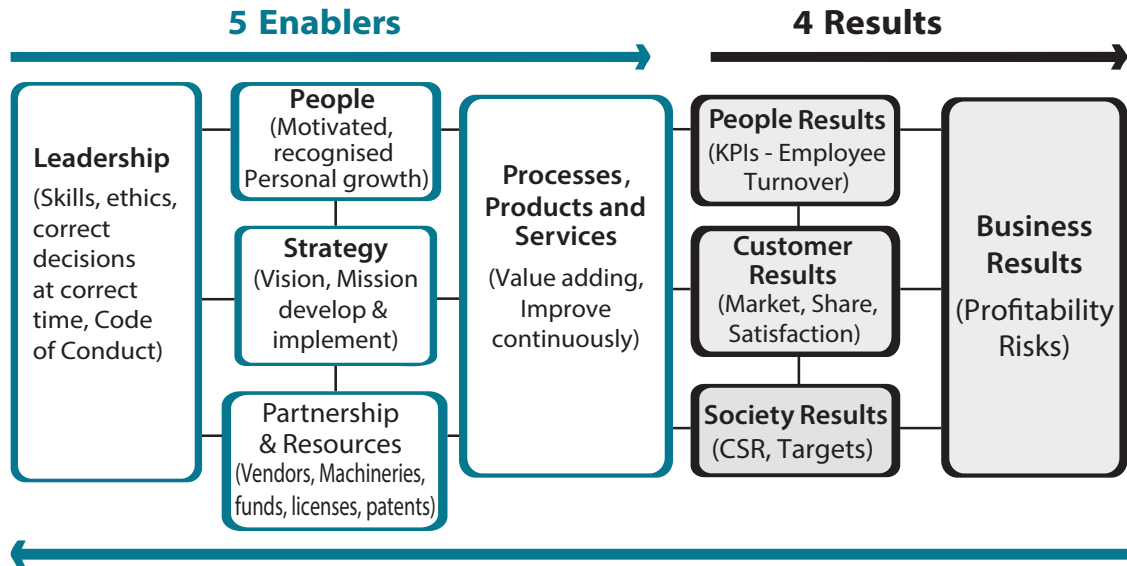
The EFQM model is a practical, non-prescriptive tool that enables organizations to understand the cause and effect relationships between what their organisation does and the results it achieves. The EFQM model presents a set of three integrated components:

#### THE FUNDAMENTALS





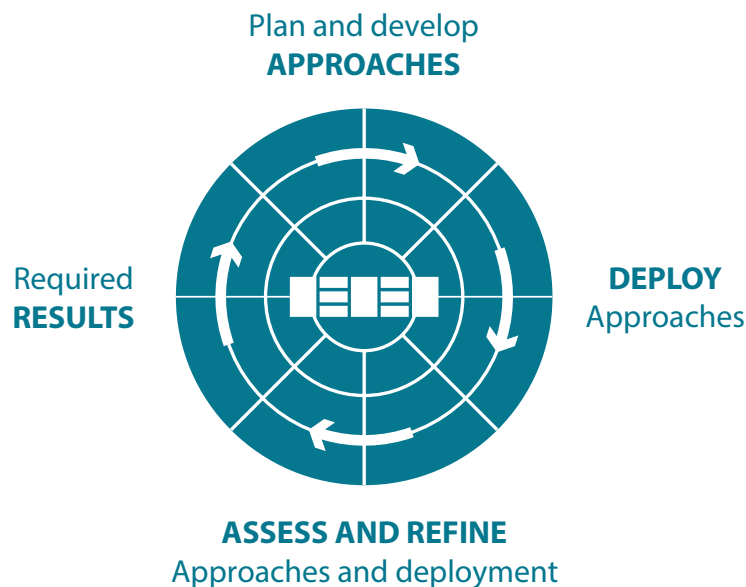
## THE CRITERIA, CONCEPTUAL FRAMEWORK



To achieve sustained success, an organisation needs **strong leadership** and clear **strategic direction**. They need to **develop and improve** their **people, partnerships** and **processes to deliver value-adding products and services** to their customers. If the right approaches are effectively implemented, they will achieve the results they, and their stakeholders, expect.

### The RADAR, logic assessment framework

The RADAR logic is a dynamic assessment framework and powerful management tool that provides a structured approach to questioning the performance of an organisation.





## B. Baldrige Criteria for Performance Excellence



SCMP mein LBW nahin hoga

## 12. Production Schedule

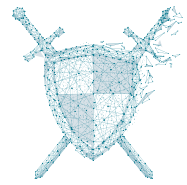
### Finished Goods Schedule

	Particulars	Before QMP	After QMP
	Gross FG Produced	**	**
Less:	Downgraded Units at Inspection Stage	**	**
	FG available for sale	**	**
Less:	Warranty replacement	**	**
	Net FG invoiced	**	**

### Raw Material Schedule

	Particulars	Before QMP	After QMP
	Raw Material Purchased	**	**
Less:	Loss in transit	**	**
	Raw Material Received at Stores	**	**
Less:	Loss in storage	**	**
	Raw Material available for production	**	**



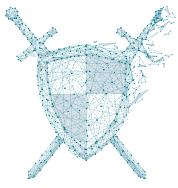


Less:	Loss in processing	**	**
	Raw Material consumed for Gross Production	**	**

## Machine Time Schedule

	Particulars	Before QMP	After QMP
	Gross Machine Hours	**	**
Less:	Downtime or Idle time	**	**
	Productive Machine Hours for Gross Production	**	**

# The main concept is that **a company must implement the quality programme even if there is an extra cost due to it**, as it will benefit the company in long term by increasing its goodwill & competitiveness.



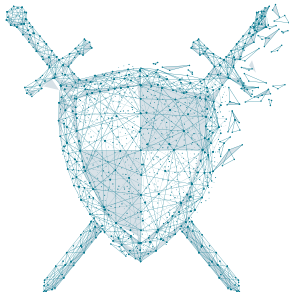
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# Theory of Constraints or Throughput Accounting

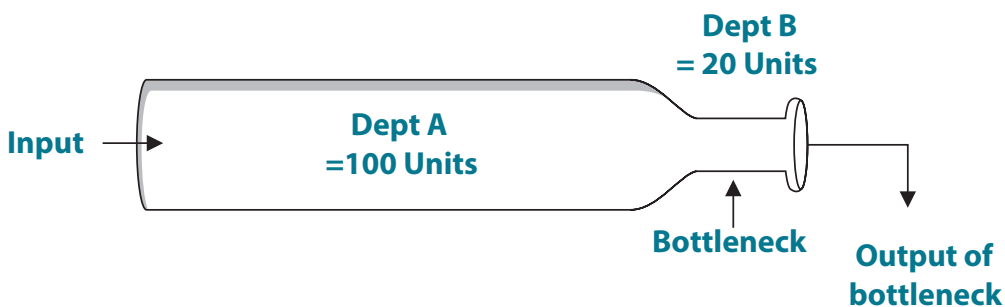
## 1. What is TOC or Theory of Bottleneck

- **Dr. Eli Goldratt** published this concept in his novel named, 'The Goal'.

It is a technique that emphasizes on identifying the constraint in the system, exploiting it and elevating it, until it is no longer a constraint.

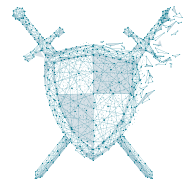
## 2. What is a Constraint or Bottleneck

The resource that limits the system output. It can be tangible or intangible.



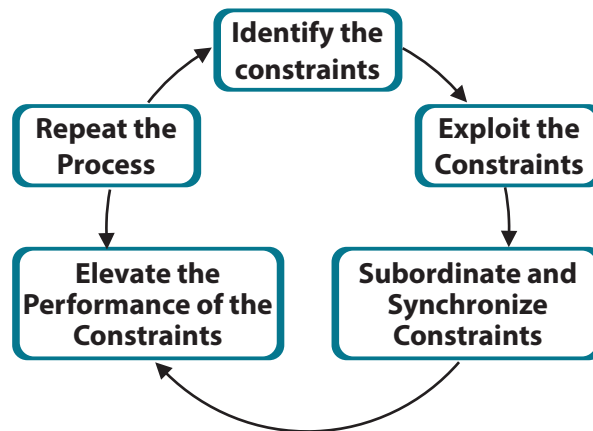
## 3. Objective of TOC

Elevating a constraint



## 4. Five Steps of TOC

- Continuous process, as there will always be a bottleneck in the system.



- # **Under Marginal Costing (Limiting Factor Concept)**, identify the Key Factor based on the resource leading to least production.
- # **Under TOC**, identify the constraints using TAR or investigation.

## 5. Nine Rules of Synchronous Manufacturing



- (1) Do not balance the capacity - **balance the flow** - focus on flow rather than idle Capacity.
- (2) The **level of utilisation** of a non - bottleneck resource is determined not by its own potential but by **some other constraint in the system**.
- (3) **Utilisation and activation** of the resource are not the same.
- (4) **An hour lost** at a bottleneck is an hour lost for the entire system.
- (5) **An hour saved** at a non - bottleneck is a mirage or illusion or negligible.
- (6) **Bottlenecks govern** both throughput and inventory in the system.
- (7) The **transfer batch** may not and many times should not be equal to the **process batch**.
- (8) A **process batch** should be **variable** both along its route and time.
- (9) **Priorities** can be set only by examining the system constraints.

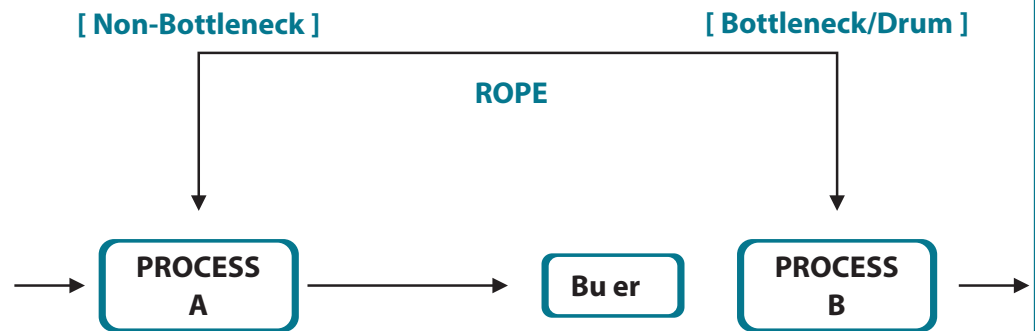


## 6. Drum Buffer Rope



An analogy to synchronise. The most limiting resource is referred to as the 'Drum' as it determines the pace or 'beat' of the entire system. The constraint resource cannot be allowed to waste one moment of its capacity. This means that it should never be stopped waiting for parts and should not use capacity producing anything other than the parts required to fulfil sales orders.

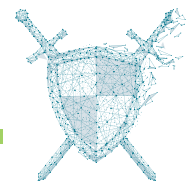
As all other resources have more capacity than the constraint, the **buffer** is introduced before the constraint that protects it from breakdowns on preceding operations. To ensure that too much inventory is not introduced into the system, it is important to start a new order only as the constraint finishes one. To ensure this, a **Rope** is tied to the first (gating) operation of the system.



**E.g. - Water Purification System** - Maintains an automated buffer of purified water, the purification starts as soon as a glass of water is taken out from the storage.

## 7. Advantages and Disadvantages of Theory of Constraints

Advantages	Disadvantages
• Reduction in inventory	• Focus on short-term goals
• More productive machines	• Emphasis is on increasing sales and volume, not quality
• Ability to meet shorter lead times	• Might result in loss of overall picture while looking at specific constraints
• Flexible	• Focuses on push approach as opposed to pull approach
• Better customer service	• Valid only if applied to total supply chain process including management, production, resources and support
• Better product mix	• Operating expenses are usually fixed in money. So, it is same as variable costing.
• Better customer relationship	



## 8. Throughput Accounting

The concept of Throughput Accounting (TA) was created by **David Galloway** and **David Waldron** (1988-89) from the theory of constraints.

In their opinion, accounting should monitor **the rate at which businesses make money**. With this important goal in mind, they focused on the return per product per bottleneck hour. They treated only direct material as variable and all labour and overhead costs as fixed.

Throughput accounting and limiting factor analysis are different approaches, despite both moves around bottleneck. Throughput accounting is considered as approach to **management reporting**. Whereas limiting factor analysis is a **financial analysis** tool that support management, to enhance revenue/contribution.

### Marginal Costing vs Throughput Accounting ⇒ Appropriateness

Marginal Costing gained importance in first half of 20th century, especially in 1930's and 40's, then labour cost used to be variable largely of completely, because there were casual workers. But circumstance and labour laws has been changed significantly since then, now the labour/workforce is largely permanent, not if the regular in nature, hence **labour cost no longer remain variable cost**. Especially in shorter period let's say decision making for 3-6 months. Labour contracts used to have **termination clause**, which usually have provision of notice etc. Throughput approach gives importance to this substance and consider only material cost as real variable cost. Hence, rather considering the contribution after deduction of all variable cost, it computes throughput contribution by reducing material cost from revenue. Hence, use of throughput costing can make decision more relevant because it considers the true nature of cost. **Therefore, Critical aspects, which management accountant need to focus are–**

- Is decision really short term or not? and
- True nature of variable overhead.

At this Point, it is important to note that the marginal costing approach requires only variable costs to be used to calculate contribution. If only material costs are variable, then only those costs should be used in the calculation of contribution. So, there should be **no difference in the two systems in this respect**.

**Overall, decision of maximisation of contribution can be taken using either of traditional or throughput contribution. However, appropriateness of selection among these two techniques depends on the variability of labour and variable overheads, which in turn depends on the time horizon of the decision.**



**Very Short Period**

**Short Period**

**Long Period**

**Throughput Accounting**

**Marginal Costing**

**Absorption Costing, ABC, Life Cycle**

## 9. Three Measures of Performance

Throughput Contribution	<p><b>Sales - Materials</b></p> <ul style="list-style-type: none"> <li>All other costs are fixed costs</li> <li>Measures incoming money</li> </ul>
Investments	<p>Facilities, Equipment, Building, Research and Development Cost, Stock of Raw materials</p> <ul style="list-style-type: none"> <li>Money tied up in the system</li> </ul>
Operating Expense	<p>Direct Labour, Rent, Utilities, Depreciation, etc.</p> <ul style="list-style-type: none"> <li>Money leaving the system</li> </ul>

## 10. Profit Statement

- Assuming production is equal to sales and inventory valuation at material cost only.

	Particulars	Amount
	Sales	**
Less:	Materials (only variable cost) (On actual capacity)	**
	Throughput Contribution	**
Less:	Operating Expenses (all are fixed) (On budgeted capacity)	**
	Profit	**

## 11. Performance Ratios

(a)  $ROI = \frac{\text{Profit}}{\text{Investments}}$

(b) **Product Return per time period (For Product Prioritisation or Ranking)**

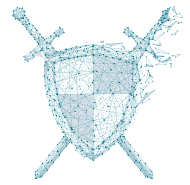
= Throughput contribution per time period of bottleneck

(c) **Productivity Ratio or Throughput Accounting Ratio of Products (For Product Selection)**

$$= \frac{\text{Throughput contribution per time period of bottleneck}}{\text{Conversion cost per time period of bottleneck}}$$

[Product is viable if TAR > 1]





# **TAR of a product can be improved by :**

- (a) Increase SP
- (b) Reduce material cost per unit without compromising quality
- (c) Reduce time required per unit without compromising quality
- (d) Reduce operating expenses
- (e) Increase bottleneck capacity

## 12. Dealing with Multiple Key Factors and Multiple Products

**For short term product mix decisions**

**Step 1:**

Throughput Accounting Ratio or Key Factor Ratio or Critical Ratio = Requirement / Availability

A resource is a key factor only if its TAR is  $> 1$

**Step 2:**

Select the resource with highest TAR

**Step 3:**

Assume the resource with highest TAR as the only key factor or the bottleneck. Now the situation has reduced to single key factor and multiple products.

**Step 4:**

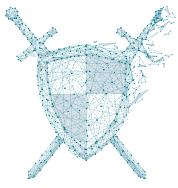
Rank the products in relation to Throughput Contribution per unit of bottleneck

**Step 5:**

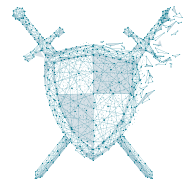
Allocate the available resource to the products in order of rank.

# If there is any **commitment** made for any product, it should be produced even before the first rank.

# Use this approach only when it is asked in exam specifically.

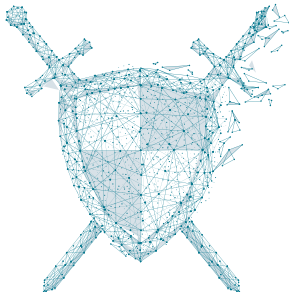


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# Supply Chain Management

## 1. Supply Chain

The entire **network of organisations** working together to **design, produce, deliver** and **service** products.

All activities associated with the flow and transformation of goods from raw material to end user.

# Also called Industry Value Chain/ Vertical Linkage

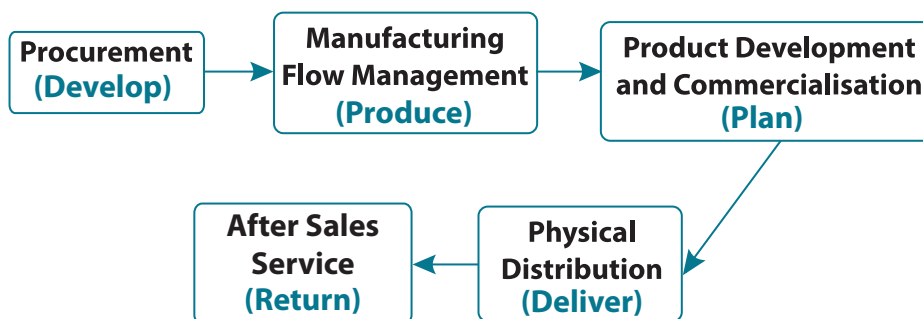
## 2. Supply Chain Management

(Objectives)

- **Integration** of key business process from end user through original suppliers that provides products, services and information that add value for customers and other stakeholders.
- **Correlate** the production and distribution of goods and services with demand of the product

## 3. Key Business Process

In case of manufacturing organizations,



In case of service organisations, the key processes may differ as per the nature of service.

However following may be noted -

- (a) **Information Flow** - to establish communication with suppliers and customers.



- (b) **Capacity and Skills** - Infrastructure set up to provide the service.
- (c) **Demand Management** - to increase demand.
- (d) **Customer Relationship Management** - customer account profitability analysis.
- (e) **Supplier Relationship Management** - for quality service as required by the customers
- (f) **Service Delivery Management** - service level agreement
- (g) **Cash flow** - payment to suppliers, collection from customers and pricing



- # All activities are interlinked.
- # Every service is different and can be formed of different activities.

## 4. Eight Processes in Global Supply Chain Framework

- (1) **Customer Relationship Management (C) - Customer interactions**
- (2) **Supplier Relationship Management (S) - Coordination**
- (3) **Customer Service Management (S) - Point of Contact**
- (4) **Demand Management (D) - Growing demand, forecasting**
- (5) **Order Fulfilment (O) - Process orders**
- (6) **Manufacturing flow management (F) - Obtain finished generates**
- (7) **Product Development and Commercialisation (D) - New Products, Improvements**
- (8) **Return Management (R) - Reverse Logistics, Gatekeeping (Criteria for Returns) & Avoidance (Screening)**



DD FOR SSC

## 5. Types of Supply Chain

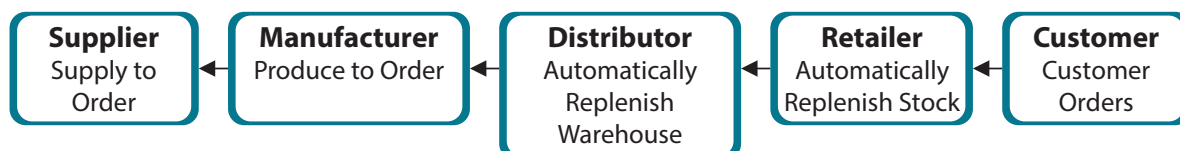
### Push System

(based on **Forecast - use IT Systems**)



### Pull System

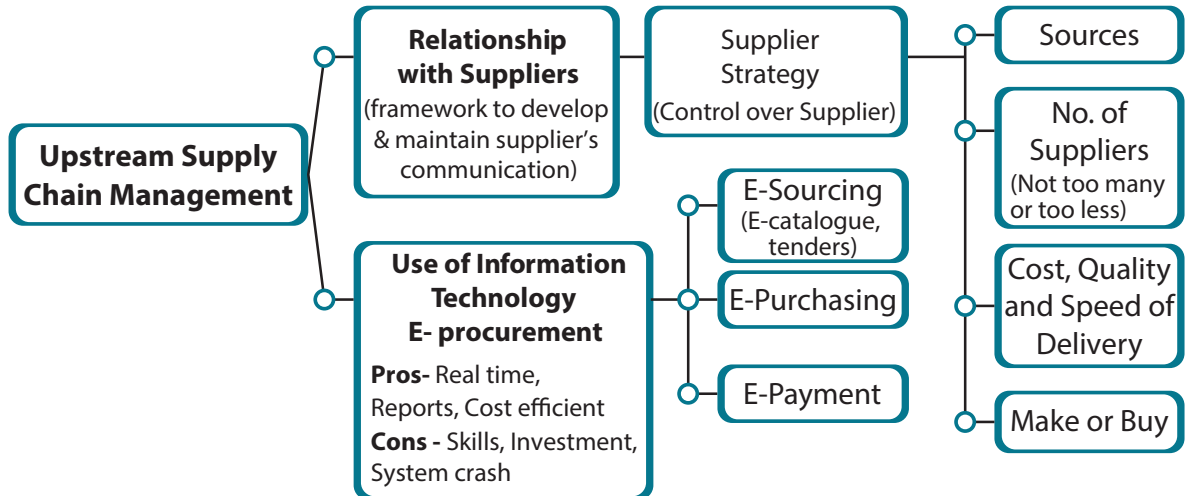
(based on **Real time Coordination - use IT Systems**)



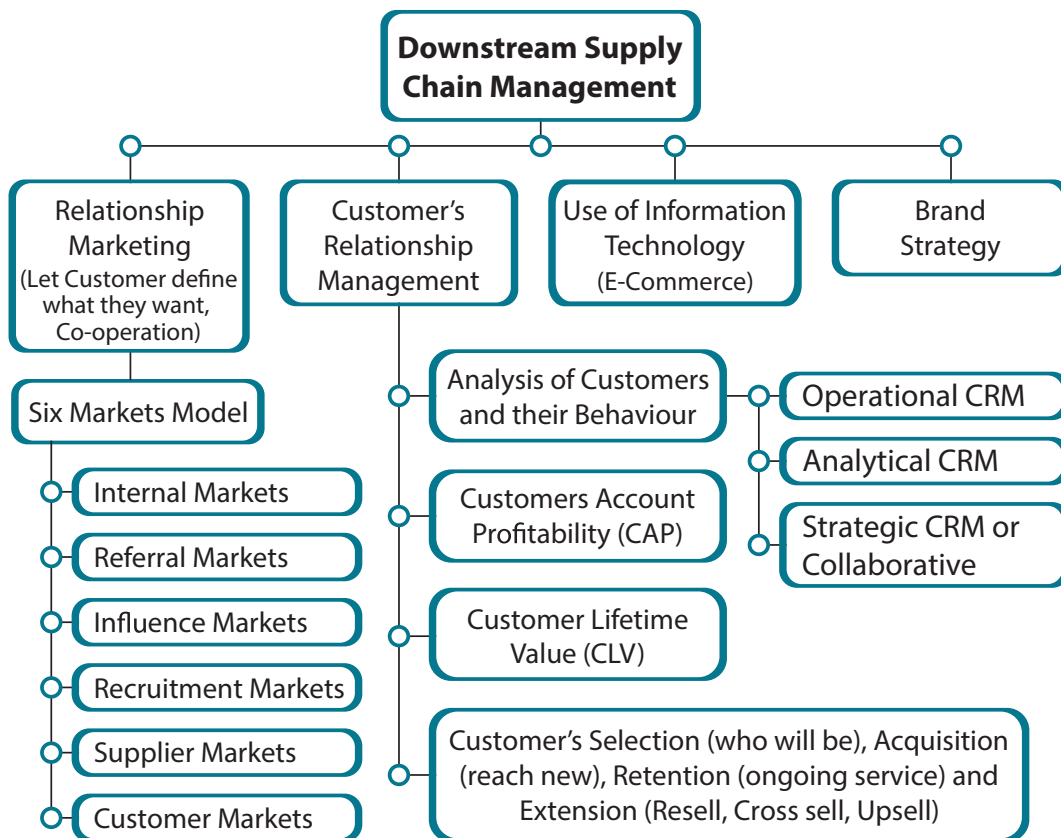


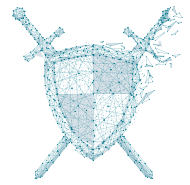
## 6. Upstream Flow Management

### - Supplier's Management



## 7. Downstream Flow Management





## 8. Service Level Agreements

It is a legally binding or an informal contract between the **customer and the service provider**. It includes definition of services, termination of agreement, rewards and penalties.

# May be implemented with suppliers also. Requires periodic audit.

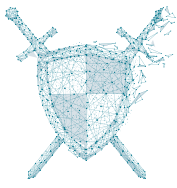
## 9. Benefits of Supply Chain

- **Inventory** reduction
- **Personnel** Reduction
- **Productivity** Improvement
- **Order** Management
- **Financial cycle** improvement
- **New or improved** processes
- **Customer** responsiveness
- **Standardization**
- **Flexibility**
- It **integrates** industry value chain
- **Seamless flow of information** and products between suppliers and customers
- Captures **customer requirement** to plan the production
- **Supplier supplies** as per production plan
- Effective **logistics**
- Integrated **ERP**

## 10. Supply Chain Management in E-Commerce

### Features of e-commerce

- Customers buying online wants **fast deliveries**
- Buyers can be in **any corner of the world**
- Orders can come **any time**
- SCM may be there to **deliver on time**.



## Supply Chain in e-commerce (ERP is must)

- (a) **Customer Order** - Capture on real time basis using ERP. No delay in intimation to production team.
- (b) **Procurement** - Material requirement to be sent to suppliers, who can deliver quality materials in the right time. No delay in supply.
- (c) **Production - Pull system** - Produce only that quantity which customer requires. No ad hoc production.
- (d) **Logistics** - Avoid any delay in deliveries from suppliers or to the customers. In house-well trained, Outsourced - reliable & well briefed.

## 11. Inventory Management Systems

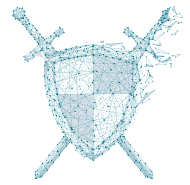
### A. Vendor Managed Inventory Technique - (Walmart and Procter and Gamble)

- (a) Supplier to access the inventory information from **all locations** - warehouse, retail stores and distribution centres
- (b) Supplier to access the **sales data** to anticipate demand and refill the requirement
- (c) Use RFID (radio frequency identification) technique or sensors or barcoding system to **easily update the data** on pick up, process and ship.

### B. Cost per Touch Inventory System (IKEA)

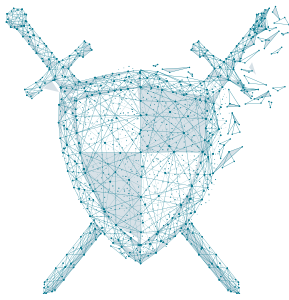
- (a) Less hands, less cost
- (b) Put products in easy to assemble
- (c) Involve lesser persons to move an inventory
- (d) Customer can select and move the product within the stores
- (e) Customer can pickup for delivery & do installation
- (f) Pass cost savings to the customers





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# Gain Sharing Arrangement

## 1. Gain Sharing Arrangements

Cost Saving arrangement.

One party may get financial benefits & other may get non-financial benefits. - Risky for supplier but can be heavily rewarding.

An agreement whereby any benefit earned during an execution of a contract will be shared by both the parties.

**E.g. 1.** Supplier agrees to receive his payment only if the customer is benefited.

**E.g. 2.** Cost saving generated in a year will be shared between supplier and customer in the ratio 40% : 60%

## 2. Reasons of Failure

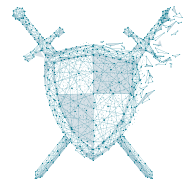
- (a) **Unstructured** agreement
- (b) **Errors** in implementation
- (c) **Relationship** between outsourced supplier and entity.

## 3. Precaution to be taken

- (a) **Be specific** - (where from the gain is to come)
- (b) **Define** gain sharing (Proportion or terms of sharing)
- (c) **Effort** from entity, cost savings is not just the responsibility of suppliers
- (d) **Team** to generate and execute innovative ideas.
- (e) **Openness** in sharing information

## 4. Profit Sharing Plan

- An arrangement between **employer and employee** for **group incentive** or cash bonus to be paid to workers or employees.
- It is computed on the basis of a **percentage of profit** (short term performance).



- It boosts the **motivation** among the employees to enhance their performance.
- It is a **performance management** tool.
- It is also a pre-stage of **Kaizen** costing.

## A. Success is dependent on

1. **Defining** the profit and percentage of profit to be shared
2. **Ratio** in which the amount of bonus will be shared between the employees.

## B. Criteria for share of profit

It may be by way of **salary** of employees or a **performance score** (based on several performance measures).

If the **criteria** is chosen as the **amount of salary** then it may happen that an under-performing worker may get his share despite his lower performance. Hence, it may demotivate the efficient employees.

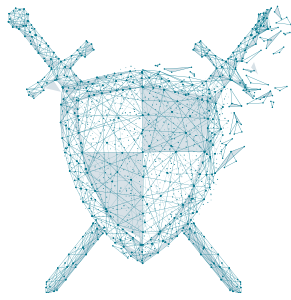


# CA Final SCMPE Saviour Revision



## Our Authorised Partners

Sl. No.	Name	City
1	Sharp Education	Ahmedabad
2	Mundhra Classes	Ajmer
3	National Academy of Commerce	Allahabad
4	Class at door	Alwar
5	Elite Coaching Academy	Aurangabad
6	Vision Academy	Aurangabad
7	Lecture Adda	Bengaluru
8	Jiloka Institute	Bhagalpur
9	Exam Nation	Delhi
10	Ace Classes	Dhanbad
11	Padhaiwale Educational Services	Dhanbad
12	Shikshavilla	Guwahati
13	Virtouso Classes	Hazaribagh
14	Admadtech	Indore
15	CA Study	Indore
16	Fast Education	Indore
17	Smart Learning Destination	Indore
18	Virtual Tree	Indore
19	Agrasen Classes	Jamshedpur
20	Commerce Academy	Jharsuguda
21	Lecturewala	Jodhpur
22	Royal Commerce Classes	Kanpur
23	Ulrn	Kolkata
24	Zeroify	Kolkata
25	Royal Commerce Classes-Lucknow	Lucknow
26	Vsmart	Maharashtra
27	Edugyan Smartech	Mohali
28	Reliable Classes	Mumbai
29	Apna Mentor	Muzaffarnagar
30	Conferenza.in	Nagpur
31	Lecturearc .in	Nagpur
32	Atharva Accounting Academy	Nashik
33	Excell Education	New Delhi
34	Make my delivery	New Delhi
35	COC Education Pvt. Ltd.	Noida
36	D-cent Educational services	Noida
37	Alfresco Educational Institute	Patna
38	AS Foundation	Pune
39	Buy Test Series	Pune
40	Edusmart	Raiganj
41	Advance Commerce Academy	Ranchi
42	Bright Brains	Rishikesh
43	Paathshala	Rourkela
44	Fortune CA	Sambalpur
45	The Professional Hub	Shillong
46	Career Academy	Siliguri
47	Pass CA CS CMA Education Services	Sundargarh
48	Tinsukia Professional Coaching Centre	Tinsukia
49	Laddha Professional Academy	Udaipur



## Chapter 3

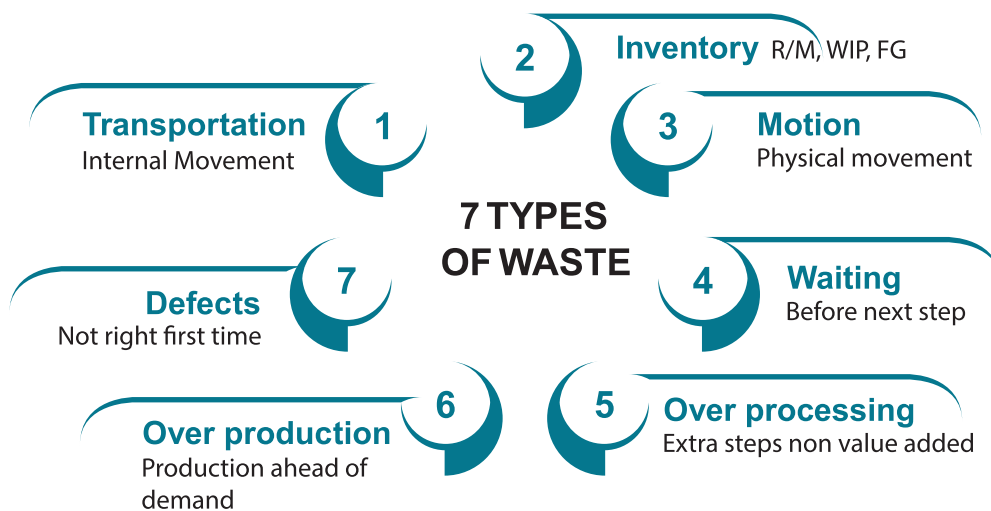
# Just in Time and Lean System

## 1. Lean System

### A. Meaning

Method for **waste minimization without sacrificing productivity.**

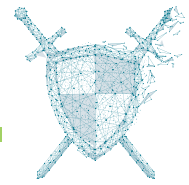
### B. Seven Types of Waste



# **Wastes** are the activities that consume resources but do not add any value from the customer's perspective and hence it increases the cost and time to produce.

### C. Techniques

- Just-in-Time (JIT) and 5S
- Kaizen Costing
- Kanban System
- Total Productive Maintenance (TPM)
- Cellular Manufacturing/ One-Piece Flow Production Systems
- Six Sigma (SS)
- Business Process Reengineering (BPR)
- Process Innovation



## D. Principles

- Perfect first-time quality
- Waste minimization
- Continuous improvement
- Flexibility

## E. Characteristics

- Zero waiting time
- Zero inventory
- Pull processing
- Continuous flow of production
- Continuous finding ways of reducing process time.

## F. Implementation of Lean System

**Step 1** List all activities of the production or service system.

**Step 2** Map each activity which adds value to the customer.

**Step 3** Eliminate all non value adding activities

## 2. Just in Time System

### A. Meaning & Purpose

A pull system for production or purchase whose objective is to produce or to procure products or components as they are required by a customer or for use, rather than for stock.

The main **purpose** is to reduce the wastage & its cost with a single piece flow.

### B. JIT Production

Each component on a production line is produced only when needed for the next stage and production is equivalent to sales demand.

**Ideal JIT production** requires an effective JIT Purchase System.

It can incur overtime cost to match production with demand but saves carrying costs.

### C. JIT Purchasing

Material purchase is as per the requirement of production.

It requires a reliable supplier. To hedge the loss against non timely delivery, penalty or reward clauses can be agreed upon.



## Cost Benefit Analysis of JIT Purchase System

Particulars	Amount
<b>Savings:</b>	
Inventory carrying cost - warehouse rent, staff, etc	**
Material inspection cost	**
Interest on working capital used for inventory	**
<b>Costs:</b>	
Increase in material purchase cost	**
Stock out costs and its contribution lost	**
<b>Net Benefit</b>	**

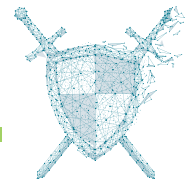
Total Cost Statement	Current	JIT Purchase
Purchase Cost	**	**
Ordering Cost	**	**
Carrying Cost	**	**
Stock out Cost	**	**
	**	**

# **Ideal JIT System** - Zero inventory & Zero Defects.

# JIT Purchase and JIT Production are **different systems**, with same purpose (waste minimisation)

## D. Principles

Principles	Features
Reduces the amount of <b>raw materials</b> inventory and improves the quality of received parts	<ul style="list-style-type: none"> <li>• <b>Long term contracts</b> with single suppliers nearby</li> </ul>
	<ul style="list-style-type: none"> <li>• Spare Parts/ Materials from suppliers on the <b>exact date</b> and at the <b>exact time</b> when they are needed</li> </ul>
	<ul style="list-style-type: none"> <li>• <b>Straight delivery to the production floor</b> for immediate use in manufactured products</li> </ul>
	<ul style="list-style-type: none"> <li>• <b>Visit</b> of engineering staff <b>at supplier sites</b> to examine supplier's processes</li> </ul>
	<ul style="list-style-type: none"> <li>• Installation of <b>EDI system</b> that tells suppliers exactly how much of which parts are to be sent</li> </ul>
	<ul style="list-style-type: none"> <li>• <b>Dropping off</b> products at the specific machines</li> </ul>



Principles	Features
Reduces the amount of <b>work-in-process</b> , while also shrinking the number of products that can be produced before defects are identified and fixed, thereby reducing scrap costs	<ul style="list-style-type: none"> <li>• <b>Shorten the setup times by employee empowerment, quality circles.</b></li> </ul>
	<ul style="list-style-type: none"> <li>• <b>Eliminating</b> the need for <b>long production runs Streamlined flow</b> of parts from machine to machine (<b>KANBAN</b>)</li> </ul>
	<ul style="list-style-type: none"> <li>• <b>Training</b> to employees how to operate a multitude of different machines, perform limited <b>maintenance, multiskilled.</b></li> <li>• <b>Stop the machine when required.</b></li> </ul>
Alters supporting <b>accounting system</b>	<ul style="list-style-type: none"> <li>• Single <b>consolidated monthly payment</b> to each supplier.</li> </ul>
	<ul style="list-style-type: none"> <li>• <b>No need</b> for suppliers to send invoices.</li> <li>• <b>No need</b> for variance reporting - as wastes are eliminated instantly</li> </ul>

## E. Backflush Costing

### Accounting system under JIT :

- No **data entry of any kind until a finished product** is completed. Trigger entries at the end of production.
- The total amount of finished goods is entered into the computer system, which multiplies it by all the components listed in the bill of materials for each item produced.

$$\text{Qty Consumed} = \text{Qty produced} \times \text{Material required/ut}$$

- This yields a lengthy list of components that should have been used in the production process and which are subtracted from the beginning inventory balance to arrive at the quantity of purchases.

$$\text{Qty Purchased} = \text{Qty Consumed} - \text{Opening Inventory}$$

### Limitations:

- (1) Dependent on production report
- (2) Scrap not reported
- (3) Lot tracing not possible
- (4) Inaccurate inventory reported





The success of a back-flushing system is directly related to a **company's willingness to invest in a well-paid**, experienced well-educated **production staff** that undergoes little turnover.

## F. Pre requisites for JIT

- Low variety of goods
- Vendor reliability
- Good communication
- Demand stability
- TQM (Deming's Principles)
- Defect free materials
- Preventive maintenance
- Details of production process & its sequential integration
- Accurate sales prediction
- Continuous monitoring
- IT system
- Top management commitment

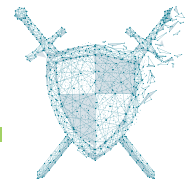
## G. Five main features of JIT

- (1) Material handling costs are reduced
- (2) Labour idle time gets reduced
- (3) JIT creates urgency for eliminating defects as quickly as possible
- (4) Respond to customer demand faster
- (5) Selected suppliers

# If the benefits of JIT can be achieved a company can have competitive advantage and success.

## H. Impact of JIT on different costs

- (1) **Waste cost** - JIT eliminates all wastes, inventory, time, materials, defects, rework
- (2) **Overhead cost** - Material handling facilities (small is needed now), inspection cost is reduced, warehouse staff and equipments, rent, etc are reduced
- (3) **Product prices** - with high product quality and on-time delivery the price can be increased
- (4) **Labour cost** - reduced due to motion study and better sorting of reduced materials (5S)



## I. Performance measurements in JIT

Three items below are not tracked in JIT -

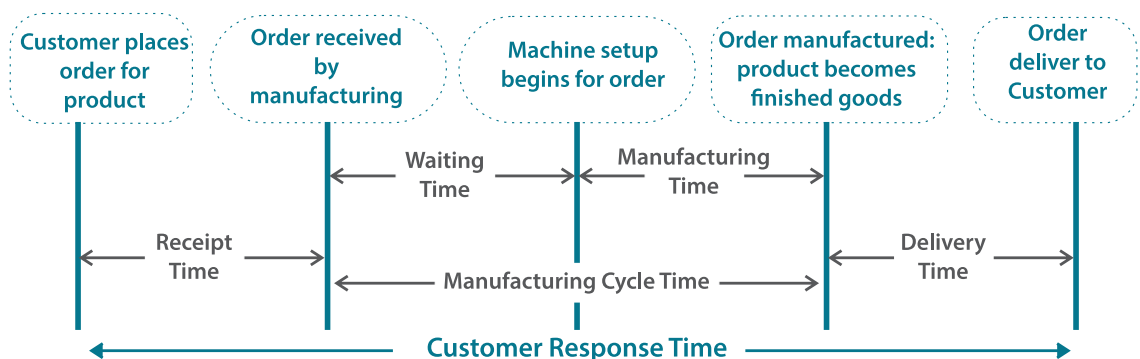
- Labour efficiency - Not needed as time is not measured
- No Piece rate to employees - to be given for volume production
- Machine utilisation - no pressure due to small workcells

Measures that are tracked are -

1. Inventory Turnover Ratios
2. Ideas generated by employees – can be measured by number of ideas per worker
3. Customer services - can be measured by number of complaints
4. Cost of quality - can be measured by on-time delivery
5. Quantity of scraps

## J. Time analysis under JIT

- **Receipt time** - is how long it takes the marketing department to specify to the manufacturing department exact requirement in the customers order. It may be also called as waiting time (before the production)
- **Manufacturing or processed time** - the time during which a raw material or WIP is undergoing conversion activity or the amount of time work is actually done on product.
- **Manufacturing cycle time** - the time taken to manufacture the Finished goods from the time and order is received by the manufacturing department. It includes all form of a time a product spends in manufacturing department but does not include the waiting time before the order is received by the manufacturing department. Similarly MCD does not include delivery time as it is related to the period after manufacturing of product has been completed.
- **Delivery time** – is the time taken to deliver a completed order to a customer
- **Customer response time** - it's time taken from the time customer customer places an order till the product is delivered to the customer.





## Takt time or Cycle Time

It is the average time between the start of production of one unit and the start of production of the next unit, when these production starts are set to match the rate of customer demand. This helps to decide the speed of manufacturing facility.

**E.g.** If a customer wants 10 units per week, then, given a 40-hour work week and steady flow through the production line, the average time between production starts should be 4 hours (actually less than that in order to account for things like machine downtime and scheduled paid employee breaks), yielding 10 units produced per week.

In reality, people and machines cannot maintain 100% efficiency and there will be stoppages for other reasons. Allowances should be made for these instances, and thus the line will be set up to run at a faster rate to account for this.

**Heijunka (means production or demand levelling)** can be applied to reduce the variation or manage the fluctuation in takt time.

**If order volume increases or decreases**, takt time may be adjusted to synchronise with demand.

## Cycle Time Efficiency or Manufacturing Cycle Efficiency

$$= \frac{\text{Value added time}}{\text{Cycle time}}$$

Where Cycle time = Value added time + Non value added time

# Manufacturing lead time or Cycle time = Waiting time + Setup time + Movement time + Process time + Inspection time.

# Under JIT System, process time is considered as the only value added time, rest all are non value adding.

# Non value adding time should be gradually eliminated, except those that are of strategic nature.

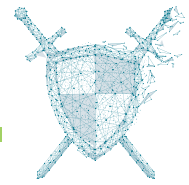
## K. 5 S under JIT

- **A place for everything and everything in its place.**
- Japanese philosophy to organise work space for **efficiency** and **effectiveness**.
- It can **applied** in - Tools Centre, Stores, Office filing, Workspaces, Mobile App Interface Designing

### Sort (Seiri)

Make work easier by eliminating obstacles and evaluate necessary items. If an item is not relevant for the work, then it should not be in the work area.

**E.g.** Red tag – A card containing detailed information of ‘unwanted things’ with a given time limit for further action to be taken. Yellow tag – A card containing detailed information of ‘needed things’, but not now with a given time limit for further action to be taken – usually kept in store



## Set in order (Seiton)

Arrange all necessary items into their most efficient and accessible arrangements. The items can be labelled and can be segregated as frequent vs infrequent.

**E.g.** R – Red – Critical Y – Yellow – Reorder G – Green – Design B – Blue – Excess

## Shine (Seiso)

Clean your workplace on a daily basis completely or set cleaning frequency. E.g. Preventive Maintenance, Employees to clean the workplace everyday for 15 -20 mins.

## Standardize (Seiketsu)

Standardize the best practices in the work area. Consistent procedures for first three S.

## Sustain (Shitsuke)

To sustain the best practices by way of training and discipline. Improved ownership by allocating areas. Motivate staff through recognition, periodic audit.

## Sixth S - Safety

Adopting practices that are not harmful to anyone.

- # **Benefits :**
- Reduced setup time, cycle time, idle time, accidents
  - Increased floor space, equipment reliability, profitability

## 3. Kaizen Costing

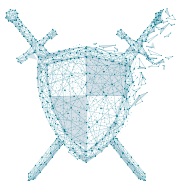
### A. Meaning

Small incremental changes routinely applied and sustained over a long period result in significant improvements.

- It can be used in any process, not restricted to production.
- No radical change or innovation
- Value Chain analysis required to identify the opportunities
- **Ask Questions (Value Engineering)**
  - Can we eliminate functions from the production process?
  - Durability?
  - Minimise the design?
  - Substitute the parts?
  - Supplier's assistance?
  - Is there any better way?

### B. Principles

- **Gradual improvements** in the existing situation, at an acceptable cost.
- **Collective decision making** and application of knowledge.
- **No limits** to the level of improvements that can be implemented.



- Setting **small and frequent standards** and continually improving these standards to achieve long-term sustainable improvements.
- **Eliminating waste**, improving systems, and improving productivity.
- Involves **all employees** and **all areas** of the business.
- **Define roles and responsibilities** of employees clearly.

## C. Kaizen Costing Vs Standard Costing

Kaizen Costing	Standard Costing
Focus on Cost reduction	Focus on cost control
Sets small standards and reduce continuously	Sets long term stable standards
Employee participation in setting	No employee participation

## D. Benefits of Kaizen

- Cost reduction by eliminating **waste**
- Improved **efficiency**
- Increases **teamwork**
- Increases overall **profitability**
- Less **defects**
- High **Customer Satisfaction**

## E. Impact on Employee Management

- (1) **Employee roles** - Solution provider
- (2) Employee **attitude** - Motivation, reward, recognition
- (3) Changes in **Culture** - empowered

## 4. Kanban System

Kanban system is a **visual signal**-based workflow management technique.

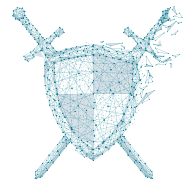
**Taiichi Ohno**, an industrial engineer, developed the first Kanban system for **Toyota automotive in Japan**.

### A. Kanban in Inventory Management

Kanban can be used in pull system of inventory, where supplier supplies the material based upon consumption.

Kanban (a yellow line, originally used in Toyota) is **visual cue** to worker (may be unskilled or even illiterate) to understand that further material is required.

Kanban reduce the cycle time and enhance the predictability, in order to promote value to customer. Kanban system hold specific amount of material (divided in Kanban Size).



Kanban system also maintain information regarding quantity, storage location, vendor and details on product/part.

While calculating Kanban size and number of Kanban required following **assumptions** need to be taken-

- **Consumption** is constant throughout the period; else smoothing factor need to be used in calculation of Kanban size.
- The **supplier** will deliver material directly to the point of use area (assembly line) and
- Requirement in term of **space** to store number of Kanban is met.

## B. Kanban Size

Total quantity in a Kanban (comprising of 2 or 3 locations)

Kanban Size can be calculated using formula i.e. **(C) x (LT) x (L) x (SF)**

Where **C stands for rate of consumption,**

**LT stands for lead time** (Note - Lead Time should be in terms of consumption pattern means if consumption is considered for week/s time then lead time shall also be considered in term of week/s)

**L stands for location of Kanban** (Note - When so even any entity implement the Kanban then keep one container of material at both the location (entity it-self and supplier), hence L is 2 unless otherwise provided)

**SF stands for smoothing factor**, which is used to set-off seasonal variations in consumption; obviously if consumption and level of stock throughout the period remain same then smoothing factor can be one.

# EOQ can also be practice as Kanban size.

## C. Number of Kanban

Number of Kanban depends upon the maximum quantity of inventory which comprises of demand/consumption during lead period and quantity of safety stock. It can be determined using following formula-

**Number of Kanban = (Quantity of safety stock + consumption during lead period) / Kanban Size**

## D. Factors for Kanban System

Kanban try to smoothen the workflow process by 'visualise the flow of the work, reducing WIP, managing process, making process policies explicit, incorporate feedback and using scientific techniques'.

In order to do so, while applying Kanban system we need to consider following factors:

1. Will supplier ready to **supply material** in the lot size equal to Kanban Size?



2. Will supplier participate in **pull system** of inventory and agree upon Kanban **Stocking program**? - reliability on supplier.
3. Will supplier agree to supply material directly at **point of use** i.e., assembly line?
4. Is the **consumption pattern** comprising significant **variations or constant** throughout?
5. What is requirement regarding **handling and storage** of material?
6. **Contribution margin** on sale of product in which raw material is used.

# These factors have major impact on calculation of Kanban size as well

## E. Precautions to be taken for Kanban System

1. Workers must understand the **visual cue** training
2. **Prediction** of consumptions pattern with assurance
3. Integrated **ERP** -with suppliers

## F. Kanban in Non-Manufacturing Facilities

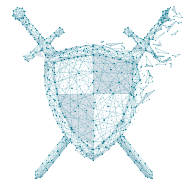
Kanban originally designed for manufacturing entities but can be applied to non - manufacturing concerns as well, for smoothening of workflow rather than inventory management.

In Kanban, signal based **dashboard** is used to manage and improve the flow of work to be followed and also categories the work into **to do, on-going** and **done** (in some of cases backlog category also be added). .

## 5. Total Productive Maintenance (TPM)

### A. Meaning

- Traditionally maintenance has been the responsibility of the maintenance team. TPM involves **all departments** for it.
- A system of maintaining and improving the integrity of production and quality systems.
- Keeps all equipment in top working condition so as to avoid breakdowns and delays in manufacturing processes.
- Of late, the concept has also been extended to processes and employees.



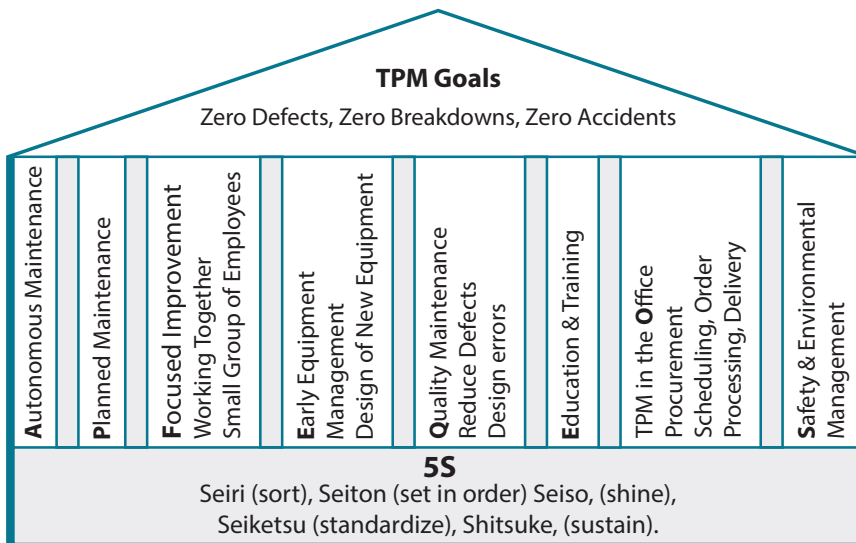
## B. Features

- Involve **all workers** from all **departments** and levels.
- **Autonomous** Maintenance.
- Achieving & Sustaining **Zero losses** due to stoppages, defects, downtimes.
- **Trouble free** machines and equipment.
- **Training** of workers across all levels.

## C. Four Phases in TPM

- **Preparation Stage**: Establish a suitable environment and conducting programme awareness.
- **Introduction Stage** : Initialization of TPM, information to suppliers, customers, and other stakeholders.
- **Implementation Stage** : This is done with the help of eight activities referred as eight pillars of TPM.
- **Institutionalizing stage** : This is the stage of getting TPM awards.

## D. Eight Pillars of TPM

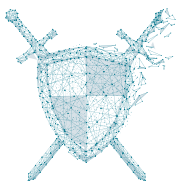


## E. Types of Maintenance

- **Preventive Maintenance (P)** - Conducted in off time and periodic interval to check the worn out spare parts to prevent breakdown.
- **Routine Maintenance (R)** - It is a daily maintenance (cleaning, inspection, oiling and re-tightening.)
- **Breakdown Maintenance (B)** - No maintenance is carried out unless the equipment actually fails. Losses due to breakdown includes - Delay, Labour Idle time, Inferior quality, Additional Setup







- **Corrective Maintenance (C)** - Focusses on making/reconfiguring machines easier to clean and maintain.
- **Autonomous Maintenance (A)** - Minor and day to day repairs carried out by the operators of plant themselves instead of waiting for technicians.
- **Maintenance Prevention (M)** - To create more reliable machines.

## F. Performance Measurement - Overall Equipment Effectiveness (OEE)

Measures six different losses. It can be calculated for any individual machine or a process.

Category	Losses traced	Ratios	Formula
<b>Time</b>	Equipment failure (big) (unplanned)	<b>Availability Ratio</b>	$= \frac{\text{Actual Productive Time}}{\text{Planned Production Time}}$
	Set up / Adjustments (planned/ unplanned)		
<b>Speed</b>	Idling and stoppages (small)	<b>Performance Ratio</b>	$= \frac{\text{Standard Time for Actual production}}{\text{Actual Productive}}$
	Reduced speed		
<b>Quality</b>	Reduced yield	<b>Quality Ratio</b>	$= \frac{\text{Good Units}}{\text{Total Units}}$
	Quality Defects		
<b>OEE = Availability × Performance × Quality</b>			

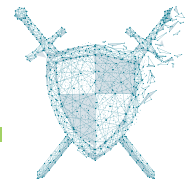
- The submetrics of OEE **compensates one another**. Detailed analysis required.
- **Nakajima Suggests - For world class performance, OEE should be 85%**. (Availability - 90%, Performance - 95%, Quality - 99%)
- **For Perfect Production = 100% (40% – Normal without TPM / Lean; 60% – Fair)**

# **Planned production time** = Total Time available – Planned Downtime  
 # **Actual productive time** = Planned production time – Unplanned Downtime  
 # **If changeover time** is given on per shift basis, it may be assumed as planned downtime.

## G. TQM and TPM

### Connection

- Both make company **more competitive** by reducing costs, improving customer satisfactions and slashing lead times.
- Both involve **workers** into all phases
- Both need fundamental **training and education** of participants.



- Both take **long time** to notice sustained tangible benefits.
- Both require commitment from **top managements**

### Difference

- TQM is a broader concept that includes TPM in it.
- TQM focuses on the quality of the product or anything that enhances Customer Satisfaction, while TPM focuses on the equipment used to produce the products.

## 6. Cellular Manufacturing

### A. Features

- Group Technology.
- A cell is created by consolidating the process required to create a specific output or different output requiring similar set of activities.
- To move as quickly as possible.
- To make similar products.
- To reduce waste.

### B. Criteria

- Efficient changeover (using quality circles).
- Multi-skilled employees.
- Buffer inventories.
- U shaped production line.
- Takt time or cycle time planning and levelling (Heijunka).

### C. Benefits

- Quick identification of problems.
- Small quantity processed at a time. Error can be easily traced.
- Work satisfaction - producing whole product by a small team.
- Employee Cohesiveness.
- Reduces inventory, space and cycle time.
- Flexible as compare to other layouts.
- Lesser need to justify the investment.

### D. Costs

- Decreased production flexibility in terms of variety and volume.
- Realignment is costly



## E. Common Cell Designs of Machine Cells

The machine cell design can be classified based on the number of machines and the degree to which the material flow is mechanised between the machines.

The most common designs are -

**Single machine cell** – consists of a machine plus supporting fixtures and tooling to make one or more part families. This can be applied to work parts that are made by one type of process such as turning or milling.

**Group machine cell with manual handling** - consists of more than one machine used collectively to one or more part families and no provision for mechanical part movement between machines. In this human operators run the cell and perform material handling.

Preferable cell shape is U-shaped. You shape is useful in movement of multifunctional workers this is used when size of the particle is huge or there is a large number of machines in the cell.

**Group machine cell with semi integrated handling** - consists of more than one machine used collectively to one or more part families and uses a mechanical handling system, such as conveyor, to move parts between machines in the cell.

**Flexible manufacturing system** – is a highly automated machine sent in the group technology that combines automated process and stations with a fully integrated material handling system.

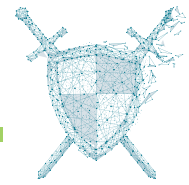
# **It is not necessary that the cells will always be totally independent.** There are various alternative ways of eliminating inter cell movement in the cellular manufacturing system like-

- Redesigning the part so that the machine belongs to other cell is no longer required for processing
- Sub contracting the part
- Adding the necessary machines in the cell

The cell designer should evaluate the consequences of each of these ways and take suitable measures to minimise the moves.

## F. Cellular manufacturing vs Scientific way of Production

Cellular manufacturing also resembles scientific way of production. By scientific way of production we mean, **time study and motion study**. The objective of cellular manufacturing is also to do time study in order to **reduce delays** and to do motion study in order to **reduce the movement time** of product while moving from one production facility to another.



## G. Clustering Methods

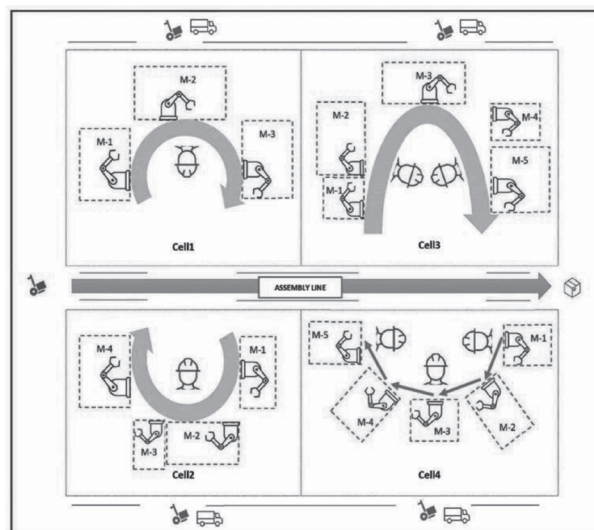
1. **Production Flow Analysis** rests on the basic idea to identify items that are made with the same processes/the same set of equipment. These parts are assembled into a part family and such that the same equipment can be grouped (clustering) into a cell to minimize handling requirements.
  - (a) **Part family grouping** - Form part families and then group machines into cells
  - (b) **Machine grouping** - Form machine cells based upon similarities in part routing and then allocate parts to cells
  - (c) **Machine-part grouping** - Form part families and machine cells simultaneously

# The machine-part grouping is most significant.

### Flow Shop or Assembly Line Workflow

#### Increases

Material flow,  
Machine utilisation,  
Space utilisation,  
Productivity,  
Components  
Standardisation,  
Employee morale,  
Quality



#### Decreases

Planning effort, Paper work, Setup time, Down time, Work movement, WIP, Material handling Cost, Direct and Indirect Labour Cost

2. Various **heuristic and exact methods** have been developed for grouping/clustering, but the simplest one is binary ordering, also known as rank order clustering or King's algorithm.
3. **Rank Order Clustering Algorithm** is a simple algorithm used to form machine-part groups.

## H. Rank Order Clustering Algorithm

The steps in using the Rank order Clustering Algorithm are as follows:

1. Assign **Binary Weight** ( $BW_j = 2^{n-j}$ ) to each column  $j$  of the matrix, where  $n$  is the number/types of components (parts).
2. Calculate the **Decimal Equivalent (DE)** of the binary values of each row  $i$  using the formula:



$$DE_i = \sum_{j=1}^n BW_j(a_{ij})$$

3. **Rank** the rows in decreasing order of their DE<sub>i</sub> values i.e., the largest value is ranked as 1. Break ties (if any) arbitrarily.
4. **Rearrange** the rows in the running order of the rankings.
5. If no further rearrangement is necessary, stop. Otherwise, go to next step i.e. 6.
6. Assign **Binary Weight** ( $BW_i = 2^{m-i}$ ) to each rearranged row *i* of the matrix, where *m* is the number of machines.
7. Calculate the **Decimal Equivalent** (DE<sub>j</sub>) of the binary values of each column *j* using the formula:

$$DE_j = \sum_{i=1}^m BW_i(a_{ij})$$

8. **Rank** the column in decreasing order of their DE<sub>i</sub> values i.e., the largest value is ranked as 1. Break **ties** (if any) arbitrarily.
9. **Rearrange** the columns in the running order of the rankings and **continue till all the rows or columns are arranged sequentially**.
10. If no rearrangement is necessary, **stop**. Otherwise, go to step 1.

## 7. Six Sigma

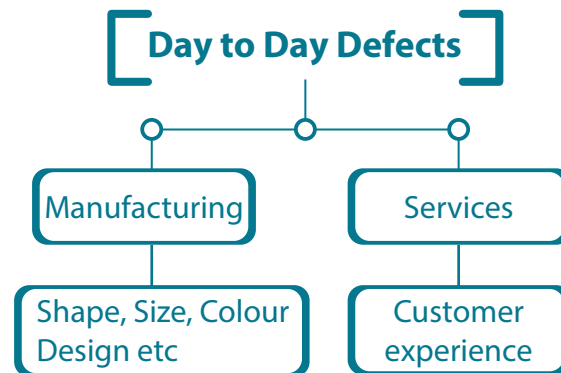
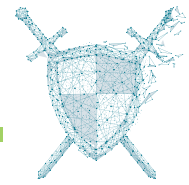
It is a technique that helps to eliminate defects in any respect that affects **customer satisfaction**. Through it, a company can measure its defects and develop ways to eliminate them and practically achieve zero defects.

3 Sigma	6.7%
4 Sigma	0.62%
6 Sigma	0.0034%

Six Sigma is **3.4 defects per million opportunities** or getting things right 99.99966% of the total production.

### Applicability

In both manufacturing and service organizations facing day to day quality issues.



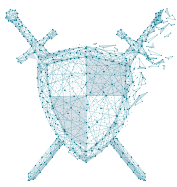
### Objectives

- (a) Deliver defect free
- (b) Reduce waste

### A. DMAIC and DMADV

These are two ways to implement Six Sigma:

DMAIC	DMADV
<p><b>D = Define</b> = Problem (E.g. zero defects)  <b>M = Measure</b> = Quantify the effect, data collection methods, compare with industry standards  <b>A = Analyse</b> = Root Cause Analysis - Series of Activities performed in the system in sequence, breakdown into various processes and sub processes and bifurcate into value adding and non value adding  <b>I = Improve</b> = Solution (cost benefit analysis)  <b>C = Control</b> = Monitor Continuously</p>	<p><b>D = Define</b> = Problem (E.g. zero defects)  <b>M = Measure</b> = Quantify the effect, data collection methods, compare with industry standards  <b>A = Analyse</b> = Root Cause Analysis - Series of Activities performed in the system in sequence, breakdown into various processes and sub processes and bifurcate into value adding and non value adding  <b>D = Design</b> = New Process (cost benefit analysis)  <b>V = Verify</b> = Monitor Continuously</p>
Review the existing processes and fixes problem(s)	Emphasises on the design of the product and processes.
More reactive process.	Proactive process.
Increase the capability.	Increase the capacity.
Rupee benefits quantified rather quickly.	Rupee benefits more difficult to quantify and tend to be much more long term.
<p><b>Examples</b> of DMAIC problem-solving methods:            Reduce the cycle time to process a patent.            Reduce the number of errors in sales list.            Improve search time for critical information.</p>	<p><b>Examples</b> of procedures that the DMADV development method is designed to address:            Add a new service            Create a real-time system.            Create a multiple-source lead tracking system</p>



## # Similarities between DMAIC & DMADV

- Both remove defects
- Both focus on customers needs

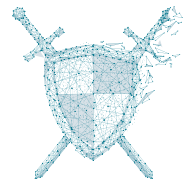
## # Pre requisites for DMAIC & DMADV

- Top management commitment & support.
- Highly motivated employees
- Continuous efforts with patience
- Reasonable duration
- Combine with other models - Value Shop, BPR etc.
- Dedicated team
- Detailed list of issues & processes

## B. Key Roles for Implementation of Six Sigma



- (1) **Executive Leadership** - Top management personnel. Set up a vision. Empower the other role holders.
- (2) **Champions** - Responsible for the Six Sigma implementation across the organization in an integrated manner. The Executive Leadership draws them from the upper management. Act as mentors to Black Belts. At GE they are called "Quality Leader".
- (3) **Master Black Belts**, identified by champions, act as **in-house expert coaches**. Devote 100% of their time to Six Sigma. They assist champions and guide Black Belts and Green Belts. Spend time on deployment of Six Sigma.
- (4) **Experts** work across company boundaries, improving services, processes, and products for their suppliers, their entire campuses, and for their customers.
- (5) **Black Belts** operate under Master Black Belts to apply Six Sigma methodology to specific projects. **Focus on Six Sigma project execution**
- (6) **Green Belts** are the employees who take up Six Sigma implementation **along with their other job responsibilities**. Operate under the guidance of Black Belts and support them.
- (7) **Yellow Belts** are employees who have been trained in Six Sigma techniques as part of a corporate-wide initiative, but have **not completed a Six Sigma project and are not expected** to actively engage in quality improvement activities



- # **Can Six Sigma enhance the impact on financial statement and stock value?**
  - Yes, the benefits have a positive impact on financial statements but only in a long run. It can enhance the stock value also but the stock value is dependent on other factors.
- # **Can Six Sigma be applied in Services?**
  - Services are subjective and every service has different criterias of errors, even for same type of service.  
Six Sigma can be used with other models like Value Shop.
- # **Can Six Sigma assure a Market?**
  - Yes, Six Sigma removes all the errors in the product's features & enhance the quality. This attracts a lot of customers.
- # **Is Six Sigma only for early adopters?**
  - No. Early adoption is definitely beneficial. But what is important is the efficient use of Six Sigma over a long term.

## C. Limitations of Six Sigma

- (1) Six Sigma focuses on **quality only** (quality is subjective)
- (2) Six Sigma does not work well with **intangible assets** (human skills)
- (3) Costly **infrastructure** required (yields corresponding benefits over time)
- (4) **Complicated** (detailed, documents)
- (5) **Not needed for all the products** (price, sensitive customers)
- (6) Focuses on **specific** type of **processes** only (that impacts more)
- (7) **Real time barriers** (lack of motivation, uncontrollable).

## D. Quality management tools

- (1) **Control chart** - monitors variance is over time
- (2) **Histogram** - to prioritise
- (3) **Pareto diagram** - 80/20 analysis of cause and defects
- (4) **Process mapping** - workflow of how things are done to identify defects
- (5) **Root cause analysis** - cause of non-conformance
- (6) **Statistical process control** - analyse data monitor process and performance

## E. Lean Six Sigma

Combination of lean and Six Sigma - to maximise profit, better team, minimise cost, satisfy customers.





## 8. Business Process Reengineering

Founded by Michael Hammer.

### A. Meaning

The fundamental rethinking and radical redesign of business processes to achieve dramatic improvements in critical contemporary measures of performance, such as **cost, quality, service, and speed**. [E.g. of BPR - Outsourcing]

# BPR is a costly activity. A thorough cost-benefit analysis required before its implementation.

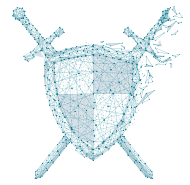
### B. Four Key Components



- (1) **Fundamental Rethinking (FR)** - "Why do we do what we do?" and "Why do we do it the way we do it?"
- (2) **Radical Redesign (RR)** "If we were a brand new business, how would we operate our company?" The goal is to reinvent.
- (3) **Dramatic Improvement (DI)** - making quantum leaps in performance
- (4) **End to End business process (EE)** - synchronising all processes as a single flow.

### C. Seven Principles of BPR

- (1) **Process should achieve desired outcomes, not just focus on existing tasks.** **E.g.** One customer relationship manager to handle all activities to fulfil the customer's orders.
- (2) **Have those who use the output of a process, perform the process.** **E.g.** Minor repair works handled by customer by their own, referring to tutorials.
- (3) **Integrate the processing of information into the work process that produces the information** **E.g.** Online form filling validating the mobile number using a one time password.
- (4) **Treat geographically dispersed resources as though they were centralized.** **E.g.** HP Computers H.O. centralising the purchasing function.
- (5) **Link parallel activities instead of integrating their results.** **E.g.** In a loan application process, several approvals or verification can be parallely undertaken as soon as the application is submitted.
- (6) **Put the decision point where the work is performed, and build controls into the process.** **E.g.** no difference between workers and managers - more empowerment.



- (7) **Capture information once and at the source** E.g. PAN Card capturing all information at source while application so that for ITR filing there is no need to provide the information again.

## D. Four Main Stages of BPR (Implementation)

### 1. Process Identification

→ Each task performed being re-engineered is broken down into a series of processes.

### 2. Process Rationalisation

→ Processes which are non-value adding, to be discarded

### 3. Process Redesign

→ Remaining processes are redesigned. Make it most efficient

### 4. Process Reassembly

→ Re-engineered processes are implemented in the most efficient manner.

- # While redesigning, ensure all statutory compliances are met (Banks, Insurance, etc.)
- # Review the improvements using performance measures
- # Lost faith of customers can be regained using BPR with customer focus

## E. Information Systems Required for Reengineering

- Real-time
- Shared data
- Financial and non-financial data
- All types of reports
- Minimum paperwork
- Inventory Management
- Integration with Suppliers

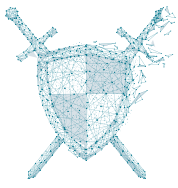
- # BPR reorganises roles of employees. The savings generated from it can be used to invest in IT Systems.

## F. Pre requisites

- BPR team
- Employees motivation
- Selection of right process
- Sustain the changes

### # DMAIC vs BPR

DMAIC - Aligns & maintain the current process & reduce variations. BPR redesigns.



## # DMADV vs BPR

DMADV - Specific process

BPR - Entire Process

## 9. Process Innovation

It is the implementation of a **new or significantly improved production or delivery method** (including significant changes in techniques, equipment and/ or software).

**E.g.** Henry Ford's Assembly Line

The process of innovating new solutions could fall into one of these areas -

- Production
- Delivery
- Support Services

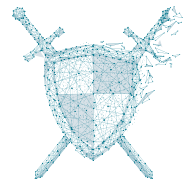
### Process Innovation vs BPR

BPR focuses on amending existing processes, while Process Innovation attempts to implement new processes into an organisation.

However, if BPR leads to a radical change in the process, leading to an innovation, it may be called as process innovation. PI is more radical than BPR.

**E.g.** Car manufactured in assembly line by robots is a BPR

Car being manufactured by a small group of people who are to assemble the entire car is a Process Innovation (may / may not be efficient as old)



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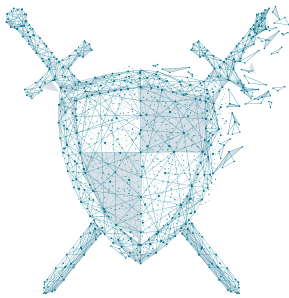


# CA Final SCMPE Saviour Revision



## Our Authorised Partners

Sl. No.	Name	City
1	Sharp Education	Ahmedabad
2	Mundhra Classes	Ajmer
3	National Academy of Commerce	Allahabad
4	Class at door	Alwar
5	Elite Coaching Academy	Aurangabad
6	Vision Academy	Aurangabad
7	Lecture Adda	Bengaluru
8	Jiloka Institute	Bhagalpur
9	Exam Nation	Delhi
10	Ace Classes	Dhanbad
11	Padhaiwale Educational Services	Dhanbad
12	Shikshavilla	Guwahati
13	Virtouso Classes	Hazaribagh
14	Admadtech	Indore
15	CA Study	Indore
16	Fast Education	Indore
17	Smart Learning Destination	Indore
18	Virtual Tree	Indore
19	Agrasen Classes	Jamshedpur
20	Commerce Academy	Jharsuguda
21	Lecturewala	Jodhpur
22	Royal Commerce Classes	Kanpur
23	Ulrn	Kolkata
24	Zeroify	Kolkata
25	Royal Commerce Classes-Lucknow	Lucknow
26	Vsmart	Maharashtra
27	Edugyan Smartech	Mohali
28	Reliable Classes	Mumbai
29	Apna Mentor	Muzaffarnagar
30	Conferenza.in	Nagpur
31	Lecturearc .in	Nagpur
32	Atharva Accounting Academy	Nashik
33	Excell Education	New Delhi
34	Make my delivery	New Delhi
35	COC Education Pvt. Ltd.	Noida
36	D-cent Educational services	Noida
37	Alfresco Educational Institute	Patna
38	AS Foundation	Pune
39	Buy Test Series	Pune
40	Edusmart	Raiganj
41	Advance Commerce Academy	Ranchi
42	Bright Brains	Rishikesh
43	Paathshala	Rourkela
44	Fortune CA	Sambalpur
45	The Professional Hub	Shillong
46	Career Academy	Siliguri
47	Pass CA CS CMA Education Services	Sundargarh
48	Tinsukia Professional Coaching Centre	Tinsukia
49	Laddha Professional Academy	Udaipur



# Target Costing

# Where competition is intense and the market is price sensitive.

## 1. Cost Control and Cost Reduction

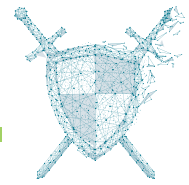
Cost Control	Cost Reduction
1. Comparison of actual with the standards or budgets to regulate the actual costs.	Achieving a permanent reduction in unit cost of products manufactured.
2. Savings (when actual < standard) may be temporary.	Savings (when revised standard < original standard) is permanent.
3. Preventive function as it ascertains the cost before its occurrence & it prevents the occurrence of non conformity.	It is a corrective action as it prevents the recurrence of high cost by eliminating the cause.
4. Temporary	Permanent
5. Decreases total cost	Decreases per unit cost
6. Ongoing Process	One time but minor is ongoing

### # Pre requisites for Cost Control :

- (1) Delegation of responsibilities for costs
- (2) Clearly defined targets
- (3) Motivated employees
- (4) Timely and efficient reporting
- (5) Recommendations followed by action
- (6) Effective follow up to judge the effective implementation

## 2. Scope of Cost Reduction

- (a) **Product Design** - A new product or improvement in existing by simplification and standardization.
- (b) **Organisation** - Better definition of roles, culture, cooperation, removal of doubts, encouragement.
- (c) **Factory Layout** - New machineries, their position inside the premises .



- (d) **Production plan programme and method** - Proper planning to ensure optimum utilisation of men, material and machines.
- (e) **Focus on other functions** - Administrative, marketing and finance management functions.
- (f) **Tools and Techniques** - BPR, JIT, Kaizen, Target Costing .

# Cost reduction requires a **dedicated team**. Changes suggested by the team are permanent. Hence, application of change management (for smooth transition) is essential with **cost benefit analysis**.

# Through **standardisation** a company can reduce cost by economies of scale, ease in inventory control, ease of use

#### # Pre requisites for Cost Reduction :

- (1) Cost Reduction Team
- (2) Well defined Programme - requirements, time limit, cost limit

## 3. Meaning of Target Costing

- A **structured** approach used in competitive environment (intense competition, price sensitive market)
- To **determine the cost** of the product proposed to be sold
- With **specific** functionality and quality
- To generate a **target profit**
- At a pre - determined selling price **or target selling price**

#### Is Target Costing just a costing technique?

No. It is more of a strategy. It goes beyond the calculation of target cost. It helps an organisation to plan its profitability over medium or long term and gain competitive advantage by continuous improvement.

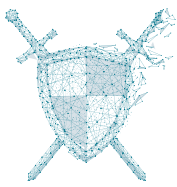
**Target Costing** is based on the concept of long term relations & mutual benefits in the long term between all the representatives of value chain.

## 4. Steps or Features in Target Costing

#### Pre-requisite Step :

Reorient the culture of thinking and attitude- prioritize the need of customers

- (a) Market requirements
- (b) Target selling price
- (c) Target production volume



- (d) Target profit margin
- (e) Target cost (called as deductive approach) (establish a balance with requirements)
- (f) Current cost (using Absorption Costing, ABC, JIT)
- (g) Cost reduction target or Cost gap
- (h) **Meet the target using** - Value engineering and value analysis (target costing team, brainstorming and analysis, product cost models for different concepts and designs, closing the gap, reduce indirect costs.) - Iterative process, very time consuming
- (i) Effective implementation
- (j) Continuous improvement - Measure the results and improve (Kaizen)

## # (1) Cost gap = Actual Cost – Target cost

Where, **Actual cost** – Absorption costing or Activity based costing or Just-in-time system.

## # (2) Reverse calculation for labour cost or labour rate or number of workers may be required to achieve the target cost.

Reduction of labour time may create pressure on workers and design team. As a result, implementation may hinder overall performance.

**Solution** to above - strong team leader, launch the product later with new ways of production.

## # (3) Target cost can be computed under **additive approach** also, i.e. starting the cost from supplier or supplier's supplier.

## # (4) It may not be possible to close the gap to the extent of 100% in the design phase. Hence, **Kaizen** is important.

## # (5) For **existing products**, cost gap can be closed for different elements of cost as below:

1. **Material Cost** = Redesign to Substitute parts, long term contract with suppliers, JIT
2. **Labour Cost** = Time and motion study
3. **Defects Cost** = TQM, TPM, JIT, Outsource
4. **Manufacturing Process Cost** - Value Analysis, BPR

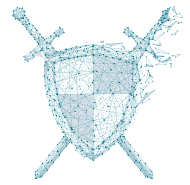
## # (6) It is required to determine whether the customers would accept redesigned product, a market research is required to study the customer behaviour.

The outcome may be :

- (a) **Price Sensitive Customers - Redesign** as they would be ready to accept lower quality.
- (b) **Quality Sensitive Customers - No Redesign.** Conduct Value Analysis to reduce cost of existing design.

## # (7) **Proportionate Cost Reduction Plan** : Reduce each item of cost (variable and fixed, both) proportionately, assuming all costs are avoidable.

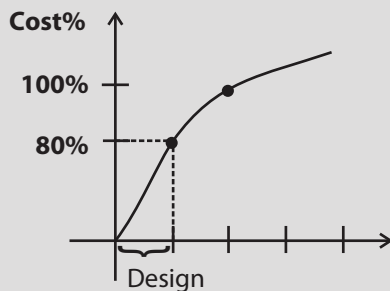




## 5. Stages of Target Costing

1. Target SP, Market Requirements - quality, functionality
2. Target Cost
3. Design the product or service
4. Pilot project to evaluate the feasibility

# As per research, **70% - 80% of Cost** of a product is **committed** during the design stage itself. Hence designing is very critical.



# Do not confuse committed with incurred. Committed cost will be incurred in future when the production will be done.

## 6. Advantages of Target Costing

- (a) **Product innovation** - for competitive advantage
- (b) Identifies **opportunities** to do real savings in terms of value than the lowest cost
- (c) **Proactive approach** - planning ahead of production and marketing
- (d) **Employee awareness and empowerment** with partnership with suppliers
- (e) Adoption of **value - added activities**
- (f) Enhances **product life** by reducing the time to market
- (g) **Market driven approach** to determine value by what customers demand and are willing to pay for.

## 7. Components of Target Costing

### A. Value Analysis

Studying the activities that are involved in producing the product to detect non value adding activities that may be eliminated or minimised to save cost but without reducing the functionality or quality of the product .



- # (1) Non Value added activities of strategic nature cannot be eliminated.
- # (2) Value analysis is review of material composition & product design. Value engineering is the application of its findings.

## B. Value Engineering

Searching for opportunities to modify the design of each component or part of a product to reduce cost but without reducing the functionality or quality of the product.

**E.g.** Tata Nano - Engine placed in the rear side of the car, instead of front.

## C. Issues dealt during Value Analysis and Value Engineering -

- Can we eliminate functions from the production process?
- Can we eliminate some durability or reliability?
- Can we minimize the design?
- Can we design the product better for the manufacturing process?
- Can we substitute parts?
- Can we combine steps?
- Can we take supplier's assistance?
- Is there a better way? - can lead to innovation

### # (1) Meaning of Value

Value is something what customer is **demanding** for and is **willing to pay** for.

### # (2) Four Aspects of Value

- **Cost Value** - is the **cost** of manufacturing and selling an item
- **Exchange Value** - is the **price** a customer is prepared to pay for the product, or service
- **Use Value** - is the **purpose** the product fulfils - **E.g.** School benches.
- **Esteem Value** - is the **prestige** a customer attaches to the product - **E.g.** Reclining feature of an office chair.
- To reduce cost, use value should not be diluted.

### # (3) Measures for determining whether an activity adds value

(a) **Is the activity necessary?** (and customer is willing to pay for) - If yes, it is VA

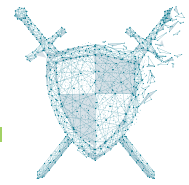
(b) **Is the activity useful to adopt budgets, targets or external benchmarks to established value added baseline?**

- If yes, it is VA (even if customer is unwilling to pay for it). It must be efficiently performed

(c) **An activity can be sometimes Value Adding & sometimes Non Value Adding**

E.g. Movement time -

- Needless movement of materials - NVA
- Transfer of WIP to next process - VA



## D. Functional Analysis

Functional analysis is concerned with improving profits by attempting to reduce costs and/or by improving products by **adding new features in a cost effective way** or **eliminating unnecessary or good to have features** that are so attractive to customers that profits actually increase. **E.g.** Adding a reclining feature to an office chair.

## 8. Problems with Target Costing

### Problems :

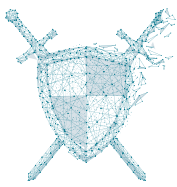
- (a) Development process may be **lengthened** to a considerable extent.
- (b) **Excessive cost cutting** in one department may lead to **employee dissatisfaction** in other departments. (E.g. Plant layout changed completely is making Engineering Department unhappy as there is no change for purchase department to negotiate with suppliers)
- (c) Sometimes **difficult to reach a consensus** on the proper design.
- (d) **High cost** of development.
- (e) May reduce **quality** of the products.
- (f) Based upon **forecasting & estimation**, which are dynamic.

### Solution

**All problems can be solved** if there is a **strong leader** having control over design team, good interpersonal skills, commitment to stay within time and cost limits.

## 9. Useful Situations for Target Costing

- (a) Where the majority of product **costs are locked in the design phase**.
- (b) **Assembly oriented industries**, as opposed to repetitive process industries that produces homogenous products.
- (c) Involved heavily with the **diversification of the product lines**.
- (d) **Use technologies** for factory automation
- (e) **Shorter product life cycles** where the payback period is achieved in less than 8 years.
- (f) Must develop **system for reducing cost during the planning**, design and development phases of a product life cycle.
- (g) Are **implementing management methods** such as JIT, Value Engineering.



## Is Target Costing applicable on Services - E.g Consulting services or a Restaurant?

No, as there is no lockup of cost during design phase. There is no designing of services. It requires only streamlining of the activities conducted by the employees providing the service which can be enhanced at any time for cost reduction.

## Is Target Costing applicable on Chemical production Industry?

No, as there is no design feature. The process created is usually most efficient and has nothing to do with cost reduction through the improvement of customer value.

## Is Target Costing applicable for Purchased goods?

Yes, the cost can be reduced by a long term contract with dedicated suppliers who can then offer low prices.

If any organisation constantly issues a stream of new products or if its existing product is subject to pricing pressure, make **target costing a central part of its strategy** as it will help to -

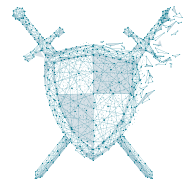
- (a) Place **emphasis on product cost** through life-cycle
- (b) Precise targeting of the **correct prices**

## 10. Target Costing vs Traditional Costing

Traditional Costing	Target Costing
A company builds a product, determines its cost, adds a profit and then does not understand why its high price does not attract buyers.	A company places the product in the market at its attractive price by cutting down the cost of producing it continuously.
Focuses on Cost Control	Focuses on Cost Reduction
Ignores price charged by competitors and what customers are ready to pay	Does extensive market research

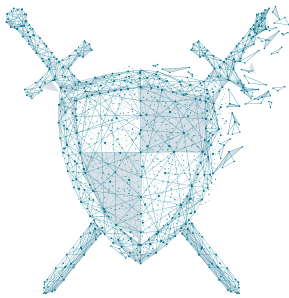
## 11. Target Costing vs Standard Costing

Standard Costing	Target Costing
Controls cost by keeping the actual cost within the predetermined cost.	Continuously challenges the standard cost.
First determines the design, then cost and at last the price.	First determines the market requirements, then target price, then target profit, then the target cost & then designs.
Standards are revised annually & are outcomes of target costing.	Standard are revised frequently.
Short term cost control approach.	Medium term profit planning approach.
Variiances are analysed post launch in periodic intervals.	Cost gap are analysed pre launch frequently to achieve the target cost.



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# Life Cycle Costing

## 1. Meaning

It means identifying the **costs and revenue** over a **product's life**. As a product progresses through its life cycle, it faces different **challenges** and **opportunities** which require changes in the **strategies**.

## 2. Objective

It aims to **maximize the profit** generated by a product **over its life**.

It helps to suggest which **strategies** the organisation needs in order to compete successfully.

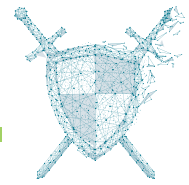
## 3. Traditional Accounting System vs Life Cycle Costing

Traditional	Life Cycle
Profitability assessed on <b>annual basis</b> . Life of a product is comprised of a series of annual periods.	Profitability assessed over the <b>entire life</b> of the product.
Treats all <b>non - production costs</b> as period costs.	Traces <b>non production costs</b> to individual products over complete life cycle.
Write offs <b>R &amp; D expenses</b> against revenue from existing products so that existing products seem less profitable.	Traces <b>R &amp; D expenses</b> to specific product so that the product profitability are well distinguished.

## 4. Product Life Cycle Phases - Characteristics and Strategies

Each product has a life cycle. The life cycle of a product varies from a few months to several years. Product life cycle is thus a pattern of expenditure, sales level, revenue and profit over the period from **new idea generation (inception)** to the **deletion of product (abandonment)** from product range.

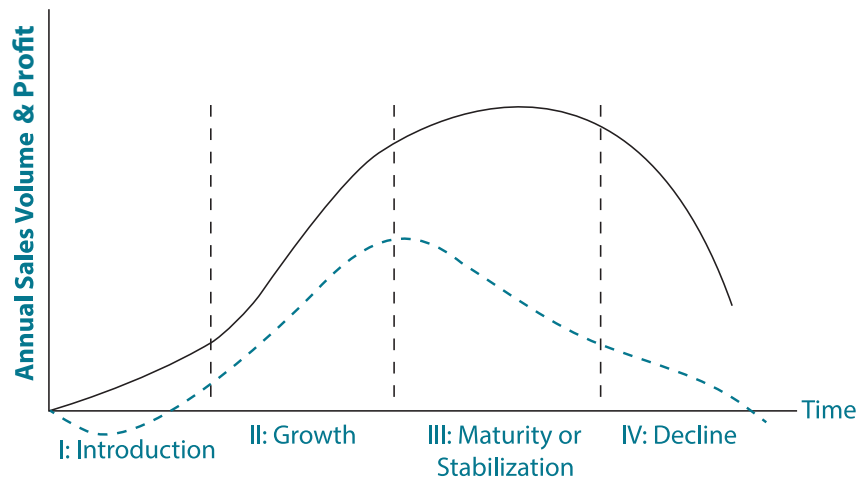
**The life cycle of a product consists of four phases / stages** viz., Introduction; Growth; Maturity and Decline (from marketing view point)



## # Pricing Strategies

- (1) **Skimming the Cream** - High price initially, gradually reduced.
- Inelastic demand
  - Innovative product
- (2) **Penetration**
- Low price to enter, gradually increased
  - Elastic demand
  - Competitive products

# **The Life cycle phases can be customised as per need** - E.g. Design Phase, Production Phase, Operations Phase, End of life Phase

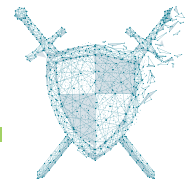


Phases	Characteristics	Strategies	Indicator	Type of Costs
Introduc-tion	<ul style="list-style-type: none"> <li>• Product identity / awareness</li> <li>• High distribution Cost</li> <li>• Pricing - Skimming</li> <li>• Competitors start copying (Basic Versions)</li> </ul>	<ul style="list-style-type: none"> <li>• Strengthen Supply chain</li> <li>• Make product more visible (attract by promotion)</li> <li>• Set price as per market</li> <li>• Induce customer to try</li> </ul>	Product Launch	Research and development, Design and Testing



Growth	<ul style="list-style-type: none"> <li>• High volume</li> <li>• Increased competition</li> <li>• Price reduction to grow</li> <li>• New channels to handle growth</li> <li>• New features</li> </ul>	<ul style="list-style-type: none"> <li>• Induce customer to buy</li> <li>• Make product available</li> <li>• Long term relationship with customer/ partners (quality, customer satisfaction)</li> <li>• Promote differentiation features</li> <li>• Value Based Pricing</li> </ul>	Price Decreases	Material, Labour, Overheads, Distribution, Advertising, Warranty Claims, Development costs
Maturity	<ul style="list-style-type: none"> <li>• Fierce competition</li> <li>• Overcapacity in industry</li> <li>• Selling Price further reduces</li> <li>• No new channels left</li> <li>• Customers move to another product</li> </ul>	<ul style="list-style-type: none"> <li>• Strong marketing effort</li> <li>• Reduce price to attract price sensitive customers</li> <li>• Huge incentive to channel partners</li> <li>• Start R&amp;D to increase life (improve features to differentiate)</li> <li>• Start new product development</li> </ul>	Price further decreases and Cost/ut minimises or remains constant	
Decline	<ul style="list-style-type: none"> <li>• Sales may drop significantly and profits may become negative</li> <li>• Competitors drop out</li> <li>• Consumer's taste changed completely</li> <li>• Substitutes available</li> </ul>	<ul style="list-style-type: none"> <li>• Revive / discontinue the product</li> <li>• Use this product to launch a new product</li> </ul>	Cost/ ut increases	Environmental cleanup cost, Disposal cost and Decommissioning cost





# Interlink of Life-Cycle Stages with BCG matrix

Growth	High	Star GROWTH	Question Mark INTRODUCTION
	Low	Cash Cow MATURITY	Dog DECLINE
		High	Low

Share

# Interlink of Life Cycle Costing with Target Costing:

If Target Costing is done within the defined time, the Life Cycle profitability may be higher

# Product development cost can be incurred in each phase with different intention.

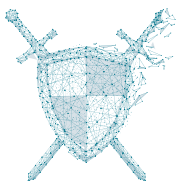
## 5. Benefits of Product Life Cycle Costing

- Earlier actions** to generate revenue & lower Costs (E)
- Understanding of **individual product profitability** (I)
- Accurate feedback** information (A)
- Cost reduction and revenue expansion **opportunities** are more apparent (O)
- Increased **visibility** of non - production costs (V)
- Promote **long-term rewarding** in contrast to short-term (L)
- Control** of manufacturing Costs Over Life (C)



## 6. Uses/Importance of Product Life Cycle

- As a **Planning tool**, it characterizes the marketing challenges in each stage that poses major alternative marketing strategies.
- As a **Control tool**, the launched PLC concept allows the company to measure product performance against similar products launched in the past.
- As a **Forecasting tool**, it is less useful because sales histories exhibit diverse patterns and the stages vary in duration
- As an **analysis tool**, it can help to suggest which strategies the organisation needs to adopt in order to compete successfully.



## 7. Factors to Maximise Products Return Over its Life-Cycle

- **Value engineering** in the design phase (as early as 25-30% completion of design) to commit the cost as low as possible
- Reduce the time to get into the **market** - to avoid competition
- **Maximise the life cycle**, especially the growth stage

- # R & D team must work cross functional
- # Early target costing increases life.
- # Value engineering is done in terms of improving quality, innovation, simplification, implementation procedures.

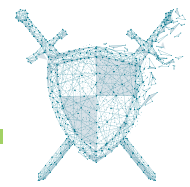
## 8. Characteristics of Product Life-cycle

- The products have **finite lives** and pass through **different stages** at **varying speed (F)**
- **Predicts** cost, revenue and profit throughout the life cycle (**P**)
- Average cost and profit per unit **varies (V)**
- Different **threats and opportunities** at each stage – and gives rise to different strategic actions (**T**)
- Different **emphasis** on each stage – R & D in introduction, cost control in decline (**E**)
- **New uses**-(product extension) or **new users**-(market extension) or increasing consumption of present users (**N**)



## 9. Impact on Selling Price and Cost per unit at Different Stages

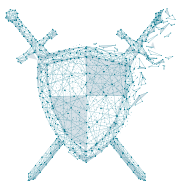
	Introduction	Growth	Maturity	Decline
Selling price	Very High To cater to esteem value customers and skimming through premium pricing.	High To capture market share, price is reduced. • Less unique now, • Discourage Competitors, • Attract new customers	Constant To match with competitors (price war)	Low Product is obsolete or no more desirable for change of customer tastes or preferences.
Cost per unit	High	Low	Very low or Constant	High



	Introduction	Growth	Maturity	Decline
	To cover the high initial costs of funds, research and development costs and high promotional expenses.	<p>Due to benefits from learning curve effect and economies of scale.</p> <ul style="list-style-type: none"> <li>• <b>D/M</b> - Quantity discount, Supplier Relations</li> <li>• <b>D/L</b> - Learning Curve (if manual)</li> <li>• <b>VOH</b> - Larger batch size</li> <li>• <b>FOH</b> - Larger volume</li> </ul>	<p>Due to larger benefits from economies of scale, efficiency and reduced promotion expenses.</p> <p>If volume remains constant or reduces, cost may remain constant or increase.</p> <ul style="list-style-type: none"> <li>• <b>D/M</b> - Increase if volume reduces</li> <li>• <b>D/L</b> - Increase if attention diverted to new product</li> <li>• <b>VOH</b> - Constant - if optimum batch size</li> <li>• <b>FOH</b> - Constant - if volume is same</li> </ul>	Due to lost benefits from scale, high promotional spending.

## 10. Customer Life Cycle - An emerging concept

- Aims to extend the life cycle of a particular customer so that they become more profitable.
- Does this by encouraging loyalty (e.g. loyalty cards) and building new products that are required post the usual life cycle [E.g. Skill courses in University]



## 11. Life Cycle Based Decision Making

### Financials :

#### (a) Calculate life cycle profitability

In the **profit statement of Life-Cycle Costing**, we generally take full cost of plant and machinery or R&D cost as an outflow instead of amortising it or taking its depreciation.

Similarly, the salvage value is taken as inflow in the full amount.

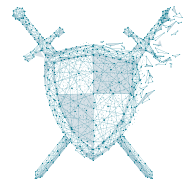
#### (b) Compare two proposals

Ignore Sunk or Committed Costs

(c) If **multiple years cash flows are** is given and **discounting rate or hurdle rate** is given, we can also prefer to evaluate life-cycle profitability on the basis of net present value.

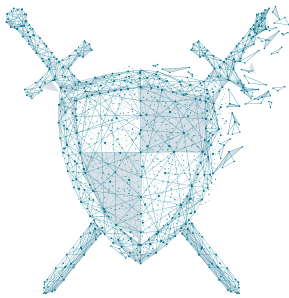
### Non Financials :

- Market Share
- Availability of Resources - Manpower, Space, Power
- Maintenance
- Life/ Durability
- Environment friendly
- Customer's flexibility
- Quality/ Defects
- Latest trend/ technology
- Safety



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# Pareto Analysis

## 1. Pareto Analysis or 80/20 Analysis

**Founded by Mr. Vilfred Pareto, an Italian Economist in Milan.**

He observed that 80% of wealth of Milan is distributed among 20% of its population and vice versa.

Basic principle is that a few items or activities are often core to the organisation's fortune while the majority are only peripheral.

80% of something is accounted for by 20% of something else.

- # Result out of Pareto may not be exactly 20% and 80%. Purpose is to have an approximate idea of majority causes
- # Periodical reviews of Pareto distribution are needed
- # Breakdown of causes is very important Avoid a general head like others

## 2. Applications of Pareto Analysis

### A. Inventory Analysis

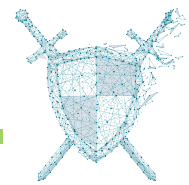
No. of Items	Value
80%	20%
20%	80%

### B. Product Profitability Analysis

No. of Products	Profit
80%	20%
20%	80%

### C. Customer Profitability Analysis

No. of Customers	Profit
80%	20%
20%	80%



## D. Quality Control

No. of Defects	Causes
80%	20%
20%	80%

## E. Activity Based Cost Analysis

Cost Driver	Overhead Costs
80%	20%
20%	80%

## 3. Management Actions using Pareto Analysis

### For low number of products/ customers yielding high revenue/profits

- Allocate maximum resources to the models (high revenue, high contribution)

### For high number of products/ customers yielding low revenue/profits

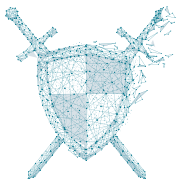
- Revision of pricing policy or review cost structure (high sales, low contribution)
- Delegate to lower level (low sales, low contribution)
- Discontinuation of certain products (low sales, low contribution)
- Promotion activities (low sales, high contribution)

## 4. Limitations of Pareto Analysis

- Potential **cost** is involved
- Product & customer **of low rank** is neglected.
- Problems that are **small initially may grow** in long run
- **Lack of understanding of Principles** can lead to wrong identification of causes
- Effectiveness is based on detail information

## 5. Advantages of Pareto Analysis

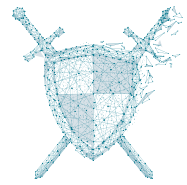
- **Root cause analysis** by breakdown of big problems into smaller pieces
- **Significance** of each cause
- **Prioritises** focus areas
- **Optimises** use of resources
- **Control** mechanism



## 6. Steps of Pareto Analysis

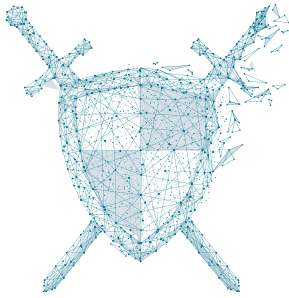
- (1) **Variable** on which analysis is required - E.g. Contribution
- (2) **Arrange** items in the descending order
- (3) **Cumulative contribution**
- (4) **Cumulative contribution %**
- (5) Identify the items falling in **first 80%**
- (6) Identify the items falling in **last 20%**
- (7) **Interpret** the result





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# Environmental Management Accounting

## 1. Meaning

A process of **collection** and **analysis** of the **information** relating to **environmental cost** for **internal** decision making.

## 2. Focus

To **account for financial** costs incurred to protect the environment and to **sustain and ensure the environmental efficiency** of the company.

## 3. Areas of Application

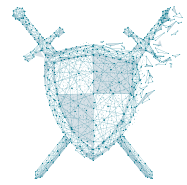
- (a) Product **Pricing**
- (b) **Budgeting**
- (c) Investment **appraisal**
- (d) Calculating **costs**
- (e) Setting quantifiable environmental **performance** targets, monitoring and reviewing
- (f) Re-evaluation of **profitability** of products
- (g) **Redesigning** the processes

## 4. Environmental information

A prerequisite for implementation of EMA

### (a) Physical information

- Physical flow of energy, water, material, etc
- To trace the input and output
- Performance indicators
- Environmental performance reports



(b) Monetary information

- Environmental cost driven by efforts to control waste and emission

5. Environmental Costs

a. As per the US Environmental Protection Agency

1. **Conventional Costs** - Cost of using raw material, utilities, capital goods included in cost accounting. Reduced usage of these are environmentally preferable. **E.g.** Raw material and energy waste
2. **Hidden Costs** - Costs that have been apportioned into overheads. **E.g.** (environmental taxes, voluntary costs)
3. **Contingent Costs** - Costs that may or may not be incurred in future. **E.g.** Clean up costs, penalty, fines, injury damages
4. **Relationship and Corporate image Costs** - Costs incurred to create a positive perception for the company in the eyes of management, customers, employees, communities and regulators. **E.g.** Environmental report costs

b. As per the United Nations Division for Sustainable Development

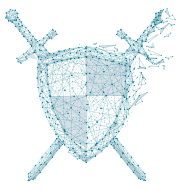
1. **Costs incurred to protect the environment** – **E.g.** Pollution prevention, High Labour Cost or increased depreciation
2. **Costs of wasted material, capital and Labour** – **E.g.** Inefficiencies in the production process.

# **Environmental Related Cost**

Attributed directly to a joint **Cost Centre**  
**E.g.** Waste filtration plant

# **Environmental Driven Cost**

Hidden in general overheads and are not directly related to a Cost Centre  
**E.g.** High Labour Cost or increased depreciation.



## C. In Practice / Generic Classification

1. **Internal Cost** – that impacts income of the company – **E.g.** waste disposal cost, Cost to improve the System, Regulatory taxes
2. **External Cost** – imposed on society at large, **E.g.** Health care of person affected, Soil erosion, deforestation, Increase in temperature.

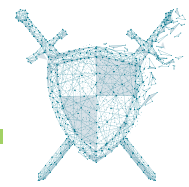
There is an inverse relationship between internal & external costs

## d. As per Hansen and Mendoza – Quality Cost Based

1. **Environmental Prevention Costs** - Costs incurred to prevent adverse impacts **E.g.** Pollution control equipment, Creating policies, R&D, Feasibility studies .
2. **Environmental Appraisal Costs** - Costs incurred to ensure compliance with standards, policies and laws. **E.g.** Monitoring, Testing, Inspection, Reporting, compliances, audit.
3. **Environmental Internal Failure Costs** - Costs incurred from activities that have been produced but not discharged into the environment **E.g.** Recycling, Disposing Scrap, Decommissioning Cost
4. **Environmental External Failure Costs** – Cost incurred on activities performed after discharging waste into the environment. If not incurred, will affect reputation and natural resources. **E.g.** Cleaning up contaminated soil, Restoring land to natural state.

# The environment cost report must show the cost categories total as a % of operating cost or sales for better comparability.

# The failure costs can be reduced by increasing prevention and appraisal costs.



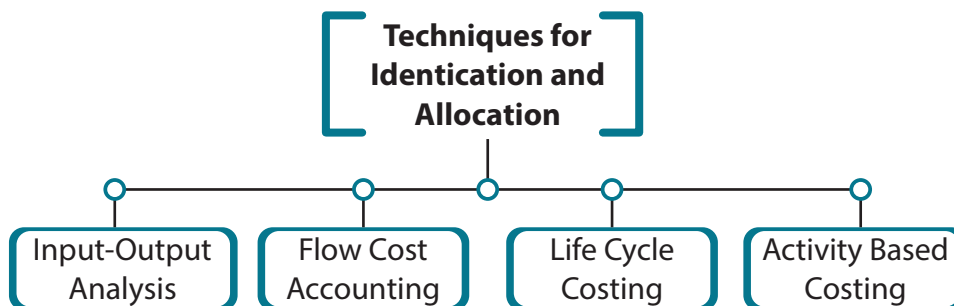
## 6. EMA Methodology to Manage Environment Cost

Phase 1 Identification of environmental cost - hidden costs

Phase 2 Allocation of environmental cost to cost centre and cost units - use techniques

Phase 3 Controlling environmental cost - take measures

## 7. Techniques for Identification and Allocation of Environmental Costs



- Input - Output Analysis** - Out of 100 kgs of Input, if output produced is 80 kgs, waste is 20 kgs.
- Flow Cost Accounting** - Track the flow of materials as well as losses at various stages of production material procurement, system of storage, delivery.
- Life Cycle Costing** - Tracks the costs over the product's life. **E.g** Rehabilitation cost at the end of life of the project. The stages of life cycle can be customised- **E.g.** Raw Material Stage, Manufacturing Stage, Distribution Stage. TQM can reduce life cycle environmental cost.
- Activity Based Costing** - Allocates cost to cost centres using cost drivers on the basis of different activities that give rise to the costs. **E.g.** of cost drivers - volume of emissions or waste, toxicity of waste, volume of emission treated (environmental impact added). By ABC, the environment driven Costs are allocated to products & services.

# Methods are not mutually exclusive. The benefit of each method is a trade off against the cost of implementing it.



## 8. Controlling Environmental Cost

**Step 1 First track the cost**

**Step 2 Take measures to control the cost.** The measure to control the cost depends upon **nature of processes** and the **resources available** with the company.

The following are important parameters - (Identify → Manage → Monitor)

- (a) **Waste** - Identify using Mass Balance approach, Cost savings approaches, to produce, treatment cost
- (b) **Water** - Optimise water consumption, reuse of used water, rain water harvesting, ultra filtration, awareness campaigns
- (c) **Energy** - Renewable sources - Solar, nuclear, LED, 5 star rated, Energy monitoring system
- (d) **Transport and Travel** - Fuel efficient vehicles, Track extra distance, GPS tracking, Route Optimisation
- (e) **Consumables and Raw materials** - Refillable printer cartridge, recycle, monitoring the usage, from raw materials - maximum yield

## 9. Reasons for Controlling the Environmental Cost

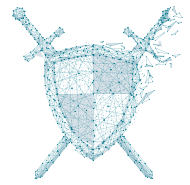
These are the reasons why EMA is gaining importance.

- (a) People around us are becoming **aware** of carbon footprint lack of attention towards environment may affect goodwill
- (b) Costs are becoming **huge** and **significant**
- (c) Strict **regulations**

# The main **difficulty** arises in defining and identifying the cost.

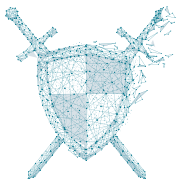
## 10. Advantages and Disadvantages of EMA

Advantages	Disadvantages
Builds public image.	Increase in cost of compliances and improvement of processes.
Improves revenue by producing products that meet the environment concerns.	High fines for failure to maintain the environment.
Reduces cost by process improvements.	Difficulties in cost allocation.
Can earn by sale of carbon credits or patenting an advanced process.	Additional burden on top management.



# **Success of EMA will imply :**

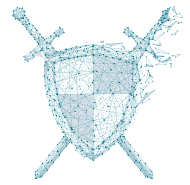
- (a) **Improved public image :** by zero discharge policies & implementation
- (b) **Improved environmental impact added :** by investing in advanced equipments, increased monitoring & audit.
- (c) **Controlled environmental cost :** by investing in advanced machineries.



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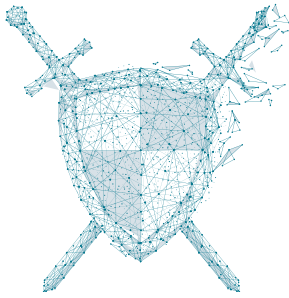


# CA Final SCMPE Saviour Revision



## Our Authorised Partners

Sl. No.	Name	City
1	Sharp Education	Ahmedabad
2	Mundhra Classes	Ajmer
3	National Academy of Commerce	Allahabad
4	Class at door	Alwar
5	Elite Coaching Academy	Aurangabad
6	Vision Academy	Aurangabad
7	Lecture Adda	Bengaluru
8	Jiloka Institute	Bhagalpur
9	Exam Nation	Delhi
10	Ace Classes	Dhanbad
11	Padhaiwale Educational Services	Dhanbad
12	Shikshavilla	Guwahati
13	Virtouso Classes	Hazaribagh
14	Admadtech	Indore
15	CA Study	Indore
16	Fast Education	Indore
17	Smart Learning Destination	Indore
18	Virtual Tree	Indore
19	Agrasen Classes	Jamshedpur
20	Commerce Academy	Jharsuguda
21	Lecturewala	Jodhpur
22	Royal Commerce Classes	Kanpur
23	Ulrn	Kolkata
24	Zeroify	Kolkata
25	Royal Commerce Classes-Lucknow	Lucknow
26	Vsmart	Maharashtra
27	Edugyan Smartech	Mohali
28	Reliable Classes	Mumbai
29	Apna Mentor	Muzaffarnagar
30	Conferenza.in	Nagpur
31	Lecturearc .in	Nagpur
32	Atharva Accounting Academy	Nashik
33	Excell Education	New Delhi
34	Make my delivery	New Delhi
35	COC Education Pvt. Ltd.	Noida
36	D-cent Educational services	Noida
37	Alfresco Educational Institute	Patna
38	AS Foundation	Pune
39	Buy Test Series	Pune
40	Edusmart	Raiganj
41	Advance Commerce Academy	Ranchi
42	Bright Brains	Rishikesh
43	Paathshala	Rourkela
44	Fortune CA	Sambalpur
45	The Professional Hub	Shillong
46	Career Academy	Siliguri
47	Pass CA CS CMA Education Services	Sundargarh
48	Tinsukia Professional Coaching Centre	Tinsukia
49	Laddha Professional Academy	Udaipur



# CVP Analysis

## 1. Breakup of Total Cost



$$VC / ut \text{ or } MC = \frac{\Delta TC}{\Delta uts}$$

(assume no change in FC) Since,  $\Delta FC = 0$ ,  $MC = \text{Incremental cost} = \Delta TC$

## 2. Contribution



$$\text{Sales} - VC = FC + \text{Profit}$$

$$\text{Total Contribution} = \text{Quantity sold} \times \text{Contribution / unit}$$

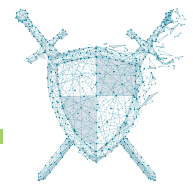
## 3. Profit-Volume Ratio or Contribution Sales Ratio



$$\frac{\text{Contribution / ut}}{SP / ut} = \frac{\text{Total Contribution}}{\text{Total Sales}} = \frac{\Delta \text{Profit}}{\Delta \text{Sales}}$$

$$\text{or, Sales} = \frac{\text{TFC} + \text{Profit (before tax)}}{\text{PV ratio}}$$





## 4. Important Assumptions



- TFC remains constant.
  - VC/unit remains constant.
  - SP/ unit remains constant.
- If any of the assumption do not hold good, do not use formulas. Follow these steps :
- (a) Contribution earned from initial volume
  - (b) Desired contribution
  - (c) Shortfall from desired contribution
  - (d) Additional volume to be sold to recover the shortfall contribution as per new cost or price

## 5. BEP

- Point means level of sales.



$$\text{BEP(uts)} = \frac{\text{FC}}{\text{Contribution pu}} \quad \& \quad \text{BEP(₹)} = \frac{\text{FC}}{\text{PVR}}$$

At BEP,

- Total Contribution = Total Fixed Cost
- No profit, No loss

## 6. Cash BEP



$$\text{Cash in BEP(uts)} = \frac{\text{Cash FC}}{\text{Contribution pu}} \quad \& \quad \text{Cash BEP(₹)} = \frac{\text{Cash FC}}{\text{PVR}}$$

At Cash BEP,

- Total Contribution = Total Cash FC
- Total Cash FC = TFC - Non Cash exp (depreciation)

BEP  $\geq$  Cash BEP



## 7. Margin of Safety



- Excess of sales over BES

- $$\text{MOS (units)} = \text{Total Sales (uts)} - \text{BES (units)} = \frac{\text{Profit}}{\text{Contribution pu}}$$

- $$\text{MOS (₹)} = \text{MOS (Units)} \times \text{SP/Unit} = \frac{\text{Profit}}{\text{PV Ratio}}$$

## 8. Jugalbandi Jodis



- (a) BES Ratio + MOS Ratio = 1

$$\text{BES Ratio} = \frac{\text{FC}}{\text{Contribution}}$$

$$\text{MOS Ratio} = \frac{\text{Profit}}{\text{Contribution}}$$



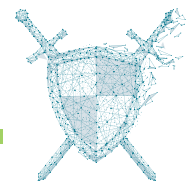
- (b) VC Ratio + Contribution Ratio = 1

## 9. BEP of Merged Company



- Find PV Ratio of the merged company at 100% capacity utilisation of merging companies

- $$\text{BEP of the Merged Co.} = \frac{\text{TFC of the Merged Co.}}{\text{PV Ratio assuming 100\% capacity}}$$



## 10. BEP with Multiple Products



### Total Contribution with sales mix in units

- **Contribution / unit × Unit sold**

Solve using x Method

### Total Contribution with sales mix in value

- **(Sales – TVC) or (Sales × PVR)**

Solve using Weighted Average Method

$$\text{Overall BEP} = \frac{\text{TFC}}{\text{Weighted Average Contribution/ut or Weighted Average PVR}}$$

## 11. BEP with Opportunity Cost



$$\text{BEP} = \frac{\text{TFC}}{\text{Contribution/unit}}$$

Where,

TFC = Normal FC + Opportunity FC

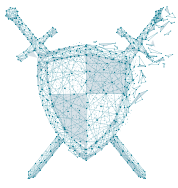
Contribution / Unit = SP – VC – Opportunity VC / Unit

## 12. BEP for Perishable Product



- Product with shelf life upto 1yr.
- Opening stock is sold first
- **BEP** = Op stock + Additional uts of current production
- **Potential BEP** = (Opening stock is discarded )  

$$= \frac{\text{Total Fixed Cost}}{\text{Contribution/unit from New Production}}$$



## 13. BEP with Step FC



- Before real BEP - No profits
- BEP exists in real terms when the calculated BEP units lies within the range of its FC
- After 1st BEP - Company starts making profit.
- When real BEP is on the upper limit of its slab, there has to be a 2nd Real BEP in the immediate next slab.
- Solve using algebraic equation or columnar approach

### A. Algebraic Equation :

When slab range are equal

**Step 1 :** Find the slab number for 1st Real BEP

**Step 2 :** Find the first Real BEP

**Step 3 :** Find the 2nd Real BEP, if applicable.

### B. Columnar Approach :

When slab range are unequal

**Step 1:** Make columns for each slab

**Step 2:** Find BEP in each slab

**Step 3:** Comment whether it is real or imaginary.

## 14. Indifference Point

### A. Between two options

#### Indifference Point

$$= \frac{\text{TFC}}{\Delta \text{VC} / \text{ut}} \text{ or } \frac{\text{TFC}}{\Delta \text{Contribution} / \text{ut}} \text{ (when SP constant)}$$

The level of operation where TC or Profit will be equal or the level of activity where the extra fixed cost of higher fixed cost option is recovered by its savings in variable cost per unit.

Expected Level	Recommendation
> Indifference point	High FC option
< Indifference point	Low FC option
= Indifference point	Any option



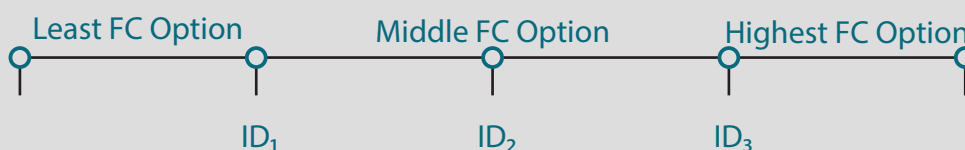
## B. Between three options

**Step 1:** First, identify indifference point between: (a) Option 1 & 2; (b) Option 2 & 3; (c) Option 3 & 1.

**Step 2:** Plot them in ascending order on a straight line.

Let us assume that the three Indifference Points are ID 1, ID 2 and ID 3 and are arranged in ascending order.

**Level of Operation :**



# Final selection is based upon both financial & non financial factors.

## 15. Shutdown Point

To choose between **Temporary Shutdown or Continue the operations** (during business distress or off season)

**Non-financial Factors:** Labour availability, Relation with suppliers, Accumulated inventory, Goodwill, Customer loyalty, Security, Competition pressure, Reopening hassles, Difficulty in regularisation.

Financial Factors	Shutdown	Continue
Total Fixed Cost		
- Unavoidable (E.g. Rent)	✓	✓
- Avoidable (E.g. Salary)	-	✓
- Reopening Costs	✓	-
<b>Total</b>	<b>Low</b>	<b>High</b>
Contribution/unit	-	✓

$$\begin{aligned}
 \text{A. Shutdown Point} &= \frac{TFC_{\text{continue}} - TFC_{\text{shutdown}}}{\text{Contribution / ut}_{\text{Continue}} - \text{Contribution / ut}_{\text{Shutdown}}} \\
 &= \frac{\text{Avoidable FC} - \text{Extra Shut Down Cost}}{\text{Contribution / ut}}
 \end{aligned}$$

The level of sales where the total loss under shutdown or continue option is equal. It's the indifference point between shutdown & continue option.





Expected Sales	Recommendations
> Shutdown point	Continue
< Shutdown point	Shut down
= Shutdown point	Any option

# Shutdown can also be interpreted as a **temporary lock out** (e.g. - Pandemic Recession)

## 16. Minimum units for BE



- Sell the product with the highest contribution per unit first.
- If batch size is applicable, plan to produce only 1 batch and see the BEP.

## 17. BE with Optimum Mix under Key Factor



- Key factor exists
- Optimum product mix has been obtained
- Use optimum mix ratio as the sales mix to find BEP
- Combined PVR =  $\frac{\text{Total contribution as per optimum mix}}{\text{Total sales as per optimum mix}}$
- Overall BEP =  $\frac{\text{TFC}}{\text{Combined PVR}}$

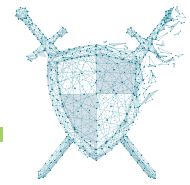
## 18. CVP Analysis in Services and Non-Profit Organisations

- Measures their output first (**E.g.** Passenger - kms, Room - days)
- Output is intangible
- Apply usual calculations
- $$\text{BE} = \frac{\text{TFC}}{\text{Average Contribution/unit}}$$

## 19. CVP analysis in JIT environment

In JIT,

- Variable cost per unit is reduced,
- Fixed costs are increased,



- Direct labour is considered as fixed instead of variable,
- Waste scrap and quantity discounts are removed,
- Batch size is equal to 1 unit

Under JIT,

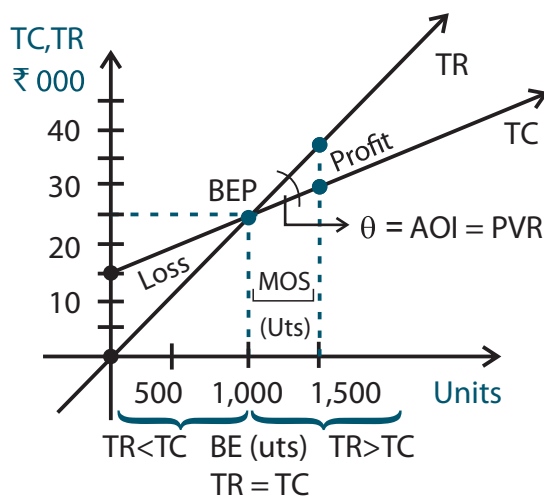
$$\text{Total Cost} = \text{Fixed Cost} + \text{VC/ut} \times \text{Uts} + \text{Engineering Cost/hr} \times \text{No. of hrs}$$

## 20. CVP Analysis under Activity Based Costing

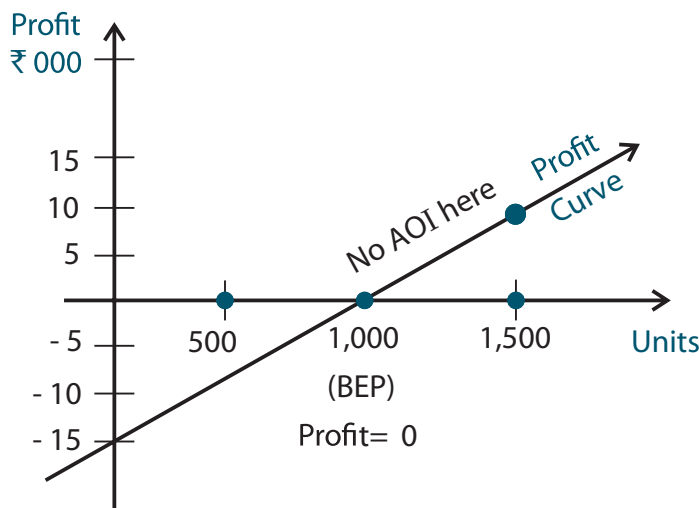
$$\text{Total Fixed Cost} = \text{Unanalysed fixed cost} + \text{Activity wise costs}$$

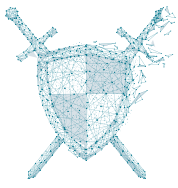
## 21. Break Even Chart and PV Chart

### A. Break Even Chart

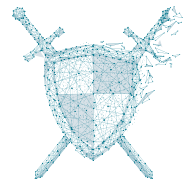


### B. PV Chart



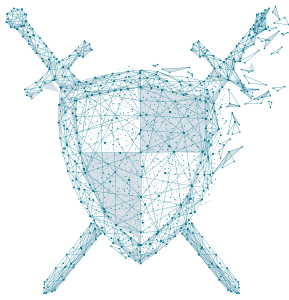


## Space For Self Notes



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# Relevant Costing

## 1. Relevant Cost

Future cost influencing a decision. Varies from situation to situation. Applicable only for short term. In opportunity approach, opportunity cost is also considered as relevant cost.

**Future Variable Cost, Avoidable FC & Opportunity cost are always relevant.**

There is always an incremental amount ( positive or negative) in any relevant cost.

## 2. Irrelevant Cost

Cost which are not influenced by any decision and thus have no impact on any decision.

**Sunk / Historical Cost, Committed FC are always irrelevant.**

The incremental amount of all irrelevant costs are always zero.

All sunk costs are irrelevant but all irrelevant costs are not sunk costs.

## 3. Approaches for Decision Making

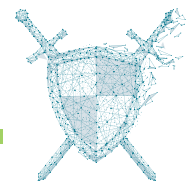


- Total Cost Approach** (Considers Relevant as well as Irrelevant Costs)
- Differential/ Incremental Cost Approach** (Considers only Relevant Costs, Irrelevant Costs are eliminated by default)
- Opportunity Cost Approach** (Considers Relevant Costs only along with Opportunity Costs)

## 4. Three Important Factors for Decision Making



- Suitability** - Vision , Ethics
- Acceptability** - Financials
- Feasibility** - Resources & Processes



## 5. Relevant Cost under Opportunity Approach

Particulars	₹
Cost to be Incurred for an offer	***
Add: Benefit Lost/Opp. Cost due to the offer	***
Less: Benefit Achieved/Opp. Gain due to the offer	***
Relevant /Incremental Cost	***

Compare the above Relevant cost with the offer Revenue to evaluate the offer

## 6. Uses of Relevant Costing

- Evaluation of offers (Offer Revenue - Incremental Cost)
- Minimum price of an offer (Incremental Cost)
- Maximum price of an offer (Incremental Profit)

## 7. Evaluation of Offers

Accept an offer if Offer Revenue > Relevant cost of the offer

However, importance to be given to **other non financial factors**.

## 8. Minimum Price of an Offer

**Minimum Price = Relevant Cost = Cost to be incurred + Opportunity Cost**

- The price at which the **net position** with and without offer will be same.
- The price where there will be an indifference to accept or reject an offer.

## 9. Maximum Price of an Offer

**Maximum Price = Relevant Gain = Additional income due to the offer.**

- Lower of (i) Outside Purchase Cost (ii) Marginal Revenue

- The price at which the **net position** with and without offer will be same.
- The price where there will be an indifference to accept or reject an offer.
- If there is a regular market for the item/service to be bought then the maximum price will be calculated after considering the outside purchase cost.



## 10. Opportunity Cost



### A. Meaning

It refers to the **highest amount of benefits sacrificed or income foregone** from the next best alternative **while selecting a particular course of action**.

Income foregone is the contribution lost or **relevant income only** (excluding irrelevant costs)

Next best alternative implies that when there are multiple alternatives, we select the **alternative with highest income**.

Opportunity cost can be understood only with respect to an alternative. While thinking of it, **do not consider the cash flows of the alternative whose opportunity cost is being computed**.

If no alternative is specified, we find the opportunity cost of resource being idle. i.e. highest of income foregone from all the available alternatives.

### B. Why to consider opportunity cost at all

To **prevent ourselves from guilt** of not considering other alternatives after a decision has been taken.

### C. Shadow Price or Opportunity Cost or Marginal Value of a Resource

Opportunity cost or shadow price is applicable **for limited resource only**. i.e. supply is less than demand or availability is less than requirement.

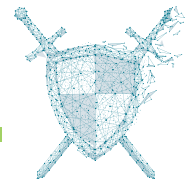
Shadow price means the **additional income** that can be generated **from 1 unit** of a resource (employed in regular work)

If the resource is **in abundant supply** or is idle, the shadow price or opportunity cost will be nil, as there will be no sacrifice of income if the resource is used an offer.

If the resource is being used for a product and is **in short supply**, the shadow price will be – the **contribution lost from 1 unit of resource** which is being earned from the product.

If the limited resource is being used in multiple products, and if we have to find the minimum price of an offer where resource will be used, **we release the resource in order of least contribution per unit of resource**.

A product should be produced only if its **contribution is able to recover its shadow price** of the resource used in it.



## 11. Opportunity Gain

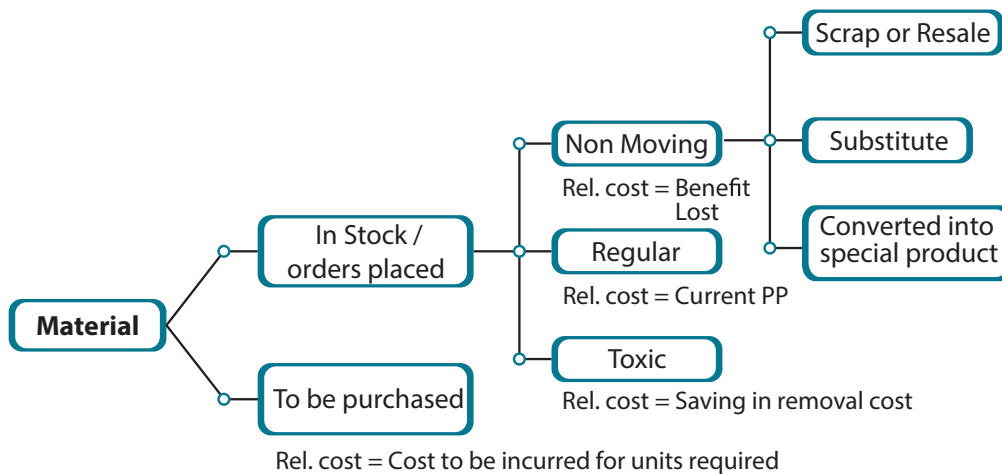


**Cost saved or benefits achieved** from the next best alternative while selecting a course of action.

Next best alternative is the alternative with **the least cost**.

Opportunity gain can be understood **as negative opportunity cost**.

## 12. Relevant Cost of Materials

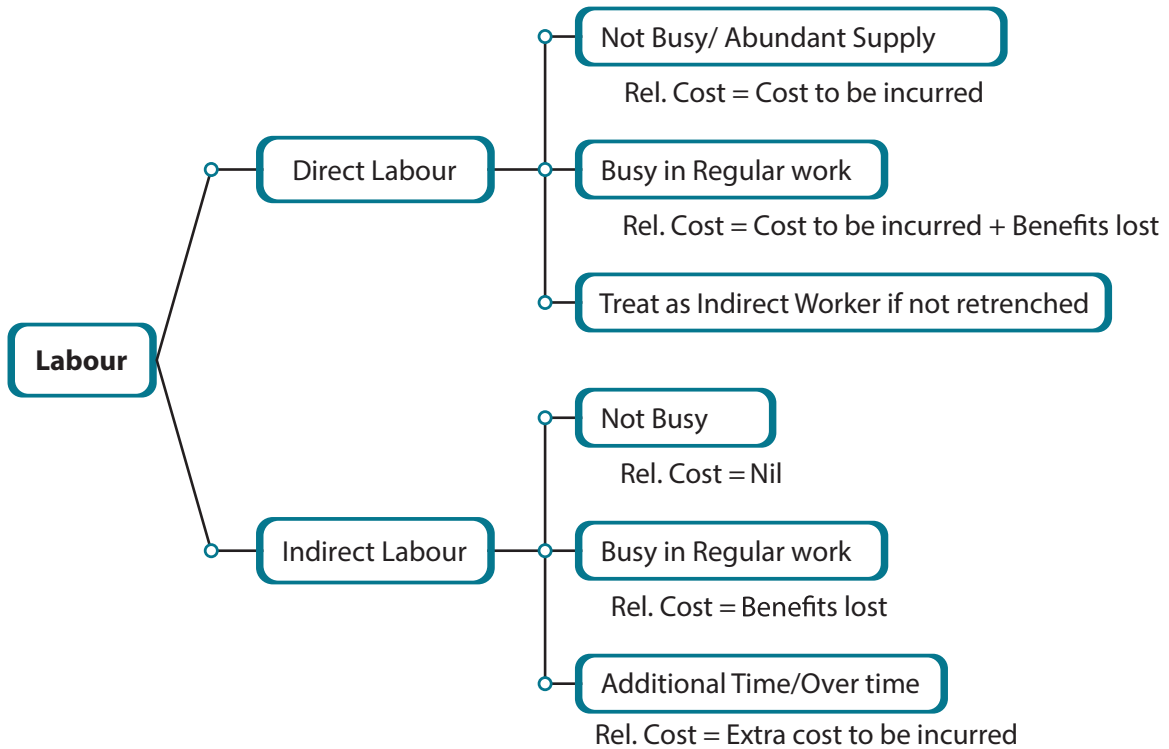


- # If materials are to be **purchased in lots** then
- No use of extra materials** - Rel Cost = Cost to be incurred for the lot purchased- Scrap value of extra quantity.
  - Regular use of extra materials** - Rel Cost = Cost to be incurred for the quantity required for the offer.





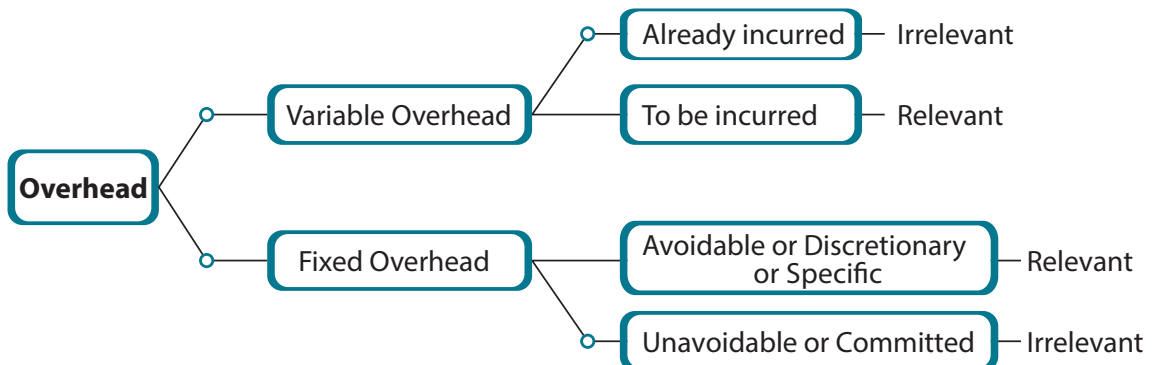
## 13. Relevant Cost of Labour



### # Question Remaining Silent

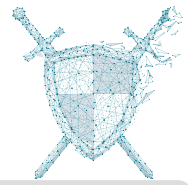
- (a) Labour = Direct Labour
- (b) Direct Labour is abundant
- (c) Indirect Labour is idle

## 14. Relevant Cost of Overheads



### # Question Remaining Silent, VOH to be assumed as Future Cost

FOH to be assumed at Committed Cost



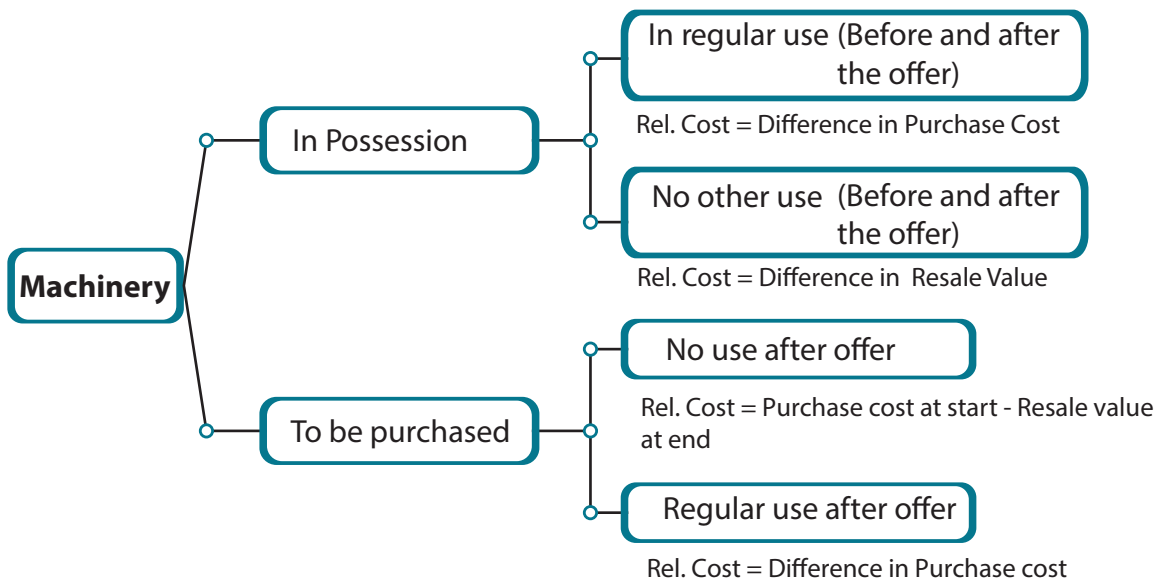
## #1. VOH Varying with LHrs or Labour Cost

Apply the given rate on actual labour hours or actual labour cost & not on the relevant labour cost.

## #2. Keywords to identify the Committed Fixed OH

Charged, Added, Recovered, Applied, Absorbed, Apportioned or Given as a Rate in % form or Rate per unit or Rate per LHR.

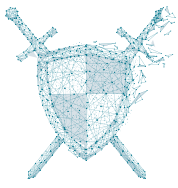
## 15. Relevant Cost of Depreciation



# Question Remaining Silent, Machine is in possession & idle.

## 16. Non Financial Factors / Ethical Considerations

- Environmental factors
- Staff Motivation
- Government regulation
- Availability of resources
- Availability of Project Sites
- Corporate Social Responsibility
- Moral duties towards the stakeholders
- Good Governance and Compliances



## 17. Demerits of Relevant Costing

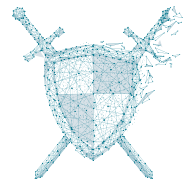
- (1) Regular work is priced at a higher rate. Hence, **existing customers** may get dissatisfied.
- (2) Committed and sunk costs are **never recovered**. Also, standard profit is not recovered. Thus, this pricing is not sustainable
- (3) **Ignores** market price, competitive strategies.
- (4) **Profit reporting** is different from the normal accounting system.
- (5) **Increasing price** after the first order may not be acceptable by new customer.
- (6) Cost once increased due to an offer may not be reduced after the offer.

## 18. Qualitative factors in Sell or Further Processing Decisions

- Resource availability-material, labour, etc
- Influence on customers who prefers to buy in original form

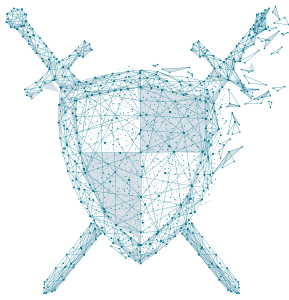
## 19. Qualitative factors in Keep or Drop decisions

- Employees layoff
- Supplier relations
- Customer relations



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# Make or Buy

## 1. Applicability

Here, we decide whether to make or buy the **raw materials or components or packing materials** required in normal course of operation.

## 2. Non Financial Factors

Quantity, Quality, Time, Uniqueness, High skills, Huge Investment, Focus, Peer co-operation, Reliability, Employee morale, Resources, Time to Market, Supplier Relations.

## 3. Financial Factors

Financial factors helps to compare the cost of manufacture with cost of purchase using relevant costing approach.

## 4. Evaluation with Key Factors

### Type I: Make or Buy decision with Single Key Factor

**Step 1:** Rank for manufacture on basis of **Savings in Manufacturing per unit of Key Factor**.

**Step 2:** On the basis of above ranking, develop an **Optimum Mix**.

**Step 3:** Find Relevant cost of manufacture of materials that could be manufactured and **purchase those materials which cannot be manufactured**.

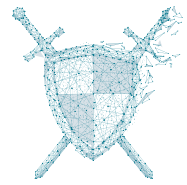
### Type II: Make or Buy decision with Two or more Key Factor

Here, we use **combination approach**.

**Step 1:** Assign any raw material or component as Rank 1 and allocate resources to produce its maximum and from remaining, produce the other component and find the total cost.

**Step 2:** Assign other raw material or component Rank 1 and find the total cost as above,

**Step 3:** Combination with least total cost is better.



- Note:**
- (a) Prefer combination approach when **there are only two** products.
  - (b) Key Factors can be more than two, also.

## Type III: Make or Buy Decision with a condition that only one component can be bought from outside



- Step 1:** First, rank on the basis of savings per unit of key factor.
- Step 2:** Select the component with least rank to purchase
- Step 3:** Check whether hours released are sufficient to produce additional requirement of other components.
- Step 4:** If Step 3 is feasible, conclude, if not, try with the next higher rank.

## 5. Make or Buy Decision with Indifference Point Analysis

### A. Between Two Options

$$\text{Indifference Point} = \frac{\Delta FC}{\Delta VE \text{ per unit}}$$

E.g.

	Make	Buy
FC	50,000	–
VC/ut	20	30

Level of Operation	Suggestion
< Indifference Point	Buy
> Indifference Point	Make
= Indifference Point	Any Option

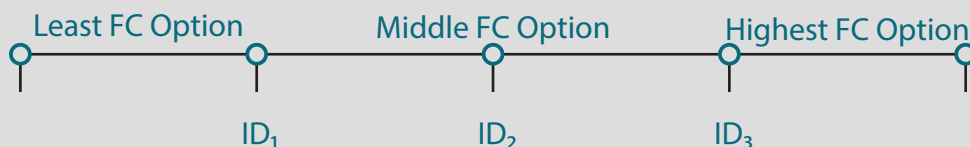
### B. Between Three Options

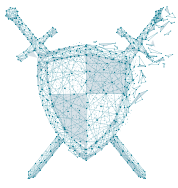
**Step 1:** First, calculate indifference point between: (a) Option 1 & 2; (b) Option 2 & 3; (c) Option 3 & 1.

**Step 2:** Plot them in ascending order on a straight line.

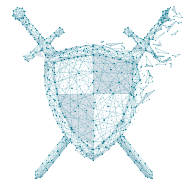
Let us assume that the three Indifference Points are ID 1, ID 2 and ID 3 and are arranged in ascending order.

**Level of Operation :**





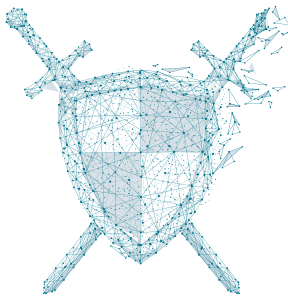
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# Key Factor

## What is a Key Factor ?

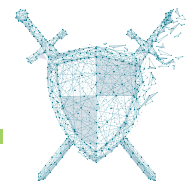
It refers to the resource whose requirement is more than its availability. It is also called as Limiting factor, Principle budgeting factor, Critical factor, Constraint.

## Ways to deal with Key Factor

1. Traditional Approach - Make best use of what is available.
2. Modern Approach - Increase the availability

## Different situations to deal with Key Factor

No of Products	No of Key Factors	How to deal with it
<b>ONE</b>	<b>Multiple</b>	<b>Theory of Bottleneck</b>
<b>Multiple</b>	<b>ONE</b>	Utilise the available for best products <b>Step 1:</b> Ranking of Products based on Contribution per unit of Key Factor <b>Step 2:</b> Allocation Based on Rank
<b>Multiple</b>	<b>Multiple</b>	<ul style="list-style-type: none"> <li>• Use Combinations (2 Products, <math>\geq 2</math> Key Factors)</li> <li>• Use Linear Programming (<math>\geq 2</math> Products, <math>\geq 2</math> Key Factors)</li> <li>• Use Simultaneous Equations (2 Products, 2 Key Factors)</li> <li>• Use Throughput Accounting (<math>\geq 2</math> Products, <math>\geq 2</math> Key Factors)</li> </ul>



## 1. Special Situations



### A. Basis of Ranking

Key Factors	Basis of Ranking
Material (Kgs)	Contribution per kg
Material Cost (₹)	Contribution per rupee of material cost
Labour Hour	Contribution per labour hour
Labour Cost (₹)	Contribution per rupee of labour cost
Machine Hour	Contribution per machine hour
Sales units	Contribution per unit sold
Sales (₹)	Contribution per rupee of sales or PVR
Land (acres)	Contribution per acre

### B. Tie between Contribution per hour of two products

Select any of the products first.

### C. Fractional Production quantity of a product using the limited resource

Prefer to not to round off the quantity. E.g. 550.70 units not to be rounded off to 551 units as the resource for 0.30 units may not be available.

### D. Specific Fixed Cost of a Product

Deduct the specific fixed cost per unit from the contribution of the product to derive the net contribution per unit. Rank the products based on **net contribution per unit of key factor**. Also to **check the viability** of extra fixed cost of each product as per the Optimum Mix.

### E. Incremental Ranking

When the demand of the product varies with the price, we calculate the contribution per unit of key factor for each value of demand and price in an incremental manner and then rank and allocate.

**Step 1:** Incremental Contribution

**Step 2:** Incremental Hours

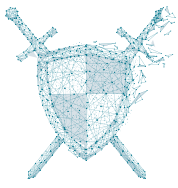
**Step 3:** Incremental Contribution per Incremental Hour

**Step 4:** Rank the demand level

**Step 5:** Allocate the available resource in order of ranks

### F. Minimum commitment for a product

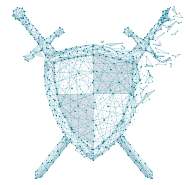
It should be produced in highest priority, even before the first rank.



## G. Shadow Price or Marginal Value or Opportunity Cost of a resource

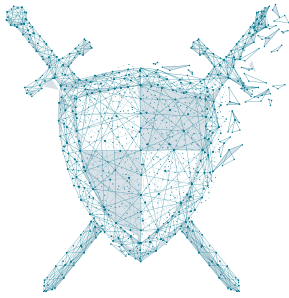
It means the income lost if one unit of a resource becomes unavailable. It is computed only for the limited resource.

A product should be produced from the limited resource only if its **contribution is equal to or greater than the shadow prices** of resources used in it.



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# Sub Contracting (Outsourcing)

## 1. Non Financial Factors

Quality, Quantity, Time, Secrecy, Capital Investments, Skills, Peer Co-Operation, Know how, Focus, Reliability, Resources, Employee Morale, Loss of Control, Use of Spare Capacity.

## 2. Outsourcing - Advantages and Disadvantages

A business practice to reduce costs or improve efficiency by shifting jobs or processes to another party or purchase few of products or parts from outside for a span of time.

It is an integral part of downsizing or reengineering.

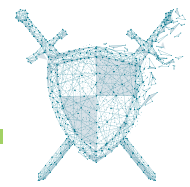
### Advantages

- Cost savings
- Frees up resources
- Flexibility

### Disadvantages

- Risk of loosing sensitive data
- Control of operations is lost
- Quality issues
- Time of delivery
- Right quantity
- Retrenchment of workforce may create strikes

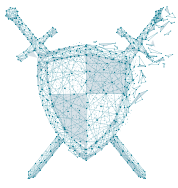
# Outsourcing can be negotiated under Gain Sharing Arrangement



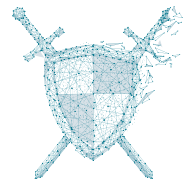
## 3. Comparative Study of Decision Making



	Make or Buy Decisions	Key Factor Decisions	Sub Contracting
1.	For Raw Materials	For Finished Goods	For Finished Goods
2.	One Time Decision	Regular Decision	One Time Decision
3.	Purchase is primary	Produce is primary	Purchase is primary
4.			
Step 1	Compare Relevant Cost of Manufacture with Purchase	N/A	Compare Relevant Cost of Manufacture with Purchase
Step 2	Decide Make or Buy	N/A	Decide Make or Buy
Step 3	Find Savings in manufacturing per unit for components to be produced	Find Contribution per unit for products to be produced	Find Savings in manufacturing per unit for components to be produced
Step 4	Find Savings in Manufacturing per hour	Find Contribution per hour	Find Savings in Manufacturing per hour
Step 5	Rank the Components	Rank the Products	Rank the Products
Step 6	Allocate the limited resource in the order of rank to produce	Allocate the limited resource in the order of rank to produce	Allocate the limited resource in the order of rank to produce
Step 7	Purchase that could not be produced to meet the requirement of production	Purchase that could not be produced to meet the market demand if Purchase price < Selling Price	Purchase that could not be produced to meet the market demand if Purchase price < Selling Price



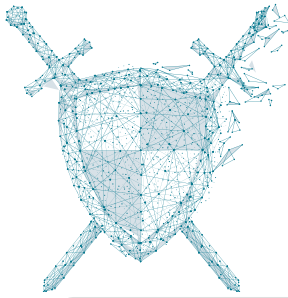
## Space For Self Notes



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# Export Offers

- **Export offers are one time / non repetitive offers.**
- **The main business of the company is to sell in domestic market.**
- **Non financial Factors :** Domestic Customer dissatisfaction, Regular price for export Customers in repeat orders may create dissatisfaction, Statutory Compliances, Buyer's creditworthiness, Additional terms, Industry analysis.

## 1. Evaluation of Export Offers



**Export offer is to be evaluated on the basis of -**

Incremental Cost or Change in Total Cost

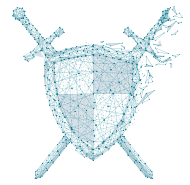
= Total Cost With Export Offer – Total Cost Without Export Offer

Net benefit from Export = Export Revenue – Incremental Cost

## 2. Minimum Price of Export Offer



Cost to be incurred + Contribution lost – Benefits achieved



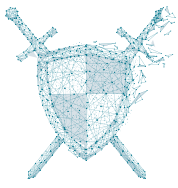
### 3. Evaluation of Export Offer



#### Under Incremental Revenue and Differential Cost Approach

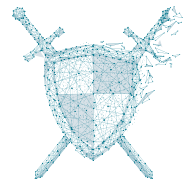
- The profit is maximum where Incremental Profit is close to zero or next higher positive than zero.
- If due to export, any level of incremental profit needs to be foregone, then include such incremental profit in the minimum price of the export offer.

**E.g.** Let us say that profit for regular business will be maximum at 90% capacity level. The incremental profit for 80% to 90% level is ₹ 600. If the export occupies 20% of the capacity, then there will be a loss of ₹ 600 as the capacity of regular business will be reduced to 80%. This amount of ₹ 600 is to be added to the minimum price of export.



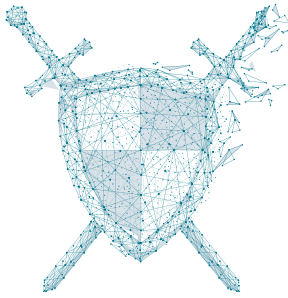
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# Linear Programming

# A mathematical technical to solve a problem that meets certain conditions.

## 1. Conditions

- Multiple Products and Multiple Constraints
- Maximisation / Minimisation Objective

## 2. Flow of Solving

Original Problem ➤ Formulation ➤ Solution ➤ Interpretation

## 3. Formulation Steps

- Tabulate the given data
- Identify decision variables
- Write objective function ('Z')
- Write constraints functions represented by inequations or equations
- Do not forget to mention the non negativity assumption

## 4. Solution Method

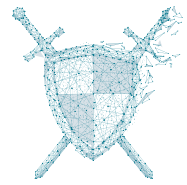
### Graphical method

2 variable problems

No restriction in no. of constraints

### Steps

1. Convert inequation into equation.
2. Take two points for each equation.
3. Plot the points on the graph and draw the equation line.
4. Identify the feasible area of each inequation, using the test point or by checking its sign



5. Shade the common feasible area.
6. Solve for Z at different boundary points of the common area.

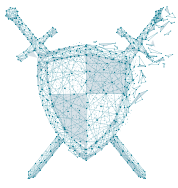
# **Unbounded Feasible Area :**

Maximization objective cannot be solved.

Minimization objective can be solved by taking the lower boundary points

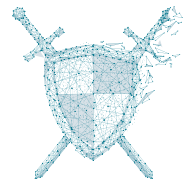
# **Test point (0,0) to be avoided** when line passes through the origin.

# **Find intersection points** by solving the equations, if needed.



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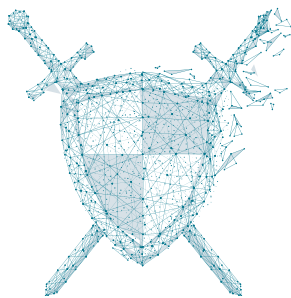


# CA Final SCMPE Saviour Revision



## Our Authorised Partners

Sl. No.	Name	City
1	Sharp Education	Ahmedabad
2	Mundhra Classes	Ajmer
3	National Academy of Commerce	Allahabad
4	Class at door	Alwar
5	Elite Coaching Academy	Aurangabad
6	Vision Academy	Aurangabad
7	Lecture Adda	Bengaluru
8	Jiloka Institute	Bhagalpur
9	Exam Nation	Delhi
10	Ace Classes	Dhanbad
11	Padhaiwale Educational Services	Dhanbad
12	Shikshavilla	Guwahati
13	Virtouso Classes	Hazaribagh
14	Admadtech	Indore
15	CA Study	Indore
16	Fast Education	Indore
17	Smart Learning Destination	Indore
18	Virtual Tree	Indore
19	Agrasen Classes	Jamshedpur
20	Commerce Academy	Jharsuguda
21	Lecturewala	Jodhpur
22	Royal Commerce Classes	Kanpur
23	Ulrn	Kolkata
24	Zeroify	Kolkata
25	Royal Commerce Classes-Lucknow	Lucknow
26	Vsmart	Maharashtra
27	Edugyan Smartech	Mohali
28	Reliable Classes	Mumbai
29	Apna Mentor	Muzaffarnagar
30	Conferenza.in	Nagpur
31	Lecturearc .in	Nagpur
32	Atharva Accounting Academy	Nashik
33	Excell Education	New Delhi
34	Make my delivery	New Delhi
35	COC Education Pvt. Ltd.	Noida
36	D-cent Educational services	Noida
37	Alfresco Educational Institute	Patna
38	AS Foundation	Pune
39	Buy Test Series	Pune
40	Edusmart	Raiganj
41	Advance Commerce Academy	Ranchi
42	Bright Brains	Rishikesh
43	Paathshala	Rourkela
44	Fortune CA	Sambalpur
45	The Professional Hub	Shillong
46	Career Academy	Siliguri
47	Pass CA CS CMA Education Services	Sundargarh
48	Tinsukia Professional Coaching Centre	Tinsukia
49	Laddha Professional Academy	Udaipur



# Learning Curve Theory

## 1. Applicability and Non Applicability

Applicability	Non - applicability
Human efforts	Automated efforts
New product / process	Existing product / process
Repetitive	Non repetitive
Regular workers	Non regular / Casual workers
Skilled / unskilled workers	Experienced workers / Experts
On Variable cost or Direct Costs or Indirect Materials	On Fixed Cost or Indirect Costs
On Fixed costs - if absorption costing is followed	On fixed costs - if marginal costing is followed

## 2. Learning Rate

$$= \frac{\text{Average time or cost per unit of first } 2n \text{ units}}{\text{Average time or cost per unit of first } n \text{ units}}$$

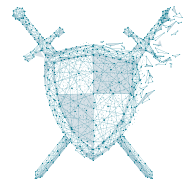
[where n is the lot size]

- # 1. **Learning Rate + Improvement Rate = 1**
- # 2. **Higher learning rate implies lower improvement rate.**
- # 3. **Learning rate of highly experienced people or machines is 100%**

## 3. Learning Curve Theory

The average time or cost per unit decreases at a constant learning rate when production is doubled.

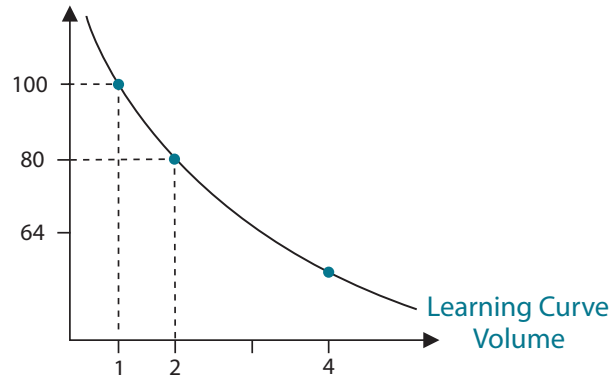
- # **Learning rate may not be infinite. It may stop after certain volume and for the volume after that, the time or cost per unit of the latest unit or batch may only continue to remain applicable.**



## 4. Graphical Presentation

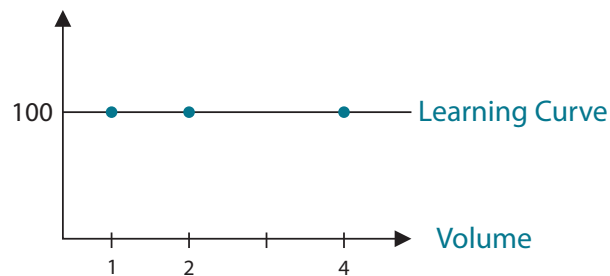
### # Learning Curve

Average Time/Unit



### # Learning Curve of machines / very experienced people

Average Time/Unit

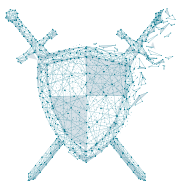


## 5. Uses of Learning Curve Theory

- Pricing Decisions over life time or for a repeat order.
- Setting standards to measure performance
- Product profitability analysis

## 6. Limitations of Learning Curve Theory

- It assumes **stable conditions** in manufacturing environment - like continuous availability of raw materials, no downtime of machines.
- The **break** between repeat production **must not be too long**.
- The workers **may not be always motivated** to improve.
- Learning eventually ceases** due to limitations in machine efficiency, workers efficiency or raw material yield capacity.
- Basis** of determination of learning rate **may not be reliable**.



## 7. Prediction by Double of Production Volume

Assuming a 90% learning rate

Cumulative output (units or batch)	Cumulative Average time per unit or batch	Total time (hours)	Incremental time (hours)
1	50	50	50
2	45	90	40
4	40.50	162	72
8	36.45	291.6	129.6

- #1. We use average time per unit to estimate the cost of an order comprising of all the cumulative units or the initial order.
- #2. We use incremental time to estimate the cost for a repeat order.
- #3. Time of a specific batch E.g. 25th batch
  - (a) Average time of first 25 batches
  - (b) Average time of first 24 batches
  - (c) Incremental Time = Time of 25th batch = (Average of first 25 × 25 batches) – (Average of first 24 × 24 batches) i.e. take Δ Total time (not Δ Average time)

## 8. Prediction at Any Volume using Learning Curve Equation

Preferred when the required average time or cost per unit cannot be determined by doubling the production volume.

$$Y = K \times X^S$$

Where,

**K = Total time of first unit or batch or average time of first unit or batch**

**X = Volume (units or batches) whose average is required**

**S = Learning curve index =  $\text{Log LCR} / \text{Log } 2$**

# Solve this equation by using **given values** or **log and antilog** or **by dirty power concept** in calculator

# Instead of Learning Curve Equation, Learning Curve table extract can be used.

## 9. Learning Rate Sensitivity Analysis

It means the **rate of change** in learning rate with respect to change in any variable (like profit or total cost), assuming all other variables as constant.

If nothing is mentioned, we change the variable against which learning sensitivity is being checked (say - profit) by 100%.