PART A: STRATEGIC COST MANAGEMENT (40 MARKS)

Unit One: Strategic Cost Management - Processes and Methods of SCM

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Introduction

Warren Buffett[1] emphasized the importance of understanding accounting, referring to it as the '*language of business'*. This perspective, which captures the essence of the function of accounting, underscores the necessity of grasping accounting principles to effectively evaluate and comprehend business operations. Language, as such, is the basis of communication between two people. So is accounting in respect to a business.

Accounting, as such, is the systematic process of recording, analyzing, and communicating financial information to support decision-making and ensure accountability. Over time, it has evolved into specialized branches tailored to meet the diverse needs of stakeholders. The following are the three branches that forms the foundation of accounting practices:

Financial Accounting - The purpose is to prepare and present financial information for external stakeholders (e.g., investors, creditors, regulators, tax authorities). The process of preparation and presentation of financial statements endeavours to ensure transparency, compliance, and comparability of financial performance. The main features are:

- The focus is on historical, transactional data for external reporting.
- The outputs of the process are referred as 'financial statements' (Income Statement, Balance Sheet, Cash Flow Statement and Statement of changes in Equity and Notes to Accounts).
- The whole process of preparation and presentation of financial statements and other issues are governed by GAAP (Generally Accepted Accounting Principles) and IFRS (International Financial Reporting Standards)[2].

[1] https://www.forbes.com/profile/warren-buffett/

[2] In the Indian context, "accounting standard" refers to the "Indian Accounting Standards (Ind AS)", which are a set of financial reporting standards designed to align with the globally accepted "International Financial Reporting Standards (IFRS)". The Indian Accounting

Cost Accounting – This branch of accounting focuses on preparation of financial information for internal use only and aids in tracking, analyzing, and controlling costs associated with production, operations, and inventory. The emphasis is on cost accumulation, allocation, and control for internal decision-making. Various cost accounting methods and techniques have developed [like job costing, process costing, contract costing activity-based costing (ABC), and standard costing] which are applied in determining product pricing, evaluating cost efficiency and also used in budgeting and inventory valuation.

Management Accounting – Management Accounting consists of two key components: 'management' and 'accounting.' While management focuses on operating an organization in alignment with its strategic objectives, accounting involves various activities aimed at assessing the organization's performance. This includes traditional accounting functions such as stewardship, control, and auditing. Essentially, management accounting refers to the process of generating and providing relevant information to support managerial decision-making. It encompasses the creation and presentation of all essential data required for effectively managing an organization.

The Chartered Institute of Management Accountants (CIMA) adopts a broader perspective on management accounting, emphasizing its role beyond traditional accounting functions and aligning it with the specific functions of management, especially decision making. According to CIMA's official definition, management accounting involves applying accounting and financial management principles to generate, protect, sustain, and enhance value for stakeholders across both for-profit and non-profit organizations in the public and private sectors.

Furthermore, CIMA highlights that management accounting is an essential aspect of management, requiring the identification, generation, presentation, interpretation, and utilization of relevant information for various purposes, including:

1. Supporting strategic decision-making and business strategy formulation
2. Planning operations over short, medium, and long-term periods
3. Determining an optimal capital structure
4. Designing reward systems for executives and shareholders
5. Providing insights for operational decision-making
6. Controlling operations to ensure resource efficiency
7. Measuring and reporting both financial and non-financial performance to management and stakeholders
8. Protecting both tangible and intangible assets
9. Enforcing corporate governance, risk management, and internal control mechanisms

Standards (Ind AS), as notified under section 133 of the Companies Act 2013, have been formulated keeping the Indian economic & legal environment in view.

These nine points collectively define the scope and importance of management accounting in modern organizations.

Thus, it may be noted that the main issue related to management accounting is related to strategy formulation and strategy implementation which are targeted in gaining competitive advantage for the business. Management accountants are professionals in accounting and finance who generate and utilize cost management information to support the execution of an organization's strategy. This information includes both financial data on costs and revenues, as well as non-financial insights related to customer retention, productivity, quality, and other critical success factors. Cost management refers to the process of developing and applying this information effectively.

Management Accounting and Cost Management

Management accountants are finance professionals responsible for generating and utilizing cost management information to support an organization's strategic objectives. This information includes financial data on costs and revenues, as well as non-financial metrics such as customer retention, productivity, and quality—key factors in business success. *Cost management* involves both the development and application of this information to enhance decision-making.

The strategic role of management accountants is outlined by the Institute of Management Accountants (IMA). Management accounting is a profession that involves collaborating with management in decision-making, designing planning and performance management systems, and offering expertise in financial reporting and control. This helps in shaping and executing an organization's strategy. By leveraging their specialized skills in areas such as decision-making, planning, and performance management, management accountants work alongside organizational leaders to drive strategic success. The *informational value chain* outlines the process by which management accountants transform casual business events into strategic decisions. The informational value chain comprises of five stages which are;

1. Business Need & Business Event (Stage 1): Organizations generate raw data from business transactions and operational activities based on specific business needs.
2. Data Collection (Stage 2): Management accountants gather and summarize this raw data for further processing.
3. Information Processing (Stage 3): Through analysis and expertise, accountants convert raw data into meaningful cost management information, which may be real or estimated.
4. Knowledge Creation (Stage 4): The processed information is integrated with insights about the organization's strategy and competitive environment, producing actionable knowledge.
5. Decision-Making (Stage 5): Using this knowledge, management accountants collaborate with leadership teams to make informed decisions that drive the organization's strategic goals.

Thus, it may be noted that the epitome of the issue is the management accountants' use of the knowledge base created by the financial accountant and the cost accountant to make decision that advance the organization's strategy.

In conclusion it may be stated that each branch of accounting plays a crucial role in ensuring an organization's success. While *financial accounting* fosters transparency and trust among external stakeholders, including investors, regulators, and creditors, *cost accounting* aids in optimizing resources and improving operational efficiency by analyzing cost structures and identifying areas for cost reduction. On the other, *management accounting* equips business leaders with essential insights for strategic decision-making, helping them navigate uncertainty and achieve long-term objectives.

Strategic management and the role of the management accountant

Effective strategic management is essential for an organization's success and remains a central theme. In today's rapidly changing business environment, factors such as economic recessions, global competition, technological advancements, and evolving business processes have made cost management more critical and dynamic than ever. To remain competitive, managers must adopt a strategic mindset.

Strategic thinking involves anticipating and adapting to changes by designing products, services, and operational processes that align with shifting customer demands. Flexibility is the key, and the ability to make rapid adjustments is crucial due to the rise of e-commerce, accelerated market entry, and adaptable manufacturing systems. Additionally, product life cycles—the period from a product's launch to its discontinuation—are becoming increasingly shorter. Past performance is no longer a reliable measure of long-term success; instead, managers must focus on forward-thinking strategies rather than relying on historical trends.

A strategic approach also requires creative and integrative thinking, problems should be analyzed from a cross-functional perspective rather than being confined to a single department like marketing, production, finance, or accounting. Cross-functional teams collaborate by leveraging expertise from multiple areas, allowing for more comprehensive problem-solving. In a dynamic and competitive business landscape, this approach ensures that all organizational resources are aligned toward the ultimate goal: meeting customer needs efficiently and effectively.

Understanding Strategic Cost Management

Strategic Cost Management (SCM) – An Introduction

Definition and Scope of SCM

Strategic Cost Management (SCM) is the process of managing costs with a strategic focus, integrating cost management techniques with overall business strategy to enhance competitiveness, improve efficiency, and maximize value. It goes beyond traditional cost control methods by aligning cost decisions with the organization's long-term goals and market positioning. SCM is an essential approach for businesses seeking to optimize costs while maintaining strategic alignment with business goals. Unlike traditional cost management, SCM is proactive, integrates with corporate strategy, and ensures long-term sustainability and competitive advantage. Companies that implement SCM effectively can improve efficiency, drive innovation, and position themselves as market leaders in their respective industries.

SCM refers to the use of cost information to develop and implement business strategies that enhance competitiveness and value creation. Unlike traditional cost management, which focuses on cost reduction and control, SCM aligns cost management practices with the firm's overall strategy to improve efficiency, innovation, and market positioning. Strategic Cost Management is a critical tool for modern businesses seeking long-term success. By aligning cost strategies with corporate objectives, firms can enhance profitability, gain competitive advantages, and ensure sustainability. Organizations that effectively implement SCM can respond proactively to market changes, optimize resources, and create superior value for stakeholders.

SCM extends beyond cost control to include issues like; *value chain analysis* (examining costs across the entire supply chain), c*ompetitive advantage* (using cost management to differentiate products or services), *customer value (*Aligning costs with customer needs and expectations), *sustainability* (integrating cost strategies with long-term environmental and social goals), and *performance measurement* (using strategic cost information for better decision-making).

Importance of SCM

SCM plays a critical role in ensuring an organization's sustainability and profitability in an increasingly competitive environment. The main reasons why SCM is important are:

- Enhancing Cost Efficiency – Helps in identifying and eliminating non-value-adding activities, reducing unnecessary costs.
- Improving Decision-Making – Provides better insights into cost behavior, enabling informed strategic decisions.
- Supporting Competitive Advantage – Helps businesses gain an edge by optimizing cost structures relative to competitors.
- Aligning Costs with Business Goals – Ensures that cost reduction initiatives do not compromise product quality or strategic objectives.
- Enhancing Profitability – Improves bottom-line performance by managing costs effectively.
- Encouraging Innovation – Drives continuous improvement in processes and resource allocation.

Differences Between Traditional Cost Management and Strategic Cost Management

Aspect	**Traditional Cost Management**	**Strategic Cost Management**
Focus	Cost control and reduction	Aligning costs with business strategy
Approach	Reactive – aims at cutting expenses	Proactive – links costs to competitive advantage
Decision-making	Short-term cost minimization	Long-term value creation
Scope	Internal cost efficiency	Broader view including supply chain and competitors

Tools	Standard costing, variance analysis	Value chain analysis, activity-based costing (ABC), target costing

Cost Behaviour, Cost Drivers, and Organizational Strategy

Cost Behaviour

Cost behaviour refers to how a company's costs change in relation to changes in its activity level (e.g., production volume, sales, or service delivery). Costs are typically classified into three categories[3]:

- Fixed Costs: Remain constant regardless of activity level (e.g., rent, salaries).
- Variable Costs: Change proportionally with activity level (e.g., raw materials, direct labour).
- Mixed/Semi-Variable Costs: Include both fixed and variable components (e.g., utilities, maintenance).
  Example: A factory's rent (fixed) stays the same even if production doubles, but raw material costs (variable) increase with higher output.

Cost Drivers

Cost drivers are factors that directly influence or cause changes in the cost of an activity. Identifying cost drivers helps organizations understand *why* costs occur and how to manage them. Common cost drivers may be classified as:

- Volume-Based Drivers: Units produced, labour hours, machine hours.
- Activity-Based Drivers: Number of orders, customer interactions, setups.
- Structural Drivers: Scale of operations, technology, complexity of processes.
  Example: In a logistics company, fuel consumption (a variable cost) is driven by *distance traveled* (cost driver).

Linkage with Organizational Strategy

In strategic management, businesses typically pursue one of two primary strategies: *cost leadership* or *differentiation.*

Cost leadership strategy focuses on minimizing costs to offer products or services at the lowest price in the industry. This approach is often used by large-scale companies that benefit from economies of scale, such as Reliance Jio, which disrupted the telecom market with affordable data plans and DMart, which operates with a low-cost retail model to offer competitive pricing.

On the other hand, differentiation strategy emphasizes uniqueness by offering superior quality, innovative features, or exceptional customer service, allowing firms like Apple to charge premium prices. Both strategies aim to create competitive advantages and drive profitability. Indian companies like Tata Motors (Jaguar Land Rover) and Asian Paints follow this strategy by providing premium products and innovative

[3] For decision making purpose, it is important to segregate semi variable cost into its fixed element and variable element because fixed cost is relatable to a particular period and is termed as *period cost* while variable cost is relatable to the product and is referred as *product cost.*

solutions that distinguish them from their competitors. Both strategies aim to create competitive advantages and drive profitability.

In this context, understanding cost behaviour and cost drivers is of critical importance for strategic decision-making. The below mentioned lines delve on the specific alignment of these issues and organizational strategies;

In cost leadership strategy, the goal is to become the lowest-cost producer in the industry. Here the understanding of the behaviour of cost is crucial as the focus should be on reducing *variable costs* (e.g., bulk purchasing, automation) and leverage economies of scale to lower *fixed costs per unit.*

In differentiation strategy, where the goal is to offer unique products/services to justify premium pricing the focus is on accepting higher *fixed costs* (e.g., R&D, branding) to create value and managing *variable costs* to avoid eroding profit margins. Under this perspective, focus on innovation (R&D spending) is a driver of product uniqueness.

Operational efficiency is an aspect which contribute in realizing strategic goals. Operational efficiency highlights maximizing output with minimization of waste. This will have the effect of reducing the per unit cost of the product. Outsourcing non-core activities will have the impact of reducing period costs and the aid of *activity-based costing (ABC)* would also help in allocating costs precisely.

Non-value-added activities (e.g., redundant processes) should be identified and eliminated as far as practicable. Use of data analytics to track cost drivers like machine downtime or employee productivity will also help in achieving operational efficiency.

Effective cost management requires aligning cost behaviour and drivers with the organization's strategic goals. By analyzing *how* costs behave and *what* drives them, companies can optimize pricing and profitability, improve resource allocation and enhance competitive advantage. The basic tools used for the purpose are break-even analysis, ABC, and cost-volume-profit (CVP) models to integrate cost behaviour insights into strategic planning. The technique of relevant cost analysis is another basic tool which is used extensively for decision making purpose.

SCM and Competitive Advantage

Competitive advantage[4] arises when a company can deliver superior value compared to its competitors. Strategic cost management is more than just an accounting exercise; it is a strategic tool that aligns cost decisions with broader business objectives. By harnessing detailed cost information, organizations can drive efficiency, foster innovation, and build sustainable competitive advantages that position them for long-term success. SCM plays a critical role in achieving competitive advantage by:

[4] Competitive advantage refers to a firm's ability to outperform its competitors by delivering greater value to customers—either through lower prices, superior quality, or innovative products—and thereby achieve higher profitability. Michael E. Porter, a renowned authority on competitive strategy, significantly contributed to this concept. In his influential books, *Competitive Strategy* (1980) and *Competitive Advantage* (1985), he introduced frameworks such as the value chain and the five forces model which help companies to identify and sustain competitive advantages in their industries by focusing on cost leadership, differentiation, or niche strategies.

- Driving Efficiency: By reducing unnecessary costs and streamlining operations, organizations can offer products or services at more competitive prices without compromising quality.
- Enhancing Innovation: Savings realized through SCM can be reinvested in research and development, leading to innovative products and services that differentiate the firm in the market.
- Supporting Strategic Flexibility: SCM provides real-time cost insights, enabling managers to adjust strategies rapidly in response to market shifts. This flexibility is essential in today's dynamic business environment where customer needs and competitive landscapes evolve quickly.
- Optimizing Resource Allocation: Efficient use of resources, guided by accurate cost information, ensures that investments are made where they yield the highest strategic returns, bolstering the firm's long-term competitive edge.

Three important components[5] of SCM

1. **Strategic Positioning Analysis**: It determines the company's comparative position in the industry in terms of performance.

   Strategic positioning is all about where a company stands in the market. It's how a business distinguishes itself from its competitors and how it is perceived by customers in comparison to other companies in the industry. By understanding its position, a business can make strategic decisions that will help it succeed.

   The *elements* of strategic position analysis are:

   - SWOT Analysis: This involves examining the organization's internal strengths and weaknesses in relation to the external opportunities and threats
   - Competitor Analysis: Assessing the strengths and weaknesses of competitors, as well as the opportunities and threats in the market
   - Market Analysis: Evaluating the market dynamics, including customer needs, industry trends, and growth potentials.
   - Resource Availability: Analyzing the organization's resources, including financial stability, skills, and expertise
   - Strategic Capability Analysis: Assessing the organization's strategic capability, including its resources and competences, to understand its competitive advantage or disadvantage
   - Value Chain Analysis: Understanding the company's internal activities and how each contributes to its competitive position and overall value creation

2. **Cost driver analysis** is a crucial tool for understanding and managing costs within an organization. By identifying and analyzing the factors that drive costs, businesses can make informed decisions to optimize their operations and improve profitability. This analysis helps in accurately allocating costs,

[5] Please refer https://indiafreenotes.com/key-elements-in-strategic-cost-management/

measuring performance, making informed decisions, and driving continuous improvement. It involves identifying all possible cost drivers for a particular type of activity or cost and explaining their cause-and-effect relationship with the total cost incurred.

For example, in the case of monthly fuel cost, the number of kilometers driven, petrol price, and fuel efficiency are cost drivers. The analysis aims to understand the relationship between these drivers and the resulting costs, helping businesses make informed decisions about resource allocation and cost management.

It is an essential component of activity-based costing (ABC) and allows management to evaluate alternative activity drivers that might be more relevant for cost allocation.

3. **Value Chain Analysis**: The process in which a firm recognizes and analyzes all the activities and functions that contribute to the final product.
    - Conducting a Value Chain Analysis can help a company discern areas of its business that are inefficient and implement strategies to optimize procedures for maximum efficiency and profitability. *The analysis typically includes primary activities (e.g., production, marketing, and distribution) and support activities (e.g., human resources, procurement, and infrastructure) that collectively make up the value chain.* By understanding and optimizing these activities, a company can achieve a competitive advantage, such as cost reduction or product differentiation.

Processes and Methods of SCM

The *process* is the overall approach or framework for managing costs strategically. It outlines the steps and decisions involved in achieving cost reduction and efficiency.

The *methods* are the specific tools or techniques used to implement the cost management process. These methods provide the practical means to achieve cost objectives.

By combining processes and methods, organizations can effectively manage their costs. The specific aspects are; identifying areas where costs can be reduced or eliminated, implementing strategies to achieve those cost reductions and monitoring and evaluating the effectiveness of these strategies.

Example:

- Process: A company decides to implement a lean manufacturing approach to reduce costs.
- Methods: The company uses tools like value stream mapping, kaizen events, and *5S*[6] to identify and eliminate waste in its production processes.

[6] 5S is a workplace organization methodology that is designed to create a clean, organized, and efficient work environment. The five S's stand for:

- Seiri (Sort): Remove unnecessary items from the workplace.
- Seiton (Set in Order): Arrange necessary items in a logical, accessible way.
- Seiso (Shine): Clean the workplace thoroughly and regularly.
- Seiketsu (Standardize): Establish and maintain consistent practices for the first three S's.
- Shitsuke (Sustain): Make 5S a habit and continuously improve the workplace.

By following the process of lean manufacturing and using specific methods like value stream mapping, the company can effectively reduce costs, improve efficiency, and gain a competitive advantage.

Significant Processes in SCM:

Strategic Cost Management is a systematic approach that helps organizations align a company's cost perspectives with broader business perspectives. This approach is structured around *five* key processes that collectively drive efficiency, support competitive advantage, and ensure long-term profitability. Each of the below mentioned processes plays an essential role in enabling organizations to manage costs strategically, ensuring that every cost decision contributes to overall competitiveness and long-term success.

1. **Strategic Cost Planning**

   This initial process ensures that cost management initiatives are integrated with the organization's overall strategy. It involves:

   - *Alignment with Business Strategy*: Ensuring that every cost-related decision supports the long-term goals of the organization.
   - *Identification of Key Cost Drivers*: Recognizing the factors that significantly impact costs and influence competitive advantage.
   - *Setting Cost Targets and Benchmarks*: Establishing clear performance metrics to guide and evaluate cost efficiency.

2. **Cost Identification and Analysis**

   In this process, organizations conduct a thorough examination of their cost structure by:

   - *Identifying and Classifying Costs*: Grouping costs based on their nature (fixed, variable) and purpose (direct, indirect).
   - *Analyzing Cost Drivers*: Delving into the underlying factors that influence each cost category.
   - *Employing Tools like Activity-Based Costing (ABC):* Utilizing advanced costing techniques to allocate expenses more accurately and gain deeper insights into cost behaviour.

3. **Cost Reduction and Improvement**

   Focused on streamlining operations and enhancing efficiency, this process includes:

   - *Implementing Cost Reduction Initiatives*: Adopting practices such as lean manufacturing, value engineering, supply chain optimization, and technology integration to reduce costs.
   - *Continuous Process Improvement*: Regularly refining processes to eliminate waste and drive incremental improvements in cost efficiency.

4. **Cost Control and Monitoring**

   Effective cost management requires rigorous oversight. This process involves:

   - *Establishing Control Systems*: Implementing policies and procedures to ensure disciplined spending.

- *Monitoring Performance*: Regularly comparing actual costs against budgets and established benchmarks.
- *Conducting Variance Analysis*: Identifying deviations from expected costs and uncovering the reasons behind these variances to inform corrective actions.

5. **Performance Evaluation and Feedback**

The final process ensures that cost management strategies remain effective and relevant by:

- *Assessing Initiative Effectiveness*: Measuring the outcomes of cost management actions against set objectives.
- *Providing Stakeholder Feedback*: Communicating performance insights to ensure accountability and promote transparency.
- *Adjusting Strategies*: Refining the cost management approach based on feedback and evaluation, ensuring continuous alignment with business goals and market conditions.

Methods/Techniques of SCM

Several techniques are employed in SCM to optimize costs while enhancing value. Some of the most important methods are discussed in the below mentioned lines:

1. **Value Chain Analysis**[7]

Effective strategy implementation requires managers to understand how a firm's Critical Success Factors (CSFs)[8] are executed at every stage of its operations. Since execution is key to achieving strategic goals, managers must ensure that all operational activities align with the firm's overall strategy. This involves analyzing every step necessary to meet customer needs, which is where Value Chain Analysis (VCA) plays a crucial role.

Value Chain Analysis is a strategic tool used to assess a firm's competitive advantage, identify opportunities for cost reduction, and improve value creation for customers. It examines all activities involved in delivering a product or service, from product development and procurement to production, sales, and customer service. While it is more straightforward for manufacturers who deal with tangible inputs and outputs, it is equally applicable to service firms and non-profit firms, though their value chains may be harder to define. Generally, an organization can be broken down into six to eight key activities to maintain analytical clarity.

The Value Chain is named so because each activity is designed to add value to the final product or service. Understanding these activities allows firms to assess their competitive positioning, whether

[7] While the general concept of analyzing business processes existed before, Michael E. Porter (1985) was the first to formalize the 'Value Chain' framework and link it explicitly to competitive strategy. In 1985, Michael E. Porter authored *Competitive Advantage: Creating and Sustaining Superior Performance* where he introduced value chain analysis.

[8] Critical Success Factors (CSFs) are the essential areas of a business or project that must be effectively executed to achieve organizational objectives and ensure long-term success. These factors help businesses and managers identify the most crucial elements that drive performance, competitive advantage, and sustainability. CSFs are strategic in nature, meaning they directly impact business goals and determine the overall success or failure of an organization. They are also measurable, allowing companies to track performance using Key Performance Indicators (KPIs).

they lead through cost efficiency or differentiation, and identify areas where they are strongest or weakest. A firm's ability to execute its strategy effectively depends on ensuring that every activity aligns with its intended market positioning.

The value chain can be divided into three sequential phases:

1. Upstream Phase – Focuses on product development and supplier relationships.
2. Operation Phase – Encompasses manufacturing (for producers) or service delivery (for service firms).
3. Downstream Phase – Involves customer interactions, including distribution, sales, and after-sales service.

These phases are closely linked to Supply Chain Management (SCM) (upstream) and Customer Relationship Management (CRM) (downstream). Firms must strategically decide which parts of the value chain to control, based on their comparative advantage, where they can provide maximum value at the lowest cost.

Porter's Value Chain Analysis[7] provided a structured way to analyze a firm's activities to identify sources of competitive advantage. It helped businesses determine where they could create value for customers and reduce costs by breaking down operations into primary and support activities.

As shown in Fig 1.1, the value chain is divided into primary and support activities. The primary activities add value directly as the firm transforms inputs into outputs — from raw materials through production phases to sales and marketing and finally customer service. Primary activities are supply chain management, operations, distribution, marketing and sales, and after-sales service. Other activities, called support activities, add value indirectly. These activities such as research and development (R&D), information systems, human resources, accounting and finance, and firm infrastructure including processes, policies, and procedures support each of the primary activities.

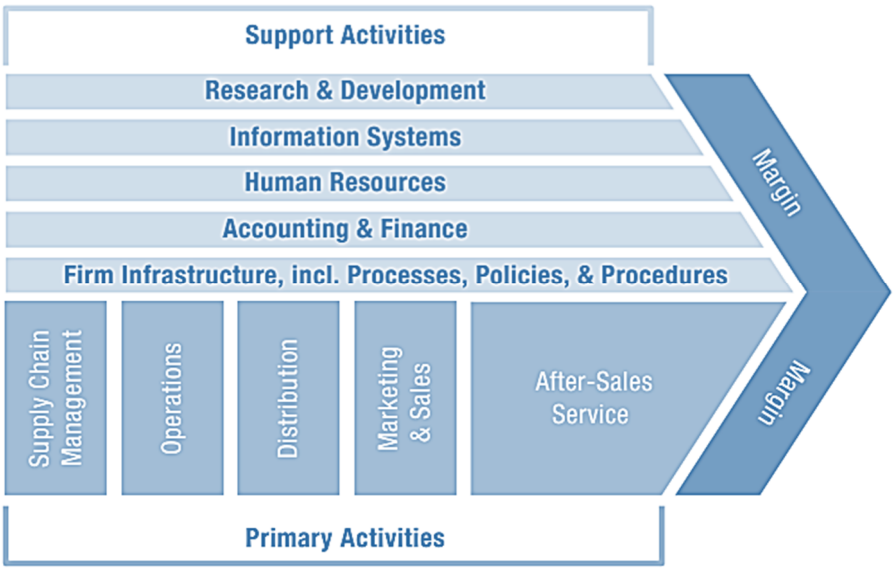

Figure1.1: Generic Value Chain: Primary and Secondary Activities

The generic value chain is adapted according to the specific needs of the business. For example, *Reliance Retail* focuses on selecting store locations, managing supply chains, operating physical and online stores, marketing, and after-sales services. In contrast, *Tata Electronics* emphasizes R&D, chip design, raw material sourcing, fabrication, quality control, sales, and technical support. Each business tailors its value chain to optimize efficiency and competitive advantage.

2. **Activity-Based Costing (ABC)**:

This method assigns costs to products based on the activities required to produce them, providing a more accurate picture of product profitability. Activity-Based Costing (ABC) is an advanced costing method that assigns indirect costs to products and services by tracing them to the specific activities that generate those costs. Unlike traditional costing system[9] which typically use broad allocation bases (such as labour hours or machine hours), ABC focuses on identifying and analyzing individual activities within an organization. This distinguished approach improves cost accuracy and product pricing by establishing a direct cause-and-effect relationship between activities and resource consumption. Major issues of ABC are covered in the below mentioned points.

- *Significance*: ABC is defined as an accounting method that identifies the activities performed within an organization and assigns the cost of each activity to cost objects (such as products, services, or customers) based on their actual consumption. This method enhances the precision of cost analysis and provides a solid basis for better pricing and decision-making.
- *Objectives:* The primary objectives of ABC include:
    - Identifying value-added activities.
    - Focusing on high-cost activities.
    - Allocating overheads more accurately.
    - Revealing opportunities for cost reduction and process improvements.
    - Enhancing product costing accuracy to inform pricing and product mix decisions.
- *ABC Process*

  There are, as such, four essential steps in implementing an ABC system:
    - *Identifying Activities***:** Determining the various activities involved in production, such as unit-level, batch-level, product-level, and facility-level activities.
    - *Assigning Costs to Activity Cost Centers:* Grouping costs into cost pools associated with specific activities.
    - *Selecting Appropriate Cost Drivers:* Identifying measurable factors (cost drivers) that influence the cost of each activity (for example, number of purchase orders or machine hours).

[9] Referred as the volume-based system

- *Assigning Costs to Products*: Tracing the costs from the activity cost centers to the products based on their usage of the activities.

- *Benefits*: ABC provides several advantages:
  - More accurate product and service costing.
  - Enhanced understanding of overhead costs and their drivers.
  - Better-informed pricing and make-or-buy decisions.
  - Improved customer profitability analysis.
  - Support for continuous improvement initiatives and performance management.
- *Weaknesses and Challenges*: Despite its benefits, ABC has some limitations:
  - It relies on historical cost data, which may not always be relevant for future planning.
  - It does not clearly separate fixed and variable costs within overheads.
  - The effectiveness of ABC depends heavily on the accuracy of cost driver identification.
  - Implementing an ABC system can be more complex and expensive compared to traditional methods.
- *Comparison with Traditional Costing*

  Unlike traditional costing methods that allocate overhead uniformly, ABC uses multiple cost drivers to assign costs more precisely, thereby providing insights into specific operational inefficiencies. This detailed approach is particularly valuable in environments with high overhead costs, diverse product ranges, and non-volume-based cost consumption.
- *Conclusion*

  ABC, as such, not only improves product costing accuracy but also serves as a strategic tool for managing overheads. By focusing on the activities that drive costs, organizations can identify inefficiencies, streamline processes, and ultimately achieve a competitive cost advantage. While ABC may require more effort and resources to implement, its potential benefits in cost management and decision-making can be substantial.

3. **Target Costing**:

Effective cost management systems evolve in response to shifting competitive landscapes. One prominent example is *Target Costing*, which is especially relevant for companies in the process and assembly sectors. In these industries, maintaining a long-term competitive edge through a low-cost strategy or product differentiation is increasingly challenging. Any advantage gained is often short-lived, as competitors quickly match new offerings at competitive prices and with even more advanced features. Instead of striving for a sustainable edge based solely on low costs or premium product attributes, firms find themselves locked in ongoing direct competition, thereby necessitating the adoption of target costing.

Target Costing[10] is considered as a philosophy in which product development is based on what the customer wants and is willing to pay for and not what it costs to produce. Hence it starts with the market determined price; then deducts the desired profit margin; and works back the target cost. Peter Drucker refers to this approach as 'price-led costing.'

The Chartered Institute of Management Accountants (CIMA) describes target costing as a systematic approach used to determine and achieve the total cost at which a product with specified functionality and quality must be produced to deliver the desired profitability at its anticipated selling price.

Thus,

$$Target\ Cost\ =\ Target\ Price - Target\ Profit$$[11]

The target cost is essentially a goal, and a company has two approaches to manage costs to meet this objective: (i) by adopting new manufacturing technologies, leveraging advanced cost management methods such as activity-based costing, and boosting productivity, or (ii) by reengineering the product or service design.

4. **Total Quality Management (TQM)**:

TQM is a holistic management strategy that embeds quality into every organizational process. According to ISO, it is a quality-centered approach that involves all members of an organization, aiming for long-term success through customer satisfaction and societal benefits.

Main Concepts

- Total**:** Involves the entire organization, supply chain, and product life cycle.
- Quality**:** Focuses on achieving excellence in products and services.
- Management: Involves planning, organizing, controlling, and leading resources to drive continuous improvement.

Origins & Evolution

TQM evolved from early 20th-century quality control in the U.S. and was further developed in the 1960s in Japan by experts like Deming[12] and Juran. In the 1980s and 1990s, Western companies embraced TQM as a comprehensive quality improvement initiative inspired by Japan's success.

Core Elements

- Management Commitment**:** Leaders must consistently support quality initiatives.
- Customer Focus**:** Prioritizing customer needs and satisfaction.
- Defect Prevention**:** Emphasizing prevention over detection of defects.

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[10] Target costing is a philosophy that prioritizes customer preferences and their willingness to pay over production costs. It begins with the market-driven selling price, subtracts the desired profit margin, and works backward to determine the target cost. Peter Drucker referred to this method as "price-led costing." Essentially, it replaces the traditional equation "Cost + Profit = Selling Price" with "Target Cost = Target Price – Target Profit."

[11] Whereas the traditional approach calculates suggest selling as cost plus profit.

[12] William Edwards Deming, a well-known quality guru, posited the 14 quality principles, such as creating a constancy of purpose, breaking down departmental barriers, and driving out fear, provide a framework for embedding quality in every facet of the organization and promoting continuous improvement.

- Employee Involvement**:** Quality is everyone's responsibility.
- Continuous Improvement**:** Ongoing measurement, analysis, and refinement of processes.
- Use of Tools**:** Techniques such as statistical analysis, benchmarking, and supplier teaming.

Objectives

- Achieve zero defects and maximum customer satisfaction.
- Enhance productivity and efficiency.
- Foster employee training and open communication.
- Improve product quality and cost-effectiveness through continuous process improvement.

Benefits

- Higher customer satisfaction and loyalty.
- Improved work culture and teamwork.
- Increased efficiency, reduced waste, and greater profitability.

Limitations

- TQM is a slow-moving, long-term process.
- Success depends on active employee participation and effective management.
- Implementation challenges may arise, especially in resistant or developing organizational cultures.

5. **Benchmarking**

Benchmarking is an ongoing process of evaluating business processes and performance indicators against industry standards or best practices from other sectors. The specific areas of measurement include quality, time, and cost, with improvements focused on achieving efficiency—doing things 'better, cheaper, and faster'. Benchmarking is more than mere replication; it requires thorough self-evaluation and the ability to adapt successful practices.

Kempner (1993) defines benchmarking as a continuous and systematic method for assessing and comparing an organization's work processes with those of others. It introduces an external perspective to internal functions, operations, or activities.

From these definitions, it is evident that the primary objective of benchmarking is to provide key personnel with an external standard for assessing the quality and cost of internal processes, ultimately helping identify areas for improvement.

The Benchmarking Process

1. Identify what to benchmark
    - The first step is to determine which processes, products, or performance metrics need improvement.
    - Organizations should focus on critical areas such as cost efficiency, customer satisfaction, and productivity.
    - Selecting the right benchmarks ensures meaningful comparisons and targeted improvements.

2. Select Benchmarking Partners
    - Choosing the right organizations or industry leaders for comparison is essential.
    - Benchmarking partners can be competitors, companies in related industries, or those organizations recognized for best practices.
    - A well-chosen partner helps set realistic and achievable targets.
3. Collect and Analyze Data
    - Gather relevant data on performance metrics through methods such as surveys, interviews, and direct observations.
    - Compare organization's data with that of benchmarking partners to identify performance gaps.
    - Analyzing this data helps in understanding strengths and areas that need enhancement.
4. Develop and Implement Action Plans
    - Based on findings, create strategies for improvement and set unambiguous, measurable goals.
    - Assign responsibilities, allocate resources, and establish a timeline for execution.
    - Continuous monitoring and adjustments ensure that benchmarking leads to sustainable improvements.

Types of Benchmarking

Despite being a straightforward concept, benchmarking is classified into multiple categories in the literature. Based on the nature of the business, benchmarking is categorized as:

1. Internal Benchmarking – Involves comparisons between different departments within the same organization. For example, an undergraduate college might compare the number of classes conducted by its English department with those of its Philosophy department, which is regarded as the benchmark due to its high student performance.
2. Competitive Benchmarking – Involves comparison with direct competitors. For instance, if the English department in College XYZ compares the number of classes it conducts with the English department of College MNK (a competing institution in the same region), it falls under competitive benchmarking.
3. Industry Benchmarking – Involves comparisons with organizations within the same industry that are not direct competitors. If the colleges mentioned earlier are not competing for student enrollment but still compare teaching practices, it would be an example of industry benchmarking.
4. Generic Benchmarking – Focuses on adopting successful business processes or functions that can be applied across industries, irrespective of the sector.

Another classification method categorizes benchmarking based on the aspect being compared:

1. Product Benchmarking – A long-standing practice where organizations analyze competitors' products through reverse engineering to evaluate features, performance, and potential areas for improvement.
2. Process Benchmarking – Focuses on analyzing and comparing business processes against industry best practices to identify areas of improvement.
3. Performance Benchmarking – Involves collecting and evaluating key performance indicators (KPIs) to compare organizational performance.
4. Strategic Benchmarking – Assesses improvements in an organization's strategic performance by comparing it with industry leaders as well as the organization's own past performance.

5. **Business Process Re-engineering (BPR)**:

BPR is defined as the radical re-design of business processes to optimize end-to-end workflows and eliminate redundancies. It emerged in the early 1990s, introduced by Michael Hammer, who emphasized that organizations should not just automate existing processes but fundamentally rethink how work is performed to achieve dramatic improvements in various performance metrics, including cost, quality, service, and speed.

BPR is crucial for organizations seeking to:

- *Enhance Efficiency:* By streamlining workflows and eliminating non-value-adding tasks, BPR helps organizations accomplish more with fewer resources, leading to increased operational efficiency.
- *Reduce Costs:* The elimination of unnecessary steps and the automation of manual tasks can significantly lower operational costs, resulting in substantial savings for organizations.
- *Align Processes with Strategic Goals*: BPR enables organizations to align their processes with strategic objectives, ensuring that resources are allocated effectively to support business priorities.
- *Improve Customer Satisfaction*: By focusing on customer needs and optimizing service delivery processes, BPR can enhance customer satisfaction and loyalty

6. **Life Cycle Costing (LCC)**:

*Life Cycle Costing (*LCC) considers all costs associated with a product over its entire life cycle, from development to disposal. It is a comprehensive financial assessment method that evaluates the total cost of ownership of an asset over its entire life span, from acquisition to disposal. This approach is crucial for decision-making in capital budgeting, procurement, and project management.

Definition of Life Cycle Costing

Life Cycle Costing, also known as whole life costing, aggregates all costs associated with an asset throughout its life cycle. This includes:

- Initial Costs: The purchase price and installation costs.
- Recurring Costs: Ongoing expenses such as operating costs, maintenance, and repairs.

- Disposal Costs: Costs incurred in disposing the asset at the end of its useful life.
- Residual Value: The estimated value of the asset at the end of its life, which can offset total costs.

The formula for calculating Life Cycle Costing can be expressed as:

Life Cycle Cost = Initial Cost+ PV of Recurring Costs − PV of Residual Value.

7. **Kaizen Costing**:

Kaizen Costing is a cost management technique focused on continuous improvement and cost reduction throughout the production process. Originating in Japan, the term 'Kaizen' means 'change for better' or 'continuous improvement'. Unlike traditional cost-cutting methods, which focus on drastic reductions, Kaizen Costing aims to optimize costs incrementally while maintaining or improving quality and efficiency.

Key Principles of Kaizen Costing

- Continuous, Small-Scale Improvements
  - Encourages gradual and consistent cost reductions rather than one-time, large-scale changes.
  - Enhances efficiency without disrupting ongoing operations.
- Employee Involvement and Ownership
  - Every employee, from shop-floor workers to management, actively participates in identifying inefficiencies.
  - Encourages teamwork, innovation, and a problem-solving mindset.
- Elimination of Waste (*Muda*[13])
  - Focuses on removing all forms of waste, including excess material, time delays, unnecessary motion, and overproduction.
  - Aligns with Lean manufacturing principles[14] to improve productivity and reduce costs.
- Proactive Cost Control
  - Costs are monitored and adjusted in real time to prevent inefficiencies before they escalate.
  - Uses cost variance analysis to track performance and implement corrective actions.
- Sustainability and Competitive Advantage
  - By embedding Kaizen principles, organizations build long-term efficiency, adaptability, and market competitiveness.
  - Encourages a culture of continuous learning and innovation.

[13] Muda refers to any activity that consumes resources without adding value to the product or service, as outlined in the Toyota Production System. As such, *muda* refers to waste itself (non-value-adding activities), while its elimination is the goal of Lean methodologies like the Toyota Production System [Ohno, T. (1988). Toyota Production System: Beyond Large-Scale Production. Productivity Press].

[14] *Lean Manufacturing* is a systematic approach aimed at maximizing value while minimizing waste in production processes. Originating from the Toyota Production System (TPS), it emphasizes efficiency, continuous improvement, and customer value.

Conclusion

Kaizen Costing is more than a cost-cutting tool—it is a strategic approach that ensures sustained improvement in business processes. By focusing on small, ongoing enhancements, organizations achieve greater efficiency, cost-effectiveness, and quality, ensuring long-term success.

8. **Six Sigma**

Six Sigma is a data-driven approach aimed at eliminating defects and improving quality, which can lead to cost savings. It comprises of a structured methodology focused on eliminating defects, reducing process variability, and enhancing quality to drive cost savings and efficiency. Originally developed by Motorola in the 1980s, it has since become a widely adopted framework across industries to improve operational performance and customer satisfaction.

Core Principles of Six Sigma

- Customer Focus: Six Sigma emphasizes understanding and meeting customer needs and expectations. Organizations must define quality from the customer's perspective, ensuring that products and services align with their requirements. Thus;
    - Quality is defined from the customer's perspective.
    - Ensures products and services meet or exceed customer expectations.
- Data-Driven Decision Making: Decisions are based on data analysis rather than assumptions or intuition. This involves rigorous data collection and statistical analysis to identify defects and areas for improvement. Thus;
    - Uses statistical analysis and empirical data rather than assumptions.
    - Helps in identifying defects, process inefficiencies, and improvement areas.
- Process Optimization: The methodology seeks to improve processes by systematically identifying and eliminating causes of defects, thereby reducing variability and enhancing quality. Thus;
    - Focuses on systematic identification and elimination of the causes of defects.
    - Reduces variability and enhances overall process stability.
- Continuous Improvement (Kaizen Mindset): Six Sigma fosters a culture of ongoing improvement, encouraging organizations to continually seek ways to enhance processes and reduce costs. Thus;
    - Encourages organizations to regularly evaluate and refine processes.
    - Aims for sustained efficiency and cost-effectiveness.
- Defect Reduction:
    - The goal is to achieve only 3.4 defects per million opportunities (DPMO).
    - Ensures high process capability and near-perfection in quality.

9. **Just-In-Time (JIT) Inventory Control**:

Just-In-Time (JIT) Inventory Control is a lean management strategy aimed at reducing inventory costs by ensuring that materials and products arrive exactly when needed, without excessive stockpiling. Originally developed in Japan, primarily by Toyota, JIT helps in minimizing waste, improving efficiency, and reducing production costs.

Key Principles of JIT Inventory Control

- Demand-Driven Production
    - Inventory is replenished based on actual demand, not forecasts.
    - Prevents overproduction and excess storage costs.
- Zero Waste Approach
    - Focuses on eliminating waste in inventory, time, and production processes.
    - Reduces obsolete stock, storage space, and capital tied up in inventory.
- Strong Supplier Relationships
    - Requires reliable suppliers for on-time delivery of materials.
    - Collaboration ensures minimal delays and inventory shortages.
- Efficient Workflow & Layout
    - Workstations and production lines are optimized for smooth material flow.
    - Reduces unnecessary movement, bottlenecks, and idle time.
- Quality Control & Defect Prevention
    - Defective items are identified and corrected immediately.
    - Ensures that only high-quality products move to the next stage.

Benefits of JIT Inventory Control

- Cost Reduction – Lowers storage, handling, and inventory carrying costs.
- Increased Efficiency – Ensures materials are available when needed, avoiding delays.
- Improved Product Quality – Defect detection and prevention lead to higher customer satisfaction.
- Better Cash Flow Management – Frees up capital otherwise locked in inventory.
- Enhanced Flexibility – Businesses can quickly adapt to market changes and customer demands.

10. **Balanced Scorecard**

Integrates financial and non-financial performance measures to provide a more comprehensive view of organizational performance.

The Balanced Scorecard (BSC) is a strategic management tool that provides organizations with a framework for translating their vision and strategy into actionable objectives across four key perspectives: financial, customer, internal business processes, and learning and growth. Developed by Dr. Robert Kaplan and Dr. David Norton in the early 1990s, the BSC helps organizations measure

performance beyond traditional financial metrics, offering a more comprehensive view of their overall health and operational effectiveness.

A firm's strategic direction is guided by critical success factors, which serve as a roadmap for competitive success. While financial measures like profitability offer insight into performance, they only reflect short-term outcomes.

To address this, modern accounting reports incorporate both financial and non-financial metrics, structured around *four* key perspectives:

1. Financial Perspective: This aspect focuses on financial performance and the metrics that indicate the success of an organization's strategy in generating revenue and profitability. Common metrics include return on investment (ROI), operating income, and cash flow.
2. Customer Perspective: This perspective assesses how customers view the organization. Metrics may include customer satisfaction scores, retention rates, and market share. Understanding customer needs and perceptions is crucial for maintaining competitive advantage.
3. Internal Business Processes Perspective: This area evaluates the efficiency and effectiveness of internal processes that create and deliver value. Metrics might include cycle times, quality rates, and process efficiencies. The goal is to identify and improve key processes that drive customer satisfaction and financial performance.
4. Learning and Growth Perspective: This perspective focuses on the organization's ability to innovate, improve, and learn. It includes metrics related to employee training and development, organizational culture, and knowledge management. A strong emphasis on learning and growth is essential for long-term sustainability and success.

Strategy Map

The strategy map is an extension of the Balanced Scorecard, visually linking the four perspectives in a cause-and-effect diagram. For many organizations, enhancing learning and growth directly improves internal processes, leading to better customer satisfaction and, ultimately, strong financial performance.

By integrating both financial and strategic insights, the Balanced Scorecard and Strategy Map help firms maintain competitive advantage and align their operations with long-term goals.

The following table provides the linkage and understanding of the various critical success factors (CSF) of the organization and the four perspectives of BSC.

Critical Success Factors and their Measurement[15]

Critical Success Factor		**How to Measure the CSF**
	Profitability	Earnings from operations, earnings trend

[15] Adopted from Cost Management, a strategic emphasis, 5th Edition, *by* Blocher, Stout, Cokins

Financial Factors	Liquidity	Cash flow, trend in cash flow, interest coverage, asset turnover, inventory turnover, receivables turnover
	Sales	Level of sales in critical product groups, sales trend, percent of sales from new products, sales forecast accuracy
	Market Value	Share price
Customer Factors	Customer Satisfaction	Customer returns and complaints, customer surveys
	Dealer and Distributor	Coverage and strength of dealer and distributor channel relationships (e.g., number of dealers per state or region)
	Marketing and Selling	Trends in sales performance, training, market research activities (measured in hours or dollars)
	Timeliness of Delivery	On-time delivery performance, time from order to customer receipt
	Quality	Customer complaints, warranty expense
Internal Business Processes	Quality	Number of defects, number of returns, customer survey results, amount of scrap, amount of rework, field service reports, warranty claims, vendor quality defects
	Productivity	Cycle time (from raw materials to finished product), labour efficiency, machine efficiency, amount of waste, rework, and scrap
	Flexibility	Setup time, cycle time
	Equipment Readiness	Downtime, operator experience, machine capacity, maintenance activities
	Safety	Number of accidents, effects of accidents
Learning and Growth	Product Innovation	Number of design changes, number of new patents or copyrights, skills of research and development staff
	Timeliness of New Product Development	Number of days over or under the announced ship date
	Employee Morale	Number of training hours, amount of skill performance improvement, Employee turnover, number of complaints, employee survey results
	Competence	Rate of turnover, training, experience, adaptability, financial and operating performance measures

11. Theory of Constraints (TOC)

The Theory of Constraints (TOC) is a methodology that helps organizations enhance efficiency and productivity by identifying and resolving bottlenecks in their processes. One of its primary applications

is in improving cycle time, which refers to the speed at which raw materials are converted into finished goods.

Crucial Aspects of TOC

- Identifying Bottlenecks
    - TOC focuses on pinpointing constraints within the production process—areas where work slows down due to capacity limitations or inefficiencies.
    - Bottlenecks often lead to accumulation of partially completed products, causing delays and inefficiencies.
- Optimizing Production Flow
    - By addressing bottlenecks, TOC streamlines production, ensuring a smooth transition from raw materials to final products.
    - This results in faster cycle times, reducing lead times and improving overall responsiveness.
- Competitive Advantage Through Speed
    - In a globalized market, the ability to deliver products faster than competitors is a critical success factor.
    - TOC emphasizes speed in three key areas:
        - Product Development: Rapid innovation to meet evolving customer demands.
        - Manufacturing: Efficient production processes to reduce delays.
        - Delivery: Ensuring on-time fulfillment of customer orders.
- Continuous Improvement
    - TOC follows an ongoing cycle of identifying, improving, and reassessing constraints, leading to continuous operational enhancements.
    - This method ensures that businesses are adaptable to changing market dynamics and customer expectations.

Conclusion

The Theory of Constraints is a powerful tool for organizations striving to improve their efficiency, responsiveness, and overall competitive edge. By focusing on eliminating bottlenecks and accelerating processes, firms can meet customer expectations for faster product development, seamless production, and timely delivery, ultimately driving business success.

MCQs

1. What is the primary objective of Strategic Cost Management (SCM)?
    a. Increase operational costs
    b. Reduce costs and enhance strategic position

c. Focus only on short-term cost reduction
d. Ignore cost information in decision-making

2. How does Strategic Cost Management differ from traditional cost analysis?
   a. It ignores cost data.
   b. It emphasizes short-term cost reduction.
   c. **It incorporates a broader strategic perspective**.
   d. It eliminates competitive advantages.

3. What role do cost accounting systems play in Strategic Cost Management?
   a. Limitation to inventory valuation
   b. Assist in short-term operational decisions
   c. Align with overall strategic goals
   d. Ignore strategic elements

4. What is the purpose of separating costs in Strategic Cost Management?
   a. To increase overall costs
   b. To simplify accounting processes
   c. To reduce the strategic position
   d. To identify costs that contribute to the strategic position

5. Which technique involves identifying and managing factors influencing the incurrence of costs?
   a. Benchmarking
   b. Activity-Based Costing (ABC)
   c. Cost Driver Analysis
   d. Total Quality Management (TQM)

6. What does Target Costing (TC) involve?
   a. Setting a target cost and increasing it
   b. Setting a target cost and working backward
   c. Ignoring cost considerations
   d. Focusing only on short-term costs

7. What is the focus of Total Quality Management (TQM)?
   a. Reducing costs through outsourcing
   b. Achieving continuous improvement and customer satisfaction
   c. Ignoring customer needs
   d. Minimizing technology adoption

8. What does Value Chain Analysis aim to achieve in Strategic Cost Management?
   a. Increase overall costs in the value chain
   b. Identify opportunities for cost reduction and value creation
   c. Eliminate value chain activities
   d. Ignore costs in the value chain

9. Which type of strategy aims to become the low-cost producer in an industry?
   a. Differentiation Strategy
   b. Focus or Niche Strategy

c. Cost Leadership Strategy
d. Sustainable Competitive Advantage Strategy

10. What is the main focus of Differentiation Strategy?
a. Increasing overall costs
b. Achieving operational efficiency
c. Offering unique and distinctive products or services
d. Reducing product quality

11. What does Focus or Niche Strategy involve?
a. Targeting a broad market
b. Concentrating on a specific market segment or niche
c. Ignoring customer needs
d. Maximizing economies of scale

12. What is Competitive Advantage?
a. Achieving cost competitiveness within industry norms
b. Any advantage that can be easily replicated
c. Unique attributes, resources, or capabilities that outperform competitors
d. A short-term advantage in the marketplace

13. What is the time horizon of Traditional Cost Management?
a. Only short-term planning
b. Only long-term planning
c. Incorporates both short-term and long-term considerations
d. No consideration of time

14. How does Strategic Cost Management integrate with overall business strategy?
a. Less integration with business strategy
b. Ignoring business strategy
c. Aligning cost management practices closely with strategic goals
d. Focusing only on operational goals

15. What is the primary focus of Porter's value chain analysis?
a. Increasing overall costs
b. Identifying opportunities for cost reduction
c. Ignoring business activities
d. Eliminating value chain activities

16. Strategic Cost Management (SCM) primarily focuses on:
a. Historical costs and financial reporting
b. Future-oriented decision-making and competitive advantage
c. Short-term cost reduction
d. Traditional cost accounting methods

17. Which of the following is NOT a component of Strategic Cost Management?
a. Strategic Positioning Analysis
b. Cost Driver Analysis

c. Value Chain Analysis
d. Financial Ratio Analysis

18. The goal of Target Costing is to:
a. Reduce costs without compromising quality
b. Set a target cost for a product based on its market price and desired profit margin
c. Allocate overhead costs more accurately
d. Identify cost drivers within the value chain

19. Kaizen Costing emphasizes:
a. Large-scale cost reduction initiatives
b. Continuous, incremental improvements in production processes
c. Cost reduction through outsourcing
d. Eliminating all non-value-added activities

20. Benchmarking involves:
a. Comparing a company's performance to industry best practices
b. Setting target costs for new products
c. Allocating costs based on activities
d. Reducing costs through automation

21. A key difference between traditional cost management and strategic cost management is:
a. Focus on historical costs vs. future-oriented decision-making
b. Use of standard costing vs. activity-based costing
c. Emphasis on cost reduction vs. cost optimization
d. All of the above

22. Strategic Positioning Analysis helps a company:
a. Identify its competitive advantage
b. Determine its cost drivers
c. Allocate costs more accurately
d. Reduce waste in the value chain

23. Value Chain Analysis is used to:
a. Identify non-value-added activities
b. Set target costs
c. Allocate overhead costs
d. Benchmark against competitors

24. Which of the following is NOT a stage of Strategic Cost Management?
a. Formulating strategies
b. Communicating strategies
c. Implementing tactics
d. Financial reporting

25. The primary goal of Strategic Cost Management is to:
a. Maximize profits
b. Reduce costs without affecting quality

c. Improve financial performance
d. **Align cost management with business strategy**

PART A: STRATEGIC COST MANAGEMENT (40 MARKS)

Unit Two: Relevant Costing

Contents

Introduction

Decision-making is a fundamental process in management that involves selecting the best alternative from available options to achieve organizational goals. Effective decision-making requires a structured approach that uses relevant information to ensure that strategic choices align with the firm's strategy, resources, and market conditions.

A well-defined decision-making process typically involves the following steps:

1. Identifying the Problem or Opportunity – Clear definition of the problem at hand.
2. Gathering and Analyzing Information – Collecting financial and non-financial data to evaluate alternatives.
3. Developing and Evaluating Alternatives – Exploring different courses of action and assessing their potential outcomes.
4. Selecting the Best Alternative – Choosing the option that best aligns with strategic objectives.
5. Implementing and Monitoring the Decision – Executing the choice and tracking its effectiveness.

In step 2 (mentioned above), financial as well as non-financial information are gathered and analysed. It is important to note that in the course of our study, only financial information is considered[1] as the academia of Strategic Cost Management primarily deals with decision making on the basis of cost information[2]. This information is either pertinent (relevant) or irrelevant for decision making purpose. Pertinent information is referred as 'relevant' information. Relevant information analysis plays a crucial role in decision-making. Managers rely on cost data, revenue projections, market trends, customer preferences, and operational efficiencies to make informed choices. The focus is on differential costs (costs that change between alternatives), opportunity costs, and qualitative factors such as customer satisfaction and brand reputation.

[1] Non-financial parameters are considered only in the understanding of Balanced Scorecard (BSC) [discussed in unit one],.
[2] The *management accountant*, as such, uses the cost information -prepared by *cost accountants* - for decision making purpose. He may also use financial information prepared by *financial accountant*.

By integrating data-driven insights with strategic thinking, businesses can improve efficiency, minimize risks, and enhance competitive advantage.

Information and decision making

Decisions made by managers are future-oriented. These decisions are made with the goal of maximising profits or minimising cost. To make well-informed choices, they rely on cost information, which helps determine the best course of action.

Decision-making, as such, are made on the following two principles:

- Decisions should focus on future consequences rather than past events or historical costs.
- Decision-making should not be influenced by unavoidable future events arising from previous commitments.

Managers require relevant information to anticipate the potential impact of their decisions on costs and profits.

Traditional cost accounting methods primarily reflect past transactions and are not designed for forward-looking analysis. It is important to note that Cost-Volume-Profit (CVP) analysis, the primary tool in decision making, has serious limitations and may not always be suitable for assessing decision outcomes[3]. One primary reason is that it makes a number of unrealistic assumptions. Effective decision-making relies on relevant costs, which focus on cash flows (inflows and outflows) which includes the following:

- Additional cash expenses required due to a decision.
- Potential savings from reduced cash outflows.
- Expected changes in cash income resulting from the decision.

Since traditional cost accounting methods do not adequately support decision-making, managers should base economic and financial decisions on future cash flows rather than past accounting measures of costs or profits.

Relevant Cost and Decision Making

It is evident from the discussion above that manger, on behalf of business will make more cost-effective decisions if the focus is on relevant cost information only. When making business decisions, only relevant costs and benefits should be considered, as they help assess the financial impact of different choices.

A relevant cost is any future expense that will directly result from a specific decision.

Definition:

Relevant costs refer to costs that are crucial for making specific business decisions. According to CIMA, they are '*costs appropriate to aiding the making of specific management decisions*'. These costs are directly associated with a particular decision and vary depending on the chosen course of action.

[3] CVP analysis is generally suitable for decision-making when it is assumed that fixed costs will remain unchanged regardless of the decision made and that variable costs accurately reflect future cash flows incurred as a result of the decision.
However, these assumptions do not always hold true. When fixed and variable cost assumptions are not valid, decision-making should be based on relevant costs to properly assess the financial and economic impact of a decision.

Relevant costs and revenues are those that change based on management decisions. They are future costs that arise only when a particular decision is made. The key idea behind relevant cost analysis is to focus on only the necessary information and avoid irrelevant data that might complicate the decision-making process.

Relevant cost analysis helps managers focus on essential financial data and make profitable and strategic decisions. By ignoring irrelevant costs, businesses can efficiently evaluate alternatives and optimize resource allocation.

Important Characteristics of Relevant Costs:

For a cost to be considered relevant, it must meet the following criteria:

- Future-Oriented**:**
    - Only future costs matter. Past expenses cannot be changed and are common to all alternatives.
    - Historical costs, also called sunk costs, are irrelevant for decision-making.
- Incremental (Additional Costs or Savings):
    - A relevant cost must be an extra expense or savings that results directly from a decision.
    - Costs that remain the same regardless of the decision are not incremental and should be ignored.
- Impact on cash flow**:**
    - Only actual cash outflows or inflows are relevant.
    - Non-cash expenses like depreciation and the book value of existing equipment are irrelevant.
    - However, the disposal value of assets (if selling an asset generates cash) is relevant.

Typology of Costs for Decision Making (DM)

In the following lines a comprehensive understanding of the costs on the basis of their relevancy for decision making are presented for conceptual understanding.

Relevant costs for DM

Relevant costs are the expenses that play a crucial role in making managerial decisions. According to CIMA, these are the costs that are directly applicable to a specific decision-making situation. They include only those expenses that impact the chosen alternative, allowing businesses to eliminate unnecessary information and focus on critical financial data. Understanding relevant costs helps managers filter unnecessary data and focus on financial factors that impact decision-making. By distinguishing between relevant and irrelevant costs, businesses can make strategic, data-driven choices that optimize profitability and resource utilization.

The main types of relevant costs include:

1. **Differential Costs**

Differential cost refers to the variation in cost between two or more alternatives. It represents the change in costs when moving from one level of activity to another. If a cost remains unchanged across alternatives, it is irrelevant to the decision.

- *Example*: A company currently pays its distributors ₹16 million in commission. If switching to an in-house sales team increases this cost to ₹12 million, the differential benefit in cost is ₹4million. Managers should compare this with potential risks of switching to in house sales team before deciding.

2. Incremental or Marginal Costs

Incremental (or marginal) cost is the additional expense incurred to produce one extra unit of a product or service. It is closely linked to increased activity levels, such as expanding production or adding a new shift.

- *Example*: A university may incur incremental costs when admitting an additional students, such as extra faculty salaries (if additional faculty is to be appointed) or classroom materials. These costs should be compared with the additional revenue generated.

3. Opportunity Costs

Opportunity cost is the benefit foregone when choosing one alternative over another. It represents the missed financial advantage due to a specific decision.

- *Example 1*: A professional leaving a job paying ₹15,000 per month to attend a university course, where tuition fee is ₹10,000 per month, incurs an out-of-pocket cost of ₹ 10000 and the opportunity cost of the decision is ₹ 15000 (as he has to forego is job in order to attend the course). Therefore, total relevant cost of the decision is ₹ 25000 (₹15,000 lost salary + ₹10,000 tuition fee).
- *Example 2*: A post graduate in finance has a choice between two job offers; one, a financial consultant job in an Investment Bank (pay ₹ 25000) and Teaching Assistant post in a University (pay ₹15,000). In this situation if she accepts the job at Investment Bank, she gets a salary of ₹ 25000 but misses an opportunity to earn ₹15000 (salary of teaching assistant). Therefore, the opportunity cost of deciding to take the job at Investment Bank is ₹15,000.
  Thus, when she chooses the job at Investment Bank, she must understand that the net relevant gain is ₹10000 (incremental revenue [₹ 25000] – opportunity cost [₹15000]).

4. Avoidable Costs

Avoidable costs are expenses that can be eliminated by selecting one alternative over another. These costs cease to exist if a particular activity or product line is discontinued.

5. **Replacement Costs**

Replacement cost is the current market price of replacing an asset, product, or material. It is a crucial factor in determining the optimal time for replacing equipment by weighing maintenance costs against productivity.

6. **Imputed Costs**

Imputed costs are hypothetical or estimated expenses that do not involve an actual cash outflow. They are considered only for decision-making purposes, similar to opportunity costs.

- *Example*: A business owner using his own building for operations of his business and not renting it out. The imputed cost is the potential rental income the owner could have earned if the building was rented to someone else.

7. **Out-of-Pocket Costs**

Out-of-pocket costs refer to expenses requiring immediate or near-future cash payments. These costs are crucial for short-term decision-making, such as pricing strategies during a recession or make-or-buy decisions.

- *Example*: If a company rejects a proposal, it can potentially avoid out-of-pocket expenses related to that decision.

Irrelevant Costs in Decision-Making

Irrelevant costs are costs that do not impact the specific decision-making process. These costs remain the same regardless of the alternative chosen and, therefore, should not be considered when evaluating different options. Irrelevant costs do not influence managerial decisions and should be ignored when evaluating business alternatives. By distinguishing between relevant and irrelevant costs, decision-makers can focus on meaningful financial data, improving efficiency and profitability.

Some common types of irrelevant costs include:

1. **Sunk Costs**

Sunk costs refer to past expenditures that cannot be recovered, making them irrelevant for future decisions. These are costs that have already been incurred and will not change regardless of the course of action taken.

- *Example*: When replacing machinery, the depreciated book value of the old equipment is a sunk cost, as it has already been accounted for and cannot be recovered.

Studies show that individuals, including managers, often factor sunk costs into their decisions, even when they shouldn't. For instance, a manager may continue investing in a failing project simply because they initiated it, rather than admitting it is non-viable.

- *Example*: A student deciding whether to complete their final year of college should only consider the tuition fees for the upcoming year and the potential increase in future earnings

from obtaining the degree. The tuition fees paid for previous years is a sunk cost and should not influence the decision.

2. Committed Costs

Committed costs are future expenses that cannot be altered, even if the business decides to change its operations. These costs are often contractual or long-term obligations that cannot be reversed.

- *Example*: A company purchases a machine for ₹40,000 and signs a three-year maintenance contract for ₹2,000 per year. While the purchase cost is a sunk cost, the three year maintenance cost is classified as committed cost. Both the costs are irrelevant to the decision of replacing/scrapping the machine.

3. Unavoidable Costs

Unavoidable costs are expenses that must be incurred, regardless of the business decision. These costs are often fixed and cannot be eliminated within the given operational constraints. It is the same as committed cost discussed in the previous paragraph.

4. Absorbed Costs

Absorbed costs are indirect expenses allocated to a product or service. Fixed costs that remain constant despite changes in activity levels are generally irrelevant for decision-making. However, specific fixed costs that directly impact a particular decision become relevant.

Example – all indirect costs (Overheads) like factory rent, depreciation of machinery, electricity charges are examples of unavoidable costs

Identifying relevant costs

In most cases relevant costs refer to the additional variable costs incurred as a direct result of a decision. In general, cost-volume-profit (CVP) analysis is commonly used to determine relevant costs in various scenarios. However, there are instances where variable costs alone are not the only relevant costs or may not even be relevant to the decision at hand.

There are specific rules or guidelines that can assist in identifying relevant costs to support effective decision-making.

Relevant Costs of Materials

Relevant costs of materials in decision-making refer to the additional cash flows involved in using materials for a specific purpose. These costs are determined under the following two situations:

- *Situation 1*: materials are not yet purchased: In this case, the relevant cost is the purchase price required to acquire them.

- *Situation 2*: materials are already in inventory: If materials have already been bought, their historical purchase cost is irrelevant, as it is considered a sunk cost.

If no materials are in inventory (*situation 1*), the relevant cost equals the purchase price of acquiring them. However, when materials are already held as inventory *(situation 2)*, identifying relevant costs becomes more complex. Since these materials were previously purchased, their original cost does not impact the decision.

Additionally, the relevant cost of materials held as inventory depends on the impact of their use on future cash flows. The financial consequences of utilizing these materials determine whether they should be considered in decision-making. In this case the relevant cost of material is determined as below;

- If the materials are in *regular use*, they will need to be replaced after consumption, making the replacement cost relevant.
- If the materials are *not in regular use*, their relevant cost depends on their potential future use and how using them now will affect future cash flows.

Additionally, the relevant cost of materials held as inventory depends on the impact of their use on future cash flows. The financial consequences of utilizing these materials determine whether they should be considered in decision-making.

Relevant Cost of Labour

The relevant cost of labour in decision-making is the additional cash outflow (or savings) that directly results from a particular decision.

- *Variable Labour Cost*: When labour costs vary based on hours worked and there is no shortage of workers, the relevant cost is simply the variable cost of labour. For instance, if part-time workers are paid Rs 10 per hour and additional work requires 100 extra hours, the relevant cost would be Rs 10 per hour, totaling Rs 1,000. This represents an actual cash outflow incurred for the decision.
- *Fixed Labour Cost with Spare Capacity*: If labour is a fixed expense and there is idle time available, the relevant cost of using that labour is Rs 0. Since workers are paid regardless of whether they are assigned tasks or remain idle, utilizing them for additional work does not create an extra financial burden. For example, if a new contract requires 30 direct labour hours, and workers are paid Rs 15 per hour under a fixed weekly wage for 40 hours, the relevant cost remains Rs 0 if there is spare capacity. The company incurs the cost of these hours irrespective of whether the contract is accepted. But when there is no spare capacity then additional wage for labour would have to be paid and then that becomes relevant for decision making purpose.
- *Labour in Limited Supply*: When labour availability is restricted, using workers for one task means sacrificing potential earnings from another. In such cases, the relevant cost includes:
    - The direct labour cost
    - The opportunity cost, which is the contribution that would be lost if the labour was utilized in its next-best alternative use.

Since fixed costs remain unchanged, the relevant cash flows are based on the net revenue loss, known as the contribution forgone. When labour is in limited supply, it is treated as a variable cost for calculating its relevant cost.

Relevant Costs and Overheads

Relevant costs related to overhead expenses should be determined using standard relevant costing principles. In cost accounting, overheads, as such, as absorbed to the cost centers and in such case it is irrelevant. The following important points may be considered;

- Fixed overhead absorption rates are not relevant since they do not represent actual cash expenditures.
- However, if the variable overhead absorption rate reflects real cash spending, it may be considered a relevant cost, as it estimates the cash outflow per additional hour worked.
- Only additional fixed overhead costs that lead to extra cash expenses or cost savings due to the decision are considered relevant.

Situations Where Fixed Costs Become Relevant for Decision-Making

Fixed costs are those costs that do not change with the level of production or sales within a defined operating range, known as the relevant range. While they are often considered sunk or unavoidable, there are certain decision-making situations where fixed costs become relevant. Businesses may face shutdown decisions when revenue does not cover fixed costs, leading to a temporary halt in operations to minimize losses. In make-or-buy decisions, outsourcing may eliminate fixed costs associated with in-house production, making them relevant to cost comparison. Similarly, when evaluating the elimination of a product line or business segment, fixed costs such as facility rent or managerial salaries become crucial, as their avoidability determines financial impact.

Pricing and special order decisions also highlight the importance of fixed costs. If existing fixed costs are already covered by normal sales, they may be ignored, but additional fixed costs arising from the order make them relevant. Investment in new technology or expansion introduces fixed costs in the form of depreciation, lease payments, or maintenance, requiring thorough financial analysis, especially if these costs are long-term commitments. Additionally, break-even analysis and cost structure decisions are influenced by fixed costs, as higher fixed expenses necessitate increased sales volumes to achieve profitability, affecting pricing and financial planning.

Fixed costs can be relevant in various decision-making scenarios. When they can be avoided, reallocated, or directly influence financial outcomes, they become critical for managerial decisions. Businesses must carefully assess these costs to make informed strategic choices.

Illustrations

1. A company has the opportunity to take on a project that would generate a net cash inflow of Rs 4,000. However, completing this job requires the use of equipment that is currently fully engaged in other work. If the company decides to allocate the equipment to this new project, it would have to forgo another job that would yield a net cash inflow of Rs 1,800.

   The opportunity cost of taking on this new project is Rs 1,800, as this represents the financial benefit lost by redirecting the equipment from the existing work.

   Financial Impact Analysis:

   Net cash inflow from the new job: Rs 4,000

   Opportunity cost of reallocating the equipment: (Rs 1,800)

   Net benefit from the new job: Rs **2,200**

2. A company is evaluating whether to undertake a special job. The job requires 200 units of direct materials, which are already available in inventory. However, these materials are regularly used for other company operations. The 200 units were originally purchased for Rs 3 per unit, but the supplier has recently increased the purchase cost to Rs 3.20 per unit.

   Financial Impact Analysis:

   If the company decides to proceed with the job for the supplier, the 200 units already in inventory will be used. However, since these materials are regularly required for other operations, additional replacement materials will need to be purchased. The cost of these replacement materials is Rs 3.20 per unit, making it the relevant cost. Therefore, the relevant cost of using the 200 units of materials amounts to Rs 640 (200 units × Rs 3.20).

3. A company has been asked to quote a price for a one-off contract. The contract would require 5,000 kilograms of X. Material X is used *not regularly* by the company. The company has 2,000 kilograms of material X currently in inventory, which cost Rs 2 per kilogram when it was purchased few years back. This is lying idle in inventory and has no further use. The price for material X has since risen to Rs 2.10 per kilogram.

   What are the relevant costs of the material X for the contract?

   Financial Impact Analysis:

   Material X is not used regularly and is 200o units of this material is in inventory which has no further use. Therefore, 2000 units can be used from the inventory and this will have zero relevant cost.

   However the order will require 5000 units of material and thus 3000 units are to be bought at Rs 20.10 per unit

   The relevant cost is.

   Relevant Cost of 2000 units in inventory = 0

   Relevant Cost of 3000 units to be bought (not in inventory) = 3000 × 2.10 = Rs 6300

Total relevant cost = (0+6300) = **6300**

4. A company has been asked to quote a price for a one-off contract. The contract would require 2,000 kilograms of material Y. There are 1,500 kilograms of material Y in inventory, but because of a decision taken several weeks ago, material Y is no longer in regular use by the company. The 1,500 kilograms
originally cost Rs 7,200, and have a scrap value of Rs 1,800. New purchases of material Y would cost Rs 5 per kilogram.
What are the relevant costs of the materials for the contract?
Financial Impact Analysis:
Material Y is not regularly used. There are 1,500 kilograms available in inventory, and if they are not used for the contract, they will be sold as scrap. The contract requires 2,000 kilograms, meaning an additional 500 kilograms must be purchased. The relevant cost of Material Y for the contract is as follows:
   Material held in inventory (scrap value) – Rs 1,800 (this is the opportunity foregone by using the material Y in the contract)
   New purchases (500 × Rs 5) – Rs 2,500 (this is the out-of-pocket cost)
   Total relevant cost of Material Y – Rs 4,300
The 1,500 kilograms already in inventory are valued at their scrap price, as this represents the benefit that would be lost if they are used for the contract instead of being sold as scrap, which would have been their next-most beneficial use.

5. A company has been asked by a customer to carry out a special job. The work would require 20 hours of skilled labour time. There is a limited availability of skilled labour, and if the special job is carried out for the customer, skilled employees would have to be moved from doing other work that earns a contribution of Rs 40 per labour hour. Skilled labour is paid Rs 30 per hour.
What is the relevant cost of the labour?
Financial impact analysis
Skilled labour is in limited supply, and allocating workers to this job would result in the loss of other work that generates Rs 30 per hour.
The relevant cost of skilled labour is calculated as follows:
   - Labour cost: (out of pocket cost) 20 hours × Rs 30 = Rs 600
   - Opportunity cost (contribution forgone): 20 hours × Rs 40 = Rs 800
   - Total relevant cost of skilled labour: **Rs 1,400**

6. A company has been asked to do a special job for a customer. This would require 8 hours of Grade A labour and 6 hours of Grade B labour. Grade A labour is paid Rs 20 per hour and Grade B labour is

paid Rs 15 per hour. The Grade A labour would have to be taken off other work that earns a contribution of Rs 40 per hour. There is sufficient Grade B labour available: if the Grade B employees do not work on this job, they will be paid but will have no other revenue-earning work to do.

Required; What are the relevant costs of the labour for the job?

Financial impact analysis

Grade A labour is in restricted supply. Grade B labour time is available and would otherwise be paid for as idle time. The relevant labour costs are therefore as follows.

Relevant Cost of Labour for the Job

Description	Calculation	Cost (Rs)
Grade A labour: Basic pay	8 hours × Rs 20	160
Grade A labour: Opportunity cost	8 hours × Rs 40	320
Grade B labour: No incremental cost	-	0
Total Relevant Cost of Labour	-	Rs 480

8. A company owns a machine that has a current net book value of Rs 2,700. It has not been used for several months, but it could now be used on a job for a customer which would last for up to six months. If the machine is not used for this job, it will be sold immediately to earn net income of Rs 2,900. After using the machine for the contract, it would have no further use or value, and it would have to be disposed of at a cost of Rs 500.

   What is the total relevant cost of the machine for the contract?

   Financial impact analysis

   - Net Book Value (Rs 2,700) - The net book value (NBV) of Rs 2,700 is given, but NBV is not relevant in decision-making because it is a sunk cost. Therefore irrelevant.
   - Opportunity Cost (Rs 2,900) - The machine could be sold immediately for Rs 2,900 if not used. Since this is the best alternative use, it is opportunity cost of using the machine for six months.
   - Disposal Cost (Rs 500)- If the machine is used for the contract, it has no further use and will require disposal at Rs 500. This is a direct cash outflow (after six months) and is relevant.

   Therefore, Total Relevant Cost = Rs 2,900 (opportunity cost) + Rs 500 (disposal cost) = **Rs 3,400**

MCQs

1. What is a relevant cost?

    a. A cost that has already been incurred
    b. **A future cost that will change as a result of a decision**
    c. A cost that remains constant regardless of decision-making
    d. cost that does not involve cash flows

2. Which of the following costs is irrelevant in decision-making?

    a. Sunk costs
    b. Incremental costs
    c. Opportunity costs
    d. Avoidable costs

3. A company is considering replacing an old machine. The original purchase price of the machine is:

    a. A relevant cost
    b. An unavoidable cost
    c. A sunk cost
    d. A variable cost

4. If a material is already available in inventory and has no alternative use except scrapping, its relevant cost for a decision is:

    a. The original purchase price
    b. Zero
    c. Its scrap value
    d. Its replacement cost

5. Which of the following is considered an opportunity cost?

    a. The cost of new equipment purchased
    b. The salary of an existing employee
    c. The benefit lost from not choosing the next-best alternative
    d. The cost of routine maintenance

6. If labour is in limited supply and choosing a contract means giving up another opportunity, the relevant labour cost includes:

    a. The wages paid to the workers
    b. The wages plus the contribution lost from the next-best alternative
    c. The total fixed costs allocated to the contract
    d. Only the wages, since contribution is not a cost

7. If spare labour capacity is available, the relevant labour cost is:

    a. **Zero, since the workers would otherwise be idle**
    b. The full wage cost
    c. The full wage cost plus overtime premium
    d. The wage cost less fixed overhead

8. A company has an opportunity to sell surplus inventory or use it in a contract. The relevant cost of using the inventory is:

    a. Its original purchase price
    b. Its carrying cost in the balance sheet
    c. Its book value

d. The highest value that could be obtained by selling the inventory instead of using it (market price or resale value)

9. A business owns a machine that has not been used recently. If the company can either use it in a contract or sell it for Rs 2,900, its relevant cost for the contract is:

a. Rs 2,400
b. Rs 2,700
c. Rs 2,900
d. Rs 3,400

10. Which of the following is a relevant cost when making a decision?

a. General administrative costs
b. Costs that will be incurred regardless of the decision
c. Future costs that can be avoided
d. Depreciation

11. A non-cash cost that should be considered when making decisions is:

a. Absorbed overhead
b. **Opportunity cost**
c. Depreciation
d. Prepaid expenses

12. When labour is readily available and paid only for hours worked, its relevant cost is:

a. Fixed overhead absorption
b. **The variable labour cost per hour**
c. Zero
d. The total company payroll cost

13. If a company must pay Rs 500 per unit to replace inventory used in a new project, the relevant cost of using the inventory is:

a. **Rs 500**
b. Rs 250
c. Rs 0
d. The original purchase price

14. A company owns a machine that can be sold for Rs 5,000 or used in production. Its relevant cost is:

a. Rs 5,000, assuming it represents the highest value obtainable from an alternative use
b. Rs 2,500, based on depreciation
c. Rs 0, since it is already owned
d. The machine's original purchase price

15. If a cost will not change as a result of a decision, it is called:

a. A variable cost
b. A relevant cost
c. **An irrelevant cost**
d. A committed cost

16. A company is considering discontinuing a product line. Which cost is NOT relevant to the decision?

a. Direct labour cost

b. Raw material cost
c. Allocated fixed overheads
d. Opportunity cost of production space

17. Which of the following costs should be included in the relevant cost analysis for a new project?

a. The cost of machinery already purchased
b. Future maintenance costs directly associated with the project
c. Past research and development costs
d. General office expenses

18. If using skilled labour for a new project will result in the loss of Rs 40 per hour from another contract, the opportunity cost is:

a. **Rs 40 per hour**
b. Rs 20 per hour
c. Rs 0, as wages are already paid
d. Rs 60 per hour

19. If a company rents a facility instead of purchasing it, the relevant cost of renting for one year is:

a. Rs 500,000
b. **Rs 50,000**
c. Rs 0
d. Rs 450,000

20. When assessing whether to close a factory, which of the following would be a relevant cost?

a. The original cost of the factory
b. **The estimated cost of demolition and land restoration**
c. Past operating losses
d. Sunk costs related to factory equipment

PART A: STRATEGIC COST MANAGEMENT (40 MARKS)

Unit 3: Managerial Decision –Making

Contents

Introduction:

Management is the cornerstone of organizational success, driven by the five core functions: *Planning*, *Organising*, *Controlling*, *Staffing*, and *Decision Making*. While each function plays a distinct role, Decision Making stands out as the thread that weaves through every stage of managerial action, shaping outcomes and ensuring coherence.

Decision Making underpins Planning, where managers analyse data, set objectives, and choose strategies to achieve goals. During Organising, decisions determine resource allocation, structural hierarchies, and workflow coordination. In Staffing, critical choices about recruitment, training, and talent retention directly impact organizational capability. The Controlling function relies on decisions to assess performance, identify deviations, and implement corrective measures.

What distinguishes effective management is the ability to make timely, informed, and ethical decisions. These choices balance risks and opportunities, align short-term actions with long-term vision, and adapt to dynamic environments. Whether resolving conflicts, prioritizing tasks, or innovating processes, decision-making empowers managers to navigate complexity and drive sustainable success. By anchoring all other functions, it transforms abstract plans into actionable results, proving that leadership excellence hinges not just on what is done, but how and why decisions are made.

The *management accountant* occupies a central role as the strategic leader's most critical analyst, serving as the linchpin between financial data and high-level decision-making. While strategic leaders (e.g., CEOs, executives) retain ultimate accountability for organizational direction, the management accountant is entrusted with synthesizing complex information, modelling scenarios, and recommending actionable

strategies. This positions them as indispensable in shaping the strategic choices that drive long-term success.

Short term decisions

Strategic Cost Management (SCM) acts as the connective framework for short-term decisions, ensuring they align with long-term objectives by systematically evaluating costs, trade-offs, and value creation. Every short-term decision is a building block for strategic success—SCM ensures those blocks are cost-efficient, value-driven, and purposefully aligned. The distinction between short-term and long-term decisions lies in their time horizon, impact, and flexibility.

It is important to note that short-term decisions focus on immediate operational efficiency, while long-term decisions prioritize sustainable competitive advantage. Strategic cost management acts as the bridge, ensuring that today's choices (e.g., product mix, pricing) lay the groundwork for tomorrow's success (e.g., innovation, market leadership). By integrating both perspectives, organizations avoid myopic cost-cutting and instead build resilience for the future. The following is a list of the short-term decisions which are individually taken up in the following paragraphs;

1. *Pricing decision* - Setting the optimal price for products to maximize profitability while remaining competitive.
2. *Diversification of Products / Introduction of new Product* - Expanding the product range to enter new markets, reduce risk, or meet changing customer demands.
3. *Selection of Profitable Product Mix / Sales Mix* – Identifying the best combination of products to maximize overall contribution and profitability.
4. *Problems of Limiting Factor* - Managing constraints such as raw materials, labour, or machine hours to optimize production.
5. *Make or Buy Decisions* -Determining whether to produce in-house or outsource based on cost-benefit analysis.
6. *Closure of a Plant or Division, Outsourcing or Suspending Activities* - Evaluating whether to continue, shut down, or outsource business operations for better resource allocation.
7. *Alternative Methods of Manufacture* - Evaluating different production techniques to enhance efficiency and reduce costs.
8. *Use of Man or Machine* - Deciding between manual labour and automation based on cost, efficiency, and scalability.
9. *Activity Level Planning* - Deciding the optimal scale of operations based on market demand and resource availability.

It may be further stated that short term decisions as mentioned in points 1,3 and 5 may be classified as product and pricing decisions. While, sort term decisions mentioned in points, 4,7 and 8 may be classified as production and resource optimisation problems. Though all of the above have strategic implications,

sort term decisions mentioned in points 5, 6 and 9 may be specifically covered under strategic business decisions.

Pricing decision

Introduction

Pricing is a crucial decision-making aspect that significantly influences a company's profitability. Whether setting the price for a new product or adjusting prices for existing ones, managers must carefully weigh costs, market conditions, and strategic objectives.

The challenges in pricing decisions are as follows;

- *Multiple Influences*: Pricing is shaped by both internal factors (such as costs and production capacity) and external factors (like market demand and competitive pressures).
- *Lack of a Universal Formula*: Market forces such as supply and demand dictate prices, but pricing decisions can also impact these forces in return.
- *Cost-Profit Relationship*: To ensure profitability, prices must exceed costs. However, determining which costs to consider is dependent on the specific pricing context.

Pricing decisions directly impacts a company's profitability and market position. When introducing a new product, determining the appropriate selling price is essential. Similarly, for an existing product, revising the price in response to cost fluctuations is necessary.

Pricing decisions are challenging due to the numerous internal and external factors that influence them. Additionally, there is no universal formula to establish or adjust prices. Market forces such as demand and supply play a significant role, but these forces can also be affected by pricing strategies. Most companies aim to achieve a reasonable to maximum level of profit. To ensure profitability, the selling price must be higher than the total cost incurred. Hence, cost-based pricing is a common approach.

Pricing for Additional (Special) Sales

When companies operate *below full capacity*, they have idle production potential. This situation arises when regular customer demand is lower than the company's production capability. For instance, a firm with an annual capacity of 10,000 units, may only be producing and selling 8,000 units only. In such cases, businesses may receive special orders (maximum of 2000 units, which is the spare capacity) either from new customers or existing ones. The decision to accept or reject such orders depends on their financial impact in terms of costs, revenue, and profit. Relevant costs for such decisions include all variable costs and any fixed costs that increase due to the special order. If fixed costs remain unchanged, they are considered irrelevant. The sum of the additional costs incurred due to the special order is termed incremental cost.

When determining the price for a special order, two scenarios arise:

1. *Company-Determined Pricing*: The company is asked to quote a price for a specific order volume. In this case, the quoted price must be at least equal to the incremental cost. Any price above this cost contributes to profitability. Quoting a price based on total costs (including fixed costs) may lead to rejection due to an uncompetitive price.
2. *Buyer-Determined Pricing*: A prospective customer offers to purchase a set quantity at a specific price. The decision to accept the offer depends on comparing the offered price with the incremental cost. If the offered price exceeds the incremental cost, accepting the order is financially beneficial. Otherwise, it is unprofitable.

For export pricing, additional costs such as packaging, insurance, transportation, and quality control must be considered. These costs are relevant in determining the net incremental cost. However, export incentives like cash subsidies and duty drawbacks may offset some expenses. The net incremental cost should be used to either determine a suitable selling price for the international market or assess the profitability of an offered price.

Pricing under Normal conditions

When market conditions are favourable, companies generally aim for planned profit margins. In such cases, pricing is based on cost-plus-profit models. Desired profit may be expressed as a percentage of sales revenue or as a return on investment. This approach ensures sustainable profitability and long-term business growth.

Pricing under abnormal conditions

Market conditions are constantly changing due to various influencing factors. Companies must closely monitor these changes and adjust their pricing strategies accordingly. Under adverse conditions, price reductions may become necessary. The extent of reduction depends on the severity of market challenges and the cost structure of the product. Some situations may warrant a minimal reduction, while others may require significant price cuts.

In extreme cases, companies may choose between two alternatives:

- *Continuing sales at reduced prices*: This may lead to lower profit margins or even losses. However, it allows the company to maintain market presence and recover losses when conditions improve.
- *Suspending sales temporarily*: If operating at a loss is unsustainable, suspending sales might be a viable option. However, this decision must factor in unavoidable fixed costs, as the company will still incur losses despite halting operations. A comparative analysis of potential losses under both scenarios helps in making an informed decision.

Criticism of Full-Cost Pricing

One key limitation of full-cost pricing is that it overlooks the inverse relationship between sales price and demand. Since demand directly affects profitability, setting prices based solely on cost may not yield the most optimal outcome.

Special Orders and Their Pricing Considerations

Special orders provide one-time revenue opportunities and typically arise in three scenarios:

1. *Businesses with Regular Sales and Spare Capacity*: Companies with unused capacity can accept special orders without impacting regular sales. In such cases, pricing can exclude unavoidable fixed costs.
2. *Businesses Without Regular Sales*: Some firms, such as construction companies or consultants, rely entirely on special orders for revenue. For these businesses, pricing must cover both variable costs and unavoidable fixed costs to ensure financial sustainability.
3. *Businesses with No Spare Capacity*: If a company is already operating at full capacity, accepting a special order means sacrificing regular sales or expanding production. In this case, pricing must consider opportunity costs, ensuring the special order generates more profit than the displaced regular business.

Illustration 1

A Company is manufacturing a product marks an average net profit of ₹ 2.50 per piece on a selling price of ₹ 14.30 by producing and selling 6,000 pieces or 60% of the capacity. His cost of sales is as under:

	₹
Direct material	3.50
Direct wages	1.25
Works overheads (50% fixed)	6.25
Sales overheads (25% variable)	0.80

During the current year, he intends to produce the same number but anticipates that fixed charges will go up by 10%, with direct labour rate and material will increase by 8% and 6% respectively but he has no option of increasing the selling price. Under this situation, he obtains an offer for further 20% of the capacity. What minimum price you will recommend for acceptance to ensure the manufacturer an overall profit of ₹ 16,730.

Solution

Computation of profit (considering the increase in cost)

Particulars	₹
Selling price	14.30
Variable costs:	
Material (₹ 3.5 × 106÷100)	3.710
Labour (₹ 1.25 × 108÷100)	1.350
Works overhead	3.1250
Sales overhead	0.200
Total	8.385
Contribution per unit	5.915
Total contribution (6,000 × ₹ 5.915)	35,490
Fixed costs	
Works OH ₹3.125	
Sales OH ₹ 0.600 3.725 (₹3.725 × 6,000 = ₹ 22,350 × 110/100)	24,585
Profit	**10,905**

Computation of selling price of the order	(₹)
Variable cost of order ₹ (2,000 × 8.385)	16,770
(+) required profit ₹ (16,730 – 10,905) =	5,825
Sales required	22,595
Selling price of order = ₹ 22,595÷2,000 = 11.2975 (or)	**11.30**

Product Diversification Strategies/ Introduction of New Products

Companies diversify their product lines to remain competitive, improve profitability, or achieve both. Various factors, such as short product lifespans, idle production capacity, and the ability to repurpose waste materials and by-products, often encourage or necessitate the introduction of new products. However, it is essential to determine whether launching a new product is financially viable and beneficial. To assess profitability, businesses must estimate the associated costs and potential revenue. While revenue projections remain consistent regardless of the costing approach used, cost allocation varies between marginal costing and full costing methods. Full costing includes both relevant and irrelevant costs (such as common and unavoidable expenses), which can distort profitability analysis by making the new product seem less profitable or even unviable.

Marginal costing, on the other hand, focuses on variable costs directly linked to the new product. If the introduction of a new product leads to an increase in fixed costs, these additional costs—referred to as direct fixed costs—should also be considered. Ultimately, the sum of variable costs and specific fixed costs should be compared to the projected revenue. If revenue exceeds costs, introducing the new product is financially viable. If costs and revenue are equal, the decision to launch the product depends on strategic considerations. Additionally, a new product is deemed profitable if it contributes towards covering common fixed costs and generating profit after recovering its variable and specific fixed costs.

Based on these aspects, businesses can make informed decisions on product diversification and ensure successful market entry.

Definition and importance

Product diversification refers to the strategy businesses use to expand their product portfolio[1] by introducing new products to reduce risk, increase revenue, and capture new market segments. It is crucial for businesses to stay competitive, respond to market trends, and meet evolving consumer demands. By diversifying, companies can mitigate risks associated with market fluctuations, technological advancements, and changing consumer preferences. Additionally, diversification allows businesses to optimize resource utilization, enhance brand equity, and foster innovation by exploring new product categories and industries.

Types of Diversification

1. Horizontal Diversification – This involves introducing new products that are related to existing ones but serve new customer segments or markets. It helps businesses leverage their existing brand strength and create synergies between different product offerings.
   Example: boAt, an Indian consumer electronics brand, was founded in 2016 by Aman Gupta and Sameer Mehta. Initially, the company focused on affordable audio accessories such as wired earphones, headphones, and Bluetooth speakers, targeting budget-conscious consumers with stylish and durable products. Over time, boAt expanded its product portfolio to include wireless earbuds, soundbars, power banks, and mobile accessories, followed by a foray into smart wearables like fitness bands and smartwatches.
2. Vertical Diversification - This occurs when a company moves up or down the supply chain. It can be:
   - Backward Integration: Producing raw materials or components in-house to reduce dependency on suppliers and lower production costs.
     Example: Reliance Industries - Oil Refining & Exploration to Petrochemicals & Textiles)
     Reliance Industries Limited (RIL) initially focused on polyester and petrochemicals, using crude oil derivatives as raw materials. To secure its input supply and reduce costs, RIL backward integrated by setting up its own oil refineries (Reliance Petroleum), ensuring direct access to crude oil for its petrochemical operations. Further, it expanded into oil and gas exploration (Reliance E&P) to extract crude oil, moving even deeper into the supply chain. This vertical integration allowed Reliance to control the entire process—from crude oil extraction to refining and finally manufacturing petrochemicals, plastics, and synthetic textiles.

   - Forward Integration: Entering distribution or retail to have better control over sales channels and customer experiences.

[1] A *product portfolio* refers to the complete collection of products or services offered by a company, managed strategically to achieve business objectives such as growth, profitability, and risk mitigation. It involves analysing and balancing a diverse range of products to optimize resource allocation and market positioning.

Example: Tata Motors - Direct Mobility Solutions & EV Ecosystem)

Tata Motors expanded beyond automobile manufacturing through forward integration by launching Tata Passenger Electric Mobility (TPEM), a dedicated subsidiary for EVs, incorporating direct leasing and digital retail models. It also ventured into fleet management and connected vehicle services through Tata Fleet Edge, offering telematics, predictive maintenance, and analytics to fleet owners. Additionally, through Tata UniEVerse, an integrated EV ecosystem, Tata Motors collaborates with Tata Power for EV charging stations, providing seamless charging solutions for its customers. These steps allow Tata Motors to control not just vehicle production but also sales, service, and infrastructure, ensuring customer retention and a strong market presence.

3. Conglomerate Diversification - Conglomerate diversification occurs when a company expands into entirely unrelated industries, meaning there is no direct link between its existing business and the new venture. Unlike horizontal diversification (expanding within the same industry) or vertical diversification (expanding within the supply chain), conglomerate diversification involves entering markets with different products, technologies, and customer bases.

   This strategy helps companies spread risk, tap into new revenue streams, and leverage their financial strength and management expertise. However, it also poses challenges such as a lack of industry-specific expertise, potential management inefficiencies, and brand dilution if not handled properly.

   Example - Tata Group is a classic example of conglomerate diversification, operating across multiple unrelated industries, including Tata Motors – Automobile manufacturing (e.g., Tata Passenger Vehicles, Tata Commercial Vehicles, and Jaguar Land Rover), Tata Steel – Steel production and metallurgy, Tata Power – Electricity generation and renewable energy, Tata Consultancy Services (TCS) – IT and software solutions, Tata Consumer Products – Beverages and food (e.g., Tata Tea, Tata Salt), Indian Hotels Company (Taj Hotels) – Hospitality and tourism, Tata Communications – Telecommunications and networking, Air India – Airline operations.
   Each of these businesses operates independently, targeting different customers and using distinct technologies and business models. Tata Group's diversification allows it to balance risks—for instance, an economic downturn affecting the automobile sector may not impact its IT or consumer products businesses.

Illustration

A company is at present working at 90 per cent of its capacity and producing 13,500 units per annum. It operates a flexible budgetary control system. The following figures are obtained from its budget.

	90% (₹)	100% (₹)
Sales	15,00,000	16,00,000
Fixed expenses	3,00,500	3,00,600
Semi-fixed expenses	97,500	1,00,500
Variable expenses	1,45,000	1,49,500
Units made	13,500	15,000

Labour and material costs per unit are constant under present conditions. Profit margin is 10 per cent.

a. You are required to determine the differential cost of producing 1,500 units by increasing capacity to 100%

b. What would you recommend for an export price for these 1,500 units taking into account that overseas prices are much lower than indigenous prices?

Solution

Computation of material and labour cost

Particulars	₹	₹
Sales at present		15,00,000
(-) Profit @ 10%		1,50,000
Total cost		13,50,000
(-) All costs other than material & labour		
Fixed expenses	3,00,500	
Semi fixed expenses	97,500	
Variable expenses	1,45,000	5,43,000
Material & Labour cost		8,07,000

a. Statement showing differential cost of 1500 units:

Particulars	₹
Material & Labour	89,667
Fixed expenses (₹ 3,00,600 – ₹ 3,00,500)	100
Semi fixed expenses (₹ 1,00,500 – ₹ 97,500)	3,000
Variable expenses (₹1,49,500 – ₹ 1,45,000)	4,500
Differential cost	97,267

b. Differential cost per unit = ₹97,267 ÷1,500 = ₹64.84

The minimum price for these 1,500 units should not be less than ₹64.84.

Selection of Profitable Product Mix / Sales Mix

The primary goal of an organisation is developing a production budget such that contribution[2] is maximized and this in turn will maximize the organization's overall profitability. Since firms often produce multiple products, achieving profitability requires strategic decisions about which products to produce and in what quantities. This aspect of the production budget is known as the *product mix decision.*
Under the short term considerations, product mix decisions fall under the category of relevant cost approach to decision making. This means that during the operational phase, only variable costs should influence the production budget.
Fixed capacity-related costs are not relevant to short-term decision-making since they are already committed (sunk) and remain unchanged regardless of how the available capacity is utilized. By optimizing the product mix, firms can ensure that resources are allocated efficiently to maximize overall profitability. During the operational phase, decision-makers utilize the existing capacity and its allocation to determine the combination of goods or services the organization will produce and deliver to its customers or clients.

Sales mix, on the other, refers to the proportion of different products or services sold, which directly impacts overall profitability due to variations in cost structures and contribution margins. By analyzing the sales mix, businesses can evaluate which products contribute most to profit and adjust their strategies accordingly. It is important to note that sales mix decisions influence total revenue and determines the overall contribution margin of the business, plays a crucial role in cost-volume-profit (CVP) analysis and helps in forecasting profitability under different sales scenarios. It aids in strategic decision-making regarding the continuation, modification, or discontinuation of specific products based on their cost and profit performance and supports pricing decisions by incorporating cost absorption principles and marginal cost analysis to optimize profitability.

[2] In CVP analysis, contribution refers to the excess of sales over and above variable cost of production. The surplus of sales over variable cost contributes towards the fixed cost and after the fixed cost is covered, towards profit. Thus, the term 'contribution'.

Illustration 3

Present the following information to show to management:

(i) The marginal product cost and the contribution p.u.

(ii) The total contribution and profits resulting from each of the following sales mix results.

Amount (₹)

Particulars	Product	Per unit
Direct Materials	A	10
Direct Materials	B	9
Direct wages	A	3
Direct wages	B	2

Fixed Expenses – ₹ 800

(Variable expenses are allotted to products at 100% Direct Wages)

Sales Price ---- A ₹ 20

Sales Price ---- B ₹15

Sales Mixtures: (a) 100 units of Product A and 200 of B.

(b) 150 units of Product A and 150 of B.

(c) 200 units of Product A and 100 of B.

Solution

(i) Statement of Marginal Product cost Amount (₹)

Sr. No.	Particulars	A	B
I.	Selling price	20.00	15.00
II.	Variable cost		
	Direct material	10.00	9.00
	Direct wages	3.00	2.00
	Variable OHs (100% of direct wages)	3.00	2.00
		16.00	13.00
III.	Contribution (I – II)	4.00	2.00

Profit at Mix (a): Amount (₹)

Sr. No.	Particulars	A	B	Total
I.	No. of units	100	200	
II.	'C' per unit	4	2	
III.	Total contribution (II x I)	400	400	800
IV.	Fixed cost			800
V.	Profit (III - IV)			Nil

Profit at Mix (b): Amount (₹)

Sr. No.	Particulars	A	B	Total
I.	No. of units	150	150	
II.	'C' per unit	4	2	
III.	Total contribution (II x I)	600	300	900
IV.	Fixed cost			800
V.	Profit (III - IV)			100

Profit at Mix (c): Amount (₹)

Sr. No.	Particulars	A	B	Total
I.	No. of units	200	100	
II.	'C' per unit	4	2	
III.	Total contribution (I x II)	800	200	1000
IV.	Fixed cost			800
V.	Profit (III - IV)			200

here 'C' means 'Contribution' .

Sales Mix and Break-Even Analysis

Most manufacturers produce and sell multiple products. Each product typically has a unique unit sales price, unit variable cost, and unit contribution margin. In such cases, calculating the sales mix is essential before determining the break-even point. The sales mix represents the proportion of unit sales across different products within a firm.

For example, consider Vortex Manufacturing, Inc., which initially sold 10,000 units of a single product. If a second product is introduced with sales of 6,000 units, the sales mix is calculated accordingly.

Assuming that adding Product B does not increase Vortex's fixed costs of Rs 15,000, the pricing and cost structure for the two products are as follows:

Product	Unit Sales Price (Rs)	Unit Variable Cost (Rs)	Unit Contribution Margin (Rs)
A	10	7	3
B	15	10	5

Vortex's break-even point is influenced by both the sales mix and the contribution margins of the individual products. The first step in determining the break-even point is calculating the weighted-average contribution margin per unit:

$$\text{Weighted-average contribution margin per unit} = \frac{(\text{Product A unit contribution} \times \text{Product A units sold}) + (\text{Product B unit contribution} \times \text{Product B units sold})}{\text{Product A units sold} + \text{Product B units sold}}$$

$$= \frac{(\text{Rs } 3 \times 10000) + (\text{Rs } 5 \times 6000)}{10000 + 6000} = \text{Rs } 3.75$$

After the weighted-average contribution margin is computed, the break-even point can be determined in the usual manner:

$$\text{Break-even sales volume (units)} = \frac{\text{Fixed cost}}{\text{Weighted-average unit contribution margin}}$$

$$= \frac{Rs\ 15000}{Rs\ 3.75} = 4000 \text{ units}$$

Since the sales mix percentages for Products A and B are 62.5% and 37.5%, respectively, their break-even quantities are:

$$\text{Product A: } 0.625 \times 4{,}000 = 2{,}500$$
$$\text{Product B: } 0.375 \times 4{,}000 = 1{,}500$$

The individual and composite number of break-even units will be different at any other level of sales mix. One easy way to determine the break-even point in sales (Rs) for the individual products, after the break-even units have been computed, is to multiply the break-even number of units per product by its unit sales price

Product A: 2,500 units × Rs 10 = Rs 25,000

Product B: 1,500 units × Rs 15 = Rs 22,500

Total Break-Even Sales: Rs 47,500

This analysis demonstrates the significance of sales mix in break-even calculations, as different product combinations impact overall profitability and financial planning.

Limiting Factor Analysis

The *limiting factor*, also referred to as the *key factor* or *principal budget factor*, is the element that must be evaluated first to ensure the feasibility of the production and the sales budget. It is the constraint that significantly impacts business operations and, therefore, should be identified and addressed before preparing budgets for various functions.

A *key factor* is essentially any constraint that limits production or sales. It can arise due to factors like shortages of materials, limited labour availability, restricted plant capacity, insufficient capital, or fluctuating product demand. When no such limiting factor exists, product selection should typically be based on the cost –volume (C/V) ratio. However, if constraints are present, decisions should be made based on contribution per unit of the limiting factor.

To create an effective budgeting plan, it is advisable to first formulate the budget associated with the key factor before developing other budgets. Unless otherwise mentioned, sales (market demand) act as the principal budget factor. However, depending on the situation, other constraints such as labour hours worked, plant capacity, raw material supply, or financial resources may also serve as key factors.

A business may also encounter multiple limiting factors simultaneously. In such cases, determining the optimal product mix becomes more complex and cannot be accurately done without applying linear programming techniques[3].

Furthermore, key factors are not necessarily permanent constraints. Over time, management can mitigate or eliminate these limitations by introducing new products, modifying the material mix, expanding plant capacity, optimizing labour utilization through overtime or additional shifts, or securing alternative financial resources. Proactive strategies help businesses adapt to changing conditions and sustain growth despite existing limitations.

Illustration 3

AB Co makes two products, the Ay and the Be. Unit variable costs are as follows.

Particulars	**Ay** (Rs)	**Be** (Rs)
Direct materials	1	3
Direct labour (Rs 3 per hour)	6	3
Variable overhead	1	1
	8	7

[3] This is outside the purview of the course. For details on the subject students can refer to

The sales price per unit is Rs 14 per Ay and Rs 11 per Be. During July 2023 the available direct labour is limited to 8,000 hours. Sales demand in the month is expected to be 3,000 units for Ay and 5,000 units for Be.

Determine the profit-maximizing production mix, assuming that labour is in short supply.

Solution

Statement showing contribution per unit of the limiting factor

Particulars	Ay (Rs)	By (Rs)
Sales Price	14	11
Variable Cost	8	7
Unit Contribution	6	4
Labour hours per unit	2 hrs.	1 hr.
Contribution per labour hour (limiting factor)	Rs 3	Rs 4

Although Ay has a higher unit contribution than **Be**, two **Be**s can be made in the time it takes to make one **Ay**.

As such, because *labour is in short supply* it is more profitable to make **Be**s than **Ays**.

Optimum Production Plan

Product	Demand	Hours Required	Hours assigned	Priority of manufacture
Be	5000	5000	5000	1st
Ay	3000	6000	3000 (Balance)	2nd
		11000	8000	

Statement of Profit (optimum production plan)

Product	Units	Hours needed	Contribution per labour hour (Rs)	Total (Rs)
Be	5000	5000	4	20000
Ay	1500	3000	3	9000
		8000		29000
Less: Fixed Cost				20000
Profit				9000

Make or Buy

In strategic cost management, the *make-or-buy* decision is a critical evaluation that businesses undertake to determine whether they should manufacture a component in-house or purchase it from an external supplier. This decision significantly impacts cost structures, operational efficiency, and competitive advantage. Organizations must carefully analyse various factors, including cost, capacity, quality, and strategic implications, before making a decision.

The following issues are to be taken into consideration from the perspective of 'cost'.

- Variable Costs: Includes direct materials, direct labour, and variable overheads incurred in producing the component.
- Fixed Costs: Generally treated as sunk costs in short-term decisions but may become relevant if additional investments are required.
- Marginal Cost vs. Market Price: If the marginal cost of production is lower than the purchase price from external vendors, in-house production is preferred.
- Additional Fixed Costs: If producing in-house incurs additional fixed costs that cannot be recovered, purchasing may be the better option.

The following issues are to be taken into consideration from the perspective of 'capacity utilization'.

- When there is idle capacity, it can be utilized for manufacturing components instead of outsourcing, provided it is cost-effective. For example, if it is assumed that 6000 units of product A is produced in Machine X which is operating at 60% capacity[4], then there is an idle capacity of 40% which may be used to produce 4000 units of product A without increasing normal capacity of the machine. if there is a special order of 3000 (say), then the marginal cost of manufacturing 3000 units will be compared with the cost of buying 3000 units to take the decision. There would be no consideration of opportunity loss.
    - It is to be noted here that consideration may have to be given to the case when there is an option of letting out capacity which is freed when buying decision is opted for. In such case the opportunity foregone by not outsourcing or letting out the capacity should be added to the marginal cost of manufacturing to making in the strategic decision of making and buying.

      Example (opportunity cost [rent income foregone] included in making strategic make-or-buy decisions) - A company manufactures a specialized component in-house at a marginal cost of ₹500 per unit. The company has an option to outsource the component (Buy) at ₹550 per unit. Surely making the component in-house is cheaper. However, if the company decides to outsource (buy), it can rent out the freed-up production facility to another company for ₹80 per unit produced.

      Calculation of Effective Cost for the Make Decision

      Marginal Cost of In-House Production: ₹500

      Opportunity Cost (Foregone Rent): ₹80

      Total Effective Cost of Making: ₹500 + ₹80 = ₹580

      Since the outsourcing cost is ₹550 per unit, while the effective cost of making is ₹580 per unit, the company should outsource the component instead of making it in-house.

[4] Since the normal capacity of the machine is 100%, there is spare capacity (idle capacity) to the tune of 40% (100 – 60) which may be utlised in case there is any special order.

- When no idle capacity exists, producing in-house might displace more profitable activities, leading to a loss of contribution, which must be carefully evaluated.

The following are the 'strategic' considerations.

- Core competencies: Organizations should focus on activities where they have expertise and outsource non-core components.
- Supply chain risk: Over-dependence on suppliers may lead to risks such as price volatility, supply disruptions, or quality issues.
- Discretion and intellectual property: Proprietary technology or trade secrets may influence the decision to manufacture in-house rather than outsource.

The following issues are to be taken into consideration from the perspective of 'quality and reliability'.

- Internal production allows for greater control over quality and consistency.
- Outsourcing may be preferable if external suppliers offer superior technology, expertise, or cost advantages.

Cost Analysis in Make-or-Buy Decision

- Cost analysis when idle capacity exists - When a company has unused production capacity, the decision is based on a cost comparison between making and buying. If the marginal cost of producing the component is lower than the market price, it is preferable to produce it in-house. Fixed costs are not considered in this scenario as they have already been incurred.
- Cost analysis when no idle capacity exists - If all production resources are fully utilized, manufacturing the component would require shifting resources from existing production, leading to a loss of contribution (i.e., forgone profits from displaced activities). In this case, making is preferred only if the contribution gained from producing the component is higher than the contribution lost from the displaced work. If the loss of contribution is significant, outsourcing becomes the better alternative.

While cost is a crucial factor, businesses must also consider capacity utilization, strategic advantages, supply chain risks, and market dynamics. A well-informed decision ensures optimal resource allocation and long-term sustainability as well as some other factors as ensuring better pricing, long-term contracts, reliable supply chains, enhancing automation and efficiency to reduce in-house production costs and reducing dependency on a single supplier to mitigate risks.

Illustration 4

Prem Industry is considering making its own motor castings, which it currently purchases for ₹ 20.50 per unit. This purchase price does not include the ordering, receiving, and inspection costs, which Prem estimates to be ₹ 2 per unit. Prem feels that, it can manufacture the 6,500 required units at a lower cost than it pays by purchasing externally. The relevant costs for both the producing and buying alternatives are as follows:

Incremental Analysis for Motor Castings (6,500 Units) ₹

	Per Unit	Cost to Make	Cost to Buy
Direct Materials	6.25	40,625	
Direct Labour	10.00	65,000	
Variable Factory Overhead	5.00	32,500	
Purchase Price	20.50		1,33,250
Ordering, Receiving and Inspection Costs	2.00		13,000
Total Relevant Costs		1,38,125	1,46,250

Solution

Assuming that Prem's facilities will remain idle if they do not manufacture the casting, Prem Industries would increase income by ₹ 8,125 per year (₹1,46,250 – ₹ 1,38,125) by making the component instead of purchasing it. If, however, Prem could use the idle capacity to manufacture a new product line instead of producing the motor castings, the contribution margin of the new product line must be considered as an opportunity cost of the "make" decision. The estimated revenue and cost data for the housings (new product line) are as follows:

	Per Unit (₹)	Total (₹)
Sales Revenue (4,800 units)	31.25	1,50,000
Manufacturing Costs :		
Direct Materials	10.00	48,000
Direct Labour	12.25	58,800
Variable Overheads	5.00	24,000
Total	27.25	1,30,800
Incremental Profit	4.00	19,200

	Make (₹)	Buy (₹)
Total Cost of Purchasing Motor Castings	-	1,46,250
Cost of Manufacturing Motor Castings	1,38,125	-
Opportunity Cost	9,200	
Net Relevant Costs	1,57,325	1,46,250

The firm would benefit by ₹ 11,075 (₹1,57,325 - ₹ 1,46,250), if it elects to buy the motor castings and manufacture the housings (new product line).

Illustration 5

A T.V. manufacturing company finds that while it costs to make component X, the same is available in the market at ₹5.75 each, with all assurance of continued supply. The breakdown of cost is:

Materials	₹2.75 each
Labour	₹1.75 each
Variable overheads	₹0.50 each
Depreciation and other fixed cost	₹1.25 each
	₹6.25 each

(a) Should the company make or buy the component?

(b) What should be your decision if the supplier offered component at ₹4.85 each?

Solution

Marginal cost per unit of component X

Materials	₹2.75
Labour	₹1.75
Variable overheads	₹0.50
Total	₹5.00

(a) The purchase cost of the above component is ₹5.75 each. If the company is having spare capacity which can not be filled with more remunerative jobs, it is recommended that the above component be manufactured in the company since the marginal cost at ₹5.00 each is less than the purchase cost of ₹5.75.

(b) In the event of purchase cost of ₹4.85 each being less than the marginal cost of ₹5.00 each, it is recommended that the component be bought from the supplier as this results in a saving of ₹0.15 each. The spare capacity thus available can be utilised for other purposes, as far as possible.

Accepting an offer below Normal Price

Introduction

Selling goods below the standard price in the domestic market can be a strategic decision influenced by factors such as market penetration, competition, surplus inventory clearance, and maintaining customer loyalty. However, before adopting this pricing strategy, a thorough financial and strategic analysis must be conducted to ensure profitability and long-term sustainability. The financial analysis will include an incremental analysis where incremental revenue is considered against the marginal cost.

The initial step in evaluating a decision to sell below the normal price in the domestic market is performing an *incremental analysis*, which includes the following calculations:

1. Incremental Revenue: This is determined by subtracting current sales from projected sales resulting from the reduced price.
2. Incremental Cost: This is computed by deducting existing costs from anticipated costs due to the pricing change.

The key decision criterion is *whether incremental revenue exceeds incremental cost.* If the additional revenue from the price reduction surpasses the corresponding cost, the decision is considered financially viable.

Beyond the basic cost-revenue analysis, several critical factors must be considered before reducing prices in the domestic market:

Additional considerations

A temporary price reduction may impact long-term earnings as customers might delay purchases, expecting further price drops. Additionally, lowering prices could set a precedent for future negotiations, reducing profit margins over time. Businesses must carefully assess whether the short-term gain from increased sales outweighs the risk of eroding pricing power in the market.

Market positioning and competition are also critical factors to consider. Price cuts may trigger a price war, leading to reduced profitability across the industry. Furthermore, brand perception could be affected, making the product seem less premium. Competitors may also respond aggressively by lowering their prices, which could impact market share and overall industry dynamics.

The additional costs associated with domestic sales expansion should not be overlooked. Increased marketing and promotional efforts may be required to communicate the pricing strategy effectively. Handling a surge in demand may necessitate additional customer service support, while higher sales volumes could lead to increased logistical and distribution expenses.

Reliability of cost estimates is another crucial aspect. Inaccurate projections may result in underestimated expenses, turning what seemed like a profitable decision into a loss-making one. Additionally, variations in consumer demand responses should be factored in to ensure that the pricing strategy remains viable under different market conditions.

Finally, the impact on incremental working capital should be analyzed. If financing costs associated with the additional working capital required for increased sales exceed the contribution margin, the decision may not be financially justified. Businesses must ensure that the interest on additional capital remains lower than the expected financial benefits from the price reduction strategy.

Conclusion

Selling goods below the normal price in the domestic market can be a strategic move to gain market share, clear inventory, and attract customers. However, the decision should be backed by a thorough financial analysis, including incremental revenue and cost evaluation. Additionally, businesses must consider long-term implications on pricing, market perception, and competition. By systematically assessing all these factors, firms can make informed decisions that balance short-term gains with long-term strategic objectives.

Illustration 6

A company is at present working at 90 per cent of its capacity and producing 13,500 units per annum. It operates a flexible budgetary control system. The following figures are obtained from its budget.

	90% Amount (₹)	100% Amount (₹)
Sales	15,00,000	16,00,000
Fixed expenses	3,00,500	3,00,600
Semi-fixed expenses	97,500	1,00,500
Variable expenses	1,45,000	1,49,500
Units made	13,500	15,000

Labour and material costs per unit are constant under present conditions. Profit margin is 10 per cent.

(a) You are required to determine the differential cost of producing 1,500 units by increasing capacity to 100%

(b) What would you recommend for an export price for these 1,500 units taking into account that overseas prices are much lower than indigenous prices?

Solution

Computation of material and labour cost

Particulars	Amount (₹)	Amount (₹)
Sales at present		15,00,000
(-) Profit @ 10%		1,50,000
Total cost		13,50,000
(-) All costs other than material & labour		
Fixed expenses	3,00,500	5,43,000
Semi fixed expenses	97,500	
Variable expenses	1,45,000	
Material & Labour cost		8,07,000

(a) Statement showing differential cost of 1500 units

Particulars	Amount (₹)
Material & Labour (8,07,000 x 1500/13500)	89,667
Fixed expenses (3,00,600 – 3,00,500)	100
Semi fixed expenses (1,00,500 – 97,500)	3,000
Variable expenses (1,49,500 – 1,45,000)	4,500
Differential cost	97,267

(b) Differential cost per unit = 97,267 / 1,500 = ₹ 64.84

The minimum price for these 1,500 units should not be less than ₹ 64.84

Illustration 7

The operating statement of a company is as follows:		Amount (₹)
Sales (80,000 @ ₹15 each)		12,00,000
Costs:		
Variable:	(₹)	
Material	2,40,000	
Labour	3,20,000	
Overheads	1,60,000	
	7,20,000	
Fixed Cost	3,20,000	10,40,000
PROFIT		1,60,000

The capacity of the plant is 1 lakh units. A customer from U.S.A. is desirous of buying 20,000 units at a net price of ₹10 per unit. Advice the producer whether or not offer should be accepted. Will your advice be different, if the customer is local one.

Solution

Statement showing computation of profit before and after accepting the order

Amount (₹)

Sr. No.	Particulars	Present Position (Before accepting) 80,000	Order Value (20,000)	Total (After accepting) 1,00,000
I.	Sales	12,00,000	2,00,000	14,00,000
II.	Variable Cost			
	Material	2,40,000	60,000	3,00,000
	Labour	3,20,000	80,000	4,00,000
	Variable OH	1,60,000	40,000	2,00,000
		7,20,000	1,80,000	9,00,000
III.	Contribution (I - II)	4,80,000	20,000	5,00,000
IV.	Fixed cost	3,20,000	–	3,20,000
V.	Profit (III - IV)	1,60,000	20,000	1,80,000

As the profit is increased by ₹ 20,000 by accepting the order, it is advised to accept the same. If the order is from local one, it should not be accepted because it will adversely affect the present market.

Closure of a Plant or Division, Outsourcing or Suspending Activities

Introduction

Deciding whether to close a plant or division, outsource production, or temporarily suspend activities is a complex decision influenced by financial viability, market conditions, and long-term strategic objectives. Businesses must assess whether continuing operations, shifting to outsourcing, or shutting down is the most sustainable approach. This decision often involves analysing cost structures, market competition, and operational efficiency to ensure optimal resource allocation. Incremental analysis is the key here as well and is similar to the analysis mentioned in all the previously mentioned short term decision making. The decision should be based on whether incremental revenue exceeds incremental cost. If revenue does not sufficiently cover the additional costs, alternatives such as outsourcing or temporary shutdown may be preferable.

Shutdown Point and Operational Viability

A shutdown point occurs when a business cannot cover its variable costs, making continued operation financially unviable. If the cost of operations exceeds revenue, shutting down temporarily or permanently becomes a practical option. However, if the business contributes towards fixed costs, it may be beneficial to continue operations to minimize losses.

In some cases, businesses may suspend activities due to an economic downturn but plan to resume operations later. In such instances, the decision should be based on marginal cost analysis. If the selling price is higher than marginal cost, continuing operations is recommended. On the other hand, suspending production may help reduce certain fixed costs, although additional expenses, such as maintenance costs for idle equipment, should be considered. The decision depends on whether the contribution margin exceeds the difference between normal fixed costs and the fixed costs incurred during suspension.

Outsourcing as an Alternative

Outsourcing production to third parties can serve as a viable alternative to plant closure, particularly when external suppliers can manufacture products at a lower cost without compromising quality. However, businesses must conduct a thorough evaluation of several critical factors before making this decision. Cost efficiency is a primary consideration, as the cost of outsourcing should be lower than in-house production while ensuring that product quality remains uncompromised. Additionally, supply chain reliability plays a crucial role, as businesses must ensure a consistent supply of materials and adherence to production schedules to avoid disruptions. Quality control is another key factor, as outsourced production must meet the company's established quality standards to maintain customer satisfaction and brand reputation. Moreover, companies should assess the risk of strategic dependence, as excessive reliance on third-party suppliers may lead to reduced control over essential business processes, potentially affecting responsiveness to market changes. Lastly, long-term competitiveness should be carefully weighed, as losing in-house manufacturing capabilities could limit a company's ability to innovate and adapt to evolving industry demands.

By thoroughly analysing these factors, businesses can make informed decisions on whether outsourcing is a sustainable and strategic alternative to plant closure.

Non-Cost Considerations in Closure or Suspension Decisions

While financial factors are crucial in deciding whether to shut down, outsource, or suspend operations, non-cost considerations also play a significant role in the decision-making process. One critical factor is the impact on employees, as laying off skilled workers can result in rehiring challenges and potential labour shortages when operations resume. Market re-entry risks must also be assessed, as a temporary shutdown could lead to a loss of market share, making it more difficult to regain a competitive position. Additionally, asset depreciation is a key concern, as machinery and equipment that remain unused for

extended periods may deteriorate or become obsolete, leading to higher costs when reopening. Competitive pressure further complicates the situation, as rivals may seize the opportunity to strengthen their market position in the company's absence, making recovery even more challenging. Considering these factors alongside financial implications ensures a well-rounded approach to making strategic business decisions.

It is important to note that the decision to close a plant, outsource, or suspend operations should be based on thorough financial analysis, market conditions, and long-term business strategy. If maintaining operations minimizes losses or outsourcing offers better cost efficiency, those options should be considered. However, if market conditions make continued operations unsustainable, closure or suspension may be necessary. A well-balanced decision ensures financial stability while maintaining future growth potential.

Shutdown Point Formula

- Shutdown Point (Units) = Avoidable Fixed Cost ÷ Contribution per Unit
- Shutdown Point (₹) (Value) = Avoidable Fixed Cost ÷ P/V Ratio

Decision-Making Framework

- If sales are below the shutdown point, ceasing operations is advisable, as even avoidable fixed costs are not recovered.
- If sales are at the shutdown point, continuing operations is feasible, as avoidable fixed costs are fully covered.
- If sales exceed the shutdown point, operations should continue, as the additional contribution helps recover remaining fixed costs.
- If outsourcing provides cost and quality advantages, shifting production to an external provider may be a viable alternative.

Example:

A factory has avoidable fixed costs of ₹3,00,000 and produces a product with a contribution per unit of ₹50. The shutdown point (units) can be calculated as:

$$\textbf{\textit{Shutdown Point (Units)}} = \frac{\textbf{\textit{Avoidable Fixed Cost}}}{\textbf{\textit{Contribution per Unit}}}$$

$$\textbf{\textit{Shutdown Point (Units)}} = \frac{300000}{50} = \textbf{6000 units}$$

This means that if the company cannot sell at least 6,000 units, it should shut down operations, as the contribution would be insufficient to cover avoidable fixed costs.

Alternatively, if the P/V Ratio (Profit/Volume Ratio) of the product is 40%, the shutdown point (₹ Value) can be determined as:

$$\textbf{\textit{Shutdown Point (Units)}} = \frac{\textbf{\textit{Avoidable Fixed Cost}}}{\textbf{\textit{(p/v ratio)}}}$$

$$\textbf{\textit{Shutdown Point (Units)}} = \frac{300000}{0.04} = 7{,}50{,}000\ (\textit{revenue required})$$

This means that the business must generate at least ₹750,000 in revenue to justify continued operations. If sales fall below this level, shutting down is the better option.

Illustration 8

The Hope Company has three divisions. Each of which makes a different product. The budgeted data for the coming year are as follows:

	A (₹)	B (₹)	C (₹)
Sales	1,12,000	56,000	84,000
Direct Material	14,000	7,000	14,000
Direct Labour	5,600	7,000	22,400
Direct Expenses	14,000	7,000	28,000
Fixed Cost	28,000	14,000	28,000

The Management is considering closing down the division C. There is no possibility of reducing fixed cost. Advise whether or not division C should be closed down.

Solution

Statement showing computation of profit before closing down of division C

Particulars	A (₹)	B (₹)	C (₹)	Total (₹)
Sales	1,12,000	56,000	84,000	2,52,000
Direct Material	14,000	7,000	14,000	35,000
Direct Labour	5,600	7,000	22,400	35,000
Direct expenses	14,000	7,000	28,000	49,000
Total Variable Cost	33,600	21,000	64,400	1,19,000
Contribution	78,400	35,000	19,600	1,33,000
Fixed cost				70,000
Profit				63,000

Statement showing computation of profit after closing 'C'

Particulars	A (₹)	B (₹)	Total (₹)
Sales	1,12,000	56,000	1,68,000
Variable costs:			
Direct Material	14,000	7,000	21,000
Direct Labour	5,600	7,000	12,600
Direct expenses	14,000	7,000	21,000
Total Variable Costs	33,600	21,000	54,600
Contribution	78,400	35,000	1,13,400
Fixed cost			70,000
Profit			**43,400**

From the above computations, it was found that profit is decreased by ₹ 19,600 by closing down division 'C', it should not be closed down. In other words, as long as if there is a contribution of ₹1, from division 'C', it should not be closed down.

Alternative Methods of Manufacture

Introduction

In the realm of strategic decision-making, selecting the most appropriate method of manufacture plays a crucial role in determining an organization's success. Manufacturing methods significantly impact cost structures, operational efficiency, product quality, and market responsiveness. With evolving technologies and competitive pressures, businesses must carefully assess their production processes to optimize resource utilization and maintain a competitive edge. The choice of manufacturing method depends on various factors, including production volume, product complexity, cost constraints, and technological advancements. Organizations must strategically align their manufacturing approach with their business objectives to ensure sustainable growth and market adaptability. Strategic decision-making in manufacturing requires careful evaluation of various production methods to achieve operational excellence and market competitiveness. Organizations must balance efficiency, cost-effectiveness, flexibility, and technological integration when selecting a manufacturing approach. By adopting the most suitable alternative manufacturing method, companies can enhance productivity, reduce waste, and respond effectively to changing market demands. A well-planned manufacturing strategy not only improves profitability but also fosters innovation and long-term sustainability in an increasingly competitive global market.

Important Alternative Manufacturing Methods

One of the widely used manufacturing methods is *job production*, which is suitable for customized, small-batch, or unique products. This method requires skilled labour, as each product is individually crafted to meet specific customer needs. Although job production ensures high-quality output, it is time-consuming

and expensive, making it ideal for industries like bespoke furniture making, custom-designed suits, and prototype development.

Another method is *batch production*, where goods are manufactured in predefined groups or batches. This approach allows businesses to benefit from economies of scale while maintaining some level of customization. Batch production is commonly used in industries such as food processing, pharmaceuticals, and clothing manufacturing, where product demand fluctuates, and flexibility is required.

For large-scale production, *mass production* is the most effective method. This approach focuses on continuous production of standardized goods, enabling companies to achieve cost efficiency through economies of scale. Mass production is heavily dependent on automation and assembly-line techniques, making it suitable for industries such as automobile manufacturing, packaged foods, and consumer electronics. However, it lacks flexibility, and any design changes may require substantial reconfiguration of the production process.

To enhance efficiency and eliminate waste, many organizations adopt *lean manufacturing* techniques. Lean manufacturing aims to maximize productivity by minimizing resource wastage while maintaining high-quality output. This method involves Just-In-Time (JIT) inventory management, continuous improvement, and process optimization. Companies such as Toyota have successfully implemented lean manufacturing principles, leading to significant cost savings and operational efficiency.

As market dynamics become increasingly volatile, businesses seek greater adaptability in their manufacturing processes. *Agile manufacturing* offers a solution by emphasizing responsiveness to customer demands and market changes. This approach incorporates modular production processes, advanced data analytics, and digital technologies to customize products efficiently. Industries such as footwear, where brands like Nike use agile manufacturing to offer personalized sneakers, benefit from this flexibility.

Another innovative approach is the use of *Flexible Manufacturing Systems (FMS),* which employ computer-controlled machinery to adapt to varying production requirements. FMS combines the advantages of automation and adaptability, allowing manufacturers to efficiently produce medium-volume, high-variety products. It is commonly used in industries requiring high precision, such as CNC machining centers and robotic manufacturing cells.

With technological advancements, *additive manufacturing*, commonly known as 3D printing, has emerged as a game-changer. This method constructs products layer by layer using digital designs, reducing material waste and enabling complex geometries that traditional manufacturing cannot achieve. Additive manufacturing is widely used in aerospace, medical devices, and rapid prototyping, where customization and precision are essential.

Factors Influencing Manufacturing Method Selection

Several critical factors influence the selection of a manufacturing method. *Cost considerations* play a fundamental role, as businesses must evaluate initial investment, operational expenses, and labour costs. Additionally, *market demand* determines the appropriate production scale, ensuring that supply meets

consumer expectations. *Technology integration* is another essential factor, as advancements in automation, artificial intelligence, and Industry 4.0 solutions are revolutionizing manufacturing capabilities. Moreover, *regulatory and environmental compliance* necessitates sustainable manufacturing practices to align with legal standards and ecological concerns. Lastly, *flexibility and scalability* are crucial in adapting to shifting consumer preferences and market conditions, allowing organizations to remain competitive and responsive.

Use of Man or Machine

In strategic decision-making, businesses must evaluate whether to rely more on human labour or automation in their manufacturing processes. The choice between man and machine depends on factors such as cost, efficiency, product complexity, and labour availability. Manual labour is preferred in industries where craftsmanship, customization, and intricate detailing are crucial, such as luxury goods, artisanal products, and handcrafted furniture. Skilled workers bring creativity, adaptability, and problem-solving capabilities, making them indispensable in certain sectors. On the other hand, automation and machinery offer unmatched efficiency, precision, and scalability. Machines are widely used in industries requiring high production volumes, consistency, and minimal human intervention, such as automobile manufacturing, semiconductor fabrication, and pharmaceutical production. Automation reduces labour costs, minimizes errors, and enhances production speed, but it requires substantial investment in technology and infrastructure.

Many modern industries adopt a hybrid approach, integrating human expertise with machine efficiency. Advanced manufacturing techniques, such as cobots (collaborative robots)[5] and AI-driven automation, enable seamless human-machine collaboration, improving productivity and operational flexibility. The decision to use man or machine should align with the organization's strategic goals, market demands, and technological capabilities to ensure long-term sustainability and competitiveness.

[5] *Collaborative robots* (cobots) are advanced machines designed to work safely alongside humans in shared workspaces, leveraging sensors and safety mechanisms (e.g., force limitation, ISO/TS 15066 standards) to prevent accidents. They enhance productivity in industries like manufacturing, healthcare, and logistics by handling repetitive tasks (e.g., assembly, sorting) while allowing humans to focus on complex decision-making. Cobots are cost-effective, user-friendly, and adaptable to evolving workflows, making them ideal for small and medium enterprises. (https://www.iso.org/standard/62996.html)

MCQs

1. Which of the following is an out-of-pocket cost?
   a. Sunk cost.
   b. Imputed cost
   c. Labour cost
   d. All of these.

2. An export order is generally accepted at:
   a. Below marginal cost
   b. Below fixed cost
   c. Below total cost but above marginal cost
   d. Above total cost.

3. Which of the following is irrelevant to decision-making process?
   a. Fixed costs
   b. Historical costs
   c. Relevant costs
   d. Variable costs.

4. Managers must determine which products should be emphasized when the plant is operating at full capacity. This is known as:
   a. An individual product decision.
   b. A production scheduling analysis.
   c. **A product-mix decision**.
   d. A shut-down or continue decision.

5. Which of the following would not be considered in a make or buy decision?
   a. Potential use of manufacturing capacity.
   b. Variable costs of production.
   c. Potential rental income from space occupied by production area.
   d. **Unchanged fixed costs**.

6. Those costs which may be saved or eliminated by making a particular decision or selecting a certain alternative are known as:
   a. Opportunity Costs.
   b. Escapable Costs.
   c. Out-of-pocket Costs.
   d. Sunk Costs.

7. If the total cost of 1000 units is ₹60,000 and that of 1001 units is ₹60,400, then the increase of ₹400 in the total cost is:
   A. Prime cost
   B. All variable overheads
   C. Marginal cost
   D. None of the above

8. Which of the following statements are true about marginal costing?
   A. In marginal costing, fixed costs are treated as product costs

B. Marginal costing is not an independent system of costing
C. The elements of cost in marginal costing are divided into fixed and variable components
D. Both b and c

9. The costing method where fixed factory overheads are added to inventory is called:
A. Activity-based costing
B. Absorption costing
C. Marginal costing
D. All of the above

10. While computing profit in marginal costing:
A. The fixed cost gets added to the contribution
B. The total marginal cost gets deducted from total sales revenue
C. The total marginal cost gets added to total sales revenue
D. None of the above

11. Which of the following assumptions are made while calculating marginal cost?
A. Total fixed cost is constant at all levels of output
B. Total variable cost varies according to the volume of output
C. All elements of cost can be divided into fixed and variable components
D. All of the above

12. Contribution margin in marginal costing is also known as:
A. Net income
B. Gross profit
C. Marginal income
D. None of the above

13. Which manufacturing method is best suited for producing unique, customized products that require skilled labour and high production time?
A) Mass production
B) **Job production**
C) Batch production
D) Lean manufacturing

14. Which manufacturing method focuses on eliminating waste, continuous improvement, and employs Just-In-Time (JIT) inventory management?
A) Agile manufacturing
B) **Lean manufacturing**
C) Mass production
D) Additive manufacturing

15. Additive manufacturing, commonly known as 3D printing, is most prominently used in which sector due to its ability to enable complex geometries and customization?
A) Automobile manufacturing and retail
B) Food processing and pharmaceuticals
C) **Aerospace, medical devices, and rapid prototyping**
D) Clothing and footwear production

Numerical MCQs (for self assessment)

1. XYZ Ltd. makes a special gadget for the car it manufactures. The machine for the gadget works to full capacity and incur ₹15 Lakhs and ₹40 Lakhs respectively as Variable and Fixed Costs.
   If all the gadgets were purchased from an outside supplier, the machine could be used to produce other items, which would earn a total contribution of ₹ 25 Lakhs. What is the maximum price that XYZ Ltd. should be willing to pay to the outside supplier for the gadgets, assuming there is no change in Fixed Costs?
   a) ₹40 Lakhs
   b) ₹65 Lakhs
   c) ₹25 Lakhs
   d) ₹15 Lakhs
2. Zee Products Ltd. manufactures four products e.g. Product E, Product F, Product G and Product H using same raw materials. The input requirements for Products E, F, G and H are 1kg, 2kgs, 5kgs and 7kgs, respectively. Product-wise Selling Price and Variable Cost data are given hereunder:

Products	E	F	G	H
Selling Price (₹)	100	150	200	300
Variable Cost (₹)	50	70	100	125

   Assuming raw material availability is a limiting factor, the correct ranking of the products would be:
   a) E, F, G & H
   b) E, F, H & G
   c) F, E, G & H
   d) F, E, H & G

3. X Ltd. has 1000 units of an obsolete item which are carried in inventory at the original price of ₹ 50,000. If these items are reworked for ₹ 20,000, they can be sold for ₹ 36,000. Alternatively, they can be sold as a scrap for ₹ 6,000 in the market. In a decision model used to analyze the reworking proposal, the opportunity cost should be taken as
   a) ₹16,000
   b) ₹6,000
   c) ₹30,000
   d) ₹ 20,000
4. A company has a break-even point when sales are ₹ 3,20,000 and variable cost at that level of sales are ₹ 2,00,000. How much would contribution margin increase or decrease if variable expenses are dropped by ₹ 30,000?
   a) Increase by 27.5%
   b) Increase by 9.375%
   c) Decrease by 9.375%
   d) Increase by 37.5%
5. Mr. Mahesh has a sum of ₹ 3,00,000 which he invested in a business. He wishes for a 15% return on his fund. It is revealed from the present cost data analysis that the variable cost of operation is 60% of sales and fixed costs are ₹ 1,50,000 p.a. On the basis of this information, you are required to find out the sales volume to earn a 15% return.
   a) ₹ 4.875 Lakhs
   b) ₹ 4.675 Lakhs
   c) ₹ 4.775 Lakhs
   d) ₹ 5.875 Lakhs

6. A radio manufacturer finds that while it costs 6.50 per unit to make a component, the same is available in the market at ₹ 5.75 each. Continuous supply is also fully assured. The break-up of costs per unit is as follows:

   Materials: ₹ 2.75

   Labour: ₹ 1.75

   Other variable expenses: ₹ 0.50

   Depreciation & other fixed costs: ₹ 1.25

   The best option for the manufacturer will be

   a) To make
   b) To buy
   c) To sell
   d) None of the above

7. A firm has given the following data:
   Fixed expenses at 50% ₹ 15,000, Fixed expenses when factory is close down ₹ 10,000, Additional expenses in closing down ₹ 1,000, Production at 50% capacity 5,000 units, contribution per unit ₹ 1. Advise whether to run the factory or close it down:

   a) Close
   b) Run
   c) Continue
   d) None of the above

8. A company manufactures and sells three types of product namely A, B and C. Total sales per month is ₹ 80,000 in which the share of these three products are 50%, 30% and 20% respectively. The variable cost of these products is 60%, 50% and 40% respectively. The combined P/V Ratio will be:

   a) 49%
   b) 48%
   c) 47%
   d) 50%

PART B: STRATEGIC FINANCIAL MANAGEMENT

UNIT 1: INTRODUCTION

CONTENTS

INTRODUCTION

Finance is said to be the life blood of business. It is defined as the provision of money at the time when it is required. Every enterprise, whether big, medium, small, needs finance to carry on its operations and to achieve its target. In fact, finance is so indispensable today that it is rightly said to be the blood of an enterprise. Without adequate finance, no enterprise can possibly accomplish its objectives. Efficient management of finance is a crucial to the sustenance and growth of a business.

Financial management refers to that part of the management activity, which is concerned with the planning, & controlling of firm's financial resources. It deals with finding out various sources for raising funds for the firm. Financial management is practiced by many corporate firms and can be called Corporation finance or Business Finance.

Howard and Uptron have defined financial management as '*an application of general managerial principles to the area of financial decision-making*'.

Weston and Brighem have defined financial management as '*an area of financial decision making, harmonizing individual motives and enterprise goal*'.

A simple day to day definition of financial management is '*the ways and means of managing money*'.

A more formal definition would be: the determination, acquisition, allocation, and utilisation of financial resources, usually with the aim of achieving some particular goals or objectives.

Nature of financial management

The terms, 'business finance', 'managerial finance', and 'corporate finance' all refer to the management of the essential investing and financing activities which business firms must undertake to produce the goods and services which people require. These terms mean the same thing as the term 'financial management'.

Specifically, financial management is about:

1. analysing financial situations,
2. making financial decisions,
3. setting financial objectives,
4. formulating financial plans to attain those objectives, and
5. providing effective systems of financial control to ensure plans progress towards the set objectives.

The nature and scope of financial management may be conceptualized as comprising of the following three issues.

1. Estimating Financial Requirements: - The first task of financial management is to estimate short term and long-term financial requirements of his business.
2. Deciding Capital Structure: - The capital structure refers to the kind and proportion of different securities for raising funds.
3. Selecting a Source of Finance: - After preparing capital structure, an appropriate source of finance is selected. Various sources from which finance may be raised include: share capital, debentures, financial institutions, commercial banks, public deposits etc.

Functions of Financial Management

A financial manager has to concentrate on the following areas of the finance function.

1. Estimating Financial Requirements: The first task of the financial manager is to estimate short term and long-term financial requirement of his business. For this purpose, he will prepare a financial plan for present as well as future.
2. Deciding Capital Structure: The capital structure refers to the kind and proportion of the different securities for raising funds. After deciding about the quantum of funds required it should be decided which type of security should be raised. As such raising finance is either through the equity or debt.

3. Selecting a Source of Finance: After preparing a capital structure plan, an appropriate source of finance is selected. Various sources from which finance may be raised, includes share capital, debentures, financial deposits etc.
4. Selecting a Pattern of Investment: After procurement of funds a decision about investment pattern is to be taken. The selection of investment pattern is related to the use of the funds. A decision has to be taken as to which assets are to be purchased?
5. Proper Cash Management: Cash management is an important task of financial manager. He has to assess the various cash needs at different times and then make arrangements for arranging cash. Cash may be required to make payments to creditors, purchasing raw material, meet wage bills, and meet day to day expenses. The cash budget and the cash flow statement are the two main tools used for efficient and effective cash management.
6. Implementing Financial Controls: An efficient system of financial management necessitates the use of various control devices.
7. Proper use of Surpluses: The utilization of profits or surpluses as also an important factor in financial management. A judicious use of surpluses is essential for the expansion and diversification plans and also protecting the interest of the shareholders. On the other, ploughing back of profit is the suitable policy of internal financing.

The above-mentioned functions summarized into three broad categories namely financing decision, investment decision and dividend decision. These are discussed briefly in the following lines.

- Investment Decision: The investment decision relates to the selection of assets in which funds will be invested by a firm. The assets which can be acquired fall into two broad groups:
    - long term assets which yield a return over a period of time in future,
    - short-term or current assets defined as those assets which in normal course of business are convertible into cash usually within a year.
- Financing Decision: Provision of funds required at the proper time is one of the primary tasks of the finance manager. Every business activity requires funds and hence every financial manager is confronted with this problem. While the investment decision is concerned with the asset-mix or the composition of the assets of a firm, the concern of the financing decision is with the financing – mix or capital structure or leverage.
- Dividend Decision: Another major area of decision making by a finance manager is known as the Dividend decisions which deal with the appropriations of after tax profits. The finance manager must decide whether the firm should distribute all profits, or retain them, or distribute a portion and retain the balance.

Objectives of financial management

At the core of financial management is efficient and effective utilization of funds (raising of funds, investment of the same and distribution of surplus generated). This is the essence of an effective finance manager. The finance manager must determine the basic objectives of the financial management. As such, typical goals or objectives of the firm include.

1. shareholder wealth maximization, popularly known as SWM
2. profit maximization;
3. managerial reward maximization;
4. behavioral goals; and
5. social responsibility.

Though there may be five underlying objectives of financial management as stipulated above the basic tenet on which financial management (corporate finance or business finance) theory operates is that the primary goal of the firm is to maximize the wealth of its shareholders, which translates into maximizing the price of the firm's equity shares. The other goals mentioned above also influence a firm's policy but are less important than SWM. It is important to note that the traditional goal of the firm emphasized by economists is profit maximization, which is contradicted by financial management theorists due to several reasons.

A comparative study of profit maximisation versus shareholders' wealth maximisation is presented in the table below;

Goal	Objective	Advantages	Disadvantages
1. Profit maximisation	Maximizing profits.	1. Easy to calculate 2. Profit, as such, is the parameter of business operations.	1. Emphasizes the short term. 2. Ignores risk and uncertainty 3. Ignores the timing of return.
2. Shareholder wealth maximisation	Maximizing the market value of equity.	1. Emphasizes the long term. 2. Recognizes risk and uncertainty 3. Recognizes the timing of the return.	1. The relationship between share price and financial decision is ambiguous 2. Can promote creative accounting[1].

Financial Goal of the Firm and Financial Decisions

It is noted in earlier lines that financial decisions of the firm encompass three specific areas;

1. Investment decisions - Investment decisions pertain to how managers must invest in various securities, instruments, assets etc. These decisions are considered more important than financing and

[1] Creative accounting consists of accounting practices that follow required laws and regulations, but capitalize on loopholes in accounting standards to falsely portray a better financial image of a company. Creative accounting techniques vary and evolve as regulations change to close the loopholes that allow them. [https://www.investopedia.com/terms/c/creative-accounting.asp]

dividend decisions. Here, the decision is taken regarding how investment should occur in different asset classes. It also involves whether to go for short term or long term assets. These decision making is pivoted around investment of funds raised and covers long term investment decisions (capital budgeting or investment appraisal) and deployment of short term funds (working capital management)

2. Financing decision - Managers take these decisions to facilitate financing for the organisation. The relation of financing decisions is to raise equity while reducing debt as much as possible. Often, they are taken in light of the investment decisions. These decisions are pivoted around minimizing the overall cost of raising finance and the design of the capital structure.
3. Dividend decision - After making a profit, an organisation has to decide how much of the profit is to be distributed to its shareholders. This distribution must be given to them in return for their investment in the company's equity. Giving too little can cause a loss of trust and confidence of shareholders in the organisation. However, giving too much would reduce the profit margin of the organisation as this would dampen internal financing. So, an optimum balanced dividend decision must be taken. These decisions involve how much of the profit is to be distributed to the shareholders and how much is to be retained. It also consists of the timing of giving dividends to the shareholders.

The efficiency and effectivity of the three financial decision making is reflected in the growth of shareholder wealth. In other words, when shareholders' wealth (measured in terms of the value of equity) is growing it may be reasonably stated that the financial decisions have been efficiently and effectively taken. Financial decisions are the decisions that managers of an organisation make about the finances. These decisions play a huge role in the financial well-being of an organisation. There are three types of financial decisions- investment, financing, and dividend. Managers take investment decisions regarding various securities, instruments, and assets. They take financing decisions to ensure regular and continuous financing of the organisation. The dividend decision has to do with the correct amount of reward to its shareholders. Finally, read the various factors affecting financial decisions.

TIME VALUE OF MONEY

The time value of money is a basic concept in financial management that holds that money in the present is worth more than the same sum of money to be received in the future. This is factual correct because money that one possesses right now can be invested and can earn a return, thus creating a larger amount of money in the future. Time value of money is a critical consideration in financial and investment decisions.

If it is asked which is preferred Rs1000 today or Rs1000 ten years from today, it is basically common sense that Rs 1000 today is better because of the recognition of time value to money. The immediate receipt of Rs 1000 provides the opportunity to put the money to work and earn interest. Efficient and effective financial decisions involve considerations of *time value of money.*

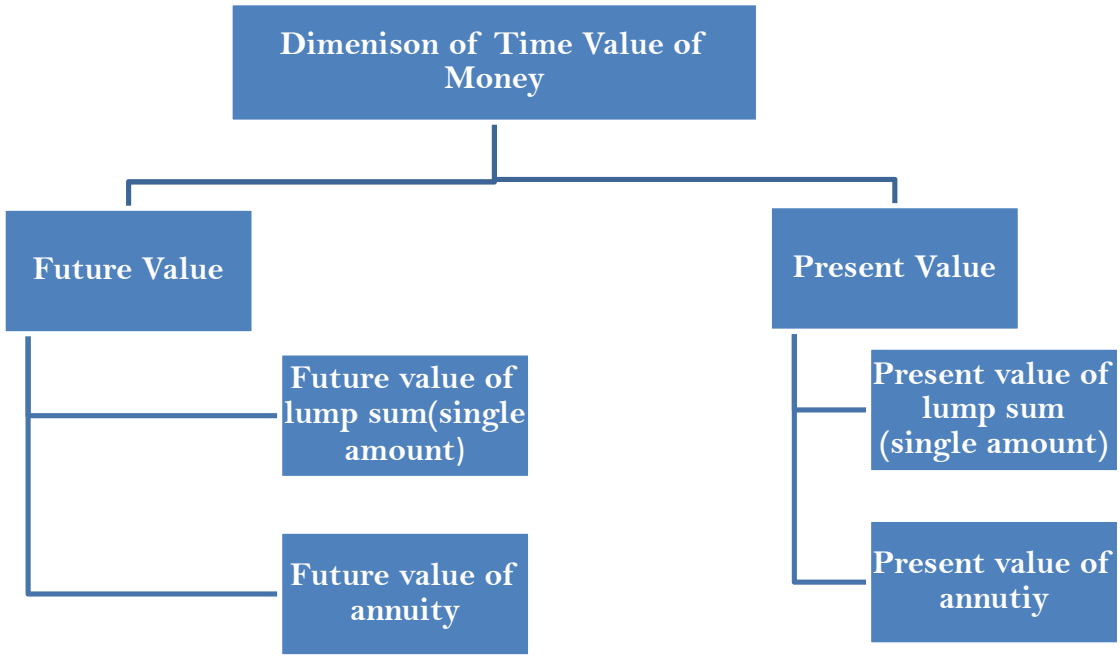
A simple example can be used to show the *time value of money.* Assume that someone offers to pay either Rs1000 now or Rs1100 one year from now. Which pay option should be considered? It depends on what kind

of return can be earned on investment at the present time. Simply, since Rs 1100 is 110% of Rs 1000, any return over above 10% would make considering Rs 1000 now a better option. If it is considered that the current rate is 11%, then Rs 1000 received now can be invested @ 11% and this will fetch more than Rs 1100, a year from now. On the other hand, if the current market rate is 9% then it is better to accept Rs 1100 a year from now as that would be better than getting Rs 1000 now and investing at 9%. Thus the concept of *time value of money* has direct linkage with wealth of the owner (in financial management parlance, SWM).

As such, net cash flows (cash inflows *minus* cash outflow) are either-

- Annuity- These are finite set of level sequential cash flows. It is defined as a series of payments (or receipts) of a fixed amount for a specified number of periods. Each payment is assumed to occur at the end of the period. The future value of an annuity is a compound annuity which involves depositing or investing an equal sum of money at the end of each year for a certain number of years and allowing it to grow.
    - An *ordinary annuity*[2] is an annuity where the cash flows occur at the *end* of each compounding period.
    - An *annuity due* is an annuity where the cash flows occur at the *beginning* of each compounding period.
- Lump sum – This is a single cash flow occurring at one particular year.

On the basis of the above discussion, there are four dimensions of *time value of money*. This is represented in the chart mentioned below:



[2] A deferred annuity is a type of annuity contract that delays income payments until a later date, typically after retirement. During the accumulation phase, the annuitant makes contributions, which grow on a tax-deferred basis. The payments begin at a predetermined future date, providing a steady income stream. Deferred annuities can be fixed, offering guaranteed returns, or variable, where returns depend on market performance.

Future value computation is also referred as *Compounding*

Present value computation is also referred as *Discounting*

Future Value – Compounding

Future value of lump sum (single cash flow)

One rupee in hand today is worth more than a rupee to be received tomorrow because of the interest it could earn from putting it in a savings account or placing it in an investment account. Compounding interest means that interest earns interest. For the discussion of the concepts of compounding and time 8value, the following may be defined;

F_n= future value = the amount of money at the end of year n

P = principal

i = annual interest rate

n =number of year

The future value of an investment compounded annually at rate i for n years is

$Fn = P(1 + i)^n = P.FVIF_{i,n}$ (the value of $FVIF_{i,n}$ is given in chart A in appendix to this chapter]

Example

If a person invests Rs1,50,000 in an investment which pays 12% rate of interest, what will be the future value of the invested amount at the end of 10 years?

Solution

The future value (FV) of the invested amount at the end of 10 years will be

$FV = PV\ (1+r)^n$

$FV = ₹1,50,000\ (1+0.12)^{10}$

$FV = ₹1,50,000 \times 3.106$

$= ₹4,65,900$

[$(1 + 0.12)^{10} = 3.106$ ($This\ is\ referred\ as\ FVIF_{12\%,10}.\ This\ is\ readily\ avaiable\ in\ Chart\ A.$)]

Doubling Period

Investors wants to know how long would take to double the investment amount at a given rate of interest. If we look at the future value interest factor table, we find that when the interest rate is 12% it takes about 6 years to double the amount. When the interest rate is 6%, it takes about 12 years to double the amount, so on

and so forth. There is a thumb rule of 72[3] that helps to find out the doubling period. According to this rule of thumb, the doubling period is obtained by dividing 72 by the interest rate.

A modification of this is the *Rule of 69*[4]. Under this Rule,

The doubling period $= 0.35 + \frac{69}{Interest\ rate}$

Example

How long it will take for Rs 20,000 to double at a compound rate of 8% per annum (approximately).

Solution

Applying *rule of 72*, we get

Number of year (to double) = $\frac{72}{8} = 9$,

Thus, as per *rule of 72*, Rs 20000 will double in 9 years.

Applying *rule of 69*, we get

Number of year (to double) = $0.35 + \frac{69}{8} = 8.975$

Thus, as per *rule of 69*, Rs 20000 will double in 8.975 years or 8 years and 355.875[5] days or 8 years and 356 days

Intra - year Compounding

Interest is often compounded more frequently than once a year. Banks, for example, compound interest quarterly, daily, and even continuously. If interest is compounded m times a year, then the general formula for solving for the future value becomes.

$$F_n = P\left(1+\frac{i}{m}\right)^{n\cdot m} = P\cdot \mathrm{FVIF}_{i/m,n\cdot m}$$

Where, m = number of compounding, for example in case of semi-annual compounding m =2 and for quarterly compounding m = 4.

Continuous Compounding

As m approaches infinity, the term $(1 + \frac{i}{m})^{m.n}$ approaches $e^{i.n}$, where e is approximately 2.71828,

and F_n becomes

$Fn = P \times e^{i.n}$

The future value increases as m increases. Thus, continuous compounding results in the maximum possible future value at the end of n periods for a given rate of interest.

Future Value of an Annuity

An annuity is defined as a series of payments (or receipts) of a fixed amount for a specified number of periods. Each payment is assumed to occur at the end of the period. The future value of an annuity is a compound

[3] This is referred as *Rule of 72*. This is an approximation formula. Please refer https://corporatefinanceinstitute.com/resources/wealth-management/rule-of-72-double-investment/ for details.
[4] For details, please refer https://www.wallstreetmojo.com/rule-of-69/
[5] Considering a year to consist of 365 days

annuity which involves depositing or investing an equal sum of money at the end of each year for a certain number of years and allowing it to grow.

In this case,

$F_n = P \times \frac{(1+i)^n - 1}{i}$

the factor $\frac{(1+i)^n - 1}{i}$ is referred as the $\text{FVIFA}_{i,n}$ and is available in Chart B, (given as appendix to this chapter).

Example

Jane Oak wishes to determine the sum of money she will have in her savings account at the end of 6 years by depositing Rs1,000 at the end of each year for the next 6 years. The annual interest rate is 8 percent.

The $FVIFA_{8\%,6years}$ years is given in Chart B as 7.336[6]. Therefore

$F_n = P \times \frac{(1+i)^n - 1}{i}$

$\Rightarrow F_n = P \times FVIFA_{8,6} = F_n = 1000 \times 7.336$ Rs 7336

Thus, Jane Oak will have Rs 7336 in her savings account at the end of 6 years by depositing Rs 1000 at the end of each year for the next six years.

Application of FVIFA

[*Deposits to Accumulate a Future Sum (or Sinking Fund)*]

An individual might wish to find the annual deposit (or payment) that is necessary to accumulate a future sum. To find this future amount (or sinking fund) we can use the formula for finding the future value of an annuity.

We know,

$S_n = A.FVIFA_{i,n}$

This can be written as

$Sinking\ fund\ amount\ = \frac{S_n}{FVIFA_{i,n}}$

Example

Mrs Nita wishes to determine the equal end of the year deposits required to accumulate Rs 5000 at the end of 5 years when her son enters college. The interest rate is 10 percent. The annual deposit may be calculated as follows;

Here, $S_n = Rs\ 5000$

$FVIFA_{10,5} = 6.1051\ (Chart\ B)$

We know,

$Sinking\ fund\ amount\ = \frac{S_n}{FVIFA_{i,n}} = \frac{5000}{6.1051}$ = Rs 818.99 = Rs 819

[6] For multiple choice questions the value of FVIF, FVIFA, PVIF, PVIFA for the specific interest rate and specific year is to be given in the problem.

Thus, if Mrs Nita deposits Rs 819 at the end of each year for 5 years at 10% interest, she will have accumulated Rs 5000 at the end of the fifth year.

Present Value – Discounting

Present value is the present worth of future sum(s) of money. The process of calculating present values, or discounting, is actually the opposite of finding the compounded future value. In connection with present value calculations, the interest rate *i* is referred as the discount rate. The calculation is based on either

- Single net cash flow (lump sum) or
- Annuity

Present value of lump sum (single cash flow)

In this case only one cash flow is receivable or payable.

We already know that

The future value of an investment compounded annually at rate i for n years is

$$Fn = P(1 + i)^n = P.FVIF_{i,n}$$

F_n= future value = the amount of money at the end of year n

P = principal

i = annual interest rate

n =number of year

The above equation can also be written as:

$P = \frac{F_n}{(1+i)^n}$ (in this relationship, $\frac{1}{(1+i)^n}$ is referred as $PVIF_{i,n}$

(the values of PVIF for various i and n are given in chart C).

Example

John Raffe has been given an opportunity to receive Rs 20,000 6 years from now. If he can earn 10 percent on his investments, what is the most he should pay for this opportunity?

To answer this question, one must compute the present value of Rs 20,000 to be received 6 years from now at a 10 percent rate of discount.

F_6 = Rs 20,000,

i is 10 percent, which equals 0.1, and

n is 6 years.

From Chart C, $PVIF_{10,6} = 0.5645$.

$$P = Rs\ 20000 \times \frac{1}{(1+0.1)^6} = Rs\ 20000 \times (PVIF_{10,6}) = Rs\ 20000 \times (0.5645) = Rs\ 11{,}290$$

This means that John Raffe, who can earn 10 percent on his investment, could be indifferent to the choice between receiving Rs11,290 now or Rs 20,000 6 years from now since the amounts are time equivalent In other words, he could invest Rs11,290 today at 10 percent and have Rs 20,000 in 6 years.

Present Value of Mixed Streams of Cash Flows

The present value of a series of mixed payments (or receipts) is the sum of the present value of each individual payment. The present value of each cash flow is calculated multiplying each cash flow is with its corresponding PVIF.

Example

Sandip Awasthi has been offered an opportunity to receive the following mixed stream of revenue over the next 3 years:

Year	Cash Inflow
1	1000
2	2000
3	500

Given that he must earn a minimum of 6 percent on his investment, what is the most he should pay today?

The present value of this series of mixed streams of revenue is as follows:

Year	Cash Inflow	PVIF	Present Value
a	b	c	d = b× c
1	1000	0.943	943
2	2000	0.890	1780
3	500	0.840	420
Total			3143

Present value of an annuity

Perpetuity is an annuity that occurs indefinitely. The stream of cash flows continues for an infinite amount of time. Fixed coupon payments on permanently invested (irredeemable) sums of money are prime examples of perpetuities. Scholarships paid perpetually from an endowment fund. The value of the perpetuity is finite

because receipts that are anticipated far in the future have extremely low present value. By definition, in a perpetuity, time period, n, is so large (i.e., mathematically n approaches infinity) that tends to become zero and the formula for a perpetuity simply becomes

$$Present\ value\ of\ a\ perpetuity\ = \frac{Perpetuity}{Intrest\ rate}\ = \frac{A}{i}$$

Example

If a particular Preference share has an Rs 80 – per – year interest payment and that the discount rate is 10 percent. The present value of this perpetuity is;

$$Present\ value\ of\ a\ perpetuity\ = \frac{Perpetuity}{Intrest\ rate}\ = \frac{A}{i}\ = \frac{80}{0.10} = 800$$

Present value of an Annuity

Interest received from bonds, pension funds, and insurance obligations all involve annuities. To compare these financial instruments, we need to know the present value of each.

The present value of an annuity (P_n) can be found using the following equation:

$$P_n = A \times PVIFA_{i,n}$$

where $PVIFA_{i,n}$ represents the appropriate value for the present value interest factor for a Re1 annuity discounted at i percent for n years and is found in Chart D.

Example

Sandip Awasthi has been offered an opportunity to receive an annuity of Rs 1000 over the next 3 years:

Then the present value is calculated as follows:

$$P_n = A \times PVIFA_{6,3}$$

$$\Rightarrow\ P_n = 1000\ \times 2.6730 = \text{Rs } 2673$$

Amortized Loans

If a loan is to be repaid in equal periodic amounts, it is said referred as an amortized loan. The periodic payment can easily be computed as follows:

We know

$$P_n = A \times PVIFA_{i,n}$$

Here A = Equated Monthly Instalment (EMI) and P_n is the present value = loan outstanding

$$A = \frac{P_n}{PVIFA_{i,n}}$$

Example

Jeff Thompson has a 40-month auto loan of Rs 5,000 at a 12 percent annual interest rate. He wants to find out the monthly loan payment amount.

Here $i = 12\% = \frac{12\%}{12\ months} = 1\% = 0.01$[7]

$P_{40} = 5000$ (the present value = outstanding loan amount)

$PVIFA_{1,40} = 32.8347\ (from\ Chart\ D\ )$

We know

$$A = \frac{P_n}{PVIFA_{i,n}}$$

Where,

A = Equated Monthly Instalment (EMI) and P_n is the present value = loan outstanding

$$A = \frac{5000}{32.8347} = \ Rs\ 152.28$$

So, to repay the principal and interest on a Rs 5,000,12 percent, 40-month loan, Jeff Thompson has to pay Rs152.28 a month for the next 40 months.

Annual Percentage Rate (APR)

The concept of APR is very important for the investor in the area of investment management. Various of investments use different compounding periods. For example, debentures may be paying interest semiannually while banks may be paying interest on fixed deposits quarterly. If an investor wishes to compare investments with different compounding periods, she/he needs to put all of the investments on a common basis. The annual percentage rate (APR), or effective annual rate (EAR), is used for this purpose and is computed as follows:

$$APR = \left(1 + \frac{r}{m}\right)^m - 1.0$$

where r = the stated, nominal or quoted rate and m = the number of compounding periods per year.

Example

If the nominal rate is 6 percent, compounded quarterly, the APR is

$$APR = \left(1 + \frac{r}{m}\right)^m - 1.0$$

[7] The interest rate i, is calculated on monthly basis as *equated monthly instalment* is to be calculated.

$$\Rightarrow APR = \left(1 + \frac{0.06}{4}\right)^4 - 1.0$$

$$\Rightarrow 0.0614 = 6.14\%$$

This means that if one bank offered 6 percent with quarterly compounding, while another offered 6.14 percent with annual compounding, they would both be paying the same effective rate of interest.

RETURN

Before the very important concepts of risk and uncertainty are discoursed upon, various concepts of 'return' and their implications in financial management. Rate of return is one of the subjects that deservedly receives a great deal of attention in the finance literature. Unfortunately, often the subject matter of an all-inclusive understanding is left to imagination. In the below mentioned lines conceptualization of the meaning of *return* is endeavored.

Return as such in its simplest form is the difference between the closing value of an investment *minus* the opening value. The percentage return is taken dividing the difference over the opening value of investment

$$\text{Simple Return} = \frac{(closing\ value\ of\ investment - opening\ value\ of\ investment)}{opening\ value\ of\ investment} \times 100$$

Example

Mr Ocean invested Rs 50000 in Equity Shares of HDFC Ltd on 1st January 2023. The share price increased significantly during the month of January 2023 and the value of investment stood at Rs 62500 on 31st January 2923. In such a situation the return can be calculated as follows;

$$\text{Simple Return} = \frac{(closing\ value\ of\ investment - opening\ value\ of\ investment)}{opening\ value\ of\ investment} \times 100$$

$$\text{Simple Return} = \frac{(62500 - 50000)}{50000} \times 100 = 25\%.$$

In the above case, Mr Ocean held the Equity Shares for one month only. The period of holding (one month, in this case) is not being considered in calculation of *simple return.* This return may be considered for one year and thus the concept of *annualized return.*

Annualized Return If the return related to a period not equal to 12 months, then the annualized return can be calculated as:

$$Annualized\ return = \frac{simple\ return}{period\ of\ simple\ return\ (in\ months)} \times 12\ months$$

In the above case, the 25% return is related to one month, annualized return can be calculated as;

$$Annualized\ return = \frac{25\%}{1\ month} \times 12\ months = 300\ \%$$

This implies that if Mr Ocean held his investment for one year and the market movement of shares remains the same then Mr Ocean would have earned a return of 300%. This measure is important for comparing various types of investments.

Compounded Annualized Growth Rate (CAGR)

Calculations as mentioned in earlier lines are valid when the investment holding period is less than or equal to 1 year.

During longer periods of time, the calculations need to be adjusted to consider the effect of compounding. Further, the scheme may have declared dividends, which bring down the ex-dividend Net Asset Value (NAV)[8] in case of a Mutual Fund. If the dividend is not considered in the return calculations, then the results will be misleading on account of under-statement of return.

Mutual funds declare Compounded Annual Growth Rate (CAGR) which provides for compounding and dividend payments. CAGR is the SEBI-accepted method of declaring scheme returns, when the period is more than a year.

CAGR – SOME ISSUES

CAGR is one of the most accurate ways to calculate and determine returns for anything that can rise or fall in value over time.

1. Investors can compare the CAGR of two alternatives in order to evaluate how well one share (or other investment) performed against other shares (or other investment) in a peer group or against a market index.
2. CAGR does not reflect investment risk.
3. The compound annual growth rate isn't a true return rate, but rather a representational figure.
4. It is essentially a number that describes the rate at which an investment would have grown if it had grown the same rate every year and the profits were reinvested at the end of each year. In reality, this sort of performance is unlikely.
5. CAGR can be used to smooth returns so that they may be more easily understood when compared to alternative investments.

Calculation of CAGR

Compound annual growth rate (CAGR) is the rate of return that would be required for an investment to grow from its beginning balance to its ending balance, assuming the profits were reinvested at the end of each year of the investment's lifespan.

$$= \left(\frac{Final\ Investmnet\ Value}{Initial\ Investmnet\ Value}\right)^{\frac{1}{n}} - 1$$

Where n = number of years

Example

[8] https://www.investopedia.com/terms/n/nav.asp

Suppose in 2013 an investor placed Rs 10,000 into an account for 5 years with a fixed annual interest rate of 1% and another Rs 10,000 into an Equity mutual fund. The rate of return in the Equity fund will be uneven over the next few years so a comparison between the two investments would be difficult.
Assume that at the end of the five-year period, the savings account's balance is Rs 10,510.10 and, although the other investment has grown unevenly, the ending balance in the stock fund was Rs 15,348.52.
Using CAGR to compare the two investments can help an investor understand the difference in returns:

$$\text{CAGR (Savings Bank Account)} = \left(\frac{Final\ Investmnet\ Value}{Initial\ Investmnet\ Value}\right)^{\frac{1}{n}} - 1 = \left(\frac{10510.10}{10000}\right)^{\frac{1}{5}} - 1 = \mathbf{1.00\%}$$

$$\text{CAGR (Savings Bank Account)} = \left(\frac{Final\ Investmnet\ Value}{Initial\ Investmnet\ Value}\right)^{\frac{1}{n}} - 1 = \left(\frac{15348.52}{10000}\right)^{\frac{1}{5}} - 1 = \mathbf{8.95\%}$$

Thus it may be noted that returns can be measured over a single period or over multiple periods. Single period returns are straightforward because there is only one way to calculate them. But there are various connotations of multi-period return. The first concept that must be discourse upon is the Holding Period Return (HPR).

A **holding period return** is the return earned from holding an asset for a single specified period of time. The period may be 1 day, 1 week, 1 month, 5 years, or any specified period. If the asset (bond, share, etc.) is bought now, time (t − 1), at a price of 100 and sold later, say at time t, at a price of 105 with no dividends or other income, then the holding period return is 5 percent [105 − (100/100)]. If the asset also pays an income of 2 units at time t, then the total return is 7 percent. This return can be generalized and shown as a mathematical expression;

HPR = Capital appreciation + Dividend yield

$$HPR = \frac{P_t - P_{t-1} + D_t}{P_{t-1}}$$

$$HPR = \frac{P_t - P_{t-1}}{P_{t-1}} + \frac{D_t}{P_{t-1}}$$

Where, P is the price and D is the dividend. The subscript indicates the time of that price or dividend: $t - 1$ is the beginning of the period and t is the end of the period.
The following two issues are of noteworthy;

- HPR is the total return earned by an investor over a single period and it includes all cash flows occurring at the end of the period.

- HPR is a valuable tool when you want to calculate the rate of return on an investment over one period assuming that no additions or withdrawals of money occur meanwhile. However, how should we compute the rate of return on the portfolio over many periods if there are cash inflows and outflows.

Money Weighted Rate of Return[9]

The money-weighted rate of return is simply an internal rate of return[9] (IRR). However, we use the term internal rate of return in the context of capital budgeting.

In financial management, this measure is called money-weighted rate of return. How was this term coined? Well, the money-weighted return accounts for the value of cash flows in given periods. So, logically the values of cash flows affect the value of the money-weighted rate of return.

Time Weighted Rate of Return

The time-weighted rate of return differs from the money-weighted rate of return as it does not depend on the value of cash flows. The time-weighted rate of return is a geometric mean return over the whole investment period. In this case compounding is taken into consideration while calculating return.

Time –weighted return (Geometric mean return) =

$$\sqrt[n]{(1 + r_1)(1 + r_2) \dots (1 + r_n)} = [(1 + r_1)(1 + r_1) \dots (1 + r_1)]^{1/n}$$

RISK AND UNCERTAINTY

In financial parlance, risk is connoted as the variability of returns. The greater the variability, the riskier the investment is considered to be. But prior to discoursing into the issue of computation of risk, it is worthwhile as to how it is differentiated from the connotation of *uncertainty*.

The most famous definition of 'risk' is found in the works of Frank Knight (1921). Connotation of risk and uncertainty is theorized in his famous book, *Risk, Uncertainty and Profit*. The author posits that while risk entails a situation in which the probability distribution of the outcome is known (either *priori* or through statistical inferences), in uncertainty the probability of occurrence is not known. The following example would supplement the understanding.

Example

Tinkuji is a small vendor who is undecided on what to sell in the fairground as a fair is to be organized in ten days. He has the option of selling tea or ice creams on a day one (1st of June, 2022) of the fair. He has made a projection that selling tea would fetch him a profit of Rs 300 if it rains on 1st June 2022, but if it is sunny and humid on the day, he would not have much customers and then he would make a profit of Rs 30. If he sells ice

[9] This is taken up for discussion in subsequent module of this study note (under Investment Decisions)

cream his profit is much higher (Rs 150) if 1st June 2022 is hot and humid. But if he decides to sell ice cream and it rains on that day then his profit would be Rs 10. How would make the decision of what to sell, tea or ice cream on 1st June 2022.

Solution

Tinkuji has to decide on selling tea or ice – cream on 1st June 2022. These are termed as *acts*. On 1st June 2022 when these acts are to take place it can either be sunny and humid or rainy. These are called *states of nature*. Tinkuji's decision (to sell tea or ice – cream) is reliant on the information he can garner on the *states of nature*. The information on *chance* of the day being 'sunny and humid' or being 'rainy' can be got from data of the last years. Tinkuji can visit the met office and check the data of the last 200 years[10]. This would mean 200 data points about whether the 1st June 2022 would be 'sunny and humid' or 'rainy'. After collection of the data, Tinkuji finds that out of 200 days (past data) it rained for 30 days. From this he can infer that the probability of rain on 1st June 2022 as 0.15 $(\frac{30}{200})$. And the probability of the day being 'sunny and humid' is 0.85 (1 – 0.15). Once Tinkuji has got this information about the state of nature he can frame the expected pay off matrix (figure 4.1) and take his decision based on expected value criterion.

		states of nature	
		Hot and Humid	Rainy
Probability of Occurrence		0.85	0.15
acts	Sell Tea	30	300
	Sell Ice-Cream	150	10

The 2 × 2 Matrix (for expected value[11] calculation)

The expected value (on the basis of which the decision is to be taken) is given as

$$EV = \sum P(X_i) \times X_i$$

Where $P(X_i)$ = Probability of occurrence of event i and X_i is the payoff related to the event i

in the given case, the EV (tea) = 30 × 0.85 + 300 × 0.15 = **70.5** and

EV (ice –cream) = 150 ×0.85 + 10 × 0.15 = **129**.

Since this is pay off, Tinkuji would choose that *act* which gives the highest pay off. Thus the decision takes his decision about which *act* to consider based on the highest expected value in case of pay off. This is only

[10] Any number of years is possible. And it is to be noted that greater the data, higher is the accuracy of statistical inference. But collection of more data involves more cost. Thus it is to be noted that there is a cost of information. And there is a trade-off between more data and more cost of gathering data.

[11] Expected Value of an Opportunity (EV) is a term used to describe the expected value of a business opportunity.

possible if the decision maker has access to information about the probability of occurrence of the various states of nature. Such a situation is referred as a *risky* situation. Information about the probability of occurrence of the state of nature is got either through statistical inference as Tinkuji did or are *priori* (defined from previous like in a throw of dice).

In all practicality, business situations are not this simple and decision maker do not have access to probability distribution regarding various *acts* or decision points. This is referred as decision making under *uncertainty*.

In decision making under *uncertainty*, the probability distribution associated with the various states of nature is either unknown or cannot be determined. This lack of information has led to the development of special decision criteria[12]:

1. Laplace
2. Minimax
3. Savage
4. Hurwicz

The above mentioned categorization[13] of *risk* and *uncertainty* is often not considered in the business world. In the world of finance, risk is simply referred as the probability that the company's net cash flows fall short of the future financial obligations of the entity. This is more in tandem with the connotation of risk forwarded by Markowtiz in 1952[14]. In this famous research paper on portfolio selection the author posits a maxim for investment behaviour which he refers as expected returns – variance of returns. The hypothesis is that the investor considers expected return as a desirable thing *and* variance of return as an undesirable thing. Subsequently the author represents the variance of return as the standard deviation of return (σ) from a security and is referred as *risk*.

Classification of financial risk

In the business world, *risk* connotes the extent to which any selected action or inaction leads to some undesirable outcome[15]. In finance parlance *risk* is categorized from various perspectives. In the following lines brief categorization of financial risk is taken up for discussion.

From a boarder perspective financial risk is classified as;

- Systematic risk
- Unsystematic risk

Systematic risk occurs due to macroeconomic factors. It is also called market risk or non-diversifiable or volatility risk as it is beyond the control of a specific company or individual, and hence, can't be diversified. All

[12] These are beyond the scope of this study note and are thus not discoursed.
[13] This categorization was initiated by Frank Knight (1921) and has been imbedded in financial literature subsequently.
[14] Markowitz, H. (1952). Portfolio Selection*. The Journal of Finance, 7(1), 77–91. https://doi.org/10.1111/j.1540-6261.1952.tb01525. (accessed on 24/02/2022)
[15] In finance parlance, a favourable variation of return (in excess of expected return) is also considered within the domain of *risk*.

investments and securities suffer from such type of risk. One can't eliminate such a risk by holding more number of securities. It is categorized as;

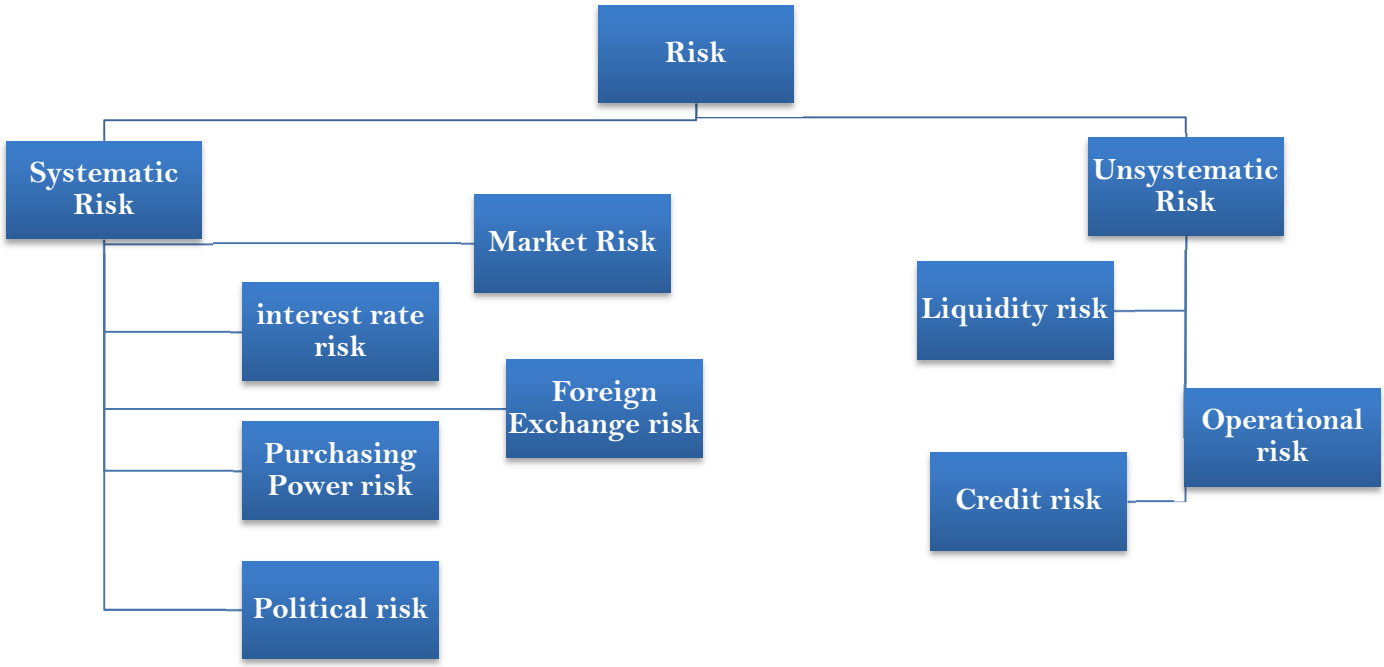
- *Interest rate risk* – the market interest rate varies and can negatively impact the entity. Entities hold financial assets in the nature of fixed interest-bearing securities. This mainly impacts the fixed income securities as bond prices are inversely related to the interest rate.
- *Market risk* – Variations in price sparked off due to real social, political and economic events are referred to as market risk. It is basically the tendency of security prices to move collectively. For instance, in the falling market, the stock price of even the best performing company's drop. Conventionally, market risk accounts for about two-thirds of total systematic risk.
- *Purchasing power risk* – Uncertainties of purchasing power is referred to as risk due to inflation. If investment is considered as consumption sacrificed, then a person, purchasing securities, foregoes the opportunity to buy some goods or services for so long as he continues to hold the securities. In case, the prices of goods and services, increases during this period, the investor actually loses purchasing power. The investors expected return will change due to change in real value of returns.
- *Foreign exchange risk* –This risk stems from the uncertainty in the changes in the value of the currencies. So, it affects only the companies doing foreign exchange transactions, like export and import companies.
- *Political risk* –Such type of risk occurs primarily due to political instability in a country or a region. For instance, if a country is at war, then the companies operating there would be considered risky.

Unsystematic risk, on the other, is that portion of total risk which results from known and controllable factors. It refers to that portion of the financial risk of an entity which is caused due to factors unique or related to an entity or the industry. It is categorized as;

- *Liquidity risk* - It is that portion of an asset's total variability of return which results from price discounts given or sales commissions paid in order to sell the asset without delay. It is a situation wherein it may not be possible to sell the asset. Assets are disposed of at great inconvenience and cost in terms of money and time. Any asset that can be bought or sold quickly is said to be liquid. Failure to realize with minimum discount to its value of an asset is called liquidity risk.
- *Credit risk* – this is also known as default risk. This arises due to the default in meeting the financial obligations as and when due for payment. The non-payment of interest and principal amounts in time will increase the risk of insolvency and bankruptcy costs.
- *Operational risk* - Operational risk arises primarily due to deviation from planned normal functioning of system, procedures, technology, human failure, omission or commission of errors. It also arises due to inherent fault in the systems, procedures and technologies that affect the revenue of the organization

adversely. As the activities of the organization change due to globalization and integration, new factors are continuously influencing and increasing the operational risk.

In figure given below, the categorization mentioned above is presented pictorially which will facilitate the reader to comprehend.



Measuring Risk

The Standard Deviation

The standard deviation (σ), which is a measure of dispersion of the probability distribution, is commonly used to measure risk. The smaller the standard deviation, the tighter the probability distribution and, thus, the lower the risk of the investment.

Mathematically

$$\sigma = \sqrt{\sum_{i=1}^{n} (r_i - \bar{r})^2 p_i}$$

Example

The following particulars are available for a particular share, namely Share A. There are three possible states of nature;

Recession, normal and prosperity with respective returns as -5%, 20% and 40% and their probabilities as 0.2,0.6, 0.2 respectively.

In such case the risk (variability of return) is calculated as follows

The expected rate of return ($\bar{r}$) is computed as follows;

$\bar{r} = \sum_{i=1}^{n} r_i p_i = (-5\%)(0.02) + (20\%)(0.06) + ((40\%)(0.2) = 19\%$

Standard deviation (σ_A) (risk of security A) = $\sigma = \sigma = \sqrt{\sum_{i=1}^{n}(r_i - \bar{r})^2 p_i}$

Return (r_i)(%)	Probability (p_i)	$r_i p_i$ (%)	$(r_i - \bar{r})$	$(r_i - \bar{r})^2$	$(r_i - \bar{r})^2 p_i$
-5	0.2	-1	-24	576	115.2
20	0.6	12	1	1	0.6
40	0.2	8	21	441	88.2
		$\bar{r} = 19$			$\sigma^2 = 204$

$\sigma^2 = 204$

Therefore $\sigma = \sqrt{204} = 14.28\%$

Thus risk of security A is measured at 14.28%.

Variance or standard deviation measures the absolute risk of the security. This may create a problem as the return of the security has also to be considered by the investor for taking a decision as to whether to invest in the security or not. Also it is well accepted that higher the risk, higher is the return. For this it is imperative to look into the risk of the security with respect to the return generated by the security. Thus the concept of Coefficient of Variation is used to measure the risk of a particular investment in respect to the return generated by the Investment.

Coefficient of Variation

Variance or standard deviation are the absolute measure of risk. The standard deviation when compared with the expected returns is known as the coefficient of variation.

$$Coefficient\ of\ Variation = \frac{\text{Standard Deviation}}{\text{Expected Return}} = \frac{\sigma}{\bar{r}}$$

Thus, the coefficient of variation is a measure of relative dispersion (risk). It is a measure of *risk per unit of expected return.* The larger the CV, the larger the relative risk of the investment.

Example

Mr Botham intends to invest Rs 60000 in either of the two securities; security A or security B. The expected return and the standard deviation of the two securities are reported to him by a financial consultancy firm. While security B has an higher expected return (24%) it also partakes higher risk (8%). Thus he is unable to decide.

	Security A	Security B
Expected return, [E(R)]	8%	24%
Standard deviation, (σ)	6%	8%

The simple tool he can use is the coefficient of variation.

We know,

$$Coefficient\ of\ Variation = \frac{\text{Standard Deviation}}{\text{Expected Return}} = \frac{\sigma}{\bar{r}}$$

$$Coefficient\ of\ Variation_{A} = \frac{\text{Standard Deviation}}{\text{Expected Return}} = \frac{\sigma}{\bar{r}} = \frac{6\%}{8\%} = \mathbf{0.75}$$

$$Coefficient\ of\ Variation_{B} = \frac{\text{Standard Deviation}}{\text{Expected Return}} = \frac{\sigma}{\bar{r}} = \frac{8\%}{24\ \%} = \mathbf{0.33}$$

From the above information it is observed that though the standard deviation of security B is larger signifying that security B is the riskier investment opportunity than security A, the risk measured in relative to return generated by the two securities favour security B as its relative measure (coefficient of variation) is lower.

Beta (β)

Financial risk refers to the uncertainty or variability in returns associated with an investment. Investors and analysts use different measures to quantify and manage this risk. One key aspect of financial risk is its division into systematic risk and unsystematic risk.

- Systematic Risk: This type of risk is inherent to the entire market and cannot be eliminated through diversification. Factors such as economic recessions, inflation, interest rate fluctuations, and geopolitical events contribute to systematic risk. Since all investments in the market are affected by these factors, systematic risk is the primary concern for investors when assessing potential returns.
- Unsystematic Risk: Also known as diversifiable or idiosyncratic risk, this type of risk is specific to an individual company or industry. It can arise due to factors like poor management decisions, regulatory changes, or product failures. The key advantage of diversification is that it helps investors eliminate unsystematic risk by holding a well-balanced portfolio of financial instruments.

Since unsystematic risk can be diversified away, what remains is systematic risk, which investors must counter and measure effectively. Beta (β) is widely regarded as an effective measure of systematic risk. Derived from the Capital Asset Pricing Model (CAPM), beta provides a relative measure of how a particular asset moves in relation to the overall market. Understanding beta helps investors make informed decisions about risk exposure and expected returns.

Since unsystematic risk can be diversified away by holding a well-diversified portfolio of financial instruments, investors are primarily concerned with systematic risk, which cannot be eliminated through diversification. Beta (β) provides a relative measure of systematic risk, making it the most relevant metric for assessing risk in an investment context. Beta specifically measures systematic risk, unlike standard deviation, which includes both systematic and unsystematic risks. By isolating the non-diversifiable risk, beta provides a clearer picture of an asset's exposure to market fluctuations.

It is defined as statistical measure that indicates the sensitivity of an asset's returns relative to the overall market. It quantifies the extent to which a security or portfolio moves in response to changes in a benchmark index, typically the market portfolio (e.g., Sensex 30, NIFTY 50).

It is important to note that The variances and correlations required for the calculation of beta are usually based on historical returns.

$$\beta_i = \frac{\mathrm{Cov}(R_i, R_m)}{\sigma_m^2} = \frac{\rho_{i,m}\sigma_i\sigma_m}{\sigma_m^2} = \frac{\rho_{i,m}\sigma_i}{\sigma_m}$$

A positive beta indicates that the return of an asset follows the general market trend, whereas a negative beta shows that the return of an asset generally follows a trend that is opposite to that of the market. In other words, a positive beta indicates that the return of an asset moves in the same direction of the market, whereas a negative beta indicates that the return of an asset moves in the opposite direction of the market. A risk-free asset's beta is zero because its covariance with other assets is zero. From the above discussion, the following can be inferred;

- $\beta = 1 \rightarrow$ The asset moves in line with the market.
- $\beta > 1 \rightarrow$ The asset is more volatile than the market (aggressive).
- $\beta < 1 \rightarrow$ The asset is less volatile than the market (defensive).
- $\beta = 0 \rightarrow$ The asset has no correlation with market movements.
- $\beta < 0 \rightarrow$ The asset moves in the opposite direction to the market.

Since beta standardizes risk relative to the market, it allows investors to compare the riskiness of different assets regardless of their industry or size. For instance, a share with a $\beta = 1.5$ is 50% more volatile than the market, making it riskier than a stock with $\beta = 0.8$.

Capital Asset Pricing Model (CAPM) and Beta (β)

The Capital Asset Pricing Model (CAPM) is a fundamental concept in finance that explains the relationship between risk and expected return on an investment. Developed by William Sharpe, John Lintner, and Jan Mossin, CAPM provides a systematic approach for pricing risky securities and determining the cost of capital. CAPM is widely used by investors and analysts to assess an asset's expected return based on its systematic risk relative to the market. It serves as the cornerstone of modern portfolio theory and corporate finance, allowing for effective risk assessment and asset valuation. Beta plays a crucial role in the Capital Asset Pricing Model (CAPM), which helps investors determine the expected return on an asset based on its risk level. The CAPM is given as;

$$E\ (R_i) = R_f + \ \beta_i \ ((R_m) - \ R_f)$$

where

$E\ (R_i) = expected\ return\ from\ the\ security\ i$

$R_f = \ \ return\ from\ risk\ free\ security$

$E\ (R_m) = Expected\ return\ from\ the\ market, m$

$\beta_i = beta\ of\ the\ securuty\ i$

Significance of CAPM

- Portfolio Management - CAPM helps investors construct well-diversified portfolios by evaluating the risk-return tradeoff of individual securities.
- Cost of Equity Calculation - Companies use CAPM to estimate the cost of equity capital, crucial for capital budgeting and financial planning.
- Asset Valuation - CAPM is instrumental in valuing stocks by estimating their expected returns, helping investors make informed buy or sell decisions.
- Risk-Adjusted Performance Measurement - Investors use CAPM to compare the performance of different assets relative to their risk levels, aiding in portfolio optimization.

Assumptions

- Investors hold diversified portfolios, eliminating unsystematic risk.
- Investors are rational and risk-averse, seeking to maximize returns for a given level of risk.
- Markets are efficient, meaning all relevant information is reflected in asset prices (aligning with the Efficient Market Hypothesis).
- There are no transaction costs or taxes, simplifying investment decisions.

Limitations

- Historical Beta Dependence: CAPM assumes that past beta values predict future risk, which may not always be accurate.
- Single Risk Factor Model: It considers only market risk, ignoring factors like liquidity risk, credit risk, and macroeconomic influences.
- Volatility in Inputs: Risk-free rate and market return estimates fluctuate over time, impacting CAPM's reliability.
- Market Efficiency Assumption: In reality, markets may not always be perfectly efficient, leading to deviations from CAPM predictions.

Illustration

The following information is given:

Beta of security A, $(\beta_A) = 1.2$

Risk-free rate (R_f): 4%

Expected market return $E(R_m)$: 12%

Calculate expected rate of return on the security $E\ (R_A)$

Solution

The CAPM is given as

$$E\ (R_i) = R_f + \beta_i\ \left((R_m) - R_f\right)$$

where

$E\ (R_i) = expected\ return\ from\ the\ security\ i$

$R_f = \ return\ from\ risk\ free\ security$

$E\ (R_m) = Expected\ return\ from\ the\ market, m$

$\beta_i = beta\ of\ the\ securuty\ i$

Substituting these data into the CAPM equation, we get

$$E\ (R_A) = 4\% + 1.2\ (12\% - 4\%) = 13.6\%$$

Thus the expected return from the security A is 13.6%

FINANCIAL MODELLING

Introduction

Financial modelling is the construction of spreadsheet models that illustrate a company's likely financial results in quantitative terms. These models can simulate the effect of specific variables, allowing companies to plan appropriate courses of action.

A financial model is a mathematical representation of a company's financial operations and statements, used to forecast future financial performance by making relevant assumptions. Additionally, financial models serve as risk management tools for analyzing various financial and economic scenarios and valuing assets.

Definition

Financial modelling is the process by which a firm constructs a financial representation of some or all aspects of the firm or a given security. It involves performing calculations and making recommendations based on financial data. The model may also summarize particular events and provide direction regarding possible actions or alternatives.

A financial model typically includes projections of financial statements such as the income statement, balance sheet, and cash flow statement. These projections are supported by schedules such as the depreciation schedule, amortization schedule, working capital management, and debt schedule. The three main financial statements in a financial model are dynamically connected using Excel formulas to ensure consistency and accuracy.

Types of Financial Models

Financial models serve different purposes and are designed to solve specific financial problems. The most common types include:

1. Valuation Models – These models estimate the value of an asset, company, or investment by analyzing future cash flows and discounting them to present value. The Discounted Cash Flow (DCF) method is commonly used, relying on assumptions about revenue growth, cost trends, and discount rates. Another approach, Comparable Company Analysis (CCA), evaluates valuation by comparing financial metrics of similar firms.
2. Forecasting Models – These models predict a company's financial performance based on historical data and assumptions about future trends. They include Revenue Forecasting Models, which estimate future sales, and Expense Forecasting Models, which project costs based on operational needs. Integrated Financial Statement Models combine income statements, balance sheets, and cash flow statements to provide a comprehensive outlook.
3. Budgeting Models – Used to allocate financial resources efficiently, these models include Operating Budgets, which track day-to-day expenses, Capital Budgets, which outline large expenditures, and Cash Budgets, which focus on managing liquidity and ensuring financial stability.
4. Merger and Acquisition (M&A) Models – These models assess the financial impact of mergers, acquisitions, and business consolidations. They involve analyzing synergies, transaction financing, and post-merger financial performance, helping companies determine the feasibility of strategic transactions.
5. Scenario Analysis Models – These models evaluate financial outcomes under various hypothetical scenarios, such as economic downturns, market expansions, or regulatory changes. Businesses use

scenario analysis to assess risk and prepare contingency plans based on multiple possible future conditions.

6. Sensitivity Analysis Models – Sensitivity models test how changes in key financial variables affect outputs. They help businesses understand the relationship between financial assumptions and outcomes, ensuring preparedness for fluctuations in costs, revenue, or market conditions.
7. Capital Structure Models – These models help businesses determine the optimal mix of debt and equity financing to minimize the cost of capital and maximize shareholder returns. They analyze leverage ratios, interest costs, and debt repayment capacity to guide financing decisions.
8. Option Pricing Models – Primarily used in derivatives trading, these models estimate the theoretical value of financial options. The Black-Scholes model, a widely used option pricing tool, considers factors such as stock price volatility, interest rates, and time to expiration.
9. Portfolio Optimization Models – These models assist investors in constructing and managing portfolios that maximize returns while minimizing risk. They use techniques like Modern Portfolio Theory (MPT) to determine the best asset allocation based on historical performance and market correlations.
10. Credit Risk Models – Used by lenders and financial institutions, these models assess the likelihood of borrower default. Credit Scoring Models analyze financial behavior to assign risk ratings, while Credit Rating Models evaluate corporate creditworthiness based on financial statements and economic conditions.

Steps in Financial Modelling[16]

The process of developing a financial model involves several key steps. It begins with data entry of key financial variables, including operating expenses, capital expenditures, revenue, and cost of goods sold, which influence inventory requirements. These inputs are then structured into three core financial statements: the income statement, which reflects profitability, the balance sheet, which details assets and liabilities, and the cash flow statement, which tracks liquidity and cash movements. Throughout the process, financial assumptions are carefully analyzed, ensuring logical interconnections between financial elements. The final step involves scenario and sensitivity analysis to test the model's responsiveness to changes in key variables. This allows decision-makers to assess potential risks and outcomes before making strategic financial decisions.

Limitations of Financial Models

Despite their usefulness, financial models have some limitations:

[16] For further learning, refer to the YouTube videos:
https://www.youtube.com/watch?v=Iiq4Sem9GPM
https://www.youtube.com/watch?v=EgAAJQKaaSc

- Complexity – Building and maintaining models is time-consuming and requires expertise in financial analysis and modelling techniques.
- Assumptions – Models rely on assumptions about future events and economic conditions, which may not always be accurate.
- Sensitivity to Inputs – Small changes in input variables can significantly impact model outputs, necessitating sensitivity analysis.
- Data Quality – The reliability of a financial model depends on the accuracy of the data used. Inaccurate or incomplete data can lead to flawed analysis.
- Overreliance – Decision-makers may place undue reliance on financial models, potentially ignoring qualitative judgment and real-world insights.
- Model Risk – Financial models are inherently uncertain and subject to limitations in modelling techniques, data quality, and unforeseen events. Regular validation is essential to minimize this risk.

Sensitivity Analysis in Financial Modelling

Sensitivity analysis is a technique used to evaluate how changes in key variables affect the outputs of a financial model. It helps assess the robustness of financial models and identifies factors that significantly impact outcomes. Sensitivity analysis is valuable in risk assessment and decision-making, providing insights into potential impacts under different scenarios.

By understanding these principles, students can build and apply financial models effectively for business analysis, investment decisions, and risk management.

MCQS

1. **Which of the following is the primary objective of financial management?**
    - A) Maximizing profits
    - B) Minimizing costs
    - C) Maximizing shareholder wealth
    - D) Ensuring liquidity
2. **Financial management involves which of the following activities?**
    - A) Budgeting
    - B) Forecasting
    - C) Investment decisions
    - D) All of the above
3. **The nature of financial management is best described as:**
    - A) A one-time activity
    - B) A perpetual process
    - C) An occasional task
    - D) A short-term process
4. **Which of the following is NOT a scope of financial management?**

- A) Investment decisions
- B) Financial planning
- C) Marketing strategies
- D) Working capital management

5. **What is the primary goal of risk management in financial management?**
   - A) Maximizing returns with less risk
   - B) Minimizing returns with more risk
   - C) Ignoring risks
   - D) Maximizing risks

6. **The financial goal of a firm is primarily to:**
   - A) Maximize sales
   - B) Maximize shareholder wealth
   - C) Minimize expenses
   - D) Maximize employee benefits
7. **Which of the following is a key financial decision?**
   - A) Investment decision
   - B) Financing decision
   - C) Dividend decision
   - D) All of the above
8. **What does the investment decision involve?**
   - A) Deciding the mix of debt and equity
   - B) Determining where to allocate funds
   - C) Deciding the dividend payout
   - D) Managing day-to-day operations
9. **Which of the following best describes the financing decision?**
   - A) Choosing the right mix of debt and equity
   - B) Deciding on the dividend policy
   - C) Managing working capital
   - D) Forecasting future financial needs
10. **The dividend decision involves:**
    - A) Determining the amount of profits to be distributed to shareholders
    - B) Deciding on the capital structure
    - C) Managing short-term assets and liabilities
    - D) Planning long-term investments
11. **What is financial modelling?**

    a. Predicting future stock prices with certainty.
    b. Forecasting financial performance using mathematical representations.
    c. Analyzing historical stock market trends.
    d. Estimating dividends paid by a company.

12. **Which of the following statements best describes the purpose of financial modelling?**
    a. To accurately predict future financial outcomes with certainty.
    b. To provide a framework for decision-making based on projections and assumptions.
    c. To analyze past financial performance exclusively.
    d. To determine historical stock prices.

13. **What is a key benefit of financial modelling for businesses?**
    a. Guaranteeing profitability in all scenarios.
    b. Identifying potential risks and opportunities.
    c. Eliminating the need for managerial judgment.
    d. Providing a static view of financial performance.

14. **Which of the following is NOT typically included in a financial model?**
    a. Historical financial data.
    b. Assumptions about future performance.
    c. Randomly generated numbers.
    d. Forecasted financial statements.

15. **What is a common software tool used for financial modelling?**
    a. Adobe Photoshop.
    b. Microsoft Excel.
    c. Google Docs.
    d. Adobe Illustrator.

16. **Which of the following is a key aspect of building a financial model?**
    a. Ignoring future uncertainties.
    b. Relying solely on historical data.
    c. Ensuring accuracy and consistency.
    d. Avoiding the use of formulas and functions.

17. **What is a sensitivity analysis in financial modelling?**
    a. Assessing the model's response to changes in key variables.
    b. Analyzing historical financial data.
    c. Ignoring potential risks.
    d. Focusing solely on future projections.

18. **Which of the following is a common financial modelling technique used to estimate future cash flows?**
    a. Net Present Value (NPV) analysis.
    b. Historical analysis.
    c. Guesswork.
    d. Trend extrapolation.

Answers

1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18
C	D	B	C	A	B	D	B	A	A	B	B	B	C	B	C	A	A

APPENDIX
CHART A

Future Value of $1: $FVIF_{i,n}$

Period	1%	2%	3%	4%	5%	6%	7%	8%	9%	10%	12%	14%	15%	16%	18%	20%	24%	28%	32%	36%
1	1.0100	1.0200	1.0300	1.0400	1.0500	1.0600	1.0700	1.0800	1.0900	1.1000	1.1200	1.1400	1.1500	1.1600	1.1800	1.2000	1.2400	1.2800	1.3200	1.3600
2	1.0201	1.0404	1.0609	1.0816	1.1025	1.1236	1.1449	1.1664	1.1881	1.2100	1.2544	1.2996	1.3225	1.3456	1.3924	1.4400	1.5376	1.6384	1.7424	1.8496
3	1.0303	1.0612	1.0927	1.1249	1.1576	1.1910	1.2250	1.2597	1.2950	1.3310	1.4049	1.4815	1.5209	1.5609	1.6430	1.7280	1.9066	2.0972	2.3000	2.5155
4	1.0406	1.0824	1.1255	1.1699	1.2155	1.2625	1.3108	1.3605	1.4116	1.4641	1.5735	1.6890	1.7490	1.8106	1.9388	2.0736	2.3642	2.6844	3.0360	3.4210
5	1.0510	1.1041	1.1593	1.2167	1.2763	1.3382	1.4026	1.4693	1.5386	1.6105	1.7623	1.9254	2.0114	2.1003	2.2878	2.4883	2.9316	3.4360	4.0075	4.6526
6	1.0615	1.1262	1.1941	1.2653	1.3401	1.4185	1.5007	1.5869	1.6771	1.7716	1.9738	2.1950	2.3131	2.4364	2.6996	2.9860	3.6352	4.3980	5.2899	6.3275
7	1.0721	1.1487	1.2299	1.3159	1.4071	1.5036	1.6058	1.7138	1.8280	1.9487	2.2107	2.5023	2.6600	2.8262	3.1855	3.5832	4.5077	5.6295	6.9826	8.6054
8	1.0829	1.1717	1.2668	1.3686	1.4775	1.5938	1.7182	1.8509	1.9926	2.1436	2.4760	2.8526	3.0590	3.2784	3.7589	4.2998	5.5895	7.2058	9.2170	11.703
9	1.0937	1.1951	1.3048	1.4233	1.5513	1.6895	1.8385	1.9990	2.1719	2.3579	2.7731	3.2519	3.5179	3.3080	4.4355	5.1598	6.9310	9.2234	12.166	15.916
10	1.1046	1.2190	1.3439	1.4802	1.6289	1.7908	1.9672	2.1589	2.3674	2.5937	3.1058	3.7072	4.0456	4.4114	5.2338	6.1917	8.5944	11.805	16.059	21.646
11	1.1157	1.2434	1.3842	1.5395	1.7103	1.8983	2.1049	2.3316	2.5804	2.8531	3.4785	4.2262	4.6524	5.1173	6.1759	7.4301	10.657	15.111	21.198	29.439
12	1.1268	1.2682	1.4258	1.6010	1.7959	2.0122	2.2522	2.5182	2.8127	3.1384	3.8960	4.8179	5.3502	5.9360	7.2876	8.9161	13.214	19.342	27.982	40.037
13	1.1381	1.2936	1.4685	1.6651	1.8856	2.1329	2.4098	2.7196	3.0658	3.4523	4.3635	5.4924	6.1528	6.8858	8.5994	10.699	16.386	24.748	36.937	54.451
14	1.1495	1.3195	1.5126	1.7317	1.9799	2.2609	2.5785	2.9372	3.3417	3.7975	4.8871	6.2613	7.0757	7.9875	10.147	12.839	20.319	31.691	48.756	74.053
15	1.1610	1.3459	1.5580	1.8009	2.0789	2.3966	2.7590	3.1722	3.6425	4.1772	5.4736	7.1379	8.1371	9.2655	11.973	15.407	25.195	40.564	53.358	100.71
16	1.1726	1.3728	1.6047	1.8730	2.1829	2.5404	2.9522	3.4259	3.9703	4.5950	6.1304	8.1372	9.3576	10.748	14.129	18.488	31.242	51.923	84.953	136.96
17	1.1843	1.4002	1.6528	1.9479	2.2920	2.6928	3.1588	3.7000	4.3276	5.0545	6.8660	9.2765	10.761	12.467	16.672	22.186	38.740	66.461	112.13	186.27
18	1.1961	1.4282	1.7024	2.0258	2.4066	2.8543	3.3799	3.9960	4.7171	5.5599	7.6900	10.575	12.375	14.462	19.673	26.623	48.038	85.070	148.02	253.33
19	1.2081	1.4568	1.7535	2.1068	2.5270	3.0256	3.6165	4.3157	5.1417	6.1159	8.6129	12.055	14.231	16.776	23.214	31.948	59.567	108.89	195.39	344.53
20	1.2202	1.4859	1.8061	2.1911	2.6533	3.2071	3.8697	4.6610	5.6044	6.7275	9.6463	13.743	16.366	19.460	27.393	38.337	73.864	139.37	257.91	468.57
21	1.2324	1.5157	1.8603	2.2788	2.7860	3.3996	4.1406	5.0338	6.1088	7.4002	10.803	15.667	18.821	22.574	32.323	46.005	91.591	178.40	340.44	637.26
22	1.2447	1.5460	1.9161	2.3699	2.9253	3.6035	4.4304	5.4365	6.6586	8.1403	12.100	17.861	21.644	26.186	38.142	55.206	113.57	228.35	449.39	866.67
23	1.2572	1.5769	1.9736	2.4647	3.0715	3.8197	4.7405	5.8715	7.2579	8.9543	13.552	20.361	24.891	30.376	45.007	66.247	140.83	292.30	593.19	1178.6
24	1.2697	1.6084	2.0328	2.5633	3.2251	4.0489	5.0724	6.3412	7.9111	9.8497	15.178	23.212	28.625	35.236	53.108	79.496	174.63	374.14	783.02	1602.9
25	1.2824	1.6406	2.0938	2.6658	3.3864	4.2919	5.4274	6.8485	8.6231	10.834	17.000	26.461	32.918	40.874	62.668	95.396	216.54	478.90	1033.5	2180.0
26	1.2953	1.6734	2.1566	2.7725	3.5557	4.5494	5.8074	7.3964	9.3992	11.918	19.040	30.166	37.856	47.414	73.948	114.47	268.51	612.99	1364.3	2964.9
27	1.3082	1.7069	2.2213	2.8834	3.7335	4.8223	6.2139	7.9881	10.245	13.110	21.324	34.389	43.535	55.000	87.259	137.37	332.95	784.63	1800.9	4032.2
28	1.3213	1.7410	2.2879	2.9987	3.9201	5.1117	6.6488	8.6271	11.167	14.421	23.883	39.204	50.065	63.800	102.96	164.84	412.86	1004.3	2377.2	5483.8
29	1.3345	1.7758	2.3566	3.1187	4.1161	5.4184	7.1143	9.3173	12.172	15.863	26.749	44.693	57.575	74.008	121.50	197.81	511.95	1285.5	3137.9	7458.0
30	1.3478	1.8114	2.4273	3.2434	4.3219	5.7435	7.6123	10.062	13.267	17.449	29.959	50.950	66.211	85.849	143.37	237.37	634.81	1645.5	4142.0	10143.
40	1.4889	2.2080	3.2620	4.8010	7.0400	10.285	14.974	21.724	31.409	45.259	93.050	188.88	267.86	378.72	750.37	1469.7	5455.9	19426	66520	*
50	1.6446	2.6916	4.3839	7.1067	11.467	18.420	29.457	46.901	74.357	117.39	289.00	700.23	1083.6	1670.7	3927.3	9100.4	46890	*	*	*
60	1.8167	3.2810	5.8916	10.519	18.679	32.987	57.946	101.25	176.03	304.48	897.59	2595.9	4383.9	7370.1	20555	56347	*	*	*	*

* FVIF > 99,999

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Appendix A

CHART B

Sum of an Annuity of $1: $FVIFA_{i,n}$

Number of Periods	1%	2%	3%	4%	5%	6%	7%	8%	9%	10%	12%	14%	15%	16%	18%	20%	24%	28%	32%	36%
1	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
2	2.0100	2.0200	2.0300	2.0400	2.0500	2.0600	2.0700	2.0800	2.0900	2.1000	2.1200	2.1400	2.1500	2.1600	2.1800	2.2000	2.2400	2.2800	2.3200	2.3600
3	3.0301	3.0604	3.0909	3.1216	3.1525	3.1836	3.2149	3.2464	3.2781	3.3100	3.3744	3.4396	3.4725	3.5056	3.5724	3.6400	3.7776	3.9184	4.0624	4.2096
4	4.0604	4.1216	4.1836	4.2465	4.3101	4.3746	4.4399	4.5061	4.5731	4.6410	4.7793	4.9211	4.9934	5.0665	5.2154	5.3680	5.6842	6.0156	6.3624	6.7251
5	5.1010	5.2040	5.3091	5.4163	5.5256	5.6371	5.7507	5.8666	5.9847	6.1051	6.3528	6.6101	6.7424	6.8771	7.1542	7.4416	8.0484	8.6999	9.3983	10.146
6	6.1520	6.3081	6.4684	6.6330	6.8019	6.9753	7.1533	7.3359	7.5233	7.7156	8.1152	8.5355	8.7537	8.9775	9.4420	9.9299	10.980	12.135	13.405	14.798
7	7.2135	7.4343	7.6625	7.8983	8.1420	8.3938	8.6540	8.9228	9.2004	9.4872	10.089	10.730	11.066	11.413	12.141	12.915	14.615	16.533	18.695	21.126
8	8.2857	8.5830	8.8923	9.2142	9.5491	9.8975	10.259	10.636	11.028	11.435	12.299	13.232	13.726	14.240	15.327	16.499	19.122	22.163	25.678	29.731
9	9.3685	9.7546	10.159	10.582	11.026	11.491	11.978	12.487	13.021	13.579	14.775	16.085	16.785	17.518	19.085	20.798	24.712	29.369	34.895	41.435
10	10.462	10.949	11.463	12.006	12.577	13.180	13.816	14.486	15.192	15.937	17.548	19.337	20.303	21.321	23.521	25.958	31.643	38.592	47.061	57.351
11	11.566	12.168	12.807	13.486	14.206	14.971	15.783	16.645	17.560	18.531	20.654	23.044	24.349	25.732	28.755	32.150	40.237	50.398	63.121	78.998
12	12.682	13.412	14.192	15.025	15.917	16.869	17.888	18.977	20.140	21.384	24.133	27.270	29.001	30.850	34.931	39.580	50.894	65.510	84.320	108.43
13	13.809	14.680	15.617	16.626	17.713	18.882	20.140	21.495	22.953	24.522	28.029	32.088	34.351	36.786	42.218	48.496	64.109	84.852	112.30	148.47
14	14.947	15.973	17.086	18.291	19.598	21.015	22.550	24.214	26.019	27.975	32.392	37.581	40.504	43.672	50.818	59.195	80.496	109.61	149.23	202.92
15	16.096	17.293	18.598	20.023	21.578	23.276	25.129	27.152	29.360	31.772	37.279	43.842	47.580	51.659	60.965	72.035	100.81	141.30	197.99	276.97
16	17.257	18.639	20.156	21.824	23.657	25.672	27.888	30.324	33.003	35.949	42.753	50.980	55.717	60.925	72.939	87.442	126.01	181.86	262.35	377.69
17	18.430	20.012	21.761	23.697	25.840	28.212	30.840	33.750	36.973	40.544	48.883	59.117	65.075	71.673	87.068	105.93	157.25	233.79	347.30	514.66
18	19.614	21.412	23.414	25.645	28.132	30.905	33.999	37.450	41.301	45.599	55.749	68.394	75.836	84.140	103.74	128.11	195.99	300.25	459.44	700.93
19	20.810	22.840	25.116	27.671	30.539	33.760	37.379	41.446	46.018	51.159	63.439	78.969	88.211	98.603	123.41	154.74	244.03	385.32	607.47	954.27
20	22.019	24.297	26.870	29.778	33.066	36.785	40.995	45.762	51.160	57.275	72.052	91.024	102.44	115.37	146.62	186.68	303.60	494.21	802.86	1298.8
21	23.239	25.783	28.676	31.969	35.719	39.992	44.865	50.442	56.764	64.002	81.698	104.76	118.81	134.84	174.02	225.02	377.46	633.59	1060.7	1767.3
22	24.471	27.299	30.536	34.248	38.505	43.392	49.005	55.456	62.873	71.402	92.502	120.43	137.63	157.41	206.34	271.03	469.05	811.99	1401.2	2404.6
23	25.716	28.845	32.452	36.617	41.430	46.995	53.436	60.893	69.531	79.543	104.60	138.29	159.27	183.60	244.48	326.23	582.62	1040.3	1850.6	3271.3
24	26.973	30.421	34.426	39.082	44.502	50.815	58.176	66.764	76.789	88.497	118.15	158.65	184.16	213.97	289.49	392.48	723.46	1332.6	2443.8	4449.9
25	28.243	32.030	36.459	41.645	47.727	54.864	63.249	73.105	84.700	98.347	133.33	181.87	212.79	249.21	342.60	471.98	898.09	1706.8	3226.8	6052.9
26	29.525	33.670	38.553	44.311	51.113	59.156	68.676	79.954	93.323	109.18	150.33	208.33	245.71	290.08	405.27	567.37	1114.6	2185.7	4260.4	8233.0
27	30.820	35.344	40.709	47.084	54.669	63.705	74.483	87.350	102.72	121.09	169.37	238.49	283.56	337.50	479.22	681.85	1383.1	2798.7	5624.7	11197.9
28	32.129	37.051	42.930	49.967	58.402	68.528	80.697	95.338	112.96	134.20	190.69	272.88	327.10	392.50	566.48	819.22	1716.0	3583.3	7425.6	15230.2
29	32.450	38.792	45.218	52.966	62.322	73.689	87.346	103.96	124.13	148.63	214.58	312.09	377.16	456.30	669.44	984.06	2128.9	4587.6	9802.9	20714.1
30	34.784	40.568	47.576	56.084	66.438	79.058	94.460	113.28	136.30	164.49	241.33	356.78	434.74	530.31	790.94	1181.8	2640.9	5873.2	12940	28172.2
40	48.886	60.402	75.401	95.025	120.79	154.76	199.63	259.05	337.88	442.59	767.09	1342.0	1779.0	2360.7	4163.2	7343.8	22728	63977	*	*
50	64.463	84.579	112.79	152.66	209.34	290.33	406.52	573.76	815.08	1163.9	2400.0	4994.5	7217.7	10435	21813	45497	*	*	*	*
60	81.669	114.05	163.05	237.90	353.58	533.12	813.52	1253.2	1944.7	3034.8	7471.6	18535	29219	46057	*	*	*	*	*	*

*FVIFA > 99.999

Appendix B

CHART C

Present Value of $1: $PVIF_{i,n}$

Period	1%	2%	3%	4%	5%	6%	7%	8%	9%	10%	12%	14%	15%	16%	18%	20%	24%	28%	32%	36%
1	.9901	.9804	.9709	.9615	.9524	.9434	.9346	.9259	.9174	.9091	.8929	.8772	.8696	.8621	.8475	.8333	.8065	.7813	.7576	.7353
2	.9803	.9612	.9426	.9246	.9070	.8900	.8734	.8573	.8417	.8264	.7972	.7695	.7561	.7432	.7182	.6944	.6504	.6104	.5739	.5407
3	.9706	.9423	.9151	.8890	.8638	.8396	.8163	.7938	.7722	.7513	.7118	.6750	.6575	.6407	.6086	.5787	.5245	.4768	.4348	.3975
4	.9610	.9238	.8885	.8548	.8227	.7921	.7629	.7350	.7084	.6830	.6355	.5921	.5718	.5523	.5158	.4823	.4230	.3725	.3294	.2923
5	.9515	.9057	.8626	.8219	.7835	.7473	.7130	.6806	.6499	.6209	.5674	.5194	.4972	.4761	.4371	.4019	.3411	.2910	.2495	.2149
6	.9420	.8880	.8375	.7903	.7462	.7050	.6663	.6302	.5963	.5645	.5066	.4556	.4323	.4104	.3704	.3349	.2751	.2274	.1890	.1580
7	.9327	.8706	.8131	.7599	.7107	.6651	.6227	.5835	.5470	.5132	.4523	.3996	.3759	.3538	.3139	.2791	.2218	.1776	.1432	.1162
8	.9235	.8535	.7894	.7307	.6768	.6274	.5820	.5403	.5019	.4665	.4039	.3506	.3269	.3050	.2660	.2326	.1789	.1388	.1085	.0854
9	.9143	.8368	.7664	.7026	.6446	.5919	.5439	.5002	.4604	.4241	.3606	.3075	.2843	.2630	.2255	.1938	.1443	.1084	.0822	.0628
10	.9053	.8203	.7441	.6756	.6139	.5584	.5083	.4632	.4224	.3855	.3220	.2697	.2472	.2267	.1911	.1615	.1164	.0847	.0623	.0462
11	.8963	.8043	.7224	.6494	.5847	.5268	.4751	.4289	.3875	.3505	.2875	.2366	.2149	.1954	.1619	.1346	.0938	.0662	.0472	.0340
12	.8874	.7885	.7014	.6246	.5568	.4970	.4440	.3971	.3555	.3186	.2567	.2076	.1869	.1685	.1372	.1122	.0757	.0517	.0357	.0250
13	.8787	.7730	.6810	.6006	.5303	.4688	.4150	.3677	.3262	.2897	.2292	.1821	.1625	.1452	.1163	.0935	.0610	.0404	.0271	.0184
14	.8700	.7579	.6611	.5775	.5051	.4423	.3878	.3405	.2992	.2633	.2046	.1597	.1413	.1252	.0985	.0779	.0492	.0316	.0205	.0135
15	.8613	.7430	.6419	.5553	.4810	.4173	.3624	.3152	.2745	.2394	.1827	.1401	.1229	.1079	.0835	.0649	.0397	.0247	.0155	.0099
16	.8528	.7284	.6232	.5339	.4581	.3936	.3387	.2919	.2519	.2176	.1631	.1229	.1069	.0930	.0708	.0541	.0320	.0193	.0118	.0073
17	.8444	.7142	.6050	.5134	.4363	.3714	.3166	.2703	.2311	.1978	.1456	.1078	.0929	.0802	.0600	.0451	.0258	.0150	.0089	.0054
18	.8360	.7002	.5874	.4936	.4155	.3503	.2959	.2502	.2120	.1799	.1300	.0946	.0808	.0691	.0508	.0376	.0208	.0118	.0068	.0038
19	.8277	.6864	.5703	.4746	.3957	.3305	.2765	.2317	.1945	.1635	.1161	.0829	.0703	.0596	.0431	.0313	.0168	.0092	.0051	.0029
20	.8195	.6730	.5537	.4564	.3769	.3118	.2584	.2145	.1784	.1486	.1037	.0728	.0611	.0514	.0365	.0261	.0135	.0072	.0039	.0021
25	.7798	.6095	.4776	.3751	.2953	.2330	.1842	.1460	.1160	.0923	.0588	.0378	.0304	.0245	.0160	.0105	.0046	.0021	.0010	.0005
30	.7419	.5521	.4120	.3083	.2314	.1741	.1314	.0994	.0754	.0573	.0334	.0196	.0151	.0116	.0070	.0042	.0016	.0006	.0002	.0001
40	.6717	.4529	.3066	.2083	.1420	.0972	.0668	.0460	.0318	.0221	.0107	.0053	.0037	.0026	.0013	.0007	.0002	.0001	*	*
50	.6080	.3715	.2281	.1407	.0872	.0543	.0339	.0213	.0132	.0085	.0035	.0014	.0009	.0006	.0003	.0001	*	*	*	*
60	.5504	.3048	.1697	.0951	.0535	.0303	.0173	.0099	.0057	.0033	.0011	.0004	.0002	.0001	*	*	*	*	*	*

*The factor is zero to four decimal places.

Appendix C

CHART D

Present Value of an Annuity of $1: $PVIFA_{i,n}$

Number of payments	1%	2%	3%	4%	5%	6%	7%	8%	9%	10%	12%	14%	15%	16%	18%	20%	24%	28%	32%
1	0.9901	0.9804	0.9709	0.9615	0.9524	0.9434	0.9346	0.9259	0.9174	0.9091	0.8929	0.8772	0.8696	0.8621	0.8475	0.8333	0.8065	0.7813	0.7576
2	1.9704	1.9415	1.9135	1.8861	1.8594	1.8334	1.8080	1.7833	1.7591	1.7355	1.6901	1.6467	1.6257	1.6052	1.5656	1.5278	1.4568	1.3916	1.3315
3	2.9410	2.8839	2.8286	2.7751	2.7232	2.6730	2.6243	2.5771	2.5313	2.4869	2.4018	2.3216	2.2832	2.2459	2.1743	2.1065	1.9813	1.8684	1.7663
4	3.9020	3.8077	3.7171	3.6299	3.5460	3.4651	3.3872	3.3121	3.2397	3.1699	3.0373	2.9137	2.8550	2.7982	2.6901	2.5887	2.4043	2.2410	2.0957
5	4.8534	4.7135	4.5797	4.4518	4.3295	4.2124	4.1002	3.9927	3.8897	3.7908	3.6048	3.4331	3.3522	3.2743	3.1272	2.9906	2.7454	2.5320	2.3452
6	5.7955	5.6014	5.4172	5.2421	5.0757	4.9173	4.7665	4.6229	4.4859	4.3553	4.1114	3.8887	3.7845	3.6847	3.4976	3.3255	3.0205	2.7594	2.5342
7	6.7282	6.4720	6.2303	6.0021	5.7864	5.5824	5.3893	5.2064	5.0330	4.8684	4.5638	4.2883	4.1604	4.0386	3.8115	3.6046	3.2423	2.9370	2.6775
8	7.6517	7.3255	7.0197	6.7327	6.4632	6.2098	5.9713	5.7466	5.5348	5.3349	4.9676	4.6389	4.4873	4.3436	4.0776	3.8372	3.4212	3.0758	2.7860
9	8.5660	8.1622	7.7861	7.4353	7.1078	6.8017	6.5152	6.2469	5.9952	5.7590	5.3282	4.9464	4.7716	4.6065	4.3030	4.0310	3.5655	3.1842	2.8681
10	9.4713	8.9826	8.5302	8.1109	7.7217	7.3601	7.0236	6.7101	6.4177	6.1446	5.6502	5.2161	5.0188	4.8332	4.4941	4.1925	3.6819	3.2689	2.9304
11	10.3676	9.7858	9.2526	8.7605	8.3064	7.8869	7.4987	7.1390	6.8052	6.4951	5.9377	5.4527	5.2337	5.0286	4.6560	4.3271	3.7757	3.3351	2.9776
12	11.2551	10.5753	9.9540	9.3851	8.8633	8.3838	7.9427	7.5361	7.1607	6.8137	6.1944	5.6603	5.4206	5.1971	4.7932	4.4392	3.8514	3.3868	3.0133
13	12.1337	11.3484	10.6350	9.9856	9.3936	8.8527	8.3577	7.9038	7.4889	7.1034	6.4235	5.8424	5.5831	5.3423	4.9095	4.5327	3.9124	3.4272	3.0404
14	13.0037	12.1062	11.2961	10.5631	9.8986	9.2950	8.7455	8.2442	7.7862	7.3667	6.6282	6.0021	5.7245	5.4675	5.0081	4.6106	3.9616	3.4587	3.0609
15	13.8651	12.8493	11.9379	11.1184	10.3797	9.7122	9.1079	8.5595	8.0607	7.6061	6.8109	6.1422	5.8474	5.5755	5.0916	4.6755	4.0013	3.4834	3.0764
16	14.7179	13.5777	12.5611	11.6523	10.8378	10.1059	9.4466	8.8514	8.3126	7.8237	6.9740	6.2651	5.9542	5.6685	5.1724	4.7296	4.0333	3.5026	3.0882
17	15.5623	14.2919	13.1661	12.1657	11.2741	10.4773	9.7632	9.1216	8.5436	8.0216	7.1196	6.3729	6.0472	5.7487	5.2223	4.7746	4.0591	3.5177	3.0971
18	16.3983	14.9920	13.7535	12.6593	11.6896	10.8276	10.0591	9.3719	8.7556	8.2014	7.2497	6.4674	6.1280	5.8178	5.2732	4.8122	4.0799	3.5294	3.1039
19	17.2260	15.6785	14.3238	13.1339	12.0853	11.1581	10.3356	9.6036	8.9501	8.3649	7.3658	6.5504	6.1982	5.8775	5.3162	4.8435	4.0967	3.5386	3.1090
20	18.0456	16.3514	14.8775	13.5903	12.4622	11.4699	10.5940	9.8181	9.1285	8.5436	7.4694	6.6231	6.2593	5.9288	5.3527	4.8696	4.1103	3.5458	3.1129
25	22.0232	19.5235	17.4131	15.6221	14.0939	12.7834	11.6536	10.6748	9.8226	9.0770	7.8431	6.8729	6.4641	6.0971	5.4669	4.9476	4.1474	3.5640	3.1220
30	25.8077	22.3965	19.6004	17.2920	15.3725	13.7648	12.4090	11.2578	10.2737	9.4269	8.0552	7.0072	6.5660	6.1772	5.5168	4.9789	4.1601	3.5693	3.1242
40	32.8347	27.3555	23.1148	19.7928	17.1591	15.0463	13.3317	11.9246	10.7574	9.7791	8.2438	7.1050	6.6418	6.2335	5.5482	4.9966	4.1659	3.5712	3.1250
50	39.1961	31.4236	25.7298	21.4822	18.2559	15.7619	13.8007	12.2335	10.9617	9.9148	8.3045	7.1327	6.6605	6.2463	5.5541	4.9995	4.1666	3.5714	3.1250
60	44.9950	34.7609	27.8756	22.6235	18.9293	16.1614	14.0392	12.3766	11.0480	9.9672	8.3240	7.1401	6.6651	6.2492	5.5553	4.9999	4.1667	3.5714	3.1250

Appendix D

STRATEGIC FINANCIAL MANAGEMENT

UNIT TWO: FINANCING DECISION

TABLE OF CONTENTS

COST OF CAPITAL (COC)

Conceptualising COC

The cost of capital is an important financial concept. It links the entity's long term decisions with the wealth of the shareholders. Conceptually when entities raise finance the one of the main criterions is the cost of capital. Computation of cost of capital is very important and finance managers must carefully consider the same. The cost of capital of a firm is the minimum rate of return expected by its investors. It is the required rate of return on the various types of financing.

According to Solomin Ezra: "Cost of capital is the minimum required rate of earning or the cut-off rate of capital expenditure."

According to Jhon J: "Cost of capital is the rate of return the firm requires from investment in order to increase the value of the firm in the market place."

The overall cost of capital is a weighted average of the individual required rates of return (costs). It is the weighted average cost of various sources of finance used by the firm. The capital used by the firm may be in the form of debt, preference capital, retained earnings and equity shares. The following are the basic characteristics of cost of capital:

1. Cost of capital is a rate of return,
2. This return, however, is calculated on the basis of actual cost of different components of capital.
3. A firm's cost of capital represents minimum rate of return that will result in at least maintaining (if not increasing) the value of its equity shares.
4. It is related to long term capital funds.
5. Cost of capital consists of three components
    a. Return at Zero Risk Level. (r_0)
    b. Premium for Business Risk (b)
    c. Premium for Financial Risk (f)

    Thus the cost of capital may be put in the form of the following equation: K = r_0+ b + f

Importance of Cost of Capital

Beyond cost of capital's role in capital structure, it indicates an organization's financial health and informs business decisions. When determining an opportunity's potential expense, cost of capital helps companies evaluate the progress of ongoing projects by comparing their statuses against their costs. Shareholders and business leaders analyse cost of capital regularly to ensure they make smart, timely financial decisions. In an ideal world, businesses balance financing while limiting cost of capital. There is intricate relationship between the risk borne by the suppliers of capital and the respective cost of capital. It is the basis of appraising new capital expenditure proposals. This gives the acceptance / rejection criterion for capital expenditure projects. The finance manager must raise capital from different sources in a way that it optimizes the risk and cost factors. The source of funds which have less cost involve high risk. Cost of capital helps the managers in determining the optimal capital structure.

Significance of Cost of Capital

In the below mentioned lines the significance of the cost of capital in the academic discipline of financial management are mentioned.

- As Acceptance Criteria in Capital Budgeting - The concept of cost of capital has assumed growing importance largely because of the needs to devise a rational mechanism for making the investment decision of the firm.
- As a Determinant of Capital Mix in Capital Structure Decisions - Financing the firm asset is the very crucial problem in every business and as a general rule there should be a proper mix of debt and

equity capital in financing the firm's assets. While designing the optimal capital structure, the management has to keep in mind the objective of maximizing the value of the firm and minimising the cost of capital.

- As a Basis for Evaluating the Financial Performance - The concept of cost of capital can be used to evaluate the financial performance of the top management. The actual profitability of the project is compared the projected overall cost of capital and the actual cost of capital of funds rise to finance the project if the actual profitability of the project is mort than the projected.
- As the Basis for taking other financial decisions - The cost of capital is also used in making other financial decisions such as dividend policy, capitalization of profits, making the right issue and working capital.

Classification of Cost of Capital

There is no fixed base of classification of cost of capital. It varies according to need, process and purpose. It may be classified as follows:

- Explicit Cost and Implicit Cost: Explicit cost is the discount rate that equates the present value of the funds received by the firm net of underwriting costs, with the present value of expected cash outflows. Thus, it is the rate of return of the cash flows of financing opportunity. On the other hand, the implicit cost is the rate of return associated with the best investment opportunity for the firm and its shareholders that will be foregone if the project presently under consideration by the firm were accepted. In the other words, explicit cost relates to raising of funds and implicit costs relate to usage of funds.
- Average Cost and Marginal Cost: The average cost is the weighted average of the costs of each components of funds. After ascertaining costs of each source of capital, appropriate weights are assigned to each component of capital. Marginal cost of capital is the weighted average cost of new funds raised by the firms.

Rationale for using K_0 as a hurdle rate[1]

A hurdle rate, which is also known as the minimum acceptable rate of return (MARR), is the minimum required rate of return or target rate that investors are expecting to receive on an investment. The rate is determined by assessing the cost of capital, risks involved, current opportunities in business expansion, rates of return for similar investments, and other factors that could directly affect an investment. Before accepting and implementing a certain investment project, its internal rate of return (IRR) should be equal to or greater than the hurdle rate. Any potential investments must possess a return rate that is higher than the hurdle rate in order for it to be acceptable in the long run. Most companies use their weighted average cost of capital (WACC) as a hurdle rate for investments. This stems from the fact that companies can buy back their own shares as an alternative to making a new investment, and would presumably earn their WACC as the rate

[1] https://corporatefinanceinstitute.com/resources/valuation/hurdle-rate-definition/

of return. In this way, investing in their own shares (earning their WACC) represents the opportunity cost of any alternative investment. A company can be viewed as a collection of projects. As a result, the use of an overall cost of capital as the acceptance criterion (hurdle rate) for investment decisions is appropriate only under certain circumstances.

Computation of Specific Cost of Capital

Computation of overall cost of capital of a firm involves computation of cost of specific source of finance referred as specific cost computation the weighted average cost of capital (WACC). The specific cost is to be calculated for individual category of finance raised. Thus specific cost of capital is to be calculated for debt, preference share, equity share and retained earnings. Thus-

A. Specific source of finance
   - Cost of Debt
   - Cost of Preference Capital
   - Cost of Equity Capital
   - Cost of Retained earnings
B. Weighted average cost of capital

Each of the above element of capital structure has a component cost that is identified by the following:

- k_i = before-tax cost of debt
- $k_d = k_i (1 - t)$ = after-tax cost of debt, where t = tax rate
- k_p = cost of preference shares
- k_r = cost of retained earnings (= internal equity)
- k_e = cost of external equity, or cost of new issue

AND

$\boldsymbol{k_0}$ = firm's overall cost of capital, or a weighted average cost of capital (**WACC**)

Cost of Debt

The before-tax cost of debt can be found by determining the internal rate of return (or yield to maturity) on the bond cash flows, (refer to time value of money [FVM]). The computation of the cost of debt will depend on whether the debt is redeemable or irredeemable (perpetual).

- Cost of perpetual/irredeemable debt $(k_i) = \frac{C}{I}$

Where C = annual interest payments in Rupees and I = Issue price (this is will be the net proceeds when the debt is a new issue)

And $k_d = k_i(1 - t)$

- In case the redeemable debt, the following shortcut formula may be used for approximating the yield to maturity on a bond:

$$k_i = \frac{C + (F - P)/n}{(F + P)/2}$$

Where

C = annual interest payments in Rupees

F = par value

P = value or net proceeds from the sale of a bond (at redemption)

n = term of the bond in years

Since the interest payments are tax-deductible, the cost of debt must be stated on an after-tax basis.

The after-tax cost of debt is: $k_d = k_i(1\text{-}t)$ where t is the tax rate

Example 1

X Ltd. issues Rs. 50,000 8% debenture. The tax rate applicable is 50%. Compute the cost of debt capital, if debentures are issued (i) at par (ii) at Premium of 10% (iii) at discount of 10%

If the debentures are issued at Par

We know,

Cost of perpetual/irredeemable debt $(k_i) = \frac{C}{I}$ and $k_d = k_i(1\text{-}t)$

Where

C = annual interest payments in Rupees

And I = net proceeds of debt issue.

Thus,

$(k_i) = \frac{C}{I} = \frac{8\%\ of\ 50000}{50000} = \frac{4000}{50000} = 0.08$

$k_d = k_i(1\text{-}t) = 0.08\ (1\text{-}\ 0.5) = 0.04 = 4\%$

If the debentures are issued at premium of 10%,

Then, I = 55000 (50000 × 110%)

Thus,

$(k_i) = \frac{C}{I} = \frac{8\%\ of\ 50000}{55000} = \frac{4000}{55000} = 0.0727$

$k_d = k_i(1\text{-}t) = 0.0727\ (1\text{-}\ 0.5) = 0.03636 = 3.64\%$

If the debentures are issued at discount of 10%,

Then, I = 45000 (50000 × 90%)

Thus,

$(k_i) = \frac{C}{I} = \frac{8\%\ of\ 50000}{45000} = \frac{4000}{45000} = 0.08888$

$k_d = k_i(1\text{-}t) = 0.0888\ (1\text{-}\ 0.5) = 0.04444 = 4.44\%$

Example 2

A company issues Rs. 10, 00,000; 10% debentures at a discount of 5%. The cost of floatation amounts to Rs. 30,000. The debentures are redeemable after 5 years. Calculate before tax and after tax cost of debt assuming a tax rate of 50%.

We know,

$$k_i = \frac{C+(F-P)/n}{(F+P)/2}$$

Where

C = annual interest payments in Rupees

F = par value

P = value or net proceeds from the sale of a bond (at redemption)

n = term of the bond in years

Since the interest payments are tax-deductible, the cost of debt must be stated on an after-tax basis.

The after-tax cost of debt is: $k_d = k_i(1\text{-}t)$ where t is the tax rate

$k_i = \frac{100000 + (1000000 - 920000^2)/5}{(100000+920000)/2} = \frac{116000}{960000} = 0.1208 = 12.08\%$ and

$k_d = k_i(1\text{-}t) = 0.1208\ (1 - 0.5) = 0.0604 =$ **6.04%**

Cost of preference Shares

- **Irredeemable Preference Share**

The cost of Preference Share, k_p is found by dividing the annual preference Share dividend, d_p, by the net proceeds from the sale of the preference share, p, as follow

$$k_p = \frac{d_p}{p}$$

- **Redeemable Preference Share**

$$K_p = \frac{D + (F-P)/n}{(F+P)/2}$$

Where,

D = annual Dividend in Rupees

F = par value

P = value or net proceeds at redemption of Preference shares

n = years before redemption of Preference shares

[2] Net proceeds of debenture (P) = Par Value (1000000) – 5% discount (50000) – floatation cost (30000)

Example 3

A company issues 1,000 7% preference shares of Rs. 100 each at a premium of 10% redeemable after 5years at par. Compute the cost of preference Capital.

We know,

$$K_p = \frac{D + (F-P)/n}{(F+P)/2}$$

$$K_p = \frac{7000 + (110000 - 100000)/5}{(110000 + 100000)/2} = \frac{9000}{105000} = 0.0857 = 8.57\%$$

Cost of Equity

Cost of equity capital is the rate at which investors discount the expected dividends of the firm to determine its share value. Conceptually the cost of equity capital (K_e) defined as the

"Minimum rate of return that a firm must earn on the equity financed portion of an investment project in order to leave unchanged the market price of the shares".

Cost of equity can be calculated from the following approach:

- Dividend price (D/P) approach
- Dividend price plus growth (D/P + g) approach
- Earning price (E/P) approach

Dividend Price Approach

The cost of equity capital will be that rate of expected dividend which will maintain the present market price of equity shares. Dividend price approach can be measured with the help of the following formula:

$$\boldsymbol{K_e = \frac{D}{P_0}}$$

Where,

K_e = Cost of equity capital

D = Dividend per equity share

P_0 = Net proceeds of an equity share

Illustration 4

A company issues 10,000 equity shares of Rs. 100 each at a premium of 10%. The company has been paying 25% dividend to equity shareholders for the *past five years and expects to maintain the same in the future also.* Compute the cost of equity capital. Will it make any difference if the market price of equity share is Rs 175?

We know, $\boldsymbol{K_e = \frac{D}{P_0}}$

Where,

K_e = Cost of equity capital

D = Dividend per equity share

P_0 = Net proceeds of an equity share

Here P_0 = 110 (100 + 10%)

$$K_e = \frac{25}{110} = 0.22727 = \mathbf{22.72\%}$$

When the market price is Rs 175

$$K_e = \frac{25}{175} = 0.14285 = \mathbf{14.29\%}$$

Dividend Price Plus Growth Approach

The cost of equity is calculated on the basis of the expected dividend rate per share plus growth in dividend. It can be measured with the help of the following formula:

$$\boldsymbol{K_e = \frac{D}{P_0} + g}$$

Where g = growth rate, other notations have the same meaning as in the previous case.

Illustration 5

a) A company plans to issue 10000 new shares of Rs. 100 each at a par. The floatation costs are expected to be 4% of the share price. The company pays a dividend of Rs. 12 per share initially and growth in dividends is expected to be 5%.

   Compute the cost of new issue of equity shares.

b) If the current market price of an equity share is Rs. 120. Calculate the cost of existing equity share capital

[when there is floatation cost, then the issue price is to adjusted with the floatation cost]

We know,

$$\boldsymbol{K_e = \frac{D}{P_0} + g}$$

$$\Rightarrow K_e = \frac{D}{P_0\,(1-f)} + g = \frac{12}{100(1-0.04)} + 0.05 = 0.175 = \mathbf{17.5\%}$$

If the current market price is 120 then the cost of equity will be

$K_e = \frac{D}{P_0} + g = \frac{12}{120} + 0.05 = 0.15 = \mathbf{15\%}$

(it is important to note that when the calculations are based on market price of the share, adjustment for floatation cost need not be made as there is no question of calculating the issue price)

Earning Price Approach

Cost of equity determines the market price of the shares. It is based on the future earnings prospects of the equity. The formula for calculating the cost of equity according to this approach is as follows.

$$\mathbf{Ke = \frac{EPS}{P_0}}$$

Where,

Ke = Cost of equity capital

E = Earnings per share

P_0 = Net proceeds of an equity share// Market Price of share

[note: it is important to understand which to take Net proceeds of an equity share or Market Price of share as P_0 and when to take which]

Example 6

A firm is considering an expenditure of Rs. 75 lakhs for expanding its operations.

The relevant information is as follows:

Number of existing equity shares =10 lakhs

Market value of existing share = Rs.100

Net earnings = Rs.100 lakhs

Compute the cost of existing equity share capital and of new equity capital assuming that new shares will be issued at a price of Rs. 92 per share and the costs of new issue will be Rs. 2 per share.

Solution

Cost of existing equity share capital

$$\mathbf{Ke = \frac{EPS}{P_0}}$$

EPS (Earnings per share) = $\frac{net\ earnings\ availabl\ to\ equity\ shareholders}{number\ of\ equtiy\ shares} = \frac{100\ lakhs}{10\ lakhs}$ = Rs 10

Therefore, Ke = $\frac{10}{100} = \mathbf{10\%}$

Cost of new issue

$$\text{Ke} = \frac{\text{EPS}}{\text{P}_0 - f^{3}} = \frac{10}{92-2} = \frac{10}{90} = \mathbf{11.11\%}$$

Cost of Retained Earnings

Retained earnings refer to the undistributed profits of the firm. Out of the total earnings, firms generally distribute only a part in the form of dividends and the rest will be retained within the business. Retained earnings is also referred as internal financing and has the opportunity cost of dividends from alternative investments. Hence shareholders expect a return on retained earnings at least that of equity. Therefore, the cost of retained earnings approximates the return that investors expect to earn on their equity investment in the company.

Or,

$$K_r = K_e$$

(however, while calculating cost of retained earnings, floatation cost is to be ignored as there is no question of issuing securities for this source of finance)

Weighted Average Cost of Capital (WACC)

It is also called as weighted average cost of capital and composite cost of capital. Weighted average cost of capital is the expected average future cost of funds over the long run found by weighting the cost of each specific type of capital by its proportion in the firm's capital structure.

The computation of the overall cost of capital (Ko) involves the following steps.

(a) Assigning weights to specific costs.

(b) Multiplying the cost of each of the sources by the appropriate weights.

(c) Dividing the total weighted cost by the total weights.

The overall cost of capital can be calculated with the help of the following formula;

$$Ko = k_d W_d + k_p W_p + k_e W_e + k_r W_r$$

Where,

K_0 = Overall cost of capital

K_d = Cost of debt

K_p = Cost of preference share

K_e = Cost of equity

[3] Floatation cost is given as an absolute figure. This can be directly subtracted from the market price. Thus the adjustment to the formula.

K_r = Cost of retained earnings

W_d= Percentage of debt of total capital

W_p = Percentage of preference share to total capital

W_e = Percentage of equity to total capital

W_r= Percentage of retained earnings

Illustration 7

ABC Ltd. has the following capital structure.

	Rs.
Equity (expected dividend 12%)	10,00,000
10% preference	5,00,000
8% loan	15,00,000

You are required to calculate the weighted average cost of capital, assuming 50% as the rate of income-tax, before and after tax.

Solution

Particulars (1)	**Weight (Rs) (2)**	**Proportion (3) (%)**	**Specific Cost (4) (%)**	**Total Specific Cost [3 × 4] =5**
Equity Share	1000000	33.33	12.00	3.99
Preference Share	500000	16.67	10.00	1.67
Loan	1500000	50.00	04.00	2.00
	3000000			7.66

Weight average cost of capital = **7.66%**

a. Capital Structure
   i. Over & Under Capitalisation
   ii. Optimum Capital Structure
   iii. Capital Gearing

b. Productivity of Capital and Leverage Analysis

CAPITAL STURCTURE

Introduction

Capital structure refers to the specific mix of debt capital and equity capital used to finance a company's assets and operations. Capital structure, as such, is a subset of the financing planning of the organisation.

Financial planning plays a major role in the field of financial management which consists of the major issues of financial management such as, capitalization, financial structure, capital structure and leverage. Financial planning encompasses the following important parts:

- Estimating the amount of capital to be raised.
- Determining types of finance and maintain the planned debt equity mix
- Formulating policies to manage the financial plan.

Meaning of Capital

The term capital refers to the total investment of the company in terms of money, and assets. It is also called as total wealth of the company. When the company is going to invest large amount of finance into the business, it is called as capital. Capital is the initial and integral part of new and existing business concern. The capital requirements of the business concern may be classified into two categories:

1. Fixed capital – this is the capital needed for meeting the long-term purpose of the business concern. Fixed capital is required mainly for the purpose of meeting capital expenditure of the business concern and it is used over a long period. It is the amount invested in various fixed or permanent assets, which are necessary for a business concern.
2. Working capital - this is the capital which is needed to meet the day-to-day transaction of the business concern. Normally working capital consists of various compositions of current assets such as inventories, bills, receivable, debtors, cash, and bank balance and prepaid expenses.

Capitalization

Capitalization refers to the process of determining the quantum of funds that a firm need to run its business. Capitalization is only the par value of share capital and debenture and it does not include reserve and surplus. Guthman and Dougall[4] defines, 'capitalization is the sum of the par value of stocks[5] and bonds outstanding'. Bonneville and Dewey defines[6] 'capitalization is the balance sheet value of stocks and bonds outstands'. Arhur. S. Dewing[7] defines, 'capitalization is the sum total of the par value of all shares'.

Generally, two types of capitalisation is identified; over – capitalisation and under – capitalisation.

[4] Guthmann, H. G., Dougall, H. E. (1955). Corporate Financial Policy. United Kingdom: Prentice-Hall.
[5] The term 'stocks' is used to mean the same thing as 'shares'. The two terms are often used in finance literature interchangeably.
[6] Dewey, L. E., Bonneville, J. H. (1938). Organizing and Financing Business: With Questions and Problems. United States: Prentice-Hall.
[7] Dewing, A. S., Dewing, F. R. (2018). Corporation Finance; a Textbook for Colleges and Schools of Business Administration. United States: Creative Media Partners, LLC.

Over – Capitalization

Over – capitalization refers to a particular situation in the entity when it possesses an excess of capital in relation to its activity level and requirements. In simple means, over capitalization is more capital than actually required and the funds are not properly used. According to Bonneville, Dewey and Kelly[6], over capitalization means, 'when a business is unable to earn fair rate on its outstanding securities'.

Suppose a company is earning a sum of Rs. 50,000 and the rate of return expected is 10%. This company will be said to be properly capitalized only when the capital employed is exactly Rs 5,00,000. If the capital employed is Rs. 6,00,000, it will be said that the company is over capitalized to the extent of Rs. 1,00,000. The new rate of earning would be: $\frac{50,000}{6,00,000} \times 100 = 8.33\%$ When the company has over capitalization, the rate of earnings will be reduced from 8.33% instead of 10% as was initially calculated.

Effects of Over Capitalization

Over – capitalisation is, as such, a case of not attaining optimum utilisation of the capital raised. Simply the operations of the company as it is being run could have been achieved with lesser amount of capital. This severely affects the proper running of operations of the company. The adverse effects are listed below;

1. Destroys the goodwill and credit worthiness – Over – capitalisation marked by low earning capacity destroys the reputation and goodwill of the company with deterrent effect on its prospects of business.
2. Difficulty in raising additional funds – It causes decline in share values which brings down the credit-standing and financial reputation of the company. Thus, it finds difficulty in mobilising additional funds.
3. Borrowings at higher rate of interest - An over- capitalised company which is not able to raise capital from the shareholders may get loans at higher rate of interest due to which the position may further deteriorate.
4. Effects on shareholders – The shareholders of an over-capitalised company are losers in all transactions, (i) The return on their investment is uncertain, irregular and nominal (ii) The market value of their holdings is reduced (iii) Their holdings have small value as collateral security, (iv) If the shares are sold, no fair consideration is obtained. (v) Speculation is encouraged in the shares and the real investors have to suffer on that account and (vi) When an over-capitalised company tries to set its house in order through reorganization, the shareholders are the worst sufferers.

Causes of Over Capitalization

Over capitalization arise due to the following important causes:

1. Over issue of capital by the company - Flawed financial planning may lead to excessive issue of shares or debentures. The issue would be, as such, redundant and have a detrimental effect on the earnings of the company.

2. Acquiring assets at inflated prices - Assets may be acquired at inflated prices or at a time when the prices were at their peak. In both the cases, the real value of the company is below its book value and the earnings are very low.
3. Providing inadequate depreciation to the fixed assets - Lack of suitable depreciation policy would make the asset values buoyant. This will abate the earnings. Lowered earnings bring about fall in share values, which represents over-capitalisation.
4. Liberal dividend policy - The company may follow a liberal dividend policy and may not retain sufficient funds for self- financing. It is not a prudent policy as it leads to over-capitalisation in the long run, when the book value of the shares falls below their real value.
5. Shortage of capital - If a company has small share capital it will be forced to raise loans at heavy rate of interest. This would reduce the net earnings available for dividends to shareholders. Lower earnings bring down the value of shares leading to over-capitalisation.

Under – capitalisation

Undercapitalization is widespread for small scale business units. It is considered a critical trigger for some serious financial problems within small business units. It can sometimes lead to closure or shutdown of the business, thus leading to grave business failure. The other problem is that it can restrict the firm from expanding or investing in other ventures. With insufficient capital, every firm will find it extremely difficult to venture into new areas or expand. Undercapitalization occurs when companies earn higher profits at a lower rate than their peers operating in the same industry. It is a situation where the business lacks funds to support operations.

Under – capitalization is used to denote the state of affairs just converse of over-capitalization. When company succeeds in earning abnormally large income consistently for long time, then the symptoms of undercapitalization gradually develop in the company. (Consistently high income). Under-capitalization is indicative of sound financial health and good management of the company. Under-capitalization will happen when market value of shares of the company becomes higher than its book value.

Bonneville and Dewey[6] defines 'under-capitalization is not an economic problem but a problem in adjusting the capital structure'. Gestenberg posits that a corporation may be under-capitalized when the rate of profit, it is making on the total capital, is exceptionally high in relation to the return enjoyed by similarly situated companies in the same industries or when it has too little capital with which to conduct its business.

Example

Suppose that the normal rate of return in an industry is 15%. A company in this industry earns a profit of Rs 300000 and has an amount of employed capital totalling Rs 000000.

The proper capital of the company for this profit of Rs 300000 should be Rs 2000000 (as 15% of Rs 2000000 = Rs 300000). The company has been earning the same profit with a capital of Rs2000000.

In this case, the company is undercapitalized to the extent of Rs1000000.

Undercapitalized companies earn profit at considerably higher rates compared to similar companies in the same industry. Undercapitalization can be compared to a lean, thin, and weak person who cannot run effectively due to this weakness but he is able to run at a faster rate than the others sue to his leanness.

Effects of Undercapitalization on Investors and Company and Shareholders

From the above discussion it appears that the state of undercapitalisation is a favourable situation as it is evident with constant higher return in relation to the capital employed by the company. But the state of undercapitalisation is, as such, a problem in case the business wishes to expand its operations. In sufficiency of capital is as bad a situation as excess of capital as expansion of projects would be stalled and even day to day operations may be stalled. This may even force the management to purposely bring about a change in numbers or manipulate the price of shares by adhering to unfair practices. The other effects may be listed below:

- It may cause undue conflict between management and employees because employees see that the firm is earning more profit and thus may demand higher wages.
- The financial obligation from the tax point of view will increase for the company.
- Customers may feel cheated during this phase because as the company is earning more and profits are increasing, they may think that it is all happening due to the excess price charged by the company for the goods or services.
- It may also cause more competitors to engage themselves in severe competition to earn more profits.
- A scenario of excess trading may occur during the undercapitalization period where the company makes more money than it is financially capable of. As a result, the creditors will suffer due to untimely payment of the credit taken.

Undercapitalization is the predecessor to overcapitalization as the company generates excessive profits and reserves, also combined with debt financing. This enhances the liquidity of investments because of the increased value of the shares, which can be sold anytime in the market on rising demand.

Remedies of Undercapitalization

The following measures should be adopted as remedial measures to limit the negative impact of undercapitalization:

1. New issue of equity shares: Under this scheme of reorganization, the number of shares is increased, which results in a reduction of the dividend per share.
2. Increase the par value of shares: Under this method, the par values of shares are increased so that the rate of dividend declines, but the dividend per share remains the same.
3. Issue bonus shares: Issue of bonus shares increases the number of shares, and so the dividend per share and the rate of dividend fall.

Undercapitalization has negative consequences, but these are not as fatal as those associated with overcapitalization. Even so, efforts should be made to reduce the pressure of undercapitalization.

CAPITAL STRUCTURE THEORIES

In order to understand the concept of optimum capital structure it is imperative to have a clear notion of the capital structure theories as is theorized in finance literature[8].

Introduction

Capital structure refers to the kinds of securities and the proportionate amounts that makeup capitalization. It is the mix of different sources of long-term sources such as equity shares, preference shares, debentures, long-term loans and retained earnings.

The term capital structure refers to the *configuration of the various long term sources of finance such as equity capital, preference share capital and debt capital.* Capital structure is the financing of the company represented primarily by long-term debt and equity.

Deciding the suitable capital structure is the important decision of the financial management because it is closely related to the value of the firm.

Financial Manager has to plan the appropriate mix of different securities in total capitalization in such a way as to minimize the cost of capital and maximize the earnings per share to the equity shareholders.

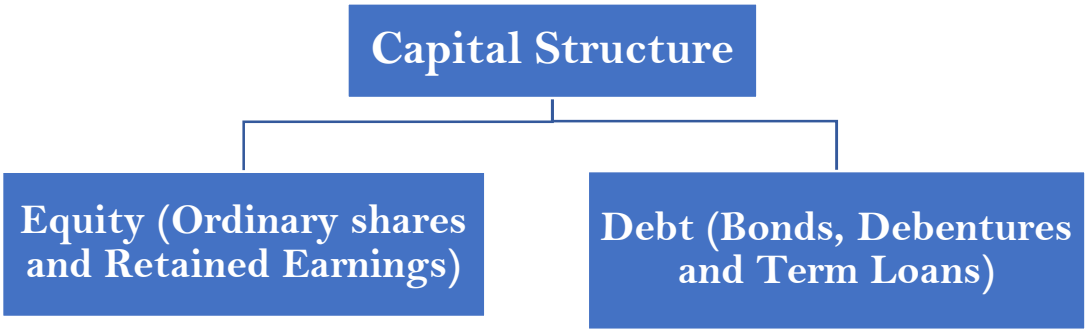
Capital structure pattern varies from company to company and the availability of finance.

There may be *four* fundamental patterns of capital structure as follows:

1. Equity shares only.
2. Equity and preference shares only.
3. Equity and Debentures only.
4. Equity shares, preference shares and debentures.

Capital structure refers to the combination of debt and equity capital which a firm uses to finance its long-term operations. Capital in this context refers to the permanent or long-term financing arrangements of the firm. Debt capital therefore is the firm's long-term borrowings and Equity capital is the long-term funds provided by the shareholders, the firm's owners. Capital structure is illustrated in figure given below;

[8] For details readers are advised to refer to *Fundamentals of Financial Management* (13th edition) *By* James C. Van Horne and John M. Wachowicz, FT Prentice Hall Harlow 2009



Definition[9]

- "Capital Structure of a company refers to the composition or make up of its capitalization and it includes all long-term capital resources".

  - Gerestenbeg

- "The mix of a firm's permanent long-term financing represented by debt, preferred stock, and common stock equity".**- James C. Van Horne**
- "The composition of a firm's financing consists of equity, preference, and debt". **- Prasanna Chandra**

Factors determining Capital Structure

The following factors are considered while deciding the capital structure of the firm.

1. Leverage

It is the basic and important factor, which affect the capital structure. It uses the fixed cost financing such as debt, equity and preference share capital. It is closely related to the overall cost of capital.

2. Cost of Capital

Cost of capital constitutes the major part for deciding the capital structure of a firm. Normally long- term finance such as equity and debt consist of fixed cost while mobilization. When the cost of capital increases, value of the firm will also decrease. Hence the firm must take careful steps to reduce the cost of capital.

3. Government policy

Promoter contribution is fixed by the Companies Act[10]. It restricts to mobilize large, long-term funds from external sources. Hence the company must consider government policy regarding the capital structure.

4. The capital structure also depends on the following;
   a. Nature of the business**:** Use of fixed interest/dividend bearing finance depends upon the nature of the business. If the business consists of long period of operation, it will apply for equity than debt, and it will reduce the cost of capital.

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[9] Readers often confuse the two terms; Capital Structure and Financial Structure
The term financial structure is different from the capital structure. Financial structure shows the pattern total financing. It measures the extent to which total funds are available to finance the total assets of the business.
Financial Structure = Total liabilities
Or
Financial Structure = Capital Structure + Current liabilities.

[10] https://www.sebi.gov.in/guide/guide20004.html (Chapter IV, Promoters Contribution and Lock-In Requirements)

b. Size of the company**:** It also affects the capital structure of a firm. If the firm belongs to large scale, it can manage the financial requirements with the help of internal sources. But if it is small size, they will go for external finance. It consists of high cost of capital.
c. Legal requirements**:** Legal requirements are also one of the considerations while dividing the capital structure of a firm. For example, banking companies are restricted to raise funds from some sources.
d. Requirement of investors**:** In order to collect funds from different type of investors, it will be appropriate for the companies to issue different sources of securities.

THE THEORY OF CAPITAL STRUCTURE

The theory of capital structure is closely related to the firm's cost of capital. Capital structure is the mix of the long-term sources of funds used by the firm. The primary objective of capital structure decisions is to maximize the market value of the firm through an appropriate mix of long-term sources of funds.
This mix, called the *optimal capital structure*, will minimize the firm's overall cost of capital.
However, there are arguments about whether an optimal capital structure actually exists.
The arguments centre on whether a firm can, in reality, affect its valuation and its cost of capital by varying the mix of the funds used. The arguments whether the mix of capital structure affects the value of the firm is theorised in the capital structure theories. In traditional finance literature, four capital structure theories have been postulated which are as follows;

1. Net operating income (NOI) approach
2. Net income (NI) approach
3. Traditional approach
4. Modigliani–Miller (MM) approach[11]

All the above four theories use the following assumptions for simplicity.

1. No income taxes are included; they will be removed later.
2. The company makes a 100 percent dividend payout.
3. No transaction costs are incurred.
4. The company has constant earnings before interest and taxes (EBIT).
5. The company has a constant operating risk.

Impact of Capital Structure on value of the Firm

The study of capital structure attempts to explain how entities utilise the mix of various forms of securities in order to finance investment. There are, a such, two schools of thoughts as to whether the mix of various forms of securities, which may be categorised into debt or equity, really impacts the value of the firm. Initially the studies were made under restrictive assumptions.

[11] This particular capital structure theory is beyond the scope of this study note. Only the basics of the hypothesis is discoursed.

Further is some of the simplified definitions for comprehensive of the capital structure theories.

1. K_d (cost of debt) = $\frac{\text{C (Annual Interest Charges)}}{\text{B (Maket Value of Debt)}}$
2. K_e (cost of equity) = $\frac{\text{Earnings avialble to Equity Shareholders (EAT)}}{\text{S (Market Value of Equity)}}$
3. K_0 (overall cost of capital) = $\frac{\text{EBIT}}{\text{V}}$ [K_0 = WACC = capitalisation rate]
4. V = B + S
   Value of the Firm = Value of Debt + Value of Equity

The Issue is what will happen to K_d, K_e and K_0 when the degree of Leverage (B/S) ratio changes.

Net Income Approach (NI)

According to this approach, there is an optimal structure[12] where the market price per share of stock is maximum. The significance of this approach is that a firm can lower its cost of capital continually and increase its total valuation by the use of debt funds. Thus, with increased use of leverage overall cost of capital decline and total value of the firm (value of stock plus value of debt) rises. Leverage is, therefore, an important variable and debt policy decision has a significant influence on the value of the firm. The basic assumptions of NI approach are:

1. Only two types of capital are employed - long - term debt and common stock.
2. The interest cost on debt and the rate at which investors capitalise earnings available to common shareholders are fixed, regardless of the debt-equity ratio.
3. There is no corporate tax rate.
4. The borrowing rate is less than the equity capitalisation rate.
5. The firm's operating earnings of the firm are not expected to grow, i.e. the firm's expected EBIT is the same in all future periods.
6. The firm's business risk is constant and is independent of its capital structure and financial risk.
7. The firm is expecting to continue indefinitely

As the proportion of cheaper debt funds in the capital structure increases, the weighted average cost of capital (K_o) decreases and approaches the cost of debt (K_d). Thus, the optimal capital structure, according to the NI approach, is one at which the total value of the firm is the highest and the cost of capital (K_o) is the lowest.

[12] This is only theoretically possible. According to this approach, a firm should go on replacing debt in the capital structure in place of equity as that would reduce the overall cost of capital. Thus, the optimal capital structure, according to the NI approach, is one at which the total value of the firm is the highest and the cost of capital (Ko) is the lowest which is when the firm operates with zero equity.

The NI approach determines the value of the firm by capitalising net income available to common equity holders and adding to its market value of debt. Graphically representation is shown below:

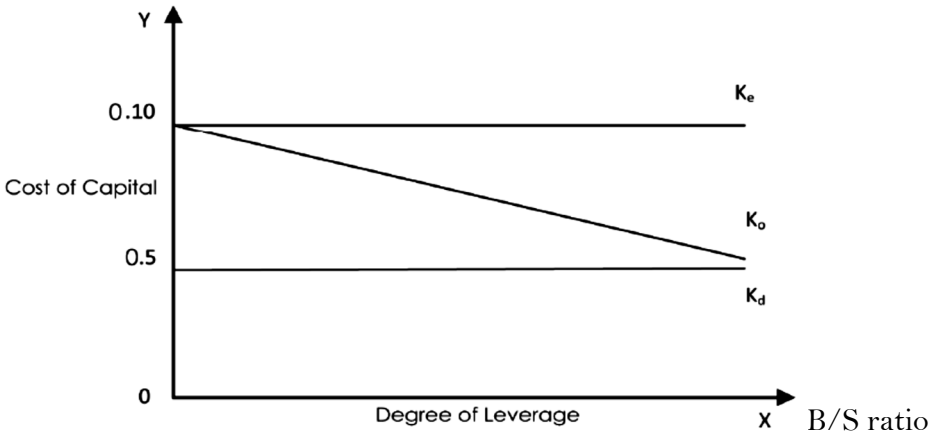


Figure 1: Net Income Approach

Net Operating Income Approach (NOI)

According to NOI approach total value of a firm remains unaffected by its capital structure. Whatever benefits results from debt financing, it will be offset by the rise in cost of equity capital with the result that overall cost of capital remains unaffected for all the degrees of the financial leverage and therefore, there is no optimal capital structure and investors are indifferent to change in capital structure.

Simply, the NOI approach suggests that the firm's overall cost of capital, k_o, and the value of the firm's market value of debt and stock outstanding, V, are both independent of the degree to which the company uses leverage. The key assumption with this approach is that k_o is constant regardless of the degree of leverage. Some of the operational issues are;

- No relevance in capital structure
- Degree of leverage is irrelevant to cost of capital i.e., a change in financial leverage would **NOT** lead to a change in the cost of capital
- It has constant overall cost of capital.
- Changes perception of investor with increase in debt

And

1. Total market value of the firm (V) is obtained by capitalising net operating income (EBIT) at the overall cost of capital (K_o) which is constant.

   Thus, $V = \frac{EBIT}{k_0}$

2. Total value of the equity is found by subtracting the value of debt from total market value of the firm.
3. The cost of equity tends to rise in correspondence with an increase in the degree of leverage.
4. The overall cost of capital is an average of the costs of debt and equity.

The NOI approach is presented graphically below.

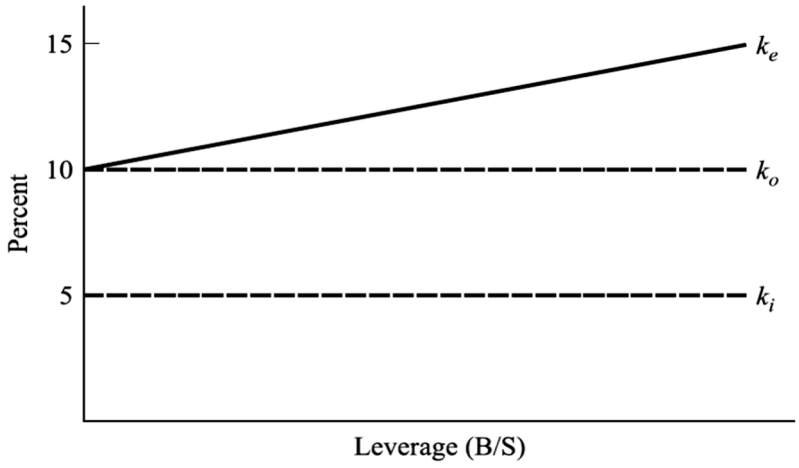


Figure 2: Net Operating Income approach

NOI approach and optimum capital structure

As per NOI approach the cost of debt, market value of the firm and the market value of the equity shares remain constant irrespective of change in the financial leverage and the benefit of low cost of debt is offset by the increased rate of return on equity with the increase in debt in the capital structure. Therefore, the overall all cost of capital remains the same at any level of debt; hence, the capital structure is optimum at any level of debt-equity mix. Under this circumstances, the optimum level of capital structure composed on debt equity composition becomes indeterminate, as the impact of financial leverage is counter balanced by a corresponding change in Ke in the opposite direction.

Traditional Approach

Traditional theorist believes that up to a certain point a firm can, by increasing proportion of debt in its capital structure, reduce cost of capital and raise market value of the stock. Beyond that point, further induction of debt will cause the cost of capital to rise and market value of the stock to fall. Thus, through a judicious mix of debt and equity the firm can minimise overall cost of capital structure. After a certain point overall cost of capital begins to rise faster than the increase in earnings per share as a result of application of additional debt.

Simply, the traditional approach to valuation and leverage assumes that there is an optimal capital structure and that the firm can increase its value through leverage. This is a moderate view of the relationship between leverage and valuation that encompasses all the ground between the NOI approach and the NI approach. Thus the traditional approach is a combination of the NI and the NOI approach.

The major issues of the traditional approach are;

It is important to note that debt should exist in the capital structure only up to a specific point, beyond which, any increase in leverage would result in the reduction in value of the firm. Thus there exists an optimum value of debt to equity ratio at which the weighted average cost of capital (WACC) is the lowest and the market value of the firm is the highest (Thus there is a right combination of equity and debt in the capital structure, at which the market value of a firm is maximum (optimum capital structure))

Once the firm crosses that optimum value of debt to equity ratio, the cost of equity rises to give a detrimental effect to the WACC.

Traditional view with respect to optimal capital structure can better be appreciated by categorising the market reaction to leverage in three stages.

Stage I - As Financial Leverage (B/S) increases, K_d being cheaper than K_e, K_0 will decrease, and thus value of the firm will increase.

Stage II- As Financial Leverage (B/S) further increases, risk perception of equity holders increase, thus they demand higher return, i.e., K_e starts to increase, thus offsetting the advantage of cheaper K_d. Thus K_0 remains unchanged /constant.

Stage III- with further increase in Financial Leverage (B/S), K_d starts increasing along with K_e (As use of excessive debt hampers firm's repute and potential debt holders demand higher return) Thus K_0 will increase.

Following is the graphical representation of the traditional theory of capital structure.

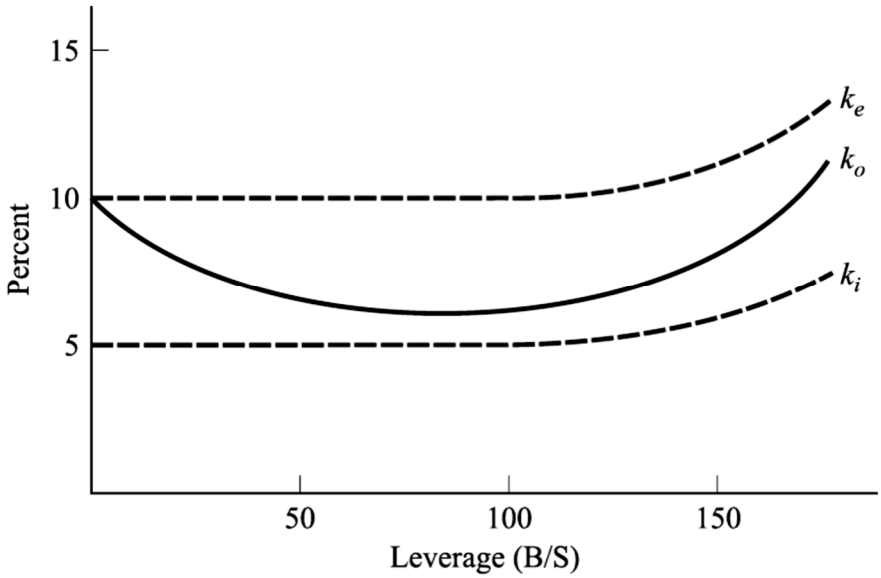


Figure 3: Traditional Approach

The shape of the graph can be explained as follows. Starting from a zero gearing level, as debt is progressively introduced into the capital structure, the cost of debt (K_d), at first remains unchanged, then

beyond a certain point it begins to increase. As more debt is added, the firm's financial risk increases and lenders will eventually begin to demand higher returns to compensate for the increased risk.

The cost of equity (K_e), can also be seen to increase as the level of financial gearing increases. This is because, in the traditionalists' view, as the level of gearing increases, the level of financial risk to which the equity holders are exposed also increases. Consequently, they will require higher returns.

The effect on the WACC is that it falls initially when debt is first introduced. This reflects the benefits of taking on lower cost debt. Eventually the WACC curve reaches a minimum point and then begins to increase when the cost of equity and the cost of debt begin to rise.

Gearing

Gearing refers to the relationship, or ratio, of a company's debt-to-equity (B/S, also referred as the D/E). Gearing shows the extent to which a firm's operations are funded by lenders versus shareholders—in other words, it measures a company's financial leverage. When the proportion of debt-to-equity is great, then a business may be thought of as being highly geared, or highly leveraged. Gearing can be thought of as leverage, where it is measured by various leverage ratios, such as the debt-to-equity (D/E) ratio.

If a company has high leverage ratios, it can be thought of as being highly geared.

The appropriate level of gearing for a company depends on its sector and the degree of leverage of its corporate peers.

As per definition a firm's gearing (or leverage) is the ratio of debt to equity finance in its capital structure.

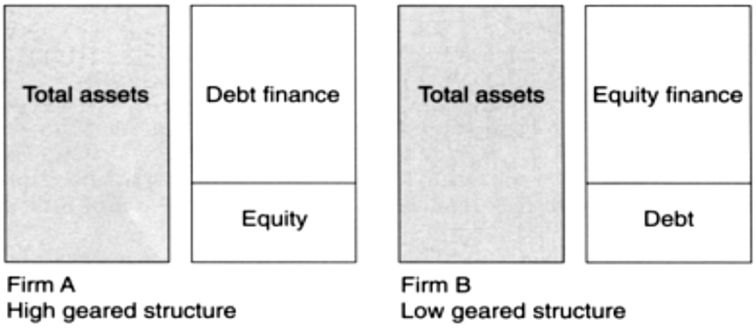
$$\text{Gearing} = \frac{\mathbf{M_v}}{\mathbf{M_v + M_e}} = \frac{\textbf{Market Value of Debt}}{\textbf{Market Value of Debt + Market Value of Equity}}$$

The gearing ratio is used to assess a firm's level of financial risk that is the risk of the firm not being able to pay its financial commitments. The level of financial risk is available that can be controlled by management, whereas the firm's business risk cannot be controlled by management and has to be accepted as given.

The level of business risk is determined by the firm's operating environment, the structure of its industry and so forth. Though these variables are beyond management's control it is imperative that the financial manager would be able to plan for economic downturns. As such, a company with excessive leverage, demonstrated by its high gearing ratio, could be more vulnerable to economic downturns than a company that's not as leveraged, because a highly leveraged firm must make interest payments and service its debt via cash flows, which could decline during a downturn. On the other hand, the risk of being highly leveraged works well during good economic times, as all of the excess cash flows accrue to shareholders once the debt has been paid down.

The following figure shows the Capital Structure of two firms (Firm A and Firm B).

Firm A's assets are financed by a high proportion of borrowings, which is debt finance, whereas by comparison Firm B is low geared, its assets are financed largely by equity.



Trading On Equity

A company may raise funds either by the issue of shares or by borrowings. Borrowings carry a fixed rate of interest and this interest is payable irrespective of fact whether there is profit or not. Of course, preference shareholders are also entitled to a fixed rate of dividend but payment of dividend is subject to the company earning profit after tax (available for dividend).

Trading on equity is a financial process in which debt in the capital structure results in gain for shareholders of a company. Trading on equity is said to happen when a company issues new debt (bonds, debentures, loans, bonds or preferred shares). The company uses these funds to gain assets which will create returns which are larger than the interest of these debts. Trading on equity is synonymous to financial leverage. Companies usually go this way to boost earnings per share.

'Trading on equity' is called so because the company gets its loan amount from the creditors based on its equity strength. Companies usually borrow funds at favourable terms by taking advantage of their equity. If the amount borrowed is large as compared to the company's equity, it is categorised as 'trading on thin equity.' When the borrowed amount is modest, the company is 'trading on thick equity.' The issue is to analyse the impact on the earnings per share. This helps in deciding whether funds should be raised by internal equity or by borrowings.

As the bottom line, we can view trading on equity as a sort of trade-off. A company uses its equity as a way to get more funds in order to purchase new assets, and uses these new assets to pay for its debt.

Example

A Company has the following capital structure.

Particulars	Rs
Equity Share Capital (Face Value – Rs 10 per share)	150000
8% Debentures	100000
	250000

The present EBIT is Rs. 50,000. The company is in 50% tax bracket. Show how the company can use more debt in the capital structure to produce higher return for the shareholders when the EBIT remain same.

Solution

Particulars	Rs
EBIT	50000
Less: Interest on Debentures (8% on 100000)	8000
Earnings Before Tax (EBT)	42000
Tax (@50%)	21000
Earnings After Tax (EAT)	21000
$EPS = \frac{EAT}{Number\ of\ Equity\ Shares} = \frac{21000}{15000} = 1.4$	
$return\ on\ equity = \frac{EAT}{Equity\ Share\ Capital} \times 100 = \frac{21000}{150000} \times 100 = 14\%$	

The company decides to make subtle changes in the capital structure by issuing more debenture and buy back some equity. After the adjustment the capital structure becomes

Particulars	Rs
Equity Share Capital (Face Value – Rs 10 per share)	100000
8% Debentures	150000
	250000

The EBIT remains at Rs 50000 and the tax rate is remains at 50%. Then

Particulars	Rs
EBIT	50000
Less: Interest on Debentures (8% on 150000)	12000
Earnings Before Tax (EBT)	38000
Tax (@50%)	19000
Earnings After Tax (EAT)	19000
$EPS = \frac{EAT}{Number\ of\ Equity\ Shares} = \frac{19000}{10000} = 1.9$	
$return\ on\ equity = \frac{EAT}{Equity\ share\ capital} \times 100 = \frac{19000}{100000} \times 100 = 19\%$	

It may be observed from the above hypothetical example that a company can increase the EPS (earnings per share) as well the return on equity (ROE) just by having proportionally more debt in the capital structure

which is also referred as 'financial leverage'[13] without any increase in the EBIT. Thus the company portrays to be more profitable without any real increase in the profits of the company.

LEVERAGE

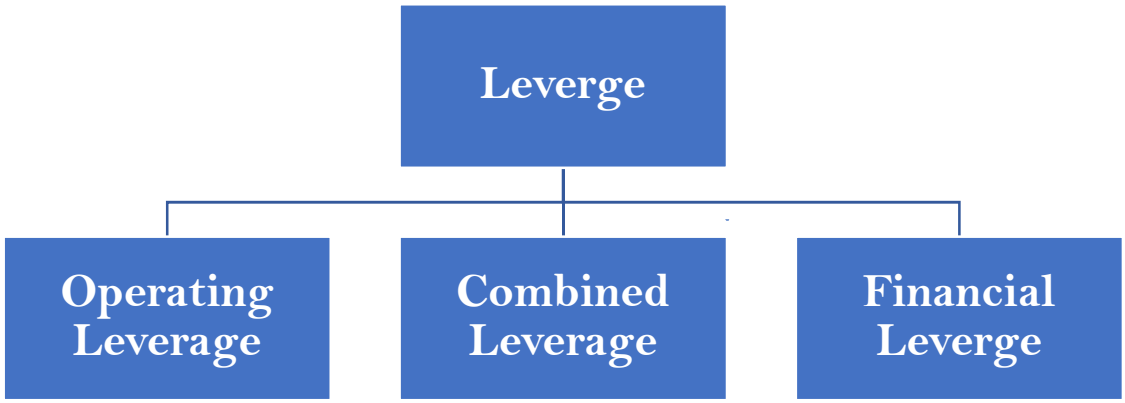
The term leverage refers to an increased means of accomplishing some purpose. Leverage is used to lifting heavy objects, which may not be otherwise possible.

From the financial point of view, leverage refers the ability to use fixed cost assets or funds to increase the return to its shareholders.

Definition of Leverage

James Horne[8] has defined leverage as, "the employment of an asset or fund for which the firm pays a fixed cost or fixed return".

Leverage can be classified into three major headings according to the nature of the finance mix of the company.



(note: Combined leverage may be considered as the sum total of operating leverage and financial leverage)

Operating Leverage

The leverage associated with investment activities is called as operating leverage. It is caused due to fixed operating expenses in the company. Operating leverage may be defined as the company's ability to use fixed operating costs to magnify the effects of changes in sales on its earnings before interest and taxes.

Operating leverage consists of two important costs viz., fixed cost and variable cost.

When the company is said to have a high degree of operating leverage if it employs a great amount of fixed cost and smaller amount of variable cost.

Thus, the degree of operating leverage depends upon the amount of various cost structure. Operating leverage can be determined with the help of a break even analysis.

[13] This is discussed in the next part of this study note.

Operating leverage can be calculated with the help of the following formula:

$$Degree\ of\ Operating\ Leverage\ = \frac{Contribution}{Operating\ Profit}$$

The degree of operating leverage may also be defined as percentage change in the profits resulting from a percentage change in the sales. It can be calculated with the help of the following formula:

$$Degree\ of\ Operating\ Leverage\ = \frac{Percentage\ Change\ in\ Profit}{Percentage\ Change\ in\ Sales}$$

Illustration

From the following selected operating data, determine the degree of operating leverage. Which company has the greater amount of business risk? Why?

	Company A Rs.	Company B Rs.
Sales	25,00,000	30,00,000
Fixed costs	7,50,000	15,00,000

Variable expenses as a percentage of sales are 50% for company A and 25% for company B.

Statement of Profit

	Company A Rs.	Company B Rs.
Sales	25,00,000	30,00,000
Variable cost	12,50,000	7,50,000
Contribution	12,50,000	22,50,000
Fixed cost	7,50,000	15,00,000
Operating Profit	5,00,000	7,50,000

$$\text{Operating Leverage} = \frac{\text{Contribution}}{\text{Operating Profit}}$$

$$\text{“A” Company Leverage} = \frac{12,50,000}{5,00,000} = 2.5$$

$$\text{“B” Company Leverage} = \frac{2,25,000}{7,50,000} = 3$$

Comments

Operating leverage for B Company is higher than that of A Company; B Company has a higher degree of operating risk. The tendency of operating profit may vary portionately with sales, is higher for B Company as compared to A Company.

Uses of Operating Leverage

- Operating leverage is one of the techniques to measure the impact of changes in sales which lead for change in the profits of the company. If any change in the sales, it will lead to corresponding changes in profit.
- Operating leverage helps to identify the position of fixed cost and variable cost.
- Operating leverage measures the relationship between the sales and revenue of the company during a particular period.
- Operating leverage helps to understand the level of fixed cost which is invested in the operating expenses of business activities.
- Operating leverage describes the overall position of the fixed operating cost.

Financial Leverage

Leverage arising from financing activities is called financial leverage.

Financial leverage represents the relationship between the company's earnings before interest and taxes (EBIT) or operating profit and the earning available to equity shareholders. Financial leverage is defined as "the ability of a firm to use fixed financial charges to magnify the effects of changes in EBIT on the earnings per share[8]". It involves the use of funds obtained at a fixed cost in the hope of increasing the return to the shareholders. It is also defined as "The use of long-term fixed interest-bearing debt and preference share capital along with share capital is called financial leverage or trading on equity".

Favourable financial leverage occurs when the company earns more on the assets purchased with the funds, then the fixed cost of their use. It is also referred as positive financial leverage. Financial leverage may be favourable or unfavourable depends upon the use of fixed cost funds. Unfavourable financial leverage occurs when the company does not earn as much as the funds cost. Hence, it is also referred as negative financial leverage.

Financial leverage can be calculated with the help of the following formula:

$$Degree\ of\ Financial\ Leverage\ = \frac{EBIT}{EBT} = \frac{Operating\ Profit}{Profit\ Before\ Tax}$$

Degree of financial leverage may also be defined as the percentage change in EPS as a result of percentage change in earnings before interest and tax (EBIT). This can be calculated by the following formula

$$Degree\ of\ Financial\ Leverage\ = \frac{Percentage\ Change\ in\ EPS}{Percentage\ Change\ in\ EBIT}$$

Illustration

A Company has the following capital structure.

	Rs.
Equity share capital	1,00,000
10% Prof. share capital	1,00,000
8% Debentures	1,25,000

The present EBIT is Rs. 50,000. Calculate the financial leverage assuring that the company is in 50% tax bracket.

Solution

Statement of Profit	Rs.
Earning Before Interest and Tax (EBIT) (or) Operating Profit	50,000
Interest on Debenture 1,25,000 × 8 × 100	10,000
Earning before Tax (EBT)	40,000
Income Tax	20,000
Profit	20,000

$$\text{Financial leverage} = \frac{\text{Operating Profit (OP)}}{\text{Profit Before Tax (PBT)}}$$

$$= \frac{50,000}{40,000} = 1.25$$

Uses of Financial Leverage

- Financial leverage helps to examine the relationship between EBIT and EPS.
- Financial leverage measures the percentage of change in taxable income to the percentage change in EBIT.
- Financial leverage locates the correct profitable financial decision regarding capital structure of the company.
- Financial leverage is one of the important devices which is used to measure the fixed cost proportion with the total capital of the company.
- If the firm acquires fixed cost funds at a higher cost, then the earnings from those assets, the earning per share and return on equity capital will decrease.

Illustration

XYZ Ltd. decides to use two financial plans and they need Rs. 50,000 for total investment.

Particulars	Plan A	Plan B
Debenture (interest at 10%)	40,000	10,000
Equity share (Rs. 10 each)	10,000	40,000
Total investment needed	50,000	50,000
Number of equity shares	4,000	1,000

The earnings before interest and tax are assumed at Rs. 5,000, and 12,500. The tax rate is 50%. Calculate the EPS.

Solution

/hen EBIT is Rs. 5,000

Particulars	Plan A	Plan B
Earnings before interest and tax (EBIT)	5,000	5,000
Less : Interest on debt (10%)	4,000	1,000
Earnings before tax (EBT)	1,000	4,000
Less : Tax at 50%	500	2,000
Earnings available to equity shareholders.	Rs.500	Rs.2,000
No. of equity shares	1,000	4,000
Earnings per share (EPS)	Rs. 0.50	Rs. 0.50
Earnings/No. of equity shares		

When EBIT is Rs. 12,500

Particulars	Plan A	Plan B
Earnings before interest and tax (EBIT).	12,500	12,500
Less: Interest on debt (10%)	4,000	1,000
Earning before tax (EBT)	8,500	11,500
Less : Tax at 50%	4,250	5,750
Earnings available to equity shareholders	4,250	5,750
No. of equity shares	1,000	4,000
Earning per share	4.25	1.44

Combined Leverage

When the company uses both financial and operating leverage to magnification of any change in sales into a larger relative changes in earning per share. Combined leverage is a combination of financial and operating leverage and is also known as composite leverage or total leverage.

Combined leverage expresses the relationship between the revenue in the account of sales and the taxable income.

Combined leverage can be calculated with the help of the following formulas:

$$Degree\ of\ Combined\ Leverage\ =\ DOL\ \times\ DFL$$

$$= \frac{Contribution}{Operating\ Profit} \times \frac{Operating\ Profit}{Profit\ Before\ Tax\ \ (EBIT)}$$

$$= \frac{Contribution}{Profit\ Before\ Tax\ (EBIT)}$$

The percentage change in a firm's earning per share (EPS) results from one percent change in sales. This is also equal to the firm's degree of operating leverage (DOL) times its degree of financial leverage (DFL) at a particular level of sales.

$$\text{Degree of Combined Leverage} = \frac{\textbf{Percentage Change in EPS}}{\textbf{Percentage Change in Sales}}$$

Illustration

Kumar company has sales of Rs. 25,00,000. Variable cost of Rs. 12,50,000 and fixed cost of Rs. 50,000 and debt of Rs. 12,50,000 at 8% rate of interest. Calculate combined leverage.

Solution

Statement of Profit

Sales		25,00,000
Less:	Variable cost	15,00,000
	Contribution	10,00,000
Less:	Fixed cost	5,00,000
	Operating Profit	5,00,000

Combined leverage = Operating leverage × Financial leverage

Calculation of financial leverage

$$\frac{\text{Contribution}}{\text{Operating Profit}} = \frac{10,00,000}{5,00,000} = 2$$

Calculation of financial leverage

Earning before Interest and Tax (EBIT)	5,00,000
Less: Interest on Debenture (8% of 12,50,000)	1,00,000
Earnings before Tax	4,00,000

$$\text{Operating leverage} = \frac{\text{Operating Profit}}{\text{Earning Before Tax}} = \frac{5,00,000}{4,00,000} = 1.25$$

Combined leverage = 2 × 1.25 = 2.5

Illustration

Calculate the Degree of Operating Leverage (DOL), Degree of Financial Leverage (DFL) and the Degree of Combined Leverage (DCL) for the following firms and interpret the results.

	Firm K	Firm L	Firm M
1. Output (Units)	60,000	15,000	1,00,000
2. Fixed costs (₹)	7,000	14,000	1,500
3. Variable cost per unit (₹)	0.20	1.50	0.02
4. Interest on borrowed funds (₹)	4,000	8,000	—
5. Selling price per unit (₹)	0.60	5.00	0.10

Solution

X	Firm K	Firm L	Firm M
Output (Units)	60,000	15,000	1,00,000
Selling Price per unit (₹)	0.60	5.00	0.10
Variable Cost per unit	0.20	1.50	0.02
Contribution per unit (₹)	0.40	3.50	0.08
Total Contribution (Unit × Contribution per unit) (₹)	₹ 24,000	₹ 52,500	₹ 8,000
Less: Fixed Costs (₹)	7,000	14,000	1,500
EBIT (₹)	17,000	38,500	6,500
Less : Interest (₹)	4,000	8,000	—
Profit before Tax (P.B.T.) (₹)	13,000	30,500	6,500
Degree of Operating Leverage = $\frac{\text{Contribution}}{\text{EBIT}}$	$\frac{24,000}{17,000}$	$\frac{52,500}{38,500}$	$\frac{8,000}{6,500}$
	=1.41	=1.38	=1.23
Degree of Financial Leverage = $\frac{\text{EBIT}}{\text{PBT}}$	$\frac{17,000}{13,000}$	$\frac{38,500}{30,500}$	$\frac{6,500}{6,500}$
	=1.31	=1.26	=1.00
Degree of Combined Leverage = $\frac{\text{Contribution}}{\text{PBT}}$	$\frac{24,000}{13,000}$	$\frac{52,500}{30,500}$	$\frac{8,000}{6,500}$
	=1.85	=1.72	= 1.23

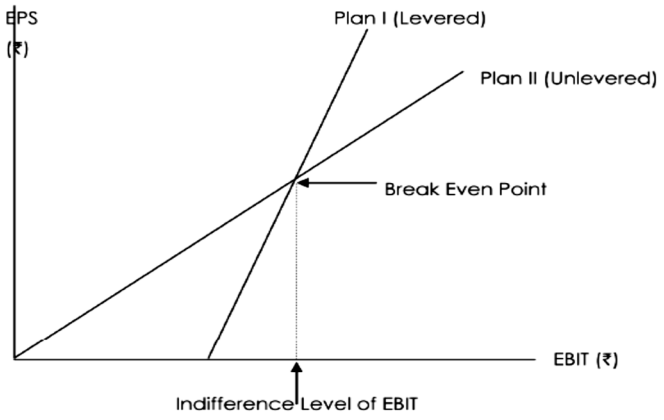
Interpretation

X Corporation has estimated that for a new product its break-even point is 2,000 units if the items are sold for Rs 14 per unit; the Cost Accounting department has currently identified variable cost of Rs 9 per unit. Calculate the degree of operating leverage for sales volume of 2,500 units and 3,000 units. What do you infer from the degree of operating leverage at the sales volumes of 2,500 units and 3,000 units and their difference if any?

EBIT – EPS indifference point

The indifference level of EBIT is one at which the EPS remains same irrespective of the debt-equity mix. While designing a capital structure, a firm may evaluate the effect of different financial plans on the level of EPS, for a given level of EBIT. Out of several available financial plans, the firm may have two or more financial plans which result in the same level of EPS for a given EBIT. Such a level of EBIT at which the

firm has two or more financial plans resulting in same level of EPS, is known as indifference level of EBIT.



For calculation of the indifference point

	EPS under Plan I (100% equity)	EPS under Plan II (Debt Plan)	EPS under Plan III (Preference Capital)
EPS	$\frac{EBIT(1-t)}{N_a}$	$\frac{EBIT-I(1-t)}{}$	$\frac{EBIT(1-t)-P.D.}{N_c}$

Where EBIT = Earnings before interest and taxes
t = Corporate tax rate
N_a = $N_b = N_c$ = No. of equity shares under different plans.
Where Plan I = 100% equity
Plan II = Debt plan
Plan III = Preference Capital

Illustration [EBIT – EPS (indifference point)]

ABC Ltd. wants to raise Rs 5,00,000 as additional capital. It has two mutually exclusive alternative financial plans. The current EBIT is Rs 17,00,000 which is likely to remain unchanged. The relevant Information is –Present Capital Structure: 3,00,000 Equity shares of Rs 10 each and 10% Bonds of Rs 20,00,000.

Tax Rate:	50%
Current EBIT:	₹ 17,00,000
Current EPS:	₹ 2.50
Current Market Price:	₹ 25 per share
Financial Plan I:	20,000 Equity Shares at ₹ 25 per share.
Financial Plan II:	12% Debentures of ₹ 5,00,000.

What is the indifference level of EBIT? Identify the financial Break-even levels

Solution

Particulars	Financial Plan I - Equity	Financial Plan II - Debt
Owner's Funds	(3,00,000×10+20,000×25) = ₹ 35,00,000	3,00,000×10 = ₹ 30,00,000
Borrowed Funds (given)	₹ 20,00,000	20,00,000+5,00,000 = ₹ 25,00,000
Total Capital Employed	₹ 55,00,000	₹ 55,00,000

Particulars	Financial Plan I	Financial Plan II
EBIT (let it be ₹X)	X	X
Less: Interest	20,00,000×10% = ₹ 2,00,000	(20,00,000×10%+5,00,000×12%)= ₹ 2,60,000
EBT	X—2,00,000	X—2,60,000
Less: Tax at 50%	½X-1,00,000	½X-1,30,000
EAT	½X-1,00,000	½X-1,30,000
Number of Equity Shares	3,00,000+20,000=3,20,000	(given) 3,00,000
EPS	[½X-1,00,000]÷3,20,000	[½X-1,30,000]÷3,00,000

MCQs

A. Cost of Capital

1. Which of the following best defines the Cost of Capital?
   a) Total expenses incurred by a company in a fiscal year
   b) Opportunity cost of funds employed by a firm in its operations
   c) Total market value of a company's equity
   d) Amount of capital raised through debt financing

Answer: b) Opportunity cost of funds employed by a firm in its operations

2. The Weighted Average Cost of Capital (WACC) is used as the discount rate for:
   a) Equity financing
   b) Debt financing
   c) All types of financing
   d) Evaluating investment projects

Answer: d) Evaluating investment projects

3. The cost of debt for a company is usually:
   a) Equal to the interest rate on its outstanding debt
   b) Higher than the cost of equity
   c) Determined solely by the company's credit rating
   d) Lower than the cost of equity

Answer: d) Lower than the cost of equity

4. Which factor does NOT influence a company's Cost of Equity?
   a) Market interest rates
   b) Company's debt-to-equity ratio
   c) Company's tax rate
   d) Company's dividend policy

Answer: c) Company's tax rate

5. The cost of preferred stock is calculated as:
   a) Dividend per share divided by market price per share
   b) Dividend per share divided by par value per share
   c) Yield to maturity of the preferred stock
   d) Total dividends paid divided by total preferred stock outstanding

Answer: b) Dividend per share divided by par value per share

6. What do the weights represent in the Weighted Average Cost of Capital (WACC) calculation?
   a) Book value of each component
   b) Face value of each component
   c) Market value of each component relative to the company's total capital structure
   d) May be calculated on the basis of both a) and b)

Answer: d) May be calculated on the basis of both a) and b)

7. What is a limitation of using the Cost of Capital for decision-making?
   a) It does not account for the time value of money
   b) It assumes a constant capital structure
   c) It is difficult to calculate
   d) It ignores market conditions and investor expectations

Answer: b) It assumes a constant capital structure

8. Which cost of capital component is usually considered tax-deductible for the company?
   a) Cost of Equity
   b) Cost of Debt
   c) Cost of Retained Earnings
   d) Cost of Preferred Stock

Answer: b) Cost of Debt

9. In the context of the Cost of Capital, what does the term "marginal cost of capital" refer to?
   a) The cost of raising additional funds for a new investment project
   b) The cost of debt financing for a specific project
   c) The average cost of all types of capital used by the company
   d) The cost of equity financing for a specific project

Answer: a) The cost of raising additional funds for a new investment project

B. Capital Structure and Leverage

10. What is the primary focus of financial leverage?
    a. Operating risk
    b. Market risk
    c. Financial risk
    d. Regulatory risk

11. Wich of the following is NOT one of the four theories of capital structure mentioned in the material?
    a. Traditional approach
    b. Modigliani-Miller approach
    c. Net income approach
    d. Dividend discount model approach

12. What is the formula to calculate the degree of financial leverage (DFL)?
    a. (Change in EPS) ÷ (Change in EBIT)
    b. (Change in EBIT) ÷ (Change in Sales Revenue)
    c. (EBIT÷EBT)
    d. (EBIT ÷Total Sales)

13. What does the Net Operating Income (NOI) approach suggest about the relationship between financial leverage and the cost of capital?
    a. Financial leverage is irrelevant to the cost of capital
    b. Financial leverage decreases the cost of capital
    c. Financial leverage increases the cost of capital
    d. Financial leverage has no impact on the cost of debt

14. What is the primary implication of high operating leverage?
    a. Greater variability in operating income
    b. Decreased profitability
    c. Lower fixed costs
    d. Increased variable costs

15. Which approach suggests that an optimal capital structure exists?
    a. Net Income Approach
    b. Traditional Approach
    c. Net Operating Income Approach
    d. Modigliani-Miller Approach

16. How does the traditional approach view the relationship between leverage and valuation?
    a. There is no relationship
    b. There is an inverse relationship
    c. There is a direct relationship
    d. The relationship is complex and nonlinear

17. What is the primary concern of financial management according to the material?
    a. Maximizing shareholder wealth
    b. Maximizing employee satisfaction
    c. Maximizing market share
    d. Maximizing revenue

Answers

1	2	3	4	5	6	7	8	9
b	d	d	c	b	d	b	b	a
10	11	12	13	14	15	16	17	18
c	d	a	a	a	b	b	a	

Numerical MCQs (for self-assessment)

18. ABC Ltd. has a total debt of Rs 500,000 and equity of Rs 1,000,000. If the market value of equity is Rs 1,500,000, what is the debt-to-equity ratio?
    a. 0.5
    b. 1
    c. 1.5
    d. 2

19. XYZ Inc. has a total asset of Rs 2,000,000 financed with Rs 800,000 of debt and Rs 1,200,000 of equity. If the firm's EBIT is Rs 500,000 and interest expense is Rs 50,000, what is the degree of financial leverage?
    a. 1.5
    b. 2
    c. 2.5
    d. 3

20. The total assets of LMN Corporation are Rs 5,000,000, and its debt-equity ratio is 0.6. What is the value of the firm's debt?
    a. Rs 2,000,000
    b. Rs 3,000,000
    c. Rs 2,500,000
    d. Rs 3,500,000

21. DEF Ltd. has a net income of Rs 400,000 and total assets of Rs 2,000,000. If its debt-to-equity ratio is 0.8, what is the return on equity (ROE)?
    a. 20%
    b. 25%
    c. 30%
    d. 35%

22. Company PQR has Rs 1,000,000 in assets, Rs 600,000 in equity, and Rs 400,000 in debt. If the firm's EBIT is Rs 200,000 and the interest expense is Rs 50,000, what is the degree of operating leverage?
    a. 1.5
    b. 2
    c. 2.5
    d. 3

UNIT 3: INVESTMENT DECISION

Table of Contents

INTRODUCTION

Capital budgeting is the process that companies use for decision making on capital projects. This is a fundamental area of knowledge for financial analysts for many reasons.

- Sound capital budgeting decisions ultimately decide the future of many corporations. Capital decisions cannot be reversed at a low cost, so mistakes are very costly.
- the principles of capital budgeting have been adapted for many other corporate decisions.
- the valuation principles used in capital budgeting are similar to the valuation principles used in security analysis and portfolio management.
- Since capital budgeting information is not ordinarily available outside the company, the analyst will have to be more careful to estimate the process. Further analysts may be able to appraise the quality of the company's capital budgeting process—for example, on the basis of whether the company has an accounting focus or an economic focus.

IMPORTANCE OF CAPITAL BUDGETING

1. **Large Investment**: Capital budgeting decision involves large investment of funds. But the funds available with the firm are always limited and the demand for funds far exceeds the resources. Hence it is very important for a firm to plan and control its capital expenditure
2. **Long Term Commitment of Funds**: capital expenditures involve not only large amount of funds but also funds for long term or permanent basis. The long term commitments of funds increases, the financial risk involved in the investment decision. Greater the risk involved, greater is need for careful planning of capital expenditure i.e. Capital Budgeting.
3. **Irreversible Nature**: The Capital expenditure decision is of irreversible nature. Once the decision for acquiring a permanent asset is taken, it becomes very difficult to dispose of these assets without incurring heavy losses.
4. **Long term Effect on profitability**: Capital budgeting decisions have a long term and significant effect on the profitability of a concern. Not only the present earnings of the firm are effected by the investments in capital asserts but also the future growth and profitability of the firm depends upon the investment decision taken today. An unwise decision may prove disastrous and fatal to the very existence of the concern.
5. **Difficulties of investment Decisions**: The long term investment decision are difficult to be taken because decision extends to a series of years beyond the current accounting period, uncertainties of future, higher degree of risk.

THE CAPITAL BUDGETING PROCESS

The specificity of the capital budgeting process depends on the manager's level in the organization, the size and complexity of the project being evaluated, and the size of the organization. As such the steps in general are as follows;

1. **Generating Ideas**—Investment ideas can come from anywhere, from the top or the bottom of the organization, from any department or functional area, or from outside the company.
2. **Analyzing Individual Proposals**—This step involves gathering the information to forecast cash flows for each project and then evaluating the project's profitability.
3. **Planning the Capital Budget**—The company must organize the profitable proposals within the company's overall strategies, and it also must consider the projects' timing. Scheduling and prioritizing of projects is important
4. **Monitoring and Post-auditing**—In a post-audit, actual results are compared to planned or predicted results, and any differences must be explained.

TYPES OF CAPITAL BUDGETING DECISIONS

The categories for analysis are:

1. **Replacement projects**. These are among the easier capital budgeting decisions. If a piece of equipment breaks down or wears out, whether to replace it may not require careful analysis. Some of the replacement decisions involve replacing existing equipment with newer, more efficient equipment, or perhaps choosing one type of equipment over another.
2. **Expansion projects**. Instead of merely maintaining a company's existing business activities, expansion projects increase the size of the business. These expansion decisions may involve more uncertainties than replacement decisions, and these decisions will be more carefully considered.
3. **New products and services**. These investments expose the company to even more uncertainties than expansion projects. These decisions are more complex and will involve more people in the decision-making process.
4. **Regulatory, safety, and environmental projects.** These projects are frequently required by a governmental agency, an insurance company, or some other external party. They may generate no revenue and might not be undertaken by a company maximizing its own private interests.
5. **Other**. The projects above are all susceptible to capital budgeting analysis, and they can be accepted or rejected using the net present value (NPV) or some other criterion. Some projects escape such analysis. These are either pet projects of someone in the company (such as the CEO buying a new aircraft) or so risky that they are difficult to analyze by the usual methods (such as some research and development decisions).

BASIC PRINCIPLES OF CAPITAL BUDGETING

Capital budgeting relies on just a few basic principles. Capital budgeting usually uses the following assumptions:

1. **Decisions are based on cash flows**. The decisions are not based on accounting concepts, such as net income. Furthermore, intangible costs and benefits are often ignored because, if they are real, they should result in cash flows at some other time.
2. **Timing of cash flows is crucial**. It is important that analysts are able to identify precisely when cash flows occur.
3. **Cash flows are based on opportunity costs**. What are the incremental cash flows that occur with an investment compared to what they would have been without the investment?
4. **Cash flows are analysed on an after-tax basis**. Taxes must be fully reflected in all capital budgeting decisions.
5. **Financing costs are ignored**. This may seem unrealistic, but it is not. Most of the time, analysts want to know the after-tax operating cash flows that result from a capital investment. Then, these after-tax cash flows and the investment outlays are discounted at the "required rate of return" to find the net present value (NPV). Financing costs are reflected in the required rate of return. If we included financing costs in the cash flows and in the discount rate, we would be double-counting the financing costs.

6. **Capital budgeting cash flows** are not accounting net income. Accounting net income is reduced by noncash charges such as accounting depreciation.

SOME ISSUES

Some important capital budgeting concepts that managers find very useful are given below.

- A **sunk cost** is one that has already been incurred. One cannot change a sunk cost. Today's decisions, on the other hand, should be based on current and future cash flows and should not be affected by prior, or sunk, costs.
- An **opportunity cost** is what a resource is worth in its next-best use.
- An **incremental cash flow** is the cash flow that is realized because of a decision: the cash flow with a decision minus the cash flow without that decision. If opportunity costs are correctly assessed, the incremental cash flows provide a sound basis for capital budgeting.
- An **externality** is the effect of an investment on other things besides the investment itself. Frequently, an investment affects the cash flows of other parts of the company, and these externalities can be positive or negative. If possible, these should be part of the investment decision. Sometimes externalities occur outside of the company. An investment might benefit (or harm) other companies or society at large, and yet the company is not compensated for these benefits (or charged for the costs). *Cannibalization* is one externality.

  Cannibalization occurs when an investment takes customers and sales away from another part of the company.
- **Conventional cash flows versus nonconventional cash flows**—A conventional cash flow pattern is one with an initial outflow followed by a series of inflows. In a nonconventional cash flow pattern, the initial outflow is not followed by inflows only, but the cash flows can flip from positive to negative again (or even change signs several times). An investment that involved outlays (negative cash flows) for the first couple of years that were then followed by positive cash flows would be considered to have a conventional pattern. If cash flows change signs once, the pattern is conventional. If cash flows change signs two or more times, the pattern is nonconventional.

Several types of project interactions make the incremental cash flow analysis challenging. The following are some of these interactions:

- **Independent projects versus mutually exclusive projects**—Independent projects are projects whose cash flows are independent of each other. Mutually exclusive projects compete directly with each other. For example, if Projects A and B are mutually exclusive, you can choose A or B, but you cannot choose both. Sometimes there are several mutually exclusive projects, and you can choose only one from the group.
- **Project sequencing**—Many projects are sequenced through time, so that investing in a project creates the option to invest in future projects. For example, you might invest in a project today and

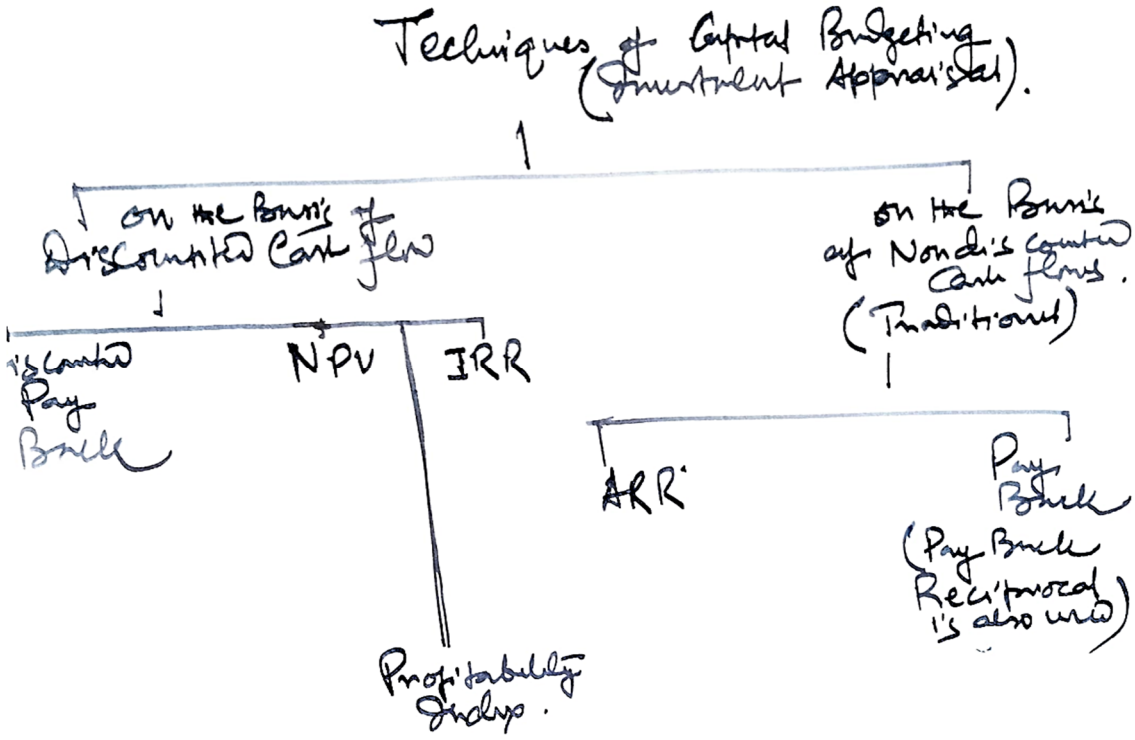
then in one year invest in a second project if the financial results of the first project or new economic conditions are favourable. If the results of the first project or new economic conditions are not favourable, you do not invest in the second project.

- **Unlimited funds** versus **capital rationing**—An unlimited funds environment assumes that the company can raise the funds it wants for all profitable projects simply by paying the required rate of return. Capital rationing exists when the company has a fixed amount of funds to invest. If the company has more profitable projects than it has funds for, it must allocate the funds to achieve the maximum shareholder value subject to the funding constraints.

TECHNIQUES OF CAPITAL BUDGETING

For financial appraisal of the project / investment proposals different techniques are used. These methods or techniques can broadly be categorized into two groups –

1. Non-Discounted Cash Flow Methods
2. Discounted Cash Flow Methods



Non-Discounted Cash Flow methods consider the cash flows over the life of the projects similarly. In other words, here it is assumed that cash flows in different time periods do not have any time value and hence are directly additive. These methods are categorized as

1. Accounting or Average Rate of Return (ARR)
2. Payback Period:
   a. Traditional Payback Period
   b. Payback Reciprocal

Discounted Cash Flow methods - cash flows, as such, do not occur over different time periods are not directly additive as they involve time value of money. Hence, before making any analysis, one has to convert them into cash flows at the same parlance i.e. either compounded cash flows or discounted cash flows. This is more realistic and in this case the cash flows are to be converted into their present values and then the analysis is proceeded.

Depending upon a few other project specific considerations these methods can be as follows:

1. Discounted Pay Back Period
2. Net Present Value (NPV)
3. Profitability Index or Benefit Cost Ratio
4. Internal Rate of Return (IRR)

Accounting or Average Rate of Return (ARR)

ARR can be calculated as follows:

$$\text{Accounting or Average Rate of Return (ARR)} = \frac{\textbf{\textit{Average Annual Profit after Tax}}}{\textbf{Average Investment}} \times 100$$

Decision Rules:

1. Acceptance/Rejection Decision: A project is accepted if it generates returns higher than the target/cut off ARR.
2. Mutually Exclusive Decision: The project which gives the highest ARR over the minimum required rate of return, is acceptable.

Advantages

- It is simple to understand.
- It is easy to operate and compute.
- Income throughout the project life is considered.
- In this method the net income after depreciation is used, therefore it is theoretically sound.

Limitations

- It does not consider cash inflows (CFAT), which is important in project evaluation rather than PAT.
- It ignores time value of money, which is important in capital budgeting decisions.

EXAMPLE 8.8 Consider the following investment:

Initial investment	$6,500
Estimated life	20 years
Cash inflows per year	$1,000
Depreciated per year (using straight line)	$325

The accounting rate of return for this project is:

$$\text{ARR} = \frac{\text{net income}}{\text{investment}} = \frac{\$1{,}000 - \$325}{\$6{,}500} = 10.4\%$$

If *average* investment (usually assumed to be one-half of the original investment) is used, then:

$$\text{ARR} = \frac{\$1{,}000 - \$325}{\$3{,}250} = 20.8\%$$

The *advantages* of this method are that it is easily understandable, simple to compute, and recognizes the profitability factor.

The *shortcomings* of this method are that it fails to recognize the time value of money, and its uses accounting data instead of cash flow data.

Payback Period Method

The basic type is the traditional payback period which is defined as a traditional or non-time value adjusted technique based on cash flow rather than profit. In other words, here numerical values of benefits i.e., cash flow are added over the years directly i.e., without discounting them.

- *Definition of Pay Back Period (PBP):*

  Pay-back period is the period required by the firm to recover the original investment from the net cash flows of an investment project. It is basically an application of the 'break-even' concept to investment.

- *Determination of PBP:* the formula for determining the pay back is given as;

$$Pay\ Back\ Period\ = \frac{\textbf{Cost of Investment}}{\textbf{Annual Cash flow}}$$

The annual cash flows as given in the above formula may be either *even* or *uneven*

The calculations are simple when the cash inflows are even; the cash flows occur at regular intervals and the amount is also the same.

Illustration

A project requires an initial investment of Rs. 3,00,000. It yields annual cash inflow of Rs. 60,000 for 8 years. You are required to find out the pay-back period of the project.

Solution:

$$\text{Pay Back Period} = \frac{\textbf{Cost of Investment}}{\textbf{Annual Cash flow}} = \frac{300000}{60000} = \mathbf{5\ years}$$

Cash flows are not even

Here PBP is determined at that point of time when cumulative cash flow becomes equal to the initial investment. Generally simple interpolation technique is used for this purpose.

EXAMPLE 8.5 Assume:

Cost of investment	$18,000
Annual after-tax cash savings	$ 3,000

Then, the payback period is:

$$\text{Payback period} = \frac{\text{initial investment cost}}{\text{increased revenues or lost savings}} = \frac{\$18{,}000}{\$3{,}000} = 6 \text{ years}$$

Decision rule: Choose the project with the shorter payback period. The rationale behind this choice is: The shorter the payback period, the less risky the project, and the greater the liquidity.

EXAMPLE 8.6 Consider two projects whose after-tax cash inflows are not even. Assume each project costs $1,000.

	Cash Inflow	
Year	**A ($)**	**B ($)**
1	100	500
2	200	400
3	300	300
4	400	100
5	500	
6	600	

When cash inflows are not even, the payback period has to be found by trial and error. The payback period of project A is ($1,000 = $100 + $200 + $300 + $400) 4 years. The payback period of project B is ($1,000 = $500 + $400 + $100):

$$2 \text{ years} + \frac{\$100}{\$300} = 2\tfrac{1}{3} \text{ years}$$

Project B is the project of choice in this case, since it has the shorter payback period.

Illustration

A project requires an initial investment of Rs. 300000. It yields cash inflow of Rs. 60 000, Rs. 50000, Rs. 70000, Rs.75000, Rs. 90000, Rs. 60000 for next 6 years. You are required to find out the pay-back period of the project.

Solution:

If cumulative cash flow is calculated, it can be identified that Rs. 300000 is achieved in between 4th and 5th year. By simple interpolation the PBP can be calculated as follows:

$$\frac{PBP-4}{5-4} = \frac{300000-255000}{345000-255000}$$

Or, PBP = 4.5 years.

Decision Rules:

- Acceptance/ Rejection Decision: A project is accepted only if the PBP is lower than the target PBP set by the management.
- Mutually Exclusive Decision: The project with least PBP should be accepted.

Some Critical Issues:

- better method than Accounting Rate of Return, it may mislead the decision maker in a number of situations.
- For example, if the projects differ significantly in terms of the investment size, then it is very likely that the larger project will have higher PBP than the smaller one.
- if the projects differ in terms of life, then again accepting a project with lower PBP may not be a wise decision, if the other one is having a longer life after PBP where the profit potential is likely to be better.

In order to overcome the above limitations, traditional PBP method should not be used blindly but should be supplemented by some other criteria.

An extension of traditional PBP may be suggested.

Payback Reciprocal: It is the reciprocal of Payback Period, i.e., 1÷ Pay Back Period. Therefore,

$$\text{Payback Reciprocal} = \frac{\textbf{Average Annual Net Cash Inflow after Taxes (i.e.CFAT p.a)}}{\textbf{Initial Investment}}$$

Higher the payback reciprocal, better is the project.

The Payback Reciprocal is considered to be an approximation of the Internal Rate of Return (IRR), if-

- *The life of the project is at least twice the payback period and*
- *The project generates equal amount of the annual cash inflows.*

Illustration

A project with an initial investment of Rs.50 Lakh and life of 10 years, generates CFAT of Rs.10 Lakh per annum. Calculate the Payback Reciprocal.

Solution:

The Payback Reciprocal will be Rs.10 Lakhs ÷ Rs. 50 Lakhs = 1/5 or 20%.

Discounted Payback Period

Discounted Payback Period is the payback period calculated on the basis of discounted cash flows, i.e., present value of cash flows, over the life of the project. This is determined based on the same principles as in case of Traditional Payback Period with the improvement over the consideration of time value of money. The procedure for computation of Discounted Payback Period is as follows:

- Determine the Total Cash Outflow of the project. (Initial Investment)
- Determine the Cash Inflow after Taxes (CFAT) for each year.
- Determine the present value of net cash inflow after taxes (CFAT) = CFAT of each year x PV Factor for that year.
- Determine the cumulative present value of CFAT of every year.
- Find out the Discounted Payback Period as the time at which cumulative DCFAT equals Initial Investment. This is calculated on "time proportion basis" (usually following simple interpolation method).

EXAMPLE 8.7 You invest $40,000 and receive the following cash inflows.

Year	Cash Inflow	PV Factor	Present Value	Accumulated Present Value
1	$15,000	0.909	$13,635	$13,635
2	20,000	0.826	16,520	30,155
3	28,000	0.751	21,028	51,183

The discounted payback period is calculated as follows:

$$\$30,155 + \frac{\$40,000 - \$30,155}{\$51,183 - \$40,000} = 2 \text{ years} + 0.47 \text{ years} = 2.47 \text{ years}$$

Illustration

X Ltd. is considering a project with following cash flow patter.

Year	1	2	3	4	5
CIAT (Rs.)	10000	15000	20000	25000	20000

Initial investment of the project is Rs. 60000 and cost of capital is 10%. Calculate DPBP.

Solution:

Calculation for DPBP

Year	CFAT (Rs.)	PVIF @ 10%	PV of CFAT	Cumulative PV
1	10000	0.909	9090	9090
2	15000	0.826	12390	21480
3	20000	0.751	15020	36500
4	25000	0.683	17075	53575
5	20000	0.621	12420	65995

Initial investment of Rs. 60000 is recovered along with the interest cost of fund in between 4th and 5th year. We apply simple interpolation to get

$$\frac{DPBP-4}{5-4} = \frac{60000-53575}{65995-53575}$$

Or, DPBP - 4 = 0.52

Or DPBP = 4.52 years

Net Present Value

For a project with one investment outlay, made initially, the net present value (NPV) is the present value of the future after-tax cash flows minus the investment outlay, or

$$NPV = \sum_{t=1}^{n} \frac{CF_t}{(1+r)^t} - \text{Outlay} \qquad (1)$$

where

CF_t = after-tax cash flow at time t
r = required rate of return for the investment
Outlay = investment cash flow at time zero

Illustration

Assume that Gerhardt Corporation is considering an investment of €50 million in a capital project that will return after-tax cash flows of €16 million per year for the next four years plus another €20 million in Year 5. The required rate of return is 10 percent.

For the Gerhardt example, the NPV would be[1]

$$NPV = \frac{16}{1.10^1} + \frac{16}{1.10^2} + \frac{16}{1.10^3} + \frac{16}{1.10^4} + \frac{20}{1.10^5} - 50$$

$$NPV = 14.545 + 13.223 + 12.021 + 10.928 + 12.418 - 50$$

$$NPV = 63.136 - 50 = €13.136 \text{ million.}$$

The investment has a total value, or present value of future cash flows, of €63.136 million. Since this investment can be acquired at a cost of €50 million, the investing company is giving up €50 million of its wealth in exchange for an investment worth €63.136 million. The investor's wealth increases by a net of €13.136 million.

Because the NPV is the amount by which the investor's wealth increases as a result of the investment, the decision rule for the NPV is as follows:

Invest if	NPV > 0
Do not invest if	NPV < 0

Positive NPV investments are wealth-increasing, whereas negative NPV investments are wealth-decreasing.

Many investments have cash flow patterns in which outflows may occur not only at time zero, but also at future dates. It is useful to consider the NPV to be the present value of all cash flows:

$$NPV = CF_0 + \frac{CF_1}{(1+r)^1} + \frac{CF_2}{(1+r)^2} + \cdots + \frac{CF_n}{(1+r)^n}, \text{ or}$$

$$NPV = \sum_{t=0}^{n} \frac{CF_t}{(1+r)^t} \qquad (2)$$

EXAMPLE 8.9 Consider the following investment:

Initial investment	$12,950
Estimated life	10 years
Annual cash inflows	$3,000
Cost of capital (minimum required rate of return)	12%

Present value of the cash inflows is

$PV = A \cdot PVIFA = \$3{,}000 \times PVIFA_{12\%,10}$ $= \$3{,}000\ (5.6502)$	$16,950.60
Initial investment (I)	12,950.00
Net present value (NPV = PV – I)	$ 4,000.60

Since the NPV of the investment is positive, the investment should be accepted.

The *advantages* of the NPV method are that it obviously recognizes the time value of money and it is easy to compute whether the cash flows form an annuity or vary from period to period.

Internal Rate of Return

The internal rate of return (IRR) is one of the most frequently used concepts in capital budgeting and in security analysis.

For a project with one investment outlay, made initially, the *IRR is the discount rate that makes the present value of the future after-tax cash flows equal that investment outlay.* Written out in equation form, the IRR solves this equation:

$$\sum_{t=1}^{n} \frac{CF_t}{(1 + IRR)^t} = \text{Outlay}$$

where IRR is the internal rate of return. The left-hand side of this equation is the present value of the project's future cash flows, which, discounted at the IRR, equals the investment outlay. This equation will also be seen rearranged as:

$$\sum_{t=1}^{n} \frac{CF_t}{(1 + IRR)^t} - \text{Outlay} = 0$$

In the Gerhardt Corporation example, we want to find a discount rate that makes the total present value of all cash flows, the NPV, equal zero. In equation form, the IRR is the discount rate that solves this equation:

$$-50 + \frac{16}{(1 + IRR)^1} + \frac{16}{(1 + IRR)^2} + \frac{16}{(1 + IRR)^3} + \frac{16}{(1 + IRR)^4} + \frac{20}{(1 + IRR)^5} = 0$$

We *calcualte* to find

IRR = 19.52%

The decision rule for the IRR is to invest if the IRR exceeds the required rate of return for a project:

Invest if	IRR > r
Do not invest if	IRR < r

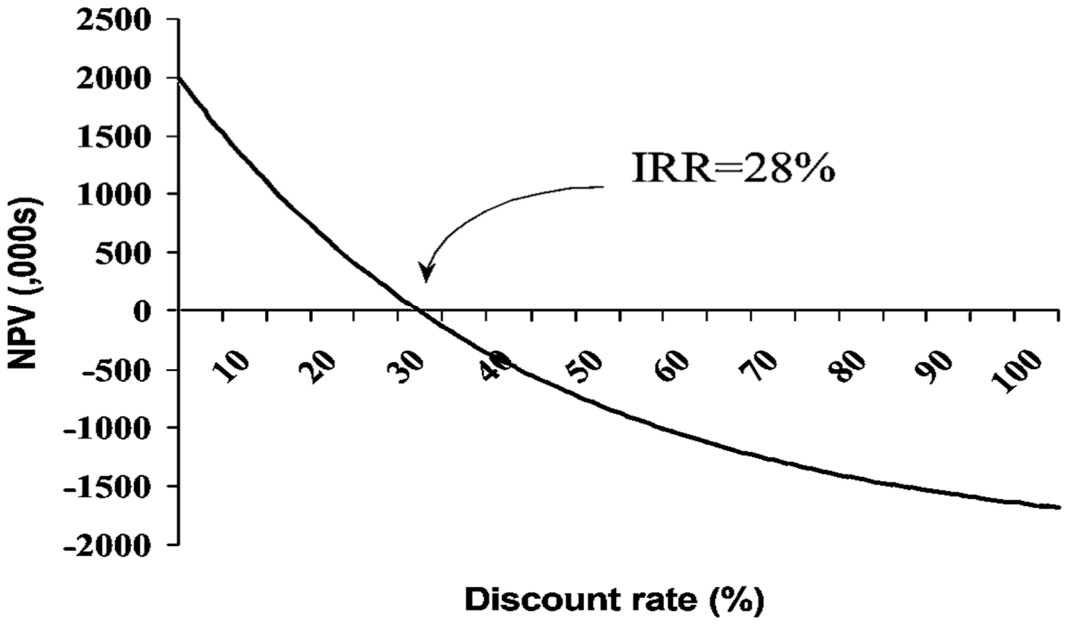
In the Gerhardt example, since the IRR of 19.52 percent exceeds the project's required rate of return of 10 percent, Gerhardt should invest.

Illustration

You can purchase a turbo powered machine tool gadget for $4,000. The investment will generate $2,000 and $4,000 in cash flows for two years, respectively. What is the IRR on this investment?

$$NPV = -4{,}000 + \frac{2{,}000}{(1 + IRR)^1} + \frac{4{,}000}{(1 + IRR)^2} = 0$$

$$IRR = 28.08\%$$

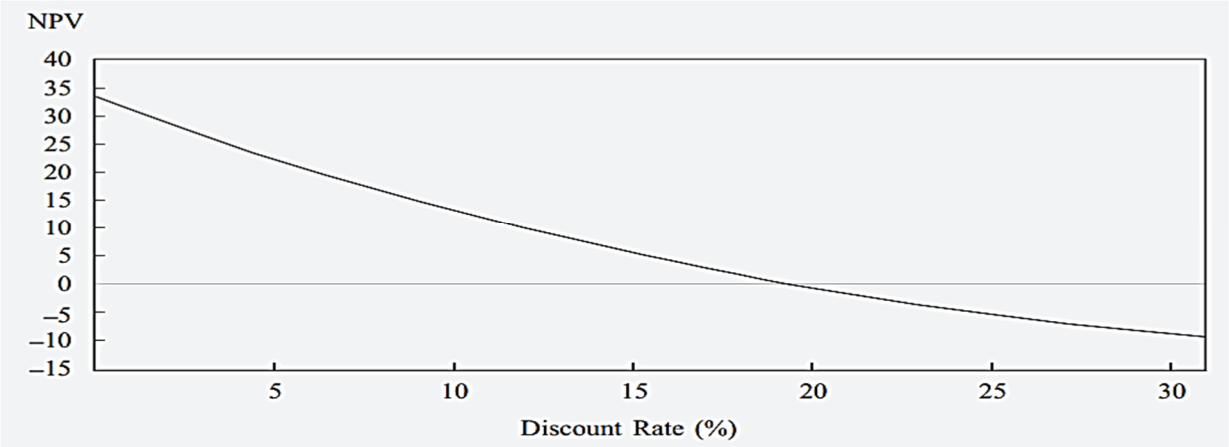


NPV Profile

The NPV profile shows a project's NPV graphed as a function of various discount rates. Typically, the NPV is graphed vertically (on the y-axis), and the discount rates are graphed horizontally (on the x-axis). The NPV profile for the Gerhardt capital budgeting project is shown below;

Discount Rate (%)	NPV (€ Millions)
0	34.000
5.00	22.406
10.00	13.136
15.00	5.623
19.52	0.000
20.00	−0.543
25.00	−5.661
30.00	−9.954

The NPV Profile



Three interesting points on this NPV profile are where the profile goes through the vertical axis (the NPV when the discount rate is zero), where the profile goes through the horizontal axis (where the discount rate is the IRR), and the NPV for the required rate of return (NPV is €13.136 million when the discount rate is the 10 percent required rate of return).

Profitability Index

The profitability index (PI) is the present value of a project's future cash flows divided by the initial investment. It can be expressed as:

$$\text{PI} = \frac{\text{PV of future cash flows}}{\text{Initial investment}} = 1 + \frac{\text{NPV}}{\text{Initial investment}}$$

The PI is closely related to the NPV. The PI is the ratio of the PV of future cash flows to the initial investment, whereas an NPV is the difference between the PV of future cash flows and the initial investment. Whenever the NPV is positive, the PI will be greater than 1.0; conversely, whenever the NPV is negative, the PI will be less than 1.0. The investment decision rule for the PI is as follows:

Invest if	PI > 1.0
Do not invest if	PI < 1.0

The Gerhardt Corporation investment (discussed earlier) had an outlay of €50 million, a present value of future cash flows of €63.136 million, and an NPV of €13.136 million. The profitability index is

$$\text{PI} = \frac{\text{PV of future cash flows}}{\text{Initial investment}} = \frac{63.136}{50.000} = 1.26$$

The PI can also be calculated as

$$\text{PI} = 1 + \frac{\text{NPV}}{\text{Initial investment}} = 1 + \frac{13.136}{50.000} = 1.26$$

Because the PI > 1.0, this is a profitable investment.

RANKING CONFLICTS BETWEEN NPV AND IRR

- For a single conventional project, the NPV and IRR will agree on whether to invest or to not invest.
- For independent, conventional projects, no conflict exists between the decision rules for the NPV and IRR.
- However, in the case of two mutually exclusive projects, the two criteria will sometimes disagree. For example, Project A might have a larger NPV than Project B, but Project B has a higher IRR than Project A. In this case, should you invest in Project A or in Project B?

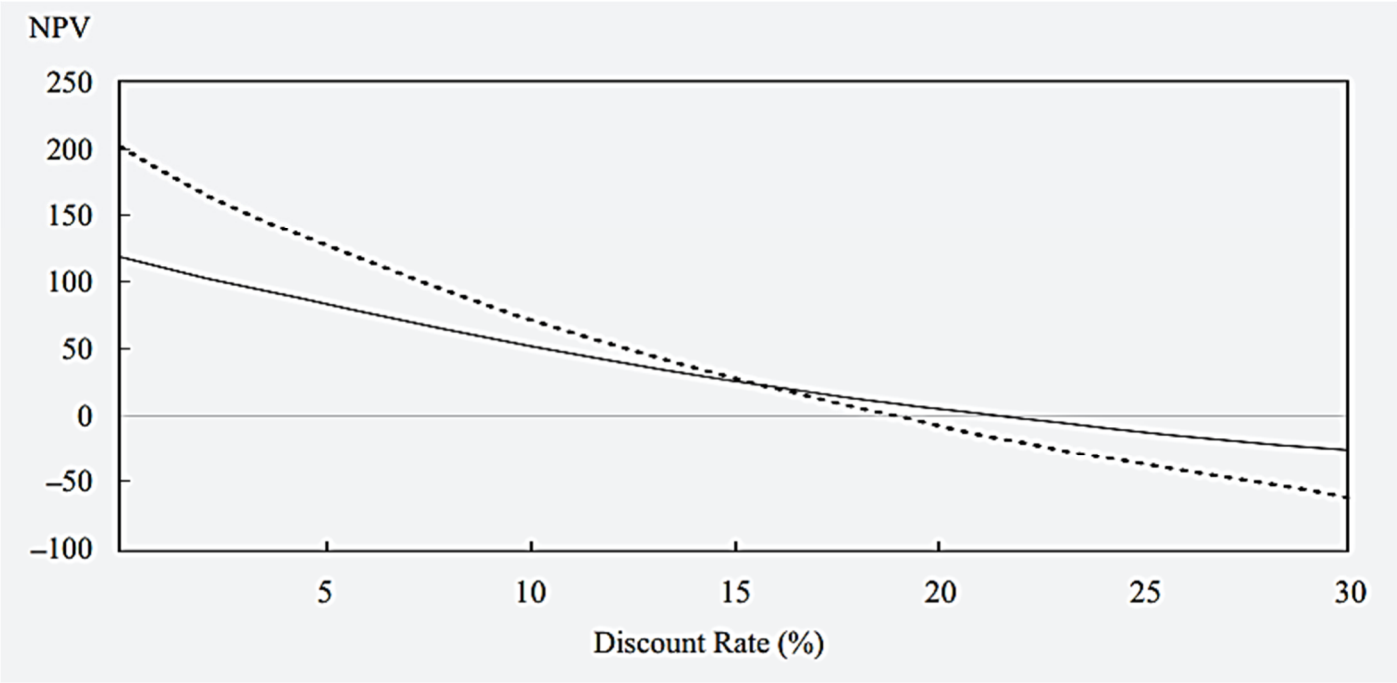
Ranking Conflict Due to Differing Cash Flow Patterns

Projects A and B have similar outlays but different patterns of future cash flows. Project A realizes most of its cash payoffs earlier than Project B. The cash flows, as well as the NPV and IRR for the two projects, are shown in the below mentioned Table. For both projects, the required rate of return is 10 percent

Illustration

	Cash Flows						
Year	**0**	**1**	**2**	**3**	**4**	**NPV**	**IRR (%)**
Project A	−200	80	80	80	80	53.59	21.86
Project B	−200	0	0	0	400	73.21	18.92

If the two projects were not mutually exclusive, you would invest in both because they are both profitable. However, you can choose either A (which has the higher IRR) or B (which has the higher NPV).



The NPV Profile

Project B (broken line) has the higher NPV for discount rates between 0 percent and 15.09 percent. Project A (solid line) has the higher NPV for discount rates exceeding 15.09 percent. The crossover point of 15.09 percent in Figure corresponds to the discount rate at which both projects have the same NPV (of 27.98). Project B has the higher NPV below the crossover point, and Project A has the higher NPV above it.

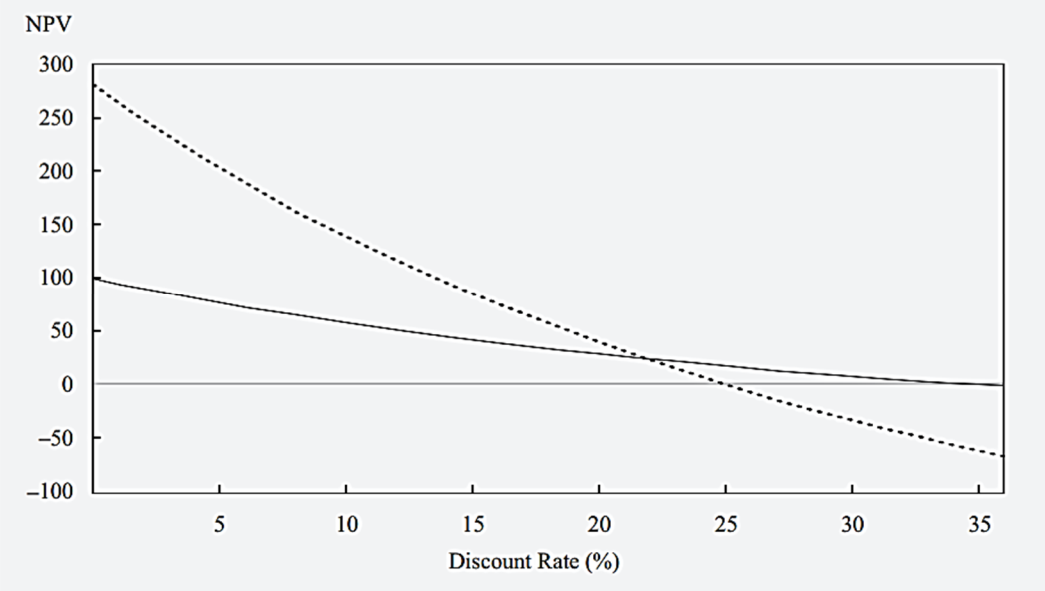
Whenever the NPV and IRR rank two mutually exclusive projects differently you should choose the project based on the NPV. Project B, with the higher NPV, is the better project because of the reinvestment assumption.

Ranking Conflicts due to Differing Project Scale

Project A has a much smaller outlay than Project B, although they have similar future cash flow patterns. The cash flows, as well as the NPVs and IRRs for the two projects, are shown in Table mentioned below. For both projects, the required rate of return is 10 percent.

	Cash Flows						
Year	**0**	**1**	**2**	**3**	**4**	**NPV**	**IRR (%)**
Project A	−100	50	50	50	50	58.49	34.90
Project B	−400	170	170	170	170	138.88	25.21

If they were not mutually exclusive, you would invest in both projects because they are both profitable. However, you can choose either Project A (which has the higher IRR) or Project B (which has the higher NPV).



The NPV Profile

Project B (broken line) has the higher NPV for discount rates between 0 percent and 21.86 percent. Project A has the higher NPV for discount rates exceeding 21.86 percent. The crossover point of 21.86 percent in above Figure corresponds to the discount rate at which both projects have the same NPV (of 25.00). Below the crossover point, Project B has the higher NPV, and above it, Project A has the higher NPV. When cash flows are discounted at the 10 percent required rate of return, the choice is clear—Project B, the larger project, which has the superior NPV.

The good news is that the NPV and IRR criteria will usually indicate the same investment decision for a given project. They will usually both recommend acceptance or rejection of the project. When the choice is between two mutually exclusive projects and the NPV and IRR rank the two projects differently, the NPV criterion is strongly preferred.

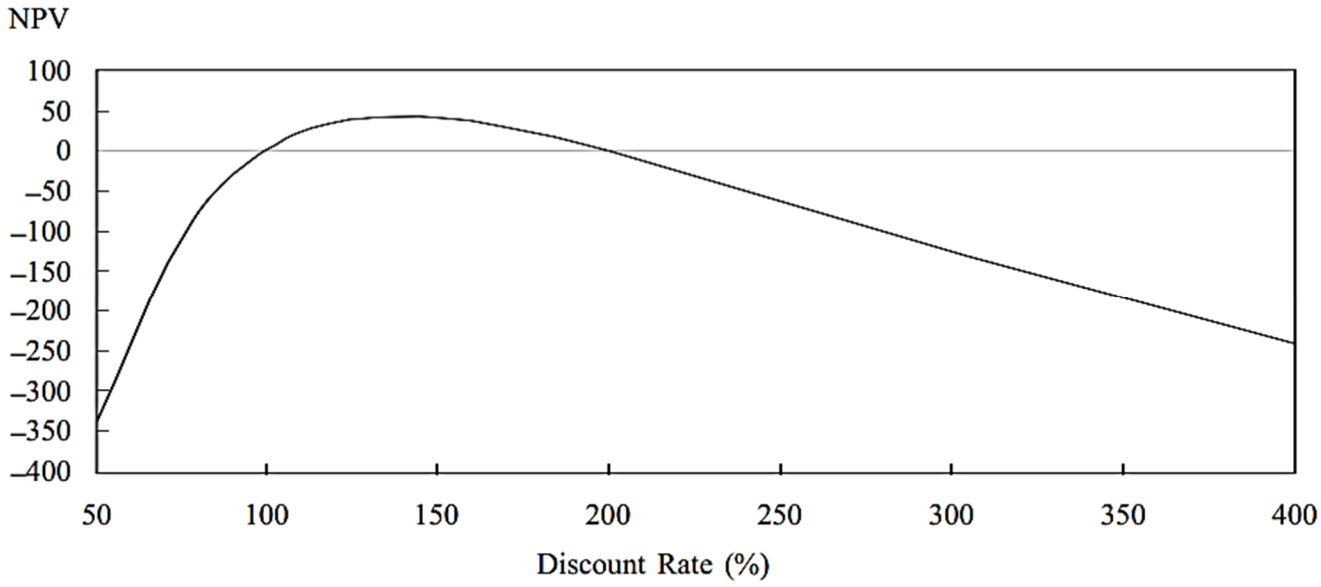
The Multiple IRR Problem and the No IRR Problem

A problem that can arise with the IRR criterion is the "multiple IRR problem." We can illustrate this problem with the following nonconventional cash flow pattern

Time	0	1	2
Cash flow	100	−300	250

The IRR for these cash flows satisfies this equation:

$$100 + \frac{-300}{(1 + \text{IRR})^1} + \frac{250}{(1 + \text{IRR})^2} = 0$$



The NPV Profile

It is important to note that

NPV criterion is a preferred criterion for Investment Appraisal

CAPITAL BUDGETING UNDER RISK

While dealing with risk and uncertainties in capital investment decisions, a financial manager, resorts to various alternative techniques based on the principle stated above. Some of the important techniques are:

1. Certainty Equivalent Approach
2. Risk Adjusted Discount Rate
3. Probability distribution

These techniques are discussed in detail as follows.

Certainty Equivalent Approach

Under this approach, the estimated cash flows over the life of the proposed project, i.e., risky cash flows, are converted to their certainty equivalent. Certainty equivalent of estimated cash flow will indicate the cash flows that are likely to be received with almost certainty (certain cash flows or riskless cash flows). The certainty equivalent cash flows are then discounted with the risk-free rate of discount (as the risk adjustment has already been made) to arrive at their present value and make a decision on the acceptance of the project under consideration.

The certain cash flows are derived through multiplying the estimated risky cash flows of the future periods by Certainty Equivalent Co-efficient of the respective periods. Certainty Equivalent Co-efficient is calculated based on the risk perceived by the decision maker.

- If, for example, the finance manager feels that he would rather have a certain inflow of Rs.10000 in the second year of a project than an inflow of Rs.20000 with 0.75 probability and Rs.30000 with a probability of 0.25. The certainty equivalent of the uncertain cash flow which has an expected value of (20000×0.75 + 30000×0.25) = Rs.22500 is Rs.10000. Hence, the certainty equivalent coefficient of the cash flows based on risk return preferences of the manager is 10000/22500 = 0.44.
- The Certainty Equivalent Coefficient (CEC) ranges between 0 and 1.
- The higher the coefficient, the higher is the confidence of the management on the forecasted cash flows.
- A CEC of unity indicates that the management is completely certain about the cash flows to be realized.
- On the extreme a CEC of zero will indicate that the management is highly doubtful about the realization of the cash flows. Generally,
- The basic steps involved are:
    1. Estimate the projects cash flows (CF_t)
    2. By multiplying estimated project cash flows (CF_t) with Certainty Equivalent Coefficient (say, α_t), determine the certainty equivalent cash flows ($\alpha_t \times CF_t$)
    3. Calculate the total PV of certainty equivalent cash flows by applying the risk-free rate of return (r). Total PV = $\sum_{t=1}^{n} \frac{\alpha_t CF_t}{(1+r)^t}$
    4. Deduct the initial investment to calculate NPV.
    5. If NPV is positive, the project is acceptable.

Illustration

A financial manager is looking at a project proposal whose cost of capital is 10%. The project requires an initial investment of Rs.10 crore and provides cash inflows of Rs.20 crores and Rs.25 crores at the end of

first and second years. The life of the project is only 2 years and its salvage value is Nil. The management feels that the certainty equivalent coefficients are 0.85 and 0.75 for year 1 and 2 respectively. The risk-free rate of discount according to the analyst is 8%. Compute the certainty equivalent cash flows and advice on the project.

Solution:

Calculation of Certainty Equivalent Cash flows (Rs. in crore)

Year	Cash Inflows	CEC	CECF	PVIF @8%	PV of CF
1	20	0.85	17	0.926	15.742
2	25	0.75	18.75	0.857	16.069
Total PV of CF					31.811
Less: Initial Investment					10.000
NPV					21.811

As per the basic NPV criterion, the project is acceptable as its NPV is positive.

Risk Adjusted Discount Rate

The rationale, underlying this method is that all the projects undertaken by a firm should not be discounted at the same rate. The rate should be so chosen for each project that it reflects the risk characteristics of the project. If the risk of the project is similar to the existing projects, the weighted average cost of capital is used as the discounting rate. But, if the project involves higher or lower risk, a higher or lower discounting rate should be used for adjusting the risk involved. Such a revised discounting rate is called Risk Adjusted Discount (RAD) Rate.

The Risk Adjusted Discount rate (RAD), therefore, consists of three exponents.

- The risk-free rate of discount,
- the premium for the normal risk of the firm and the
- premium (whether positive and negative) for the extra or below normal risk of the project.

Symbolically, RADR (say, i) = r + u + a

Where,

- r = risk free rate
- u = the premium for normal risk of the firm
- a = the premium for the abnormal or subnormal risk of the project compared to the normal risk of the firm.

The first two components, taken together, constitute the weighted average cost of capital. In an uncertain environment, due to increase in the discount rate, present value of cash flows will be less and will reduce the value of NPV or IRR, etc.

The additional risk premium may be decided upon by the firm on a case-to-case basis, or a blanket rate may be decided for each class of investments.

For example, a firm may decide the discount rates for various categories of investments as follows:

Category of Investment	**Discount rate**
Replacement investments	Cost of capital + 2%
New projects	Cost of capital + 4%
Research and development investments	Cost of capital + 5%

Illustration

A firm is considering a replacement investment. The firm feels that the suitable discount rate for investment is cost of capital + 2%. Firm's cost of capital is 13%. The cash flows as projected by the company's analyst are as follows:

Initial outflow is Rs. 14 lakhs and expected cash inflow for 1-5 years is Rs. 2.54 lakhs and from 6-10 years is Rs. 3.14 lakhs. Calculate the NPV of the project.

Solution:

NPV = -14 + 2.54 x PVIFA (15,5) + 3.14 x PVIFA (15, 6-10)

= -14 + 2.54 x PVIFA (15,5) + 3.14 x PVIFA (15,5) x PVIF (15,5)

= -14 + 2.54 x 3.352 + 3.14 x 3.352 x 0.497

= (-) Rs. 0.255 lakhs

Since, NPV is negative, the project should not be accepted.

Note: Risk Adjusted Discounting rate (RADR) = cost of capital + 2% =13% + 2% = 15%

Probability Distributions

Expected values of a probability distribution may be computed. Before any capital budgeting method is applied, compute the expected cash inflows or, in some cases, the expected life of the asset.

EXAMPLE 9.2 A firm is considering a $30,000 investment in equipment that will generate cash savings from operating costs. The following estimates regarding cash savings and useful life, along with their respective probabilities of occurrence, have been made:

Annual Cash Savings ($)		Useful Life	
6,000	0.2	4 years	0.2
8,000	0.5	5 years	0.6
10,000	0.3	6 years	0.2

Then, the expected annual saving is:

$$\begin{aligned} \$6{,}000(0.2) &= \$1{,}200 \\ \$8{,}000(0.5) &= \quad 4{,}000 \\ \$10{,}000(0.3) &= \quad 3{,}000 \\ &\quad \underline{\$8{,}200} \end{aligned}$$

The expected useful life is:

$$\begin{aligned} 4(0.2) &= 0.8 \\ 5(0.6) &= 3.0 \\ 6(0.2) &= 1.2 \\ &\quad \underline{5 \text{ years}} \end{aligned}$$

The expected NPV is computed as follows (assuming a 10 percent cost of capital):

$$\begin{aligned} \text{NPV} = \text{PV} - \text{I} &= \$8{,}200(\text{PVIFA}_{10\%,5}) - \$30{,}000 \\ &= \$8{,}200(3.7908) - \$30{,}000 = \$31{,}085 - \$30{,}000 = \$1{,}085 \end{aligned}$$

The expected IRR is computed as follows: By definition, at IRR,

$$\begin{aligned} \text{I} &= \text{PV} \\ \$30{,}000 &= \$\ 8{,}200(\text{PVIFA}_{r,5}) \\ \text{PVIFA}_{r,5} &= \frac{\$30{,}000}{\$\ 8{,}200} = 3.6585 \end{aligned}$$

which is about halfway between 10 percent and 12 percent in Appendix D, so that we can estimate the rate to be ~11 percent. Therefore, the equipment should be purchased, since (1) NPV = $1,085, which is positive, and/or (2) IRR = 11 percent, which is greater than the cost of capital of 10 percent.

MCQs

1. Which of the following best defines capital budgeting?
   A. Managing short-term expenses
   B. Evaluating long-term investment projects
   C. Monitoring daily cash transactions
   D. Calculating monthly profits

Answer: B) Evaluating long-term investment projects

2. Which capital budgeting technique does not consider the time value of money?
   A. Net Present Value (NPV)
   B. Payback Period

C. Internal Rate of Return (IRR)
D. Profitability Index (PI)

Answer: B) Payback Period

3. What is the primary goal of capital budgeting analysis?
   A. Maximizing shareholder wealth
   B. Minimizing employee turnover
   C. Maximizing short-term profits
   D. Minimizing long-term investments

Answer: A) Maximizing shareholder wealth

4. Which method of capital budgeting focuses on the accounting profits generated by an investment?
   A. Net Present Value (NPV)
   B. Payback Period
   C. Accounting Rate of Return (ARR)
   D. Profitability Index (PI)

Answer: C) Accounting Rate of Return (ARR)

5. Which capital budgeting technique discounts all cash flows at a predetermined rate?
   A. Payback Period
   B. Net Present Value (NPV)
   C. Internal Rate of Return (IRR)
   D. Accounting Rate of Return (ARR)

Answer: B) Net Present Value (NPV)

6. What does the Internal Rate of Return (IRR) represent?
   A. The percentage return on investment
   B. The payback period of a project
   C. The accounting rate of return
   D. The time value of money

Answer: A) The percentage return on investment

7. Which capital budgeting method emphasizes the recovery of initial investment?
   A. Net Present Value (NPV)
   B. Payback Period
   C. Internal Rate of Return (IRR)
   D. Profitability Index (PI)

Answer: B) Payback Period

8. Which of the following is a limitation of the Payback Period method?
   A. It considers time value of money
   B. It accounts for all cash flows
   C. It ignores cash flows after payback
   D. It is easy to calculate

Answer: C) It ignores cash flows after payback

9. Which capital budgeting method may result in multiple IRRs for a project?
   A. Payback Period
   B. Net Present Value (NPV)
   C. Internal Rate of Return (IRR)
   D. Profitability Index (PI)

Answer: C) Internal Rate of Return (IRR)

10. What does the Profitability Index (PI) measure?
    A. Percentage return on investment
    B. Time taken to recover initial investment
    C. Present value of future cash flows
    D. Profit generated per dollar of investment

Answer: C) Present value of future cash flows

11. Which capital budgeting technique assumes reinvestment at the project's cost of capital?
    A. Payback Period
    B. Net Present Value (NPV)
    C. Internal Rate of Return (IRR)
    D. Profitability Index (PI)

Answer: B) Net Present Value (NPV)

12. Which of the following factors are typically considered in capital budgeting decisions?
    A. Short-term market trends
    B. Inflation rate
    C. Employee turnover
    D. Customer satisfaction

Answer: B) Inflation rate

13. Which capital budgeting technique is considered the most comprehensive?
    A. Payback Period
    B. Net Present Value (NPV)
    C. Accounting Rate of Return (ARR)
    D. Profitability Index (PI)

Answer: B) Net Present Value (NPV)

14. What is the main advantage of using Net Present Value (NPV) method?
    A. It is easy to understand
    B. It considers the time value of money
    C. It ignores future cash flows
    D. It doesn't require discounting cash flows

Answer: B) It considers the time value of money

15. Which capital budgeting method helps in ranking projects based on their return per dollar invested?
    A. Payback Period
    B. Net Present Value (NPV)
    C. Accounting Rate of Return (ARR)
    D. Profitability Index (PI)

Answer: D) Profitability Index (PI)

16. An asset costs Rs 2,10,000 with a Rs 30,000 salvage value at the end of its ten-year life. If annual cash inflows are Rs 30,000, the cash payback period is
    A. 8 years.
    B. **7 years**.
    C. 6 years.
    D. 5 years.

17.

B Company is considering the purchase of a piece of equipment that costs $23,000. Projected net annual cash flows over the project's life are:

Year	Net Annual Cash Flow
1	$3,000
2	8,000
3	15,000
4	9,000

The cash payback period is:
a) 2.63 years.
b) 2.80 years.
c) 2.37 years.
d) 2.20 years.

18. If a company's required rate of return is 10% and, in using the net present value method, a project's net present value is zero, this indicates that the
    A. Project's rate of return exceeds 10%.
    B. Project's rate of return is less than the minimum rate required.
    C. Project earns a rate of return of 10%.
    D. Project earns a rate of return of 0%.

19. When a capital budgeting project generates a positive net present value, this means that the project earns a return higher than the
    A. Internal rate of return.
    B. Annual rate of return.
    C. Required rate of return.
    D. Present value index

20. S. Company

S Company recently invested in a project with a 3-year life span. The initial investment was $15,060 and annual cash inflows were $7,000 for year 1; $8,000 for year 2; and $9,000 for year 3. The company expects a 15% required rate of return, information related to that is presented below. What is the net present value for the project?

Year	Present Value	Present Value of an Annuity
1	.870	.870
2	.756	1.626
3	.658	2.283

a) $15,264.
b) $3,000.
c) $9,744.
d) $12,000.

21. The present value index is computed by dividing the
    A. Total cash flows by the initial investment.
    B. **Present value of cash inflows by the initial investment**.
    C. Initial investment by the total cash flows.
    D. Initial investment by the present value of cash flows.

22. J Company

J Company has an 8% required rate of return. It's considering a project that would provide annual cost savings of $20,000 for 5 years. The most that Johnson would be willing to spend on this project is

Year	Present Value	Present Value of an Annuity
1	.926	.926
2	.857	1.783
3	.794	2.577
4	.736	3.312
5	.681	3.993

a) $50,364.
b) $66,240.
c) $79,860.
d) $13,620.

WORKING CAPITAL MANAGEMENT

INTRODUCTION

Working capital is the capital which is needed to meet the day-to-day transaction of the business concern. Normally working capital consists of various compositions of current assets such as inventories, bills, receivable, debtors, cash, and bank balance and prepaid expenses.

In financial literature working capital is defined as "any acquisition of funds which increases the current assets increase the Working Capital also for they are one and the same".

Meaning of Working Capital

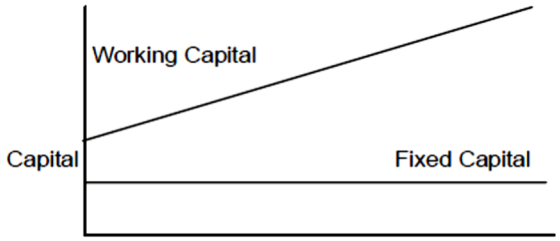
Working capital management is also one of the important parts of the financial management. It is concerned with short-term finance of the business concern which is a closely related trade-off between profitability and liquidity. Efficient working capital management leads to improve the operating performance of the business concern and it helps to meet the short term liquidity. Hence, study of working capital management is not only an important part of financial management but also are overall management of the business concern. Working capital is described as the capital which is not fixed but the more common uses of the working capital is to consider it as the difference between the book value of current assets and current liabilities.

Working capital, as such, is needed to meet the following purpose:

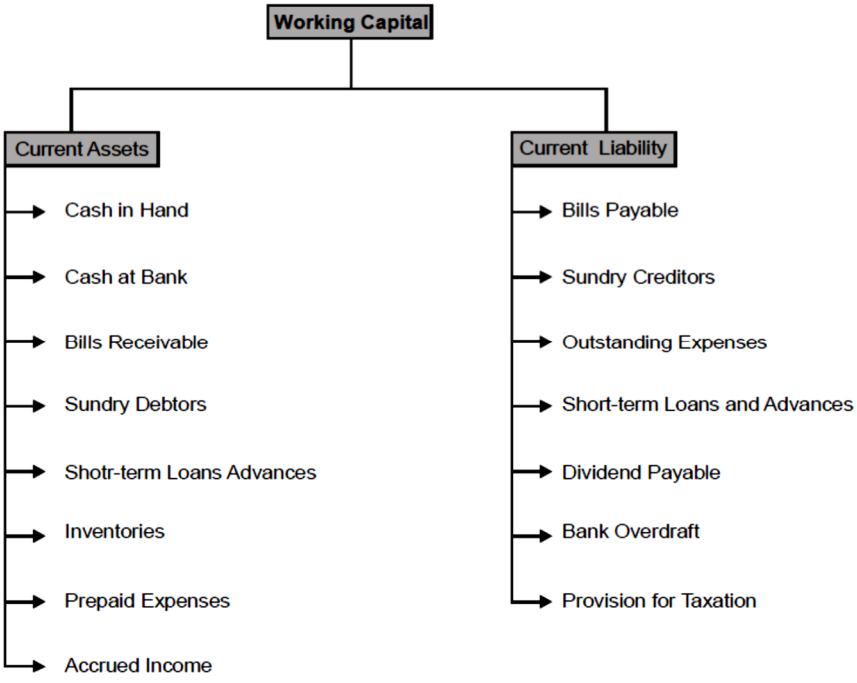
- Purchase of raw material
- Payment of wages to workers
- Payment of day-to-day expenses
- Maintenance expenditure etc.

Capital of the concern may be divided into two major headings.

1. Fixed capital means that capital, which is used for long-term investment of the business concern. For example, purchase of permanent assets. Normally it consists of non-recurring in nature.
2. Working Capital is another part of the capital which is needed for meeting day to day requirement of the business concern. For example, payment to creditors, salary paid to workers, purchase of raw materials etc., normally it consists of recurring in nature. It can be easily converted into cash. Hence, it is also known as short-term capital.

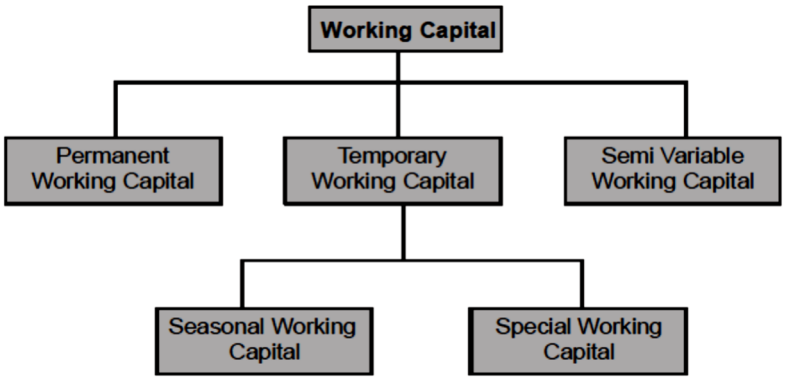


Components of Working Capital



Types of Working Capital

Working Capital may be classified into three important types on the basis of time



Permanent Working Capital

It is also known as Fixed Working Capital. It is the capital; the business concern must maintain certain amount of capital at minimum level at all times. The level of Permanent Capital depends upon the nature of the business. Permanent or Fixed Working Capital will not change irrespective of time or volume of sales.

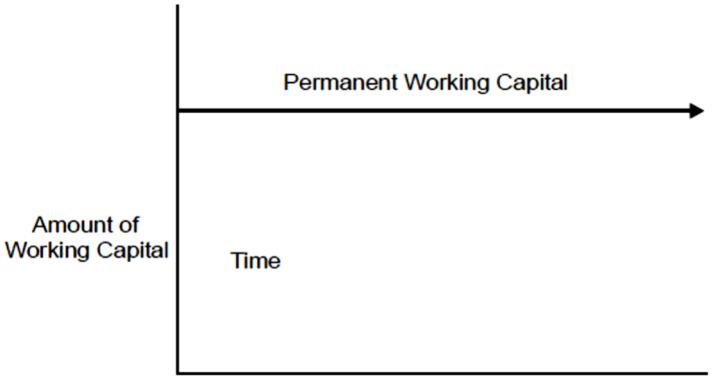
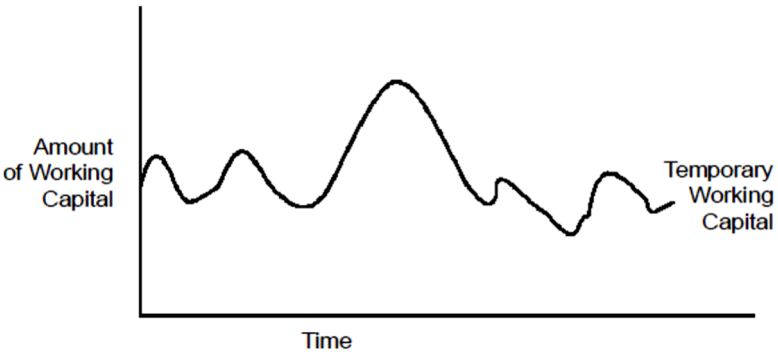


***Fig. 10.4** Permanent Working Capital*

Temporary Working Capital

It is also known as variable working capital. It is the amount of capital which is required to meet the Seasonal demands and some special purposes. It can be further classified into Seasonal Working Capital and Special Working Capital.

The capital required to meet the seasonal needs of the business concern is called as Seasonal Working Capital. The capital required to meet the special exigencies such as launching of extensive marketing campaigns for conducting research, etc.



Need of Working Capital

Working Capital is an essential part of the business concern. Every business concern must maintain certain amount of Working Capital for their day-to-day requirements and meet the short-term obligations.

Working Capital is needed for the following purposes.

1. Purchase of raw materials and spares**:** The basic part of manufacturing process is, raw materials. It should purchase frequently according to the needs of the business concern. Hence, every business concern maintains certain amount as Working Capital to purchase raw materials, components, spares, etc.
2. Payment of wages and salary**:** The next part of Working Capital is payment of wages and salaries to labour and employees. Periodical payment facilities make employees perfect in their work. So a business concern maintains adequate the amount of working capital to make the payment of wages and salaries.
3. Day-to-day expenses**:** A business concern has to meet various expenditures regarding the operations at daily basis like fuel, power, office expenses, etc.
4. Provide credit obligations**:** A business concern responsible to provide credit facilities to the customer and meet the short-term obligation. So the concern must provide adequate Working Capital.

Factors Determining Working Capital Requirements

Working Capital requirements depends upon various factors. There are no set of rules or formula to determine the Working Capital needs of the business concern. The following are the major factors which are determining the Working Capital requirements.

1. Nature of business**:** Working Capital of the business concerns largely depend upon the nature of the business. If the business concerns follow rigid credit policy and sell goods only for cash, they can maintain lesser amount of Working Capital. A transport company maintains lesser amount of Working Capital while a construction company maintains larger amount of Working Capital.
2. Production cycle**:** Amount of Working Capital depends upon the length of the production cycle. If the production cycle length is small, they need to maintain lesser amount of Working Capital. If it is not, they have to maintain large amount of Working Capital.

3. Business cycle**:** Business fluctuations lead to cyclical and seasonal changes in the business condition and it will affect the requirements of the Working Capital. In the booming conditions, the Working Capital requirement is larger and in the depression condition, requirement of Working Capital will reduce. Better business results lead to increase the Working Capital requirements.
4. Production policy**:** It is also one of the factors which affects the Working Capital requirement of the business concern. If the company maintains the continues production policy, there is a need of regular Working Capital. If the production policy of the company depends upon the situation or conditions, Working Capital requirement will depend upon the conditions laid down by the company.
5. Credit policy**:** Credit policy of sales and purchase also affect the Working Capital requirements of the business concern. If the company maintains liberal credit policy to collect the payments from its customers, they have to maintain more Working Capital. If the company pays the dues on the last date it will create the cash maintenance in hand and bank.
6. Growth and expansion**:** During the growth and expansion of the business concern, Working Capital requirements are higher, because it needs some additional Working Capital and incurs some extra expenses at the initial stages.
7. Availability of raw materials**:** Working Capital requirements depend on the availability of raw materials. Raw materials are the basic components of the production process. If the raw material is not readily available, it leads to production stoppage (Stock out). So, the concern must maintain adequate raw material; for that purpose, they have to spend some amount of Working Capital.
8. Earning capacity**:** If the business concern consists of high level of earning capacity, they can generate more Working Capital, with the help of cash from operation. Earning capacity is also one of the factors which determines the Working Capital requirements of the business concern.

Working Capital Management and Risk-Return Trade-off

The management of net working capital requires consideration for the trade-off between return and risk. Holding more current than fixed assets means a reduced liquidity risk**.** However, the rate of return will be less with current assets than with fixed assets.

Fixed assets typically earn a greater return than current assets.

Types of working capital policy

Broadly there are three distinct types of working capital policy which a company can adopt,

- an aggressive policy,
- a moderate policy or
- a conservative policy.

The type of policy relates to the firm's general approach to the investing and financing of its working capital needs.

Aggressive and conservative policies tend to represent the opposite ends of a spectrum of working capital policy options, with one somewhere in between the two variously described as a moderate policy.

The policies differ in their attitudes to both the investment in, and the financing of, current assets.

The more conservative in attitude the policy, the greater the level of investment in current assets and the greater the firm's reliance on long-term capital (in the form of debt or equity) to finance the investment in current assets.

Conversely, the more aggressive the working capital policy, the lower the level of investment in current assets, and the less is the firm's reliance on long-term capital to finance current assets.

The maturity matching principle

According to the maturity matching principle the financial manager should match the maturity term of the asset with the same maturity term of finance used to acquire the asset.

In other words, long-term assets are financed with long-term sources of finance and short-term assets are financed with short-term sources of finance. The maturity matching principle is also variously referred to as the self-liquidating or hedging principle. In finance, a hedging strategy is one that is used to minimise risk, thus the notion of 'hedging one's bets'. It is relevant here because following the hedging principle minimises the risk of the firm not being able to pay its financial obligations as they mature.

Computation (Estimation) of Working Capital

Working Capital requirement depends upon number of factors, which are already discussed in the previous parts. Now the discussion is on how to calculate the Working Capital needs of the business concern. It may also depend upon various factors but some of the common methods are used to estimate the Working Capital.

The requirement of working capital is

1. Either at a particular point of time
    a. Gross W/C
    b. Net W/C
2. On the basis of conversion cycle

Concepts of Working Capital (at a particular point of time)

Gross Working Capital

Gross Working Capital is the general concept which determines the working capital concept. Thus, the gross working capital is the capital invested in total current assets of the business concern. Gross Working Capital is simply called as the total current assets of the concern.

$$\boldsymbol{GWC = \Sigma CA}$$

Net Working Capital

Net Working Capital is the specific concept, which, considers both current assets and current liability of the concern. Net Working Capital is the excess of current assets over the current liability of the concern during a particular period. If the current assets exceed the current liabilities it is said to be positive working capital; it is reverse, it is said to be Negative working capital.

$$NWC = \Sigma CA - \Sigma CL$$

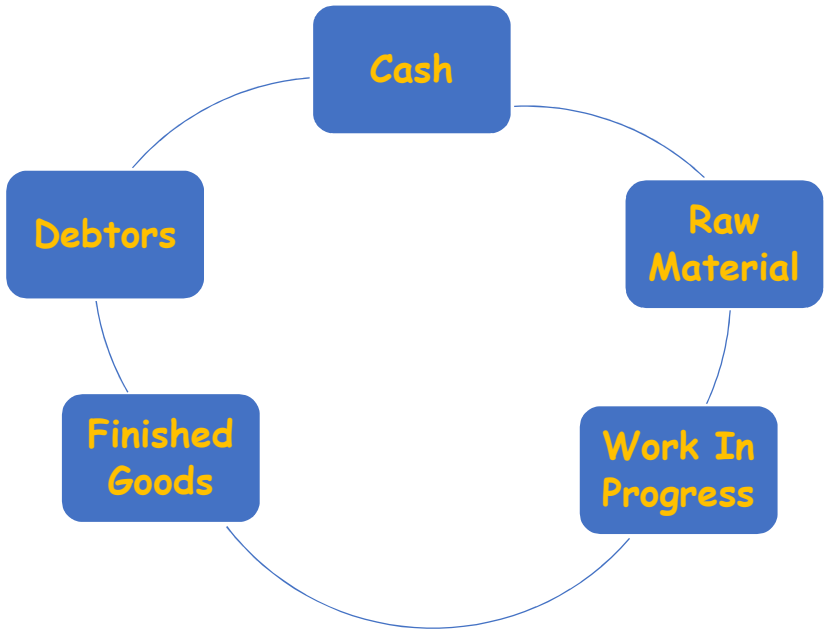
Working Capital (on the basis of Conversion Cycle)[1]

The working capital cycle is the length of time between the entity's outlay on raw materials, wages and other expenditures, and the inflow of cash from the sale of the goods. In a manufacturing entity, this is the average time that raw materials remain in inventory less the period of credit taken from suppliers plus the time taken for producing the goods plus the time the goods remain in finished inventory plus the time taken by customers to pay for the goods.

The working capital cycle can be calculated approximately as shown in the calculation below. Allowances should be made for any significant changes in the level of inventory taking place over the period. If, for example, the entity

is deliberately building up its level of inventory, this will lengthen the working capital cycle. A statement of how the working capital cycle (sometimes called the 'cash conversion period') might be worked is given below. Note that the individual day's figures can all be worked on a variety of different bases. The main thing is to select that basis which is most meaningful in each case and then to apply it consistently from year to year.

Computation of Operating Cycle



[1] Source: https://einvestingforbeginners.com/operating-cycle-cash-flow-csmit/

$$Gross\ operating\ cycle\ of\ the\ firm\ = \boldsymbol{RMCP + WIPCP + FGCP + RCP}$$

Where,

RMCP = Raw material conversion period

WIPCP = Work in progress conversion period

FGCP = Finished goods conversion period

RCP = Receivables conversion period

However, a firm may acquire some resources of credit and thus defer payments for some time. In this case we need to calculate the Net operating cycle.

$$Net\ operating\ cycle\ period^{2}$$
$$= Gross\ operating\ cycle\ period\ -\ Payable\ deferral\ period\ (DPO)$$

THE CASH CONVERSION CYCLE[3]

The Cash Conversion Cycle (CCC) is a metric that shows the amount of time it takes a company to convert its investments in inventory to cash. The conversion cycle formula measures the amount of time, in days, it takes for a company to turn its resource inputs into cash.

Cash Conversion Cycle = DIO + DSO – DPO

- $DIO\ =\ Days\ Inventory\ Outstanding$
- $DSO\ =\ for\ Days\ Sales\ Outstanding$
- $DPO\ =\ Days\ Payable\ Outstanding$

Days Inventory Outstanding (DIO)

DIO is the number of days, on average, it takes a company to turn its inventory into sales. Essentially, DIO is the average number of days that a company holds its inventory before selling it. The formula for days' inventory outstanding is as follows:

$$\text{DIO} = \frac{\textbf{Average Inventory}}{\textbf{Cost of Goods Sold}} \times \boldsymbol{365}$$

Example

Company A reported a Rs 1,000 beginning inventory and Rs 3,000 ending inventory for the fiscal year ended 2018 with Rs 40,000 cost of goods sold. The DIO for Company A would be:

$$\text{DIO} = \frac{\frac{(1000+3000)}{2}}{40000} \times \boldsymbol{365 = 18.25}$$

[2] Conceptually the Net Working Capital Cycle and the Cash Conversion cycle are used to mean the same thing.

[3] Source: https://corporatefinanceinstitute.com/resources/knowledge/accounting/cash-conversion-cycle/

Therefore, it takes this company approximately 18 days to turn its inventory into sales.

(it is important to note that the

$$\text{DIO} = \frac{365\ days\ or\ 52\ weeks\ or\ 12\ months^{4}}{Inventory\ Turnover}$$

$$\text{Where Inventory Turnover} = \frac{\text{Cost of Goods Sold}}{\text{Average Inventory}}$$

Inventory turnover is calculated as 'times' while DIO is calculated in days, weeks or months).

Days Sales Outstanding (DSO)

DSO is the number of days, on average, it takes a company to collect its receivables. Therefore, DSO measures the average number of days for a company to collect payment after a sale. The formula for days' sales outstanding is as follows:

$$\text{DSO} = \frac{\textbf{Average Accounts Receivable (Debtors+Bills Receivable)}}{\textbf{Total Credit Sales}} \times \boldsymbol{365}$$

Example

Company A reported Rs 4,000 in beginning accounts receivable and Rs 6,000 in ending accounts receivable for the fiscal year ended 2018, along with credit sales of Rs 1,20,000. The DSO for Company A would be:

$$\text{DSO} = \frac{\frac{(4000+6000)}{2}}{120000} \times \boldsymbol{365 = 15.20}$$

Therefore, it takes this company approximately 15 days to collect a typical invoice.

(it is important to note that the

$$\text{DSO} = \frac{365\ days\ or\ 52\ weeks\ or\ 12\ months^{5}}{Receivable\ Turnover^{6}}$$

$$\text{Where Inventory Turnover} = \frac{\textbf{Total Credit Sales}}{\textbf{Average Accounts Receivable (Debtors+BR)}}$$

Receivable Turnover is calculated as 'times' while DSO is calculated in days, weeks or months).

[4] This depends on the answer is sought. This may be in days, weeks or months.
[5] This depends on the answer is sought. This may be in days, weeks or months.
[6] The term 'Receivables' refers to the sum total of debtors and bills receivable.

Days Payable Outstanding (DPO)

DPO is the number of days, on average, it takes a company to pay back its payables. Therefore, DPO measures the average number of days for a company to pay its invoices from trade creditors, i.e., suppliers. The formula for days payable outstanding is as follows:

$$\text{DPO} = \frac{\textbf{Average Accounts Payable (Creditors+Bills Payable)}}{\textbf{Cost of Goods Sold}^{7}} \times \boldsymbol{365}$$

Example

Company A posted Rs 1,000 in beginning accounts payable and Rs 2,000 in ending accounts payable for the fiscal year ended 2018, along with Rs 65,000 in cost of goods sold. The DPO for Company A would be:

$$\text{DPO} = \frac{(1000+2000)\div 2}{65000} \times \boldsymbol{365} \;\; \boldsymbol{= 16.846 \text{ days}}$$

Therefore, it takes this company approximately 17 days to pay for its invoices.

(it is important to note that the

$$\text{DPO} = \frac{365 \textit{ days or } 52 \textit{ weeks or } 12 \textit{ months}}{\textit{Payable Turnover}^{8}}$$

$$\text{Where Payable Turnover} \;\; = \frac{\textbf{Cost of Goods Sold}}{\textbf{Average Accounts Payable (Creditors +Bills Payable)}}$$

Payable Turnover is calculated as 'times' while DPO is calculated in days, weeks or months).

Cash Conversion Cycle - Calculation

The Cash Conversion Cycle Formula = **DIO + DSO – DPO**.

We can break the cash cycle into three distinct parts:

- DIO,
- DSO, and
- DPO.

The first part, using days' inventory outstanding, measures how long it will take the company to sell its inventory. The second part, using days' sales outstanding, measures the amount of time it takes to collect cash from these sales.

The last part, using days payable outstanding, measures the amount of time it takes for the company to pay off its suppliers.

Therefore, the cash conversion cycle is a cycle where the company purchases inventory, sells the inventory on credit, and collects the accounts receivable and turns them into cash.

[7] Credit Purchase may be used in place of COGS (this is followed in some books)
[8] The term 'Payable' refers to the sum total of Creditors and Bills Payable.

Using the DIO, DSO, and DPO for Company A above, we find that our cash conversion cycle for Company A is:

$CCC^{9} = 18.25 + 15.20 - 16.846 = 16.604$

Therefore, it takes Company A approximately 17 days to turn its initial cash investment in inventory back into cash.

Interpreting the Cash Conversion Cycle

The cash conversion cycle formula is aimed at assessing how efficiently a company is managing its working capital. As with other cash flow calculations, the shorter the cash conversion cycle, the better the company is at selling inventories and recovering cash from these sales while paying suppliers.

The cash conversion cycle should be compared to companies operating in the same industry and conducted on a trend.

For example, measuring a company's conversion cycle to its cycles in previous years can help with gauging whether its working capital management is deteriorating or improving.

In addition, comparing the cycle of a company to its competitors can help with determining whether the company's cash conversion cycle is "normal" compared to industry competitors.

ILLUSTRATION

Illustration

From the following information extracted from the books of a manufacturing company, compute the operating cycle in days and the amount of working capital required:

Period Covered		365 days
Average period of credit allowed by suppliers	16 days	
Average Total of Debtors Outstanding	480	
Raw Material Consumption	4,400	
Total Production Cost	10,000	
Total Cost of Sales	10,500	
Sales for the year	16,000	
Value of Average Stock maintained:		
Raw Material		320
Work-in-progress		350
Finished Goods		260

[9] This is also referred as the Net Operating Cycle (NOC) based on the operating cycle concept of Working Capital.

Solution

Computation of Operating Cycle

(i) *Raw material held in stock:*

$$\frac{\text{Average stocks of raw materials held}}{\text{Average consumption per day}} = \frac{320}{4{,}400 \times 365}$$

$$= \frac{320 \times 365}{4{,}400} = 275 \text{ days}$$

Less: Average credit period granted by Suppliers $\frac{16 \text{ days}}{11 \text{ days}}$

(ii) *Work-in-progress:*

$$\frac{\text{Average WIP maintained}}{\text{Average cost of production per day}} = \frac{350}{10{,}000/365}$$

$$= \frac{365 \times 320}{10{,}000} = 13 \text{ days}$$

(iii) *Finished good held in stock:*

$$\frac{\text{Average finished goods maintained}}{\text{Average cost of goods sold per days}} = \frac{260}{10{,}500/365}$$

$$= \frac{260 \times 365}{10{,}500} = 9 \text{ days}$$

(iv) *Credit period allowed to debtors:*

$$\frac{\text{Average total of outstanding debtors}}{\text{Average credit sales per day}} = \frac{480}{16{,}000 \times 365}$$

$$= \frac{365 \times 480}{16{,}000} = 11 \text{days}$$

Total operating cycle period: (i) + (ii) + (iii) + (iv) = 44 days
Number of Operating cycles in a year = 365/44
= 8.30

$$\text{Amount of Working Capital required} = \frac{\text{Total operating cost}}{\text{Number of operating cycles in a year}}$$

= 10,500/8.3
= Rs. 1,265

Alternatively, the amount of working capital could have also been calculated by estimating the components of working capital method, as shown below:

Value of Average Stock Maintained	320
Raw Material	350
Work-in-progress	260
Finished Goods	480
Average Debtors Outstanding:	1,410
Less: Average Creditors Outstanding	145
	1,265

Illustration 2

ABC company plans to achieve annual sales of 1,00,000 units for the year 2005. The following is the cost structure of the company as per the previous figures.

Materials .. 50%

Labour .. 20%

Overheads .. 10%

The following further particulars are available from the records of the company.

1) Raw materials are expected to remain in stores for an average period of one month before issue to production.

2) Finished goods are to stay in the warehouse for two months on an average before being sold and sent to customers.

3) Each unit of production will be in process for one month on the average.

4) Credit allowed by the suppliers of raw material is one month from the date of delivery of materials.

5) Debtors are allowed credit for two months from the date of sale of goods.

6) Selling price per unit is Rs.9 per unit.

7) Production and sales follow a consistent pattern and there are no wide fluctuations.

Determine the quantum of working capital required to finance the activity level of 1,00,000 units for the year 2005.

Solution

Current Assets:

	Amount (Rs.)
1. Raw Material Inventory (1 month) $(1{,}00{,}000 \times 9 \times \frac{1}{12} \times \frac{50}{100})$	= 37,500
2. Work-in-progress Inventory (1 month) $(1{,}00{,}000 \times 9 \times \frac{1}{12} \times \frac{80}{100})$	= 60,000
3. Finished goods Inventory (2 months) $(1{,}00{,}000 \times 9 \times \frac{2}{12} \times \frac{80}{100})$	= 1,20,000
4. Debtors (2 months) $(1{,}00{,}000 \times 9 \times \frac{2}{12} \times \frac{100}{100})$	= 1,50,000
	3,67,500

Less: Current Liabilities:

1. Creditors (1 month) $(1{,}00{,}000 \times 9 \times \frac{1}{12} \times \frac{50}{100})$	= 37,500
Working capital required	= 3,30,000

Notes: 1) Raw material inventory is expressed in raw material consumption.

2) Work-in-progress inventory is expressed in cost of production (COP) where, COP is deemed to include materials, labour and overheads.

3) Finished goods inventory is supposed to have been expressed in terms of cost of sales. Since separate details are not given, the figures are worked out on COP.

4) Debtors are expressed in terms of total sales value.

5) Creditors are expressed in terms of raw material consumption, since separate figures are not available for purchases.

THE COMPONENTS OF WORKING CAPITAL AND THEIR MANAGEMENT.

Introduction

It is noted in the initial discussion that working capital consists of the summation of the current assets of the firm less the summation of the current liabilities of the firm. Cash, inventory and receivables (debtors and bills receivables) are the three most important current assets of a company. while payables (creditors and bills payables) is the single most important component of current liabilities. In the next few lines, the management of the three important components of current assets are taken up for discussion namely inventory, cash and receivables.

Inventories occupy the most strategic position in the structure of working capital of most business enterprises. It constitutes the largest component of current asset in most business enterprises. The turnover of working capital is largely governed by the turnover of inventory. The term 'inventory' refers to the stockpile of production a firm is offering for sale and the components that make up the production. Material (raw materials, semi-finished goods or finished parts, which the business operates on) is the first and most important element of cost. In most of the manufacturing organisations, materials form the single largest component of cost.

Management of Inventories

The maintenance of inventory means blocking of funds and so it involves the interest and opportunity cost to the firm. Efforts are made to minimize the stock of inputs and outputs by proper planning and forecasting of demand of various inputs and producing only that much quantity which can be sold in the market. In Japan, industries have adopted concept of JIT (Just in Time) and components, materials are received when required for which detailed instructions are given to suppliers. As against this by and large in India the inventory of coal, raw materials and packing materials is very high and many items become junk or obsolete causing heavy loss to the enterprise.

Objectives of Inventory Management

The primary objectives of inventory management are:

i. To minimize the possibility of disruption in the production schedule of a firm for want of raw material, stock and spares.
ii. To keep down capital investment in inventories.

The term material simply means any commodity or substance which is processed in a factory in order to be converted into finished product. It is categorised as;

- Raw Materials: basic materials supplied in crude form.
- Components: These are not raw in nature rather are finished parts made out of raw materials which are assembled to make the finished product.

- Tools: These are the appliances used in the manufacturing operations.
- Spare Parts: These are used for the maintenance of plant, machinery and buildings and for smooth running of reduction schedule.
- Consumable Stores: These are the items used for smooth running of the machines, e.g., lubricants, oil, cotton waste, rags, brooms, etc.

MATERIALS CONTROL

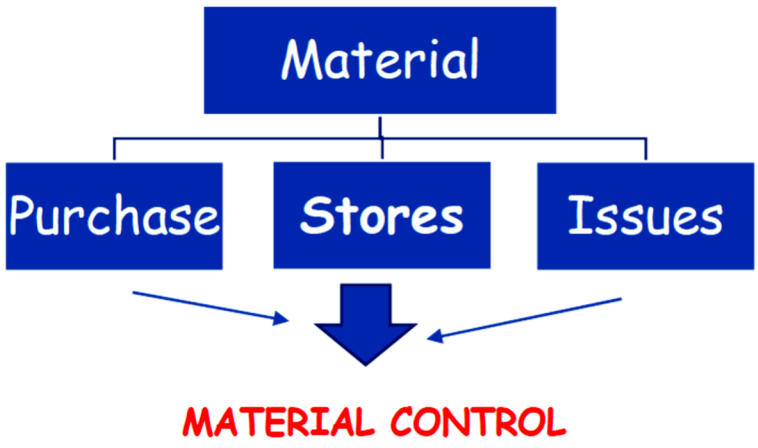
Inventory control is concerned with the acquisition, storage, handling and use of inventories so as to ensure the availability of inventory whenever needed, providing adequate provision for contingencies, deriving maximum economy and minimizing wastage and losses. Materials control[10] may be defined as the systematic control over the procurement, storage and usage of materials so as to maintain an even flow of materials and at the same time avoiding excessive investment in inventories.

Two important aspects of material control are:

1. To ensure the smooth flow of production without interruptions.
2. Prevention of excessive investments in materials stock.

It is important to note that the issue of Material comprises of three specific functions;

- Purchase of material
- Storage of material
- And issue of material from stores department to production department.



Importance of material control

The aim of a sound inventory control system is to secure the best balance between "too much and too little." Too much inventory carries financial rises and too little reacts adversely on continuity of productions and competitive dynamics. Designing a sound inventory control system is in a large measure

[10] The terms 'Material Control' and the term 'Inventory Control' are used interchangeably in this study note.

for balancing operations. It is the focal point of many seemingly conflicting interests and considerations both short range and long range. The specific points of importance may be summed up as follows;

1. Minimizing interruption in production process
2. Optimization of material cost
3. Reduction in wastage
4. Completion of order in time

Requisites of Material Control System

- Coordination and cooperation between the various departments concerned viz purchase, receiving, inspection, storage, issues and Accounts and Cost departments
- Use of standard forms and documents in all the stages of control
- Classification, coordination, standardization and simplification of materials
- Planning of requirement of material
- Efficient purchase organization
- Budgetary control of purchases
- Planned storage of materials, physical control as well as efficient book control through satisfactory storage control procedures, forms and documents
- Appropriate records to control issues and utilization of stores in production
- Efficient system of Internal Audit and Internal Checks
- System of reporting to management regarding material purchase, storage and utilization

INVENTORY MANANEGEMENT

Inventory control means – making the desired items of required quality and quantity available to various departments/section as & when they need. Inventory management is about inventory control which is also known as material control. It is about managing the costs related to the inventory. The **relevant costs** for related to a normal level of inventory includes the following

1. Cost of capital – Since inventory is equivalent to locked-up working capital the cost of capital is an important relevant cost. this is the opportunity cost of investment in inventory.
2. Space cost[11] –Inventory keeping needs space and therefore, how much and when question of inventory keeping are related to space requirements. this cost may be the rent paid for the space.
3. Materials handling cost - The material need to be moved within the warehouse and the factory and the cost associated with the internal movement of materials (or inventory) is called materials handling cost.

[11] This is also referred as the Carrying Cost (cost of carrying the inventory in the warehouse).

4. Obsolescence, spoilage or Deterioration cost – If the inventory is procured in a large quantity, there is always a risk of the item becoming absolute due to a change in product design or the item getting spoiled because of natural ageing process.
5. Insurance costs –There is always a risk of fire or theft of materials. A firm might have taken insurance against such mishaps and the insurance premium paid are the relevant cost.
6. Cost of general administration – maintenance of inventory will involve the use of various staffs. With large inventories, the cost of general administration might go up.
7. Inventory procurement cost - Cost associated with the procurement activities such as tendering, evaluation of bids, ordering, follow-up the purchase order, receipt and inspection of materials etc. is called inventory procurement cost.

As such inventory control is effected through either of the following

1. By setting of quantitative levels
2. By using ratios
3. Physical verification
4. On the basis of relative classification

By Setting Quantitative Levels

Inventory levels refers to the amount of stock available throughout the production schedule. By tracking inventory levels, the exact stock to be kept at hand (consistently meet demand without accruing unnecessary holding costs) can be forecasted. For instance, when the inventory levels are low, and an important order is to be fulfilled then there would be lack of inventory to fulfill the demand. And as a result, there will be absence of stock to run the production cycle smoothly. This is referred as stock-out which implies missing out on sales and revenue.

On the other, holding too much inventory requires a blockage of capital investment. As the inventory units sit in your warehouse, the more carrying costs gathers up, and the more likely they will turn to dead stock. So, by the time the units are actually sold, margins may have shrunk. Thus inventory management is all about having the right quantity of stock, a trade-off between too much and too little inventory. Thus the objective of inventory management is to achieve optimal inventory levels. Either the top management or by materials department set the norms for inventories. The top management usually sets monitory limits for investment in inventories. The materials department has to allocate this investment to the various items and ensure the smooth operation of the concern. A number of factors enter into consideration in the determination of stock levels for individual items for the purpose of control and economy. In the next few lines the calculation for fixation of stock level is considered which is essential to maintain sufficient stock for the smooth flow of production and sales. The following are the important techniques usually adopted in different industries:

1. Maximum Stock Level. - It is the maximum level of goods that is maintained by a retail store. Beyond the maximum level of stock, the retailer should not order more goods, as it may increase the carrying cost. When the stock crosses the maximum stock level it is called over stocking
2. Minimum Stock Level. - It is the minimum level of goods that should be maintained by retail to avoid customer dissatisfaction. If the stock in retail store is less than the minimum level, then the retailer should immediately order the goods. When the stock goes below the minimum level then it is called under-stocking
3. Danger Level - If the stock touches danger levels, then immediate action should be taken to maintain the stocks even if additional cost is incurred in arranging the required goods.
4. Re-Order Level. (ROL) - When the quantity of goods reaches a certain level then a fresh order is sent to procure new products. The retailer places an order before the goods reach a minimum level.
5. Re – Order Quantity (ROQ) [//Economic Ordering Quantity (EOQ)][12]
6. Average of Stock Level – this is the average of the minimum and the maximum level.

The formulas for calculation of the various stock levels are given below

Maximum stock level
= Re-order level + Re-ordering quantity – (Minimum consumption x Minimum re-order period).

Minimum level
= Re-order level - (Normal consumption x Normal re-order period).

Safety stock level
= Ordering level – (Average rate of consumption × Re-order period)
OR
= (Maximum rate of consumption - Average rate of consumption) × Lead time

Average stock level = $\frac{Maximum\ level + Minimum\ level}{2}$

Ordering level (Reorder Level // ROL)
= **Maximum consumption x Maximum re-order period**.
OR
= Maximum consumption x Lead time + Safety Stock
OR
= Minimum level + Consumption during time lag period

Illustration
From the following information, calculate minimum stock level, maximum stock level and re-ordering level:

- Maximum Consumption = 200 units per day
- Minimum Consumption = 120 units per day
- Normal Consumption =160 units per day
- Reorder period = 10 days – 15 days

[12] This is discussed in details in the next section.

- Reorder quantity (Q) = 1,600 units
- Normal reorder period = 10 days.

Solution

***Reorder Level* (*ROL*)**

$= Maximum\ consumption \times Maximum\ re-order\ period.$

$= 200\ units \times 15 = \mathbf{3000\ units}$

Maximum stock level

$= Re-order\ level + Re-ordering\ quantity - (Minimum\ consumption \times Minimum\ re-order\ period).$

$= 3000 + 1600 - (120 \times 10) = 3000 + 1600 - 1200 = 3400\ units$

Minimum level

$= Re-order\ level - (Normal\ consumption \times Normal\ re-order\ period)$

$= 3000 - (160 \times 10) = 3000 - 1600 = 1400\ units$

$$\textbf{\textit{Average stock level}} = \frac{Maximum\ level + Minimum\ level}{2}$$

$$\textbf{\textit{Average stock level}} = \frac{3400\ units + 1400\ units}{2} = 2400 \text{ units}$$

The Classical Model of Inventory Management[13]

The classical model is based on the following assumptions

1. Demand (D) is assumed to be uniform.
2. The purchase price per unit (C_0) is independent of quantity ordered.
3. The ordering cost per order (C_1) is fixed irrespective of size f lot.
4. The carrying cost/holding cost (C_2) is proportional to the quantity stored.
5. Shortage are not permitted i.e., as soon as the level of inventory reaches zero, the inventory is replenished.
6. The lead time (LT) for deliveries (i.e. the time of ordering till the material is delivered) is constant and is known with certainty.

The classical model[13] is the simplest of the inventory model and involves constant demand (consumption of inventory) with instantaneous order replenishment and no shortage.

The inventory level follows the pattern depicted in the figure shown below. When the inventory reaches zero level, an order of size Q units is received instantaneously. The stock is depleted uniformly at a constant demand rate.

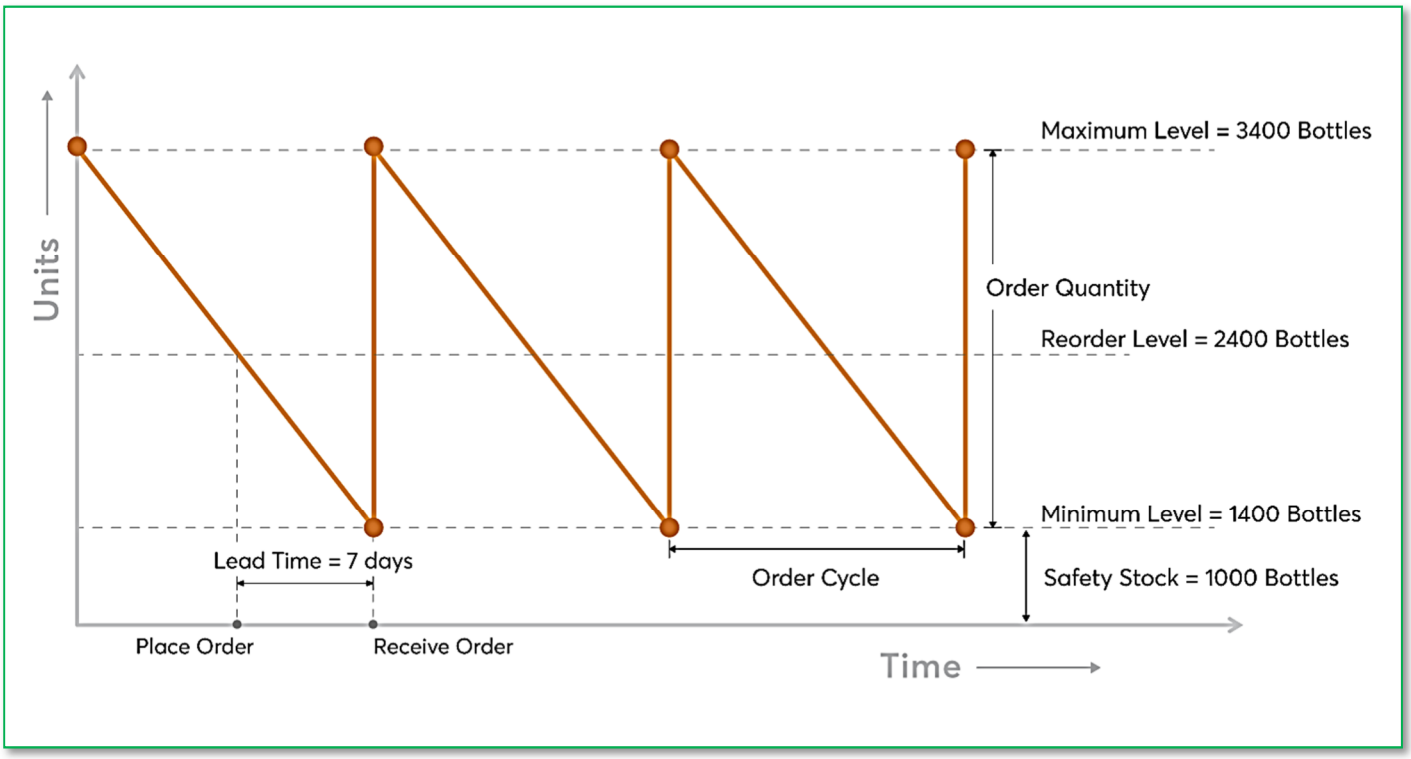
[13] This is the the WILSON Lot Size Formula. This is also known as the ANDLER's Formula or HARRIS' formula. For details readers may refer to 'Inventory Control Models and Methods' *by* Dieter Bartmann Martin J. Beckmann.

The cost model requires two cost parameters:

C_1= Setup cost associated with the placement of an order (Rupees per order). This is referred as the ordering cost.

C_2= the stock holding cost also referred as the carrying cost (Rupees per inventory unit)

The Classical Model[13][14]



Economic Order Quantity

DEFINITION: The economic order quantity (EOQ [**Q***]) is the order quantity [Reorder Quantity, Q] that minimizes total holding and ordering costs for the year. Even if all the assumptions don't hold exactly, the EOQ gives us a good indication of whether or not current order quantities are reasonable.

The Classical EOQ Model[13]

"**Q***" is one such "Q" (ROQ) which **minimises total cost of inventory**

Assumptions of the model

1. The demand for the year is known and evenly spread throughout the year
2. There is no time gap between placing an order and receiving its supply.
3. Ordering cost very directly with the number of orders and Fixed per unit material cost (C_0)

[14] The chart is adopted from https://finance.zohocorp.com/wp-content/uploads/2019/06/rop-graph-1.png

4. Fixed ordering cost [per order] ($\boldsymbol{C_1}$)
5. Carrying cost very directly with the average inventory and Fixed holding/carrying cost [unit holding/carrying cost] ($\boldsymbol{C_2}$)
6. There is no quantity discount
7. Constant lead time

Particular to this Model

(Of course, these assumptions don't always hold, but the model is pretty robust with the assumption).

From the assumtion of the model, the following may be stated

- Let Q = order size
- the number orders/year = $\frac{D}{Q}$
- Average inventory level = $\frac{Q}{2}$
- Annual ordering cost per year = $\frac{D}{Q} \times C_1$
- Average annual carrying cost per year = $\frac{Q}{2} \times C_2$
- Total material cost for the year = D × C_0

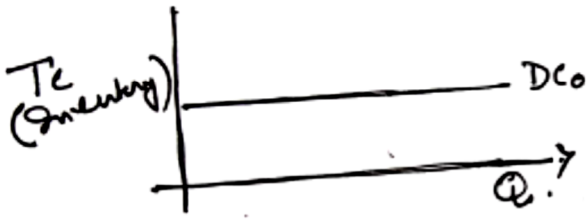
Total Inventory Cost

$$= Annual\ Material\ Cost + Annual\ Ordering\ Cost + Annual\ Carrying\ Cost$$

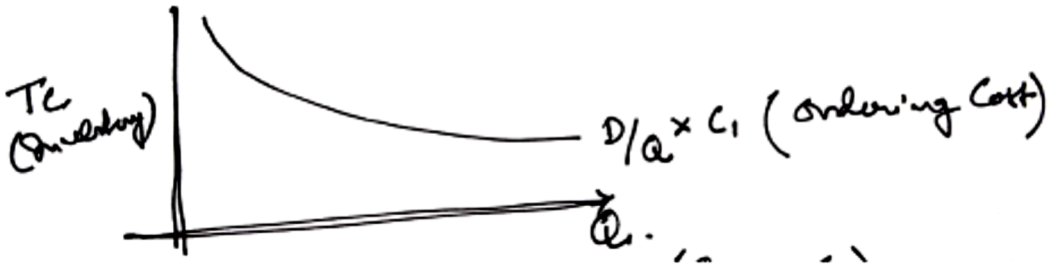
$$\boldsymbol{Total\ Inventory\ Cost} = D \times C_0 + \frac{D}{Q} \times C_1 + \frac{Q}{2} \times C_2$$

The Annual ordering cost per year, the average annual carrying cost per year and the total material cost for the year may be defined in the following lines

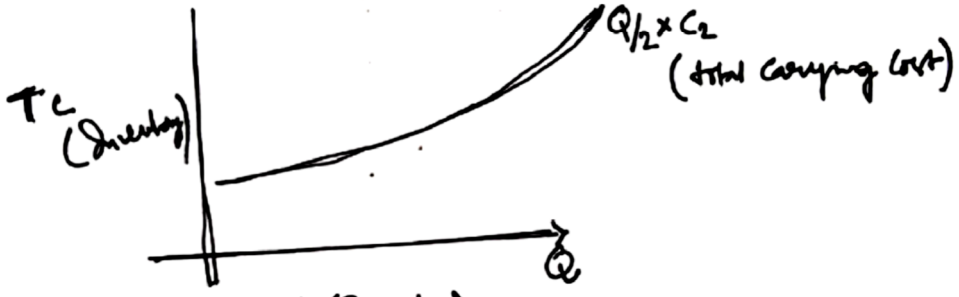
(A) Material Cost ($D \times C_0$)
= Irrelevant (when the decision is How much to order at a time?)

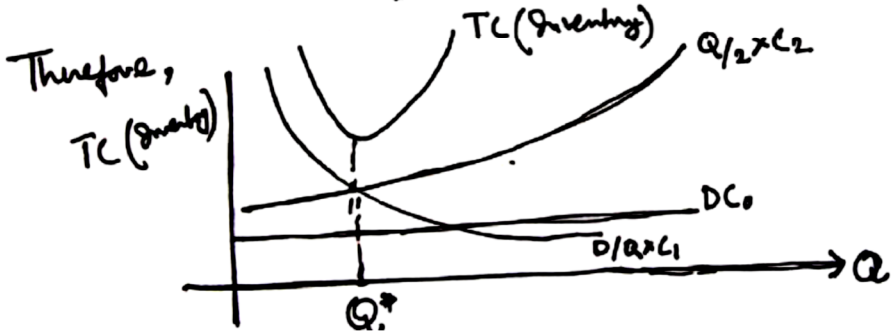


(B) Ordering Cost ($D/Q \times C_1$) [Number of orders × ordering cost per order]



(C) Carrying Cost (Stock holding cost) ($Q/2 \times C_2$)
(Average Inventory × Carrying cost per unit)
$\frac{Q}{2}$ (Average Inventory) × C_2 ($C_0 \times I$) [Carrying cost p.u]





From the above it is evident that the EOQ (Q*) is one such order quantity (Q) which if purchased at a time the firm would be able to minimise the total cost of Inventory.

The mathematical calculation[15] is rather simple.

[15] Mathematical operation of *Maxima* and *Minima* is used to find the minimum point of the cost function.

The objective is to minimise TC = $D \times C_0 + \frac{D}{Q} \times C_1 + \frac{Q}{2} \times C_2$

From the above, using the mathematical operation of *maxima* and *minima* the formula for economic order quantity (EOQ) is derived.

$EOQ\ (Q^*) = \frac{\sqrt{2\,D\,C_1}}{C_2}$

And

- $Number\ of\ order = \frac{Annual\ Demand}{Q^*}$
- $Average\ annual\ ordering\ cost = number\ of\ orders \times ordering\ cost/order$

  $(Average\ annual\ ordering\ cost = \frac{D}{Q^*} \times C_1)$
- $Average\ annual\ carrying\ cost = average\ quantity$[16] $\times\ Carrying\ cost\ per\ unit\ (year)$

  $Average\ annual\ carrying\ cost = \frac{Q^*}{2} \times C_2$

  $and\ the\ \text{TC}\ (Q^*) = D \times C_0 + \frac{D}{Q} \times C_1 + \frac{Q}{2} \times C_2$

It is important to note that Q* is a particular reorder quantity (Q) at which the total cost of inventory is the minimum. Q* is a particular Q (reorder quantity) at which the total cost of inventory is the minimum. Here it may be noted that the total material cost ($D \times C_0$) is irrelevant in the calculation (for this particular model. This is one of the assumptions of the model[17])

Illustration (EOQ – The classical model)

A company makes bicycles. It produces 450 bicycles a month. It buys the tires for bicycles from a supplier at a cost of Rs. 20 per tire. The company's inventory carrying cost is estimated to be 15% of cost and the ordering is Rs. 50 per order. Calculate;

- EOQ
- What is the number of orders per year?
- Compute the average annual ordering cost
- What is the average annual carrying cost?
- Compute the total inventory cost.

Solution

$D = Annual\ Demand = (2 \times 450 \times 12) = 10800\ tyres$

$C_0 = Rs\ 20\ per\ unit$

[16] The classical model suggest that the Q* units is ordered at a time and the next order is not placed before the whole stock is consumed (or Q become 0). Thus the maximum stock (as per the model) is Q* and the minimum stock is O. And average is $\frac{Maximum\ (Q^*) + Minimum\ (0)}{2} = \frac{Q^*}{2}$

[17] This assumption is relaxed in the next model where discount on the price happens when a particular quantity is ordered.

$C_1 = Rs\ 50\ per\ order$

$I\ =\ Inventory\ carrying\ cost\ (in\ percentage)\ =\ 15\%\ (given)$

$C_2 = C_0 \times \mathrm{I}\ =\ Rs\ 20\ \times\ 15\%\ =\ Rs\ 3\ per\ year$

We know,

- $EOQ\ (Q^*) = \frac{\sqrt{2\ D\ C_1}}{C_2} = \frac{\sqrt{2 \times 10800 \times 50}}{3} = 600$ tyres
- $Number\ of\ order = \frac{Annual\ Demand}{Q^*} = \frac{10800}{600} = 18\ orders$
- $Average\ annual\ ordering\ cost\ = \frac{D}{Q^*} \times C_1 = \frac{10800}{600} \times 50 = Rs\ 900$[18]

  $(Average\ annual\ ordering\ cost = number\ of\ orders\ \times ordering\ cost/order)$
- $Average\ annual\ carrying\ cost\ = \frac{Q^*}{2} \times C_2 = \frac{600}{2} \times 3 = 900$

  $(Average\ annual\ carrying\ cost\ = average\ quantity$[19] $\times Carrying\ cost\ per\ unit\ (year))$

And

$$\boldsymbol{Total\ Inventory\ Cost}$$
$$= Annual\ Material\ Cost\ +\ Annual\ Ordering\ Cost\ +\ Annual\ Carrying\ Cost$$
$$\boldsymbol{Total\ Inventory\ Cost}\ =\ D\ \times C_0\ +\ \frac{D}{Q^*} \times C_1\ +\ \frac{Q^*}{2} \times C_2$$
$$\boldsymbol{Total\ Inventory\ Cost}\ =\ 10800\ \times 20\ +\ \frac{10800}{600} \times 50\ +\ \frac{600}{2} \times 3$$
$$= \mathbf{216000 + 900 + 900\ = 217800}$$

EOQ with Price Break

In real life situation a firm would be able to avail discount in price of material cost where firms place large purchase orders. In this case the price paid per unit (C_0) will not remain same. This has to be considered while calculating the EOQ. However, the basic EOQ formula can still be used as a starting point for determining the optimum quantity to order. The management decision would be whether to avail the discount or remain ordering at EOQ. In this case the simple solution is to compare between the $TC\ (Q^*)$ and the $TC\ (Q$[20]$)$.

When $TC\ (Q^*) > TC\ (Q)$, it is recommended to avail the discount and order the minimum quantity to avail the discount which is different from the EOQ calculated previously.

When $TC\ (Q^*) < TC\ (Q)$, it is recommended to place order of Q* which will be economic than availing the order.

[18] The ordering cost is equal to the carrying cost when Q* (EOQ) is the quantity ordered.

[19] The classical model suggest that the Q* units is ordered at a time and the next order is not placed before the whole stock is consumed (or Q become 0). Thus the maximum stock (as per the model) is Q* and the minimum stock is O. And average is $\frac{Maximum\ (Q^*) + Minimum\ (0)}{2} = \frac{Q^*}{2}$

[20] This is the minimum quantity which is required to be ordered for availing the discount.

Illustration: EOQ (Price Break)

A company manufactures a special product which requires a component 'Alpha'. The following particulars are collected for the year 2015.

- Annual demand of Alpha 8,000 units
- Cost of placing an order Rs 200 per order
- Cost per unit of Alpha Rs 400
- Carrying cost percentage p.a. 20%

The company has been offered a quantity discount of 4% on the purchase of 'Alpha' provided the order size is 4,000 components at a time.

Required:

- Compute the economic order quantity.
- Advise whether the quantity discount offer can be accepted.

Solution

$$D = Annual\ Demand = 8000\ units$$

$$C_0 = Rs\ 400\ per\ unit$$

$$C_1 = Rs\ 200\ per\ order$$

$$I = Inventory\ carrying\ cost\ (in\ percentage) = 20\%\ (given)$$

$$C_2 = C_0 \times I = Rs\ 400 \times 20\% = Rs\ 80\ per\ year$$

Considering the situation without Price Break

$$EOQ\ (Q^*) = \frac{\sqrt{2\ D\ C_1}}{C_2} = \frac{\sqrt{2 \times 8000 \times 200}}{80} = \mathbf{200\ units}$$

If order is placed for the economic order quantity (EOQ), without availing the discount

$$\textbf{Total Inventory Cost}$$

$$= Annual\ Material\ Cost + Annual\ Ordering\ Cost + Annual\ Carrying\ Cost$$

$$\textbf{Total Inventory Cost} = D \times C_0 + \frac{D}{Q^*} \times C_1 + \frac{Q^*}{2} \times C_2$$

$$\textbf{Total Inventory Cost} = 8000 \times 400 + \frac{8000}{200} \times 200 + \frac{200}{2} \times 80$$

$$= \mathbf{3200000 + 8000 + 8000 = 3216000}$$

It is stated that the company has been offered a quantity discount of 4% on the purchase of 'Alpha' provided the order size is 4,000 components at a time. Thus a discount of 4% on the purchase price of Rs 400 (16) will reduce the purchase price to Rs 384 if the order size (Q) is 4000 units.

Then, $C_0 = Rs\ 384\ per\ unit$ and

$$C_2 = C_0 \times \text{I} = Rs\ 384 \times 20\% = Rs\ 76.8\ per\ year$$

Considering the situation with Price Break

Order size = 4000 units.

$$\textbf{Total Inventory Cost} = D \times C_0 + \frac{D}{Q} \times C_1 + \frac{Q}{2} \times C_2$$

$$\textbf{Total Inventory Cost} = 8000 \times 384 + \frac{8000}{4000} \times 200 + \frac{4000}{2} \times 76.8$$

$$= \mathbf{3072000 + 400 + 153600 = 3226000}$$

Thus we find that

When $TC\ (Q^*) < TC\ (Q)$

And therefore it is recommended not to avail the discount and order the at EOQ.

Use of Ratio

Inventory Turnover Ratio

Inventory Turnover signifies a ratio of the value of materials consumed during a given period to the average level of inventory held during that period. The ratio is worked out on the basis of the following formula:

$$\text{Inventory Turnover Ratio (in times)} = \frac{\text{Cost of Goods Sold}}{\text{Average Stock } \left(\frac{\text{Opening Stock + Closing Stock}}{2}\right)}$$

$$\text{Inventory Velocity (in days/weeks/ months)} = \frac{365\ or\ 52\ or\ 12}{Inventory\ Turnover\ ratio}$$

The purpose of the above ratio is to ascertain the speed of movement of a particular item. A high ratio indicates that the item is moving fast with a minimum investment involved at any point of time. On the other hand, a low ratio indicates the slow moving item. Thus Inventory Turnover Ratio may indicate slow moving dormant and obsolete stock highlighting the need for appropriate managerial actions.

Illustration

Compute the Inventory turnover ratio from the following:

Opening Stock - Rs 10,000

Closing Stock - Rs 16,000

Cost of Goods Sold - Rs 78,000

Solution (Inventory Turnover Ratio)

$$\text{Inventory Ratio} = \frac{\text{Value of Material (Period)}}{\text{Average Stock (Period)}}$$

$$\text{Average Stock} = \frac{\text{Op + Closing}}{2} = \frac{10000 + 16000}{2} = 13000$$

$$\text{Inventory Turnover Ratio} = \frac{78000}{13000} = 6 \text{ (times)}$$

PERPETUAL INVENTORY SYSTEM

Perpetual Inventory System may be defined as 'a system of records maintained by the controlling department, which reflects the physical movements of stocks and their current balance'.

Thus it is a system of ascertaining balance after every receipt and issue of materials through stock records to facilitate regular checking and to avoid closing down the firm for stock taking.

To ensure the accuracy of the perpetual inventory records (bin card and Stores ledger), physical verification of stores is made by a programme of continuous stock taking.

The operation of the perpetual inventory system may be as follows: -

- The stock records are maintained and up to date posting of transactions are made there in so that current balance may be known at any time.
- Different sections of the stores are taken up by rotation for physical checking. Every day some items are checked so that every item may be checked for a number of times during the year.
- Stores received but awaiting quality inspection are not mixed up with the regular stores at the time of physical verification, because entries relating to such stores have not yet been made in the stock records.
- The physical stock available in the store, after counting, weighing, measuring or listing as the case may be, is properly recorded in the bin cards / Inventory tags and stock verification sheets.

Perpetual inventory system should not be confused with continuous stock taking; Continuous stock taking is an essential feature of perpetual inventory system. Perpetual inventory means the system of stock records and continuous stock taking, whereas continuous stock taking means only the physical verification of the stock records with actual stocks.

In continuous stock taking, physical verification is spread throughout the year. Everyday 10 to 15 items are taken at random by rotation and checked so that the surprise element in stock verification may be maintained and each item may be checked for a number of times each year. On the other hand, the surprise element is missing in case of periodical checking, because checking is usually done at the end of year.

Advantages of perpetual inventory system

- The system obviates the need for the physical checking of all items of stock and stores at the end of the year.
- It avoids the dislocation of the routine activities of the organisation including production and despatch.
- A reliable and detailed check on the stores is maintained.
- Errors, irregularities and loss of stock through other methods are quickly detached and through necessary action recurrence of such things in future is minimised.
- As the work is carried out systematically and without undue haste the figures are readily available.
- Actual stock can be compared with the authorised maximum and minimum levels, thus keeping the stocks within the prescribed limits. The disadvantages of excess stocks are avoided and capitalised up in stores materials cannot exceed the budget.
- The recorder level of various items of stores are readily available thus facilitating the work of procurement of stores.
- For monthly or quarterly financial statements like Profit and Loss Account and Balance Sheet the stock figures are readily available and it is not necessary to have physical verification of the balances.

Periodical Stock Verification

This system envisages physical stock verification at a fixed date/period during the year. Generally, under this system the activity takes place at the end of the accounting period or a date close to such date. Usually the system is opened in the following manner: -

- A period of 5/7 days, depending on the magnitude of the work is chosen during which all the items under stock are verified physically and such period is known as 'cut-off' period. During this period there are no movements of stock items and neither 'receipts' nor are 'issues permitted.
- The items are physically counted/measured depending on their nature and are noted down in records which are signed by the auditors if they are present in stock verification.
- The bin cards balances are also checked and initiated. Generally, the physical balances and bin card balances of various items should be same unless shortage/excesses are there or the recording/ balancing in the cards are incorrect.

- After the physical verification is completed work sheets are countersigned by the godown supervisors and the stock verified.
- Thereafter reconciliation statement is prepared item wise where the physical balances and bin card balances are different.
- Then the balance as per bin cards and as per stores ledger is also compared and necessary adjustments are made to show the correct position of stock at the year end.
- Finally, the shortages/excess statement is prepared by the concerned departments and are placed before the higher management for their approval for adjustments.

Inventory Control on the Basis of Relative Classification

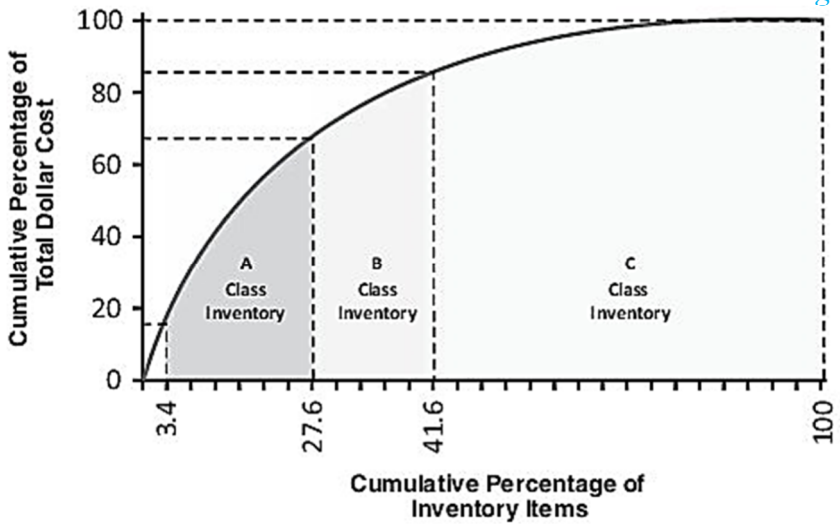
- **ABC Analysis**

The "ABC Analysis" is an analytical method of stock control which aims at concentrating efforts on those items where attention is needed most. It is based on the concept that a small number of the items in inventory may typically represent the bulk money value of the total materials used in production process, while a relatively large number of items may present a small portion of the money value of stores used resulting in a small number of items be subjected to greater degree of continuous control.

Category	No. of Items	% of the Total No. of Items	Value Amount (Rs)	% of the Total Value Item	Average Value Amount (Rs)
A	75	6	70,000	70	933
B	375	30	20,000	20	53
C	800	64	10,000	10	12
	1250	100	1,00,000	100	998

Category 'A' items represent 70% of the total investment but as little as only 6% of the number of items. Maximum control must be exercised on these items. Category 'B' is of secondary importance and normal control procedures may be followed.

Category 'C' comprising of 64% in quantity but only 10% in value, needs a simpler, less elaborate and economic system of control.



ABC ANALYSIS[21]

- **VED Analysis**

VED stands for Vital, Essential and Desirable- analysis is used primarily for control of spare parts. The spare parts can be classified in to three categories i.e Vital, Essential and Desirable- keeping in view the criticality to production.

- **FSN analysis**

FSN analysis is the process of classifying the materials based on their movement from inventory for a specified period. All the items are classified in to F- Fast moving, S- Slow moving and N - Non-moving Items based on consumption and average stay in the inventory. Higher the stay of item in the inventory, the slower would be the movement of the material. This analysis helps the store keeper / purchase department to keep the fast moving items always available & take necessary steps to dispose off the non-moving inventory.

Just in time (JIT)

JIT is a production strategy that strives to improve a business return on investment by reducing in-process inventory and associated carrying costs. Inventory is seen as incurring costs, or waste, instead of adding and storing value, contrary to traditional accounting. In short, the Just-in-Time inventory system focuses on "**the right material, at the right time, at the right place, and in the exact amount**".

[21] https://www.researchgate.net/publication/256852552_ABC_Inventory_Management_Support_System_With_a_Clinical_Laboratory_Application/figures?lo=1

CASH MANAGEMNT

The management of cash lies at the heart of liquidity management and is consequently an integral and vital part of the financial manager's or corporate treasurer's role. The term 'cash' in financial management terms refers to currency and demand deposits[22]. Cash management involves having the optimum, neither excessive nor deficient, amount of cash on hand at the right time. Proper cash management requires that the company know how much cash it needs, as well as how much it has and where that cash is at all times. The objective of cash management is to invest excess cash for a return while retaining sufficient liquidity to satisfy future needs. The financial manager must plan when to have excess funds available for investment and when money needs to be borrowed.

The amount of cash to be held depends upon the following factors:

1. Cash management policies
2. Current liquidity position
3. Management's liquidity risk preferences
4. Schedule of debt maturity
5. The firm's ability to borrow
6. Forecasted short- and long-term cash flow
7. The probabilities of different cash flows under varying circumstances

The company should not have an excessive cash balance (idle Cash) since no return is being earned upon it. The two key tasks for the financial manager are to attain the optimal balance and rate of turnover of cash which maximises the market value of the firm. The cash balance should be sufficient to satisfy the firm's operational needs and avoid the risk of financial distress or illiquidity. On the other hand, it should not be so excessive that it depresses returns, as investing in cash is likely to yield lower returns than investing in fixed assets.

As such, cash Balance = the greater of

1. compensating balances or
2. precautionary balances + transaction balances + speculative balances.

Motive for Holding Cash

Cash is held for the following purposes.

- **Transaction Motive -** A firm needs cash to make payments for acquisition of resources and services for the normal conduct of business.
- **Precautionary Motive -** A firm keeps additional funds to meet any emergency situation.

[22] As per para 5.1 and 5.2 of Accounting Standard 3 the term 'cash' comprises on hand and demand deposits with bank and the 'cash equivalents' are short term, highly liquid investments that are readily convertible into known amounts of cash and which are subject to an insignificant risk of changes in value.

- **Speculative Motive -** Some firms may also maintain cash for taking advantages of speculative changes in prices of input and output.

Optimum Balance of Cash

A firm should hold an optimum balance of cash, and invest any temporary excess amount in short-term (marketable) securities. In choosing these securities, the firm must keep in mind safety, maturity and marketability of its investment.

Management of Cash involves three things:

1. managing cash flows into and out of the firm,
2. managing cash flows within the firm, and
3. financing deficit or investing surplus cash and thus, controlling cash balance at a point of time.

It is an important function in practice because it is difficult to predict cash flows and there is hardly any synchronisation between inflows and outflows.

- **Marketable securities** serve as protection against cash shortages. Companies with seasonal operations may buy marketable securities when they have excess funds and then sell the securities when cash deficits occur. A firm may also invest in marketable securities when funds are being held temporarily in anticipation of short-term capital expansion. In selecting an investment portfolio, consideration should be given to return, default risk, marketability, and maturity date.

- **Marketable Securities** The excess amount of cash held by the firm to meet its variable cash requirements and future contingencies should be temporarily invested in marketable securities, which can be regarded as near moneys.

- **Cash Budget** is an important aspect of cash management**.** Firms prepare cash budget to plan for and control cash flows. Cash budget is generally prepared for short periods such as weekly, monthly.

DETERMINING CASH REQUIREMENTS

The optimal cash volume, from the financial manager's point of view,
is the one which balances risk with return and is consistent with the overall goal of
maximising shareholder value.
Determining the optimal cash requirement will inevitably have a subjective as well as a
more scientific, quantitative dimension.
Cash flows are generally more erratic and less predictable than stock and debtor flows, and therefore are more difficult to model.
While quantitative cash management models have been developed to assist the

financial manager or corporate treasurer, these will have to be supplemented by experience, judgement, and a professional 'feel'.

Cash turnover ratio

This ratio is used to indicate how efficiently a business is using its current asset of cash. It is measured similar to stock turnover.

A target cash turnover ratio, based on an assessment of the company's financial plan, should be determined.

$$\text{CT Ratio} = \frac{\text{Sales for the period}}{\text{Average Cash Balance}}$$

A high cash turnover ratio usually suggests an efficient use of the firm's current asset of cash. However, too low a cash balance may increase the risk of financial distress or illiquidity.

Lock-Box System

The lockbox is a highly effective cash flow tool and data management system that can enhance your efficiency and productivity and, ultimately, save you money.

This is a method followed to expedite conversion of an instrument (e.g., cheque, draft, bills, etc.) into cash.

Illustration

It takes Travis Corporation about 7 days to receive and deposit payments from customers. Therefore, a lockbox system is being considered. It is expected that the system will reduce the float time to 5 days. Average daily collections are Rs 500,000. The rate of return is 12 percent.

The reduction in outstanding cash balances arising from implementing the lockbox system is:

2 days × Rs 500,000 = Rs 1,000,000

The return that could be earned on these funds is:

Rs 1,000,000 × 0.12 = Rs 120,000

The maximum monthly charge the company should pay for this lockbox arrangement is therefore:

Rs 120,000 ÷ 12 = Rs 10,000 (anything less than this is effective)

Illustration

Charles Corporation is exploring the use of a lockbox system that will cost Rs 100,000 per year. Daily collections average Rs 350,000. The lockbox arrangement will reduce the float period by 2 days. The firm's rate of return is 15 percent.

The cost–benefit analysis is shown below.

Return on early collection of cash	0.15 × 2 × Rs 350,000 =	Rs 105,000
Less: Cost		100,000

Net benefit (Advantage of lockbox) Rs. 5,000

Cash Management Model

There are two specific Cash Management Model

1. Baumol Model and
2. Miller – Orr Model

Baumol model is the most popular quantitative cash management model which assists in determining optimal cash need.

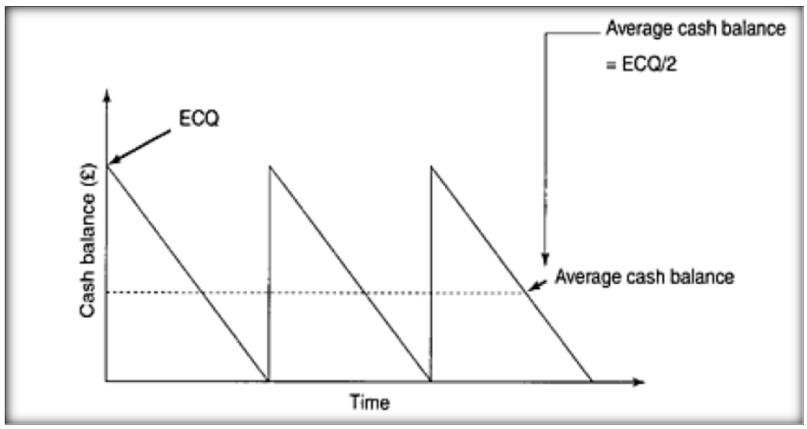
The Baumol model

The model was developed by William Baumol in 1952, is similar to the Economic Order Quantity (EOQ) model we studied in relation to stock management. The Baumol model treats cash held for transactional purposes as an inventory item. The firm's 'stock' of marketable securities is not included, it will be drawn on to top up transactional cash balances when required. Alternatively, it will be used as a repository for surplus transactional cash balances.

A diagram of the Baumol model is presented in Figure given below.

It assumes an initial stock of cash is drawn on at a constant rate until it is fully consumed, at which point it is replenished immediately, and in full.

The Baumol model therefore makes essentially the same assumptions as the EOQ model, that is, certainty of demand and constancy of demand.



Assumption

1. Simplistic scenario where cash flows into and out of a business at constant predictable rates.
2. The initial 'stock' of cash is then consumed at a constant daily rate during the month.
3. Immediate replenishment in full.
4. fixed cost per conversion irrespective of the sum of money involved.

The Model

The Model attempts to determine the **optimum cash balance** under **conditions of certainty**.

The objective is to minimize the sum of the **fixed costs of transactions** and the **opportunity cost of holding cash balances**.

These costs are expressed as:

$$\mathbf{ECQ}=\sqrt{\frac{2\times U\times C}{R}}$$

ECQ = Economic Cash Quantity (Optimal Cash Conversion)

U = Usage/ Demand over the planning period

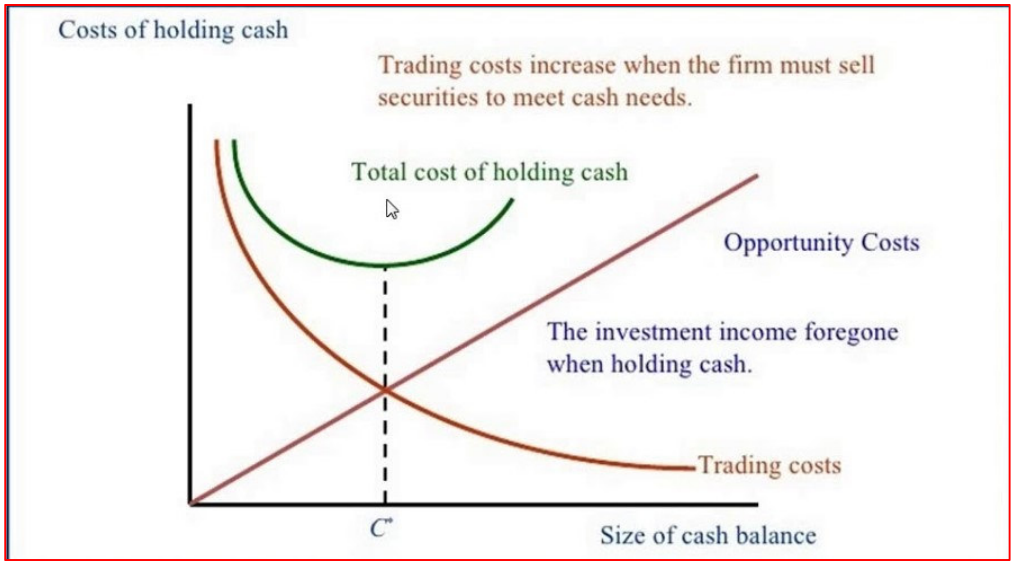
C = Conversion Cost of Marketable securities

R = Opportunity Cost of Holding cash

ECQ -- This is the most economic amount of cash to convert or 'order' from the firm's repository of marketable securities to replenish the cash balance when it reaches zero. It is the value which minimises the total cost (TC) of controlling cash.

Total cost in this case is the sum of total conversion costs plus total opportunity costs, thus:

Total cost (TC) = conversion costs + opportunity costs



The cash management model[23]

Example 1 — BAUMOL MODEL

Quantum Industries, a chemical manufacturing company, estimates its total cash requirement for the coming financial year at Rs 5 million. The treasurer estimates the cost of converting marketable securities into cash at Rs 50 and the average annual rate of return on marketable securities is currently 7 per cent. The treasurer wishes to determine:

1. the optimum amount of cash to convert each time the cash balance reduces to zero, that is the **economic conversion quantity** ECQ,
2. the **number of conversions** required each year,
3. the **average cash balance**, and
4. the **total cost**.

[23] https://i.ytimg.com/vi/2A0UkOYPbRc/maxresdefault.jpg

Example one (Quantum Industries)

Total Cash Requirement = 5 Million = U

Conversion Cost (Per Conversion) = Rs 50 = C

Average annual Return (of Marketable Securities)

= 7% P.a = R = 7%.

= .07

$$ECQ = \sqrt{\frac{2 \times 5{,}000{,}000 \times 50}{0.07}}$$

(Economic Conversion Quantity) = Rs 84515 (Rounded).

(1) Economic Conversion Quantity (ECQ) = Rs 84515

(2) Number of Conversions = $\frac{U}{ECQ} = \frac{5000000}{84515}$

(3) Average Cash Balance

$\frac{ECQ}{2} = 42258$ = 59.2 days

(just over 1 week)

(4) Total Cost = $\left[\frac{U}{ECQ} \times C\right] + \left[\frac{ECQ}{2} \times R\right]$

4 (continued)

Total cost= $\frac{U}{ECQ} \times C + \frac{ECQ}{2} \times R$

$= \frac{5000000}{84515} \times 50 + \frac{84515}{2} \times 0.07$

(Rs 59.2 × 50) + (Rs 42,258 × 0.07)

=Rs 5,908 (rounded).

Example 2 —BAUMOL CASH MODEL

The financial manager of NewPort Transport, a transport and freight company, estimates that its total cash demand for the coming year will be Rs 3.5m. The conversion cost is estimated at Rs 25 per transaction and the interest rate on short-term investments is 9 per cent.

You are required to calculate the following:

1. the optimal quantity of cash to withdraw from marketable securities each time the cash balances reduce to zero, that is, the ECQ;
2. the number of conversion transactions each year;
3. the average cash balance; and
4. the total cost.

The cash cycle

The management of cash flow is a very dynamic process. Cash will continually circulate through the business in the form of a cash cycle. There will be, for example, cash flowing out to pay for goods, services and expenses and cash flowing in from sales to customers.

The concept of the **cash cycle** (**cash conversion cycle**) was introduced in the context of the Inventory Management.

It was defined as the operating cycle (inventory days plus debtor days) minus creditor payment days.

A **positive cash cycle,** where the operating cycle is greater than the creditor payment period, needs to be financed. The more extended the cash cycle, the greater the financing required and the greater the risk of the firm experiencing liquidity problems.

Conversely, a **negative cash cycle,** where the operating cycle is less than the creditor payment period, yields a positive cash flow and lessens the risk of the firm encountering any liquidity problems. In such circumstances the spontaneous financing in the form of credit from suppliers more than covers operational needs. Any surplus cash can be invested on a short-term basis or alternatively applied to other areas of the firm's business.

The Miller–Orr Model

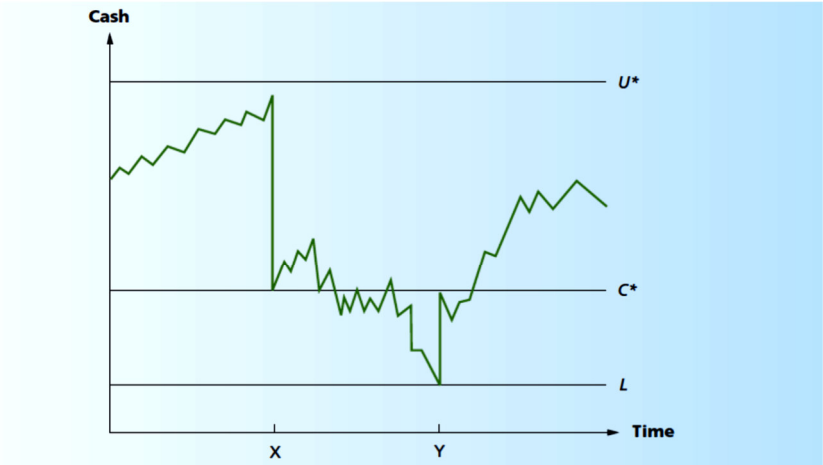
The Miller–Orr model is a stochastic model for cash management where uncertainty exists for cash payments. In other words, there is irregularity of cash payments.
The Miller–Orr model places an upper and lower limit for cash balances.

When the upper limit is reached a transfer of cash to marketable securities or other suitable investments is made. When the lower limit is reached a transfer from securities to cash occurs. A transaction will not occur as long as the cash balance falls within the limits.

The Miller–Orr model takes into account the

- fixed costs of a securities transaction (***C***), assumed to be the same for buying as well as selling,
- the daily interest rate on marketable securities (***i***), and
- the variance of daily net cash flows (***σ***).

A major assumption is the randomness of cash flows. The two control limits in the Miller–Orr model may be specified as '*h*' (Rupees) as an upper limit and 'zero' (Rupees) at the lower limit. When the cash balance reaches the upper level, *h* less ≈ Rupees of securities are bought and when the cash balance equals zero, and ≈ Rupees of securities are sold and the new balance again reaches ≈.



*U** is the upper control limit. *L* is the lower control limit. The target cash balance is *C**. As long as cash is between *L* and *U**, no transaction is made.

The **optimal cash balance (*z*)** is computed as follows:

$$\mathbf{Z} = \sqrt[3]{\frac{3C\sigma^2}{4i}}$$

C = Fixed cost of each securities transaction

σ² = Variance of Daily net cash flows

i = Daily interest rate on securities

⇒ The optimal value for **h (upper limit) is computed as 3z**.

⇒ The **average cash balance will approximate (z + h)/3**.

⇒ And **Minimum Cash Balance is Zero**.

EXAMPLE 4.10 Delta Inc. has experienced a stochastic demand for its product, which results in fluctuating cash balances randomly. The following information supplied:

Fixed cost of a securities transaction	$10
Variance of daily net cash flows	$50
Daily interest rate on securities (10%/360)	0.0003

The optimal cash balance, the upper limit of cash needed, and the average cash balance follow:

$$z = \sqrt[3]{\frac{3(10)(50)}{4(0.0003)}} = \sqrt[3]{\frac{3(10)(50)}{0.0012}} = \sqrt[3]{\frac{1.500}{0.0012}}$$

$$= \sqrt[3]{1{,}250{,}000} = \$102$$

The optimal cash balance is $102. The upper limit is $306(3 × $102). The average cash balance is

$$\frac{(\$102 + \$306)}{3} = \$136$$

When the upper limit of $306 is reached, $204 of securities ($306 – $102) will be purchased to bring you to the optimal cash balance of $102. When the lower limit of zero dollars is reached, $102 of securities will be sold to again bring you to the optimal cash balance of $102.

When lower limit is not zero but L

Illustration 2 (Miller – Orr Model)

PKG Company has a policy of maintanning cash balance of Rs 5,00,000. The Standard deviation of the company's daily cash flows is Rs 2,00,000. The annual interest rate is 14 percent. The transaction cost of buying and selling securities is Rs 150 per transaction. Determine PKG's upper control limit and the return point per per the Miller –Orr Cash management Model.

Since the standard deviation of net cash flows is given on daily basis, the annual interest rate has to be chnaged to daily basis.

SOLUTION

$$Z = \left[\frac{3}{4} \times \frac{150 \times 200{,}000^2}{0.14/365}\right]^{\frac{1}{3}} = \text{Rs } 227{,}227$$

The upper control limit and return point are as follows:

$$\text{Upper Limit} = \text{Lower Limit} + 3Z = 500{,}000 + (3 \times 227{,}227)$$
$$= \text{Rs } 1181{,}680$$
$$\text{Return Point} = \text{Lower Limit} + Z = 500{,}000 + 227{,}227$$
$$= \text{Rs } 727{,}227$$
$$\text{Av. Cash Balance} = \text{Lower Limit} + 4/3Z = 500{,}000 + 4/3\,(227{,}227)$$
$$= \text{Rs } 802{,}969$$

PKG will not allow the cash balance to go below the lower limit of Rs 500000 (which is the minimum cash balance it maintains. If the firm's cash balance touches this limit, it will sell marketable securities worth (Z) Rs 2,27,227 and restore return point to Rs 7,27,227 cash balance. On the other hand, if PKG's cash balance touches the upper limit of Rs 11,81,680, it will spend cash buying marketable securities worth (2Z) Rs 4,54,454 and bring the cash balance to the return point (Rs 11,81,680 - 4,54,454) = Rs 7,27,227 cash balance.

When lower limit is not zero but L (with emphasis on return point C*)

USING THE MODEL To get started, management sets the lower limit (L). This limit is essentially a safety stock; so where it is set depends on how much risk of a cash shortfall the firm is willing to tolerate.

Like the BAT model, the optimal cash balance depends on trading costs and opportunity costs. Once again, the cost per transaction of buying and selling marketable securities, F, is assumed to be fixed. Also, the opportunity cost of holding cash is R, the interest rate per period on marketable securities.

The only extra piece of information needed is σ^2, the variance of the cash flow per period. For our purposes, the period can be anything, a day or a week, for example, as long as the interest rate and the variance are based on the same length of time.

Given L, which is set by the firm, Miller and Orr show that the cash balance target, C^*, and the upper limit, U^*, that minimize the total costs of holding cash are:[1]

$$C^* = L + (3/4 \times F \times \sigma^2/R)^{1/3} \quad [19A.5]$$

$$U^* = 3 \times C^* - 2 \times L \quad [19A.6]$$

Also, the average cash balance in the Miller–Orr model is:

$$\text{Average cash balance} = (4 \times C^* - L)/3 \quad [19A.7]$$

The derivation of these expressions is relatively complex, so we do not present it here. Fortunately, as we illustrate next, the results are not difficult to use.

For example, suppose F = \$10, the interest rate is 1 percent per month, and the standard deviation of the monthly net cash flows is \$200. The variance of the monthly net cash flows is:

$$\sigma^2 = (\$200)^2 = \$40{,}000$$

We assume a minimum cash balance of L = \$100. We can calculate the cash balance target, C^*, as:

$$\begin{aligned} C^* &= L + (3/4 \times F \times \sigma^2/R)^{1/3} \\ &= \$100 + (3/4 \times \$10 \times \$40{,}000/.01)^{1/3} \\ &= \$100 + (30{,}000{,}000)^{1/3} \\ &= \$100 + 311 = \$411 \end{aligned}$$

The upper limit, U^*, is thus:

$$\begin{aligned} U^* &= 3 \times C^* - 2 \times L \\ &= 3 \times \$411 - 2 \times \$100 \\ &= \$1{,}033 \end{aligned}$$

Finally, the average cash balance is:

$$\begin{aligned} \text{Average cash balance} &= (4 \times C^* - L)/3 \\ &= (4 \times \$411 - \$100)/3 \end{aligned}$$

THE CASH BUDGET[24]

- ✓ A company's annual financial plan is called a *budget.*
- ✓ The budget is a set of formal (written) statements of management's expectations regarding sales, expenses, production volume, and various financial transactions of the firm for the coming period. Simply put, a budget is a set of pro forma statements about the company's finances and operations.
- ✓ A budget is a tool for both planning and control.
- ✓ At the beginning of the period, the budget is a plan or standard; at the end of the period, it serves as a control device to help management measure the firm's performance against the plan so that future performance may be improved.

The budget is classified broadly into two categories: the *operational budget*, which reflects the results of operating decisions; and the *financial budget.*

The financial budget consists of:

1. **Cash budget**
2. Pro forma balance sheet

The Cash Budget

The cash budget is prepared in order to forecast the firm's future financial needs. It is also a tool for cash planning and control. Because the cash budget details the expected cash receipts and disbursements for a designated time period, it helps avoid the problem of either having **idle cash on hand or suffering a cash shortage**. However, if a cash shortage is experienced, the cash budget indicates whether the **shortage is temporary or permanent**, that is, *whether short-term or long-term borrowing is needed.*

The cash budget typically consists of four major sections:

i. The **receipts section**, which gives the beginning cash balance, cash collections from customers, and other receipts
ii. The **disbursements section**, which shows all cash payments made, listed by purpose
iii. The **cash surplus or deficit section**, which simply shows the difference between the cash receipts section and the cash disbursements section
iv. The **financing section**, which provides a detailed account of the borrowings and repayments expected during the budget period

[24] Budget, as such, is not covered in the syllabus. But cash budget is being included here as it is an important aspect of cash management.

Each element of the cash budget is made up as follows.

i. **Cash receipts.** These will include anticipated cash inflows arising from: cash sales, credit sales, cash from the disposal of assets, dividend income, and any other cash receipts expected during the budget period.

ii. **Cash payments.** These will include all the anticipated cash outflows for the budget period and will typically consist of: payments to suppliers for purchases; payments for operating expenses such as salaries, wages, rents, insurance, transport and travel; payments of taxes, dividends and interest; and the purchase of fixed assets.

iii. **Net cash flow.** This is the difference between the budgeted cash receipts and the budgeted cash payments for each month: it is equal to 1 minus 2 above. If receipts are greater than payments this will be a positive figure: it will be negative if payments is the greater figure.

iv. **Opening cash balance.** This is the opening cash balance at the start of each month, it will be the same as the closing cash balance for the previous month. Again this can be a positive or negative figure.

v. **Closing cash balance.** By adding the opening cash balance for a month to the net cash flow for the same month the closing cash balance is determined: it is equal to 3 plus 4 above. Whether this is a positive or negative figure will depend on the positive or negative characteristics of items 3 and 4 above.

vi. **Minimum cash balance.** The firm may have a policy of ensuring that it maintains at least a minimum cash balance at all times. If the closing cash balance revealed at 5 above is less than the required minimum there will be a *cash deficit* and the firm will need recourse to some short-term financing. Should the closing cash balance be greater than the required minimum then there will be a *cash surplus* available for investing in suitable short-term, liquid investments.

Some conceptual issues

i. The cash budget contains four major sections. They are the_____ section, _____ section, _____section, and the financing section

ii. Cash budgets should include noncash charges such as depreciation: (*a*) true; (*b*) false.

iii. Cash budgets are prepared on a short-term basis such as on a monthly, quarterly, or even weekly basis: (*a*) true; (*b*) false.

iv. Operating budgets would include cash budgets: (*a*) true; (*b*) false.

v. The idea behind preparing cash budgets is to avoid unnecessary cash _____ and _____ .

Illustration 1 (Cash Budget). The following sales budget is given for Van Dyke Sales Co. for the second quarter of 2018:

	April	May	June	Total
Sales Budget	Rs 45000	Rs 50000	Rs 60000	Rs 155000

Credit sales are collected as follows: 70 percent in month of sale, 20 percent in month following sale, 8 percent in second month following sale, and 2 percent uncollectible. The accounts receivable balance at the beginning of the second quarter is Rs 18,000, of which Rs 3,600 represents uncollected February sales, and Rs 14,400 represents uncollected March sales.

Compute (*a*) the total sales for February and March, and (*b*) the budgeted cash collections from sales for each month February through June. Without prejudice to answer (*a*), assume February sales equal Rs 40,000 and March sales equal Rs 50,000.

(b) Assuming Feb sales as Rs 40000 and March Sales as Rs 50000 [ignoring what is calculated in (a) above]

	April	**May**	**June**
Cash collections			
February			
40,000 (8%)	$ 3,200		
March			
50,000 (20%)	10,000		
50,000 (8%)		$ 4,000	
April			
45,000 (70%)	31,500		
45,000 (20%)		9,000	
45,000 (8%)			$ 3,600
May			
50,000 (70%)		35,000	
50,000 (205)			10,000
June			
60,000 (70%)			42,000
Total cash collections	$44,700	$48,000	$55,600

Illustration 2 (Cash Budget)

Cash Collections. The following data are given for Erich Stores:

	September	October	November	December
	Actual (Rs)	Actual (Rs)	Estimated (Rs)	Estimated (Rs)
Cash Sales	7000	6000	8000	6000
Credit Sales	50000	48000	62000	80000
Total	57000	54000	70000	86000

Past experience indicates net collections normally occur in the following pattern:

No collections are made in the month of sale, 80 percent of the sales of any month are collected in the following month, 19 percent of sales are collected in the second following month, and 1 percent of sales are uncollectible.

Compute (*a*) total cash receipts for **November and December**, and (*b*) **accounts receivable balance** at November 30 if the October 31 balance is Rs 50,000

(*a*)

	November	December
Cash receipts		
Cash sales	$ 8,000	$ 6,000
Cash collections		
September sales		
50,000 (19%)	9,500	
October sales		
48,000 (80%)	38,400	
48,000 (19%)		9,120
November sales		
62,000 (80%)		49,600
Total cash receipts	$55,900	$64,720

(*b*) Accounts receivable (November 30) = $50,000 + $62,000 – $9,500 – $38,400 = $64,100

[a] From December sales: $\frac{\$90,000 - (\$90,000 \times 0.1)}{2} = \$40,500$

January sales: $\frac{\$80,000 - (\$80,000 \times 0.1)}{2} = 36,000$

$76,500

[b] From January sales:

February sales: $\frac{\$70,000 - (\$70,000 \times 0.1)}{2} = 31,500$

$67,500

$31,500

[c] From February sales:

March sales: $\frac{\$86,00 - (\$86,000 \times 0.1)}{2} = 38,700$

$70,200

MCQs

1. What is the purpose of working capital in a business?
    a) To finance long-term projects
    b) To cover short-term expenses and obligations
    c) To invest in marketable securities
    d) To purchase fixed assets

Answer: b) To cover short-term expenses and obligations

2. What is the formula for calculating net working capital?
    a) Total current assets - Total current liabilities
    b) Total current assets + Total current liabilities
    c) Total current assets ÷ Total current liabilities
    d) Total current assets × Total current liabilities

Answer: a) Total current assets - Total current liabilities

3. Which of the following is NOT a component of current assets?
    a) Cash and Cash Equivalents
    b) Property, Plant, and Equipment
    c) Accounts Receivable
    d) Inventory

Answer: b) Property, Plant, and Equipment

4. What does a positive working capital indicate?
    a) The company is highly leveraged
    b) The company has more current liabilities than current assets
    c) The company has more current assets than current liabilities
    d) The company is facing liquidity issues

Answer: c) The company has more current assets than current liabilities

5. Which factor does NOT determine the working capital requirements of a business concern?
    a) Nature of business
    b) Production policy
    c) Dividend policy
    d) Availability of raw materials

Answer: c) Dividend policy

6. Which of the following is a component of current liabilities?
    a) Long-term loans
    b) Accounts Payable
    c) Retained Earnings
    d) Property, Plant, and Equipment

Answer: b) Accounts Payable

7. What is the purpose of the DuPont analysis?
    a) To understand the implications of working capital management
    b) To understand the implications of return on equity
    c) To understand the implications of capital budgeting decisions
    d) To understand the implications of financing decisions

Answer: b) To understand the implications of return on equity

8. What does a relaxed current asset investment policy prioritize?
   a) Profitability
   b) Liquidity and safety
   c) Flexibility
   d) Risk-taking

Answer: b) Liquidity and safety

9. What does the cash turnover ratio measure?
   a) How efficiently a company generates revenue from its cash resources
   b) The ratio of cash to total assets
   c) The rate of cash flows into and out of a company
   d) The ratio of cash to marketable securities

   Answer: a) How efficiently a company generates revenue from its cash resources

10. What is a compensating balance in cash management?
    a) The minimum cash balance required by a bank
    b) Cash reserves held for speculative purposes
    c) Cash reserves for day-to-day operations
    d) Excess cash held for investment purposes

    Answer: a) The minimum cash balance required by a bank

11. What is the purpose of a lockbox mechanism?
    a) To secure cash reserves in a bank vault
    b) To expedite the collection of customer payments
    c) To minimize cash disbursement delays
    d) To optimize cash forecasting accuracy

    Answer: b) To expedite the collection of customer payments

12. What is the primary benefit of using marketable securities in cash management?
    a) Maximizing returns
    b) Minimizing liquidity
    c) Improving cash flow forecasting
    d) Enhancing shareholder value

    Answer: a) Maximizing returns

13. Which model is used to determine the optimal cash balance under certainty?
    a) Miller-Orr model
    b) EOQ model
    c) Baumol model
    d) Markowitz model

    Answer: c) Baumol model

14. What is the primary objective of the Miller-Orr model?
    a) To minimize transaction costs
    b) To maximize cash reserves
    c) To maintain a stable cash balance
    d) To optimize cash flow forecasting

Answer: c) To maintain a stable cash balance

15. What does the Economic Order Quantity (EOQ) model aim to minimize?
A. Total holding and ordering costs
B. Total sales revenue
C. Total manufacturing costs
D. Total marketing expenses

Answer: A. Total holding and ordering costs

16. What does the Inventory Turnover Ratio measure?
A. The number of orders placed per year
B. The efficiency of inventory management
C. The total value of inventory held
D. The percentage of inventory sold

Answer: B. The efficiency of inventory management

17. Which of the following is NOT a key step in physical stock verification?
A. Planning and Preparation
B. Inventory Segregation
C. Digitalization of records
D. Reconciliation

Answer: C. Digitalization of records

18. What is the primary purpose of setting quantitative levels in inventory control?
A. To increase inventory turnover
B. To determine stock levels for individual items
C. To reduce stock-outs
D. To minimize procurement costs

Answer: B. To determine stock levels for individual items

19. VED Analysis is primarily used for the control of:
A. Raw materials
B. Finished products
C. Spare parts
D. Consumable stores

Answer: C. Spare parts

20. FSN Analysis classifies materials based on:
A. Their alphabetical order
B. Their value and frequency of replenishment
C. Their physical properties
D. Their geographical origin

Answer: B. Their value and frequency of replenishment

PART C: INDIRECT TAXATION

(1) An important source of revenue: Indirect taxes are a major source of tax revenues for Governments worldwide and continue to grow as more countries move to consumption-oriented tax regimes. In India, indirect taxes contribute more than 50% of the total tax revenues of Central and State Governments.

(2) Tax on commodities and services: It is levied on commodities at the time of manufacture or purchase or sale or import/export thereof. Hence, it is also known as commodity taxation. It is also levied on provision of services.

(3) Shifting of burden: There is a clear shifting of tax burden in respect of indirect taxes. For example, GST paid by the supplier of the goods is recovered from the buyer by including the tax in the cost of the commodity.

(4) No perception of direct pinch: Since, value of indirect taxes is generally inbuilt in price of commodity, most of the time the taxpayer pays the same without actually knowing that he is paying tax to the Government. Thus, taxpayer does not perceive a direct pinch while paying indirect taxes.

(5) Inflationary: Tax imposed on commodities and services causes an all-round price spiral. In other words, indirect taxation directly affects the prices of commodities and services and leads to inflationary trend.

(6) Wider tax base: Unlike direct taxes, the indirect taxes have a wide tax base. Majority of the products or services are subject to indirect taxes with low thresholds.

1. **Introduction to GST Laws**
    - I. **BROAD PRINCIPLES OF GST**
    - II. **TAXES SUBSUMED IN GST**
    - III. **TAXES THAT ARE NOT SUBSUMED IN GST**
    - IV. **GST IN INDIA**
2. **Supply**
3. **Time, Place and Value of Supply**
4. **Basics of Customs Act**

1. BROAD PRINCIPLES OF GST

(i) GST is a value added tax levied on manufacture, sale and consumption of goods and services

(ii) Broad-based tax & destination based tax

(iii) Technically paid by suppliers but it is actually funded by consumers

(iv) Collected through a staged process i.e. a tax on the value added to goods or services at every point in the supply chain

(v) A tax on consumption of products from business sources, and not on personal or hobby activities

(vi) Input tax credit is provided throughout the value chain

(vii) Manufacturers, wholesalers, retailers and service providers charge GST at the specified rate on price of the goods and services from consumers and claim input credits for GST paid by them on procurement of goods and services (raw material).

(viii) Since, only the value added at each stage is taxed under GST, there is no tax on tax or cascading of taxes under GST system. GST does not differentiate between goods and services and thus, the two are taxed at a single rate.

2. TAXES SUBSUMED IN GST.

CENTRAL TAXES	STATE TAXES
• Central Excise Duty • Duties of Excise (Medicinal and Toilet Preparations) • Additional Duties of Excise (Goods of Special Importance) • Additional Duties of Excise (Textiles and Textile Products) • Additional Duties of Customs (commonly known as CVD) • Special Additional Duty of Customs (SAD) • Service Tax • Central Sales Tax • Cesses and surcharges in so far as they relate to supply of goods or services	• State VAT • Purchase Tax • Luxury Tax • Entry Tax (All forms) • Entertainment Tax **(except those levied by the local bodies)** • Taxes on advertisements • Taxes on lotteries, betting and gambling • State cesses and surcharges in so far as they relate to supply of goods or services

3.TAXES THAT ARE NOT SUBSUMED IN GST

Following products are outside the ambit of GST

1. Petroleum Products viz, petroleum crude, high spirit diesel, motor spirit (commonly known as petrol), natural gas and aviation turbine fuel

2. Alcoholic Liquor for human consumption

3.Electricity

Following taxes continue to be levied on above-mentioned products even post GST.

• Central excise duty continues to be levied on manufacture of tobacco, petroleum crude, diesel, petrol, ATF and natural gas; **[Tobacco and related products would be subjected to both GST and Excise Duty]**

• State excise duty is leviable on manufacture of alcoholic liquor, opium, Indian hemp and narcotics,

• VAT is leviable on intra-State sale of petroleum crude, diesel, petrol, ATF, natural gas and alcoholic liquor.

• Petroleum crude, diesel, petrol, ATF, natural gas are presently not taxable under GST and alcoholic liquor is outside the ambit of GST

4. GST in India

A. Basic Principles of GST in India

(i) GST is a consumption or destination-based tax levied on the basis of the "Destination principle."

(ii) Comprehensive tax regime covering both goods and services and collected on value-added at each stage of the supply chain.

(iii) GST paid on the procurement of goods and services can be set off against that payable on the supply of goods or services.

GST is levied on goods and services imposed at each point of SUPPLY

B. DUAL MODEL OF GST

The power to levy taxes would be subjectively distributed between Centre and States and there will be separate levies in the form of

a. Intra-State Supply of goods and services

- Central Goods and Services Tax (CGST): Payable to Central Government and
- State Goods and Services Tax (SGST) / Union Territory Goods and Service Tax (UTGST): Payable to State Government/union territory (as applicable) where they are consumed.

b. Inter-State Supply of goods and services

- (iii) Integrated Goods and Services Tax (IGST): Payable to Central Government.

Centre will levy and administer CGST and IGST while respective State/UTs will levy and administer SGST/UTGST.

C. Types of Supply

Intra-State Supply - Where the **location of the supplier** and the **place of supply** of goods or services are in the **same State/Union territory**, it is treated as **INTRA-STATE SUPPLY** of goods or services respectively

INTER STATE SUPPLY - Where the **location of the supplier** and **place of supply** of goods or services are in (i) two different States or (ii) two different Union Territories or (iii) a State and a Union territory, it is treated as **INTER-STATE SUPPLY** of goods or services respectively

C. Import and Export

Import will be treated as inter-state supply and IGST will be chargeable along with basic custom duty. However, in GST, Export will be treated as Zero rated supplies and no IGST is payable.

D. Rates of GST

Rates of GST are 0.5%, 3%, 5%, 12%, 18%, and 28%.

These are IGST rates, However, where CGST and SGST/UTGST is applicable (i.e. in case of intra-State supply) rates of IGST shall be divided into 2 parts i.e., 50% pf rate of IGST shall be treated as rate of CGST and balance 50% shall be treated as SGST/UTGST.

Illustration 1

Mr. A Sold a Television to Mr. B for ₹100,000. CGST rate @ 18%, CGST rate @ 9% and SGST rate @ 9%.

Determine the amount of GST in both the following case

- Mr. A is from Kolkata and Mr. B is from Delhi
- Mr. A and Mr. B both are from Jaipur.

Ans-

(i) If Mr. A is from Kolkata and Mr. B is from Delhi, then location of supplier and place of place of supply is in two different states so this is treated as Inter-State Supply of Goods and IGST will be levied.

Particulars	Amount (₹)
Sale Price of Television	100,000
Add: IGST @ 18 %	18,000
Total Invoice Value	118,000

So, the IGST amount is ₹18,000.

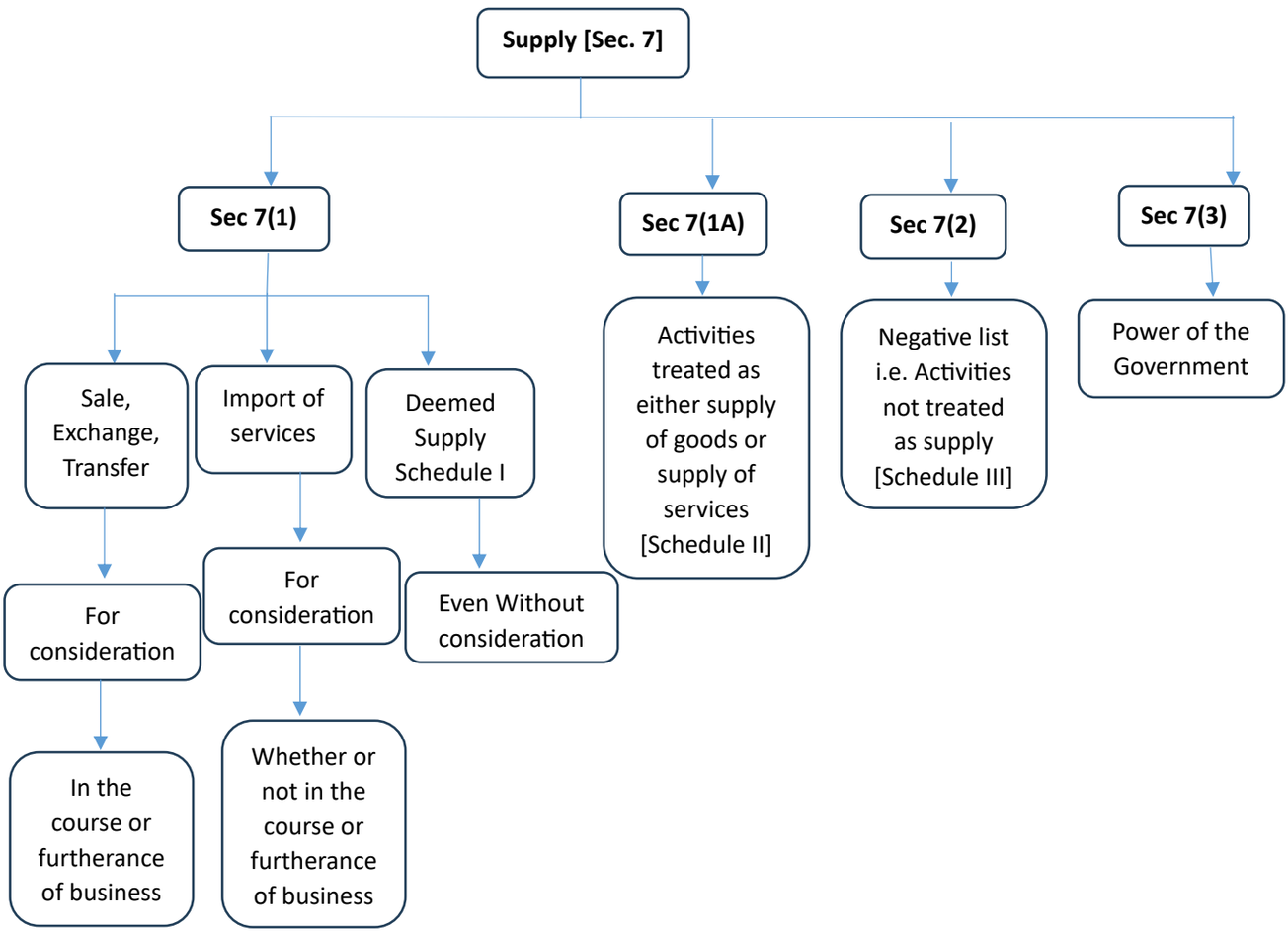
(ii) If Mr. A and Mr. B both are from Jaipur, then location of supplier and place of supply is the same state of Rajasthan So, it is treated as Intra-state supply of Goods and CGST & SGST will be levied.

Particulars	Amount (₹)
Sale Price of Television	100,000
Add: CGST @ 9 %	9,000
SGST @ 9%	9,000
Total Invoice Value	118,000

So, the CGST amount is ₹9,000 and the SGST amount is ₹9,000

5. Supply

Section 7	Meaning and scope of supply
Section 8	Taxability of composite and mixed supplies
Schedule I	Matters to be treated as supply **even if made without consideration**
Schedule II	Matters to be treated as supply of goods or as supply of services
Schedule III	Matters or transactions which shall be treated **neither as supply of goods nor as supply of services**



Supply [Sec. 7(1)]

Supply includes:

a. **all forms** of supply of goods or services or both such as sale, transfer, barter, exchange, licence, rental, lease or disposal made or agreed to be made for a **consideration** by a person **in the course or furtherance of business.**

aa. the activities or transactions, by a person, other than an individual, to its members or constituents or vice- versa, for cash, deferred payment or other valuable consideration.

- Notwithstanding anything contained in any other law for the time being in force or any judgment, decree or order of any Court, tribunal or authority, the person and its members or constituents shall be deemed to be two separate persons, and the supply of activities or transactions inter se shall be deemed to take place from one such person to another;

b. import of services **for a consideration whether or not** in the course or furtherance of business.

c. The activities specified in Schedule I, made or agreed to be made **without a consideration**.

All forms of supply of goods or services or both for a consideration by a person in the course or furtherance of business [Sec. 7(1)(a)]

Supply includes all forms of supply (goods and/ or services) and includes agreeing to supply when the supply is for a consideration and in the course or furtherance of business. It specifically provides for the inclusion of the following classes of transactions:

a. Sale	Sale is a lawful, permanent and absolute transfer of ownership of property in goods for money consideration under a valid contract such that no rights are left behind with the transferor.
b. Transfer	Transfer is to lawfully convey property from one person to another. Consent of the transferor and capacity of transferee may not be present although all other ingredients of a lawful contract are involved.
c. Barter	Barter is where the consideration is in the form of goods or services (and not in money) for a sale or transfer. Barter will involve two supplies and not one.
d. Exchange	The act of giving or taking one thing in return for another.
e. License	To give permission to enter and use the property (movable or immovable) or permission to act.
f. Rental	An arrangement to rent something or the amount of money that you pay to rent something.
g. Lease	To make a legal agreement by which money is paid in order to use land, a building, a vehicle, or a piece of equipment for an agreed period of time.
h. Disposal	The act of getting rid of something, especially by throwing it away

Import of service for consideration whether or not in the course or furtherance of business [Sec. 7(1)(b)]

The word 'supply' includes import of a service (not goods), made for a consideration and whether or not in the course or in furtherance of business. This implies that import of paid services, even for personal consumption would qualify as 'supply' and, therefore, would be liable to tax.

Activities specified in Schedule I, made or agreed to be made without a consideration [Sec. 7(1)(c)]

As per schedule I, following activities are to be treated as supply even if made without consideration provided such activities are in course or furtherance of business:

1. Permanent transfer or disposal of business assets where input tax credit (ITC) has been availed on such asset shall be treated as supply.

   Where ITC has not been availed at the time of acquisition of assets, disposal of such assets without consideration is not treated as supply.

2. Supply of goods or services or both between:
   - related persons or
   - distinct persons as specified in sec. 25,

   when made in the course or furtherance of business, shall be treated as supply (even though without consideration)

Exception : Gifts not exceeding ₹ 50,000 in value in a financial year by an employer to an employee shall not be treated as supply of goods or services or both.

3. Supply of goods*:
   a. by a principal to his agent where the agent undertakes to supply such goods on behalf of the principal; or
   b. by an agent to his principal where the agent undertakes to receive such goods on behalf of the principal.

   * The clause is applicable in case of Pakka aarhatia (i.e., the agent selling or buying in this own name).
4. Import of services by a person from a related person or from any of his other establishments outside India, in the course or furtherance of business.

Activities or transactions to be treated as supply of goods or supply of services [Sec. 7(1A) with Schedule II]

In the earlier tax regime, activities like works contract was treated as both goods and services. Both VAT and service taxes were applicable on it. There were various rates, composition schemes available for works contractors with many complexities thus resulting in litigation. To settle the innumerable complexities and confusion regarding these types of activities, Schedule II is inserted in the GST laws which specifically mention the nature of supply involved in these activities.

As per Schedule II, the following activities or transactions shall be treated as either supply of goods or supply of service.

Particulars	Type of activity	Nature of supply	
		Supply of goods	Supply of services
Transfer	a. any transfer of the title in goods **Example 5 :** Roby Collection sells readymade garments to its customers is a supply of goods	Yes	
	b. any transfer of right in goods or of undivided share in goods without transfer of title thereof **Example 6 :** Akhil gives his weaving machine to Rahul on rent for two months is a supply of services		Yes
	c. any transfer of title in goods under an agreement which stipulates that property in goods shall pass at a future date upon payment of full consideration as agreed **Example 7 :** Narayan supplied car to Kunal with a condition that ownership shall be transferred after full and final payment, is treated as supply of goods.	Yes	
Land and Building	a. any lease, tenancy, easement, licence to occupy land **Example 8 :** Vikram, owner of a piece of land in Napasar, Bikaner, leases the same land to Murli for one year at an agreed consideration, is a supply of services.		Yes
	b. any lease or **letting out of the building** including a commercial, industrial or **residential complex** for **business or commerce**, either wholly or partly **Example 9:** Vikash owns a shop in the market area. Such shop is let out by Vikash to Anil, it is treated as supply of services.		Yes
Treatment or process	Any treatment or process which is applied to another person's goods is a supply of services **Example 10 :** Job work		Yes
Transfer of business assets	a. where goods forming part of the assets of a business are transferred or disposed of by or under the directions of the person carrying on the business so as no longer to form part of those assets **Example 11:** Kunal disposes his business asset being old laptop. This transaction is treated as supply of goods.	Yes	
	b. where, by or under the direction of a person carrying on a business, goods held or used for the purposes of the business are put to any private use or are used, or made available to any person for use, for any purpose other than a purpose of the business. **Example 12 :** Sonam provides her business laptop to his son Mohak for his full-time study is treated as supply of services. c. where any person ceases to be a taxable person, any goods forming part of the assets of any business carried on by		Yes

Particulars	Type of activity	Nature of supply	
		Supply of goods	Supply of services
	him shall be deemed to be supplied by him in the course or furtherance of his business immediately before he ceases to be a taxable person. **Example 13 :** Due to ill-health, Mr. X shut downs his business. Any business asset left at the time of shut down of the business shall be treated as supply. **Exceptions** i. the business is transferred as a going concern to another person; or ii. the business is carried on by a personal representative who is deemed to be a taxable person.	Yes	
Immovable property	Renting of immovable property **Taxpoint :** Rent of immovable property for any purpose is treated as supply of service. However, vide Notification No. 12/2017- CT(R) dated 28/06/2017, renting of residential dwelling for use as residence is treated as exempted supply [Entry 12].		Yes
Construction	Construction of a complex, building, civil structure or a part thereof, including a complex or building intended for sale to a buyer, wholly or partly. **Exception :** However, where the entire consideration has been received: a. after issuance of completion certificate, where required, by the competent authority; or b. after its first occupation – whichever is earlier. then it is not treated as supply. **Taxpoint** ➢ Sale of ready flat, where entire consideration is received after aforesaid date, is not a supply. ➢ "Competent authority" means the Government or any authority authorised to issue completion certificate under any law for the time being in force and in case of non-requirement of such certificate from such authority, from any of the following: i. an architect registered with the Council of Architecture constituted under the Architects Act, 1972; or ii. a chartered engineer registered with the Institution of Engineers (India); or iii. a licensed surveyor of the respective local body of the city or town or village or development or planning authority; ➢ "Construction" includes additions, alterations, replacements or remodelling of any existing civil structure.		Yes
Intellectual property right	Temporary transfer or permitting the use or enjoyment of any intellectual property right (IPR) **Taxpoint :** Transfer of ownership in IPR permanently is treated as supply of goods.		Yes
Information technology software	Development, design, programming, customization, adaptation, upgradation, enhancement, implementation of information technology software; **Example 14 :** Mr. Rahul develops a customized software for X Ltd. It is treated as supply of services		Yes

Particulars	Type of activity	Nature of supply	
		Supply of goods	Supply of services
Non-compete fee	Agreeing to the obligation to refrain from an act, or to tolerate an act or a situation, or to do an act; **Taxpoint :** Non-compete agreement is treated as supply of services. Further, charges recovered from the supplier for non-supplying the desired product is treated as supply of services.		Yes
Right to use	Transfer of the right to use any goods for any purpose (whether or not for a specified period) for cash, deferred payment or other valuable consideration. **Example 15 :** Hire purchase.		**Yes**
Composite supply	a. works contract; and **Taxpoint :** As per sec. 2(119), "works contract" means a contract for building, construction, fabrication, completion, erection, installation, fitting out, improvement, modification, repair, maintenance, renovation, alteration or commissioning of any immovable property wherein transfer of property in goods (whether as goods or in some other form) is involved in the execution of such contract.		Yes
	b. supply, by way of or as part of any service or in any other manner whatsoever, of goods, being food or any other article for human consumption or any drink (other than alcoholic liquor for human consumption), where such supply or service is for cash, deferred payment or other valuable consideration.		

Activities neither supply of goods nor supply of services (Negative List) [Sec. 7(2)]

The following activities shall be treated neither as a supply of goods nor supply of services

a. activities or transactions specified in Schedule III; or

b. such activities or transactions undertaken by the Central Government, a State Government or any local authority in which they are engaged as public authorities, as may be notified by the Government on the recommendations of the Council,

Activities or transactions specified in Schedule III

1. Services by an employee to the employer in the course of or in relation to his employment.

2. Services by any **court or Tribunal** established under any law for the time being in force.

3. a. the functions performed by the **Members** of Parliament, Members of State Legislature, Members of Panchayats, Members of Municipalities and Members of other local authorities

   b. the duties performed by any person who holds any post in pursuance of the provisions of the **Constitution** in that capacity; or

   - Duties performed by President of India, Vice-President of India, Prime Minister of India, Chief Justice of India, Speaker of the Lok Sabha, Controller and Auditor General of India (CAG), Chairman of Union Public Service Commission, Chief Election Commissioner, Attorney General of India in that capacity are covered

   c. The duties performed by any person as a **Chair-person** or a **Member** or a **Director** in a body established by the **Central Government** or a **State Government** or **local authority** and who is not deemed as an employee before the commencement of this clause.

4. Services of funeral, burial, crematorium or mortuary including **transportation** of the **deceased**.

5. Sale of land and, subject to clause (b) of paragraph 5 of schedule II, sale of building. (i.e., excluding sale of under-construction premises where the part or full consideration is received before issuance of completion certificate or before its first occupation, whichever is earlier).

6. Actionable claims, other than specified actionable claim.

7. Supply of goods from a place in the non-taxable territory to another place in the non-taxable territory without such goods entering into India i.e., merchant trading or Out and Out transactions.

8. a. Supply of warehoused (i.e. customs bonded) goods to any person **before clearance** for home consumption.
   b. Supply of goods by the consignee to any other person, by endorsement of documents of title to the goods, after the goods have been dispatched from the port of origin located outside India but before clearance for home consumption i.e., high sea sale

3. Time, Place and Value of Supply

3.1 Time of Supply

In order to calculate and discharge tax liability it is important to know the date when the tax liability arises i.e. the date on which the charging event has occurred. In GST law, it is known as Time of Supply. Time of supply means the point of time when goods/services are considered as supplied. If the seller knows the time of supply, then it will help him to recognize the due date for the payment of taxes.

GST law has provided separate provisions to determine the time of supply of goods and time of supply of services.

Time of Supply of Goods – Forward Charge [Sec. 12(2)]

The time of supply of goods shall be the earlier of the following dates :

a. the date of issue of invoice by the supplier; or

b. the last date on which he is required to issue the invoice with respect to the supply u/s 31; or

c. the date on which the supplier receives the payment with respect to the supply [Not relevant]

Tax Invoice [Sec. 31]

1. A registered person supplying taxable goods shall issue a tax invoice, before or at the time of :

Where the supply involves movement of goods	Removal of goods for supply to the recipient
Where the supply does not involve movement of goods	Delivery of goods or making available thereof to the recipient

2. In case of **continuous supply of goods,** where successive statements of accounts or successive payments are involved, the invoice shall be issued before or at the time each such statement is issued or, as the case may be, each such payment is received [Sec. 31(4)]

3. Where the goods being **sent or taken on approval** for sale or return are removed before the supply takes place, the invoice shall be issued before or at the time of supply or 6 months from the date of removal, whichever is earlier [Sec. 31(7)]

Illustration 1

Determine the time of supply in following cases

Case	Invoice Issued on	Removal of goods for supply on	Goods made available on	Payment received on	Time of Supply
1.	15/04/2024	20/04/2024	20/04/2024	19/04/2024	15/04/2024
2.	15/05/2024	20/04/2024	20/04/2024	19/04/2024	20/04/2024
3.	15/04/2024	NA	20/04/2024	27/04/2024	15/04/2024
4.	15/05/2024	NA	20/04/2024	30/05/2024	20/04/2024
5.	15/04/2024	20/04/2024	20/04/2024	19/03/2024	15/04/2024

Illustration 2

Ramesh issues an invoice of ₹ 54,200 for supply of goods as on 10/04/2024 and received ₹ 55,000 in his bank account through NEFT on the same date which was credited into his books of account on 11/04/2023. Determine the time of supply of goods and the time of supply of excess receipt. How shall your answer differ, if he received ₹ 75,000 instead of ₹ 55,000?

Solution:

a. Time of supply in case of supply of goods shall be 10/04/2024. Date of receipt of payment is not relevant for determining time of supply in view of the Notification No. 66/2017-CT dated 15/11/2017.

b. Ramesh has received ₹ 800 in excess. He will adjust the excess amount against the next supply. The time of supply of such excess amount shall be the date of issuance of next invoice.

c. In alternate situation, he has received ₹ 20,800 in excess. Even in this situation, the time of supply of such excess amount shall be the date of issuance of next invoice assuming that this excess will be adjusted in the said invoice.

Time of Supply of Goods in case of reverse charge [Sec. 12(3)]

In case of supplies in respect of which tax is paid or liable to be paid on reverse charge basis, the time of supply shall be the earliest of the following dates:

- the date of the receipt of goods; or
- the date of payment as entered in the books of account of the recipient; or
- the date on which the payment is debited in his bank account; or
- the date immediately following 30 days from the date of issue of invoice or any other document, by whatever name called, in lieu thereof by the supplier.

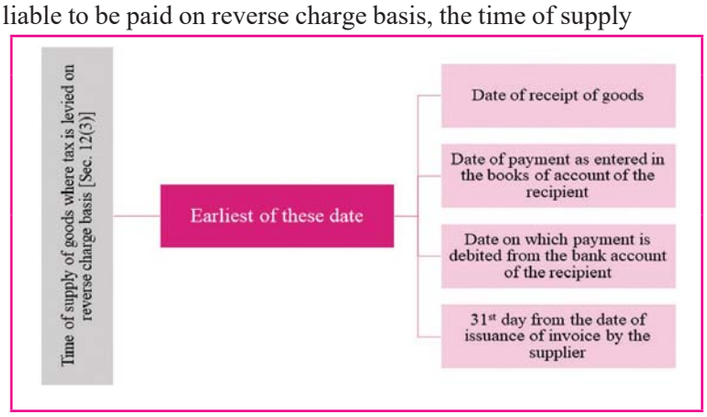


Illustration 3 :

Mr. Amar supplies goods (liable under reverse charge) to Mr. Nath. You are required to determine time of supply considering following details :

01.04.2024	Mr. Nath approaches Mr. Amar and places an order
10.04.2024	Mr. Nath receives the goods
15.04.2024	Mr. Amar issues an invoice
20.04.2024	Mr. Nath makes a payment by cheque and accordingly records it in his books of accounts
25.04.2024	The payment gets debited from Mr. Nath's bank account

How shall your answer differ if the goods were received by Mr. Nath on 30.04.2024 instead of 10.04.2024

Solution:

The time of supply shall be the earlier of the following dates:

a. the date of receipt of goods i.e. 10.04.2024
b. the date of payment as recorded in the books of Mr. Nath i.e. 20.04.2024
c. the date when the payment gets debited from the bank of Mr. Nath i.e. 25.04.2024
d. the date immediately following 30 days from the date of issue of invoice by Mr. Amar, i.e. 15.04.2024 + 30 days + 1 day = 16.05.2024

Therefore, the time of supply will be 10.04.2024.

Time of Supply in case of Voucher [Sec. 12(4)]

In case of supply of vouchers by a supplier, the time of supply shall be :

If the supply is identifiable at the point at which voucher is issued	The date of issue of voucher
In all other cases	The date of redemption of voucher

Time of Supply of goods in residual cases [Sec. 12(5)]

Where it is not possible to determine the time of supply under any of the aforesaid provisions, the time of supply shall be :

Where a periodical return has to be filed	The date on which such return is to be filed
In any other case	The date on which the tax is paid.

Time of Supply in case of enhancement in value on account of interest, late fee, etc. [Sec. 12(6)]

The time of supply to the extent it relates to an addition in the value of supply by way of interest, late fee or penalty for delayed payment of any consideration shall be the date on which the supplier receives such addition in value.

Illustration 4 :

Mr. Viswa enters into a contract for supply of goods worth ₹ 10, 00,000 with Mr. Nath on 10th April 2024. Such goods are removed with an invoice dated 12th April 2024 on 13th April 2024 for delivery to Mr. Nath. The terms of the contract demanded the payment against such supply to be made within 60 days beyond which a late payment charge of ₹ 20,000 will have to be paid by Mr. Nath. Mr. Nath makes the payment of ₹ 10,00,000 along with the late payment charges on 15th July 2024. What will be the time of supply in respect of the entire amount?

Solution:

In sec. 12(2), the time of supply in respect of ₹ 10, 00,000 will be the date of issuance of invoice or last date of issuance of invoice. Last date of issuance of invoice will be the date of removal where supply involves movement of goods.

- Date of issuance of invoice: 12th April 2024
- Last date of issuance of invoice: 13th April 2024 (date of removal)
- The date of payment is immaterial as per Notification no. 66/2017-CT dated 15th November 2017.

So, the time of supply will be 12th April, 2024 in respect of ₹ 10, 00,000.

However, in respect of the time of supply for the amount of ₹ 20,000 paid as late payment charges, time of supply as per sec. 12(6) has been stated to be the date on which the supplier receives the addition in value. Here, the additional amount of ₹ 10,000 is received on 15th July 2024. Hence, the time of supply for this amount will also arise on 15th July 2024.

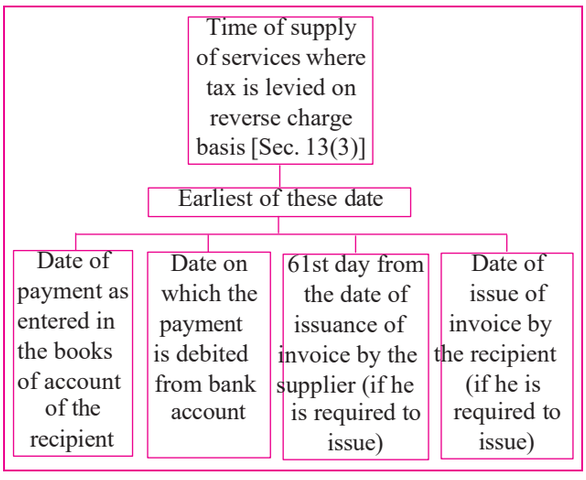
Time of Supply of Services – Forward Charge [Sec. 13(2)]

The time of supply of services shall be the earliest of the following dates, namely :

Situation	Time of Supply
If the invoice is issued within the period prescribed u/s 31	a. The date of issue of invoice by the supplier; b. The date of receipt of payment – whichever is earlier
If the invoice is not issued within the period prescribed u/s 31	a. The date of provision of service; b. The date of receipt of payment – whichever is earlier
In any other case	The date on which the recipient shows the receipt of services in his books of account.

Time of Supply of Services – Reverse Charge [Sec. 13(3)]

a. the date of payment as entered in the books of account of the recipient; or
b. the date on which the payment is debited in his bank account; or
c. the date immediately following 60 days from the date of issue of invoice or any other document, by whatever name called, in lieu thereof by the supplier, in cases where invoice is required to be issued by the supplier.
d. the date of issue of invoice by the recipient, in cases where invoice is to be issued by the recipient.



Time of Supply of Services – Voucher [Sec. 13(4)]

In case of supply of vouchers by a supplier, the time of supply shall be :

If the supply is identifiable at the point at which voucher is issued	The date of issue of voucher
In all other cases	The date of redemption of voucher

Time of Supply of Services – Residual Cases [Sec. 13(5)]

Where it is not possible to determine the time of supply of service under any of the aforesaid provisions, the time of supply shall be :

Where a periodical return has to be filed	The date on which such return is to be filed
In any other case	The date on which the tax is paid.

Time of Supply in case of enhancement in value on account of interest, late fee, etc. [Sec. 13(6)]

The time of supply to the extent it relates to an addition in the value of supply by way of interest, late fee or penalty for delayed payment of any consideration shall be the date on which the supplier receives such addition in value.

3.2 Place of Supply

Introduction

Place of supply is important to determine the kind of tax that is to be charged. As per sec. 7 of the IGST Act, when the location of supplier and the place of supply are in two different States (or Union territory), then it will be an inter-State supply and IGST would be chargeable. And when they are in the same State (or Union territory), then it will be an intra-State supply and CGST/ SGST would be chargeable.

'Place of supply' is not a phrase of common understanding, it is a legal term and as in the cases of all legal terms, their common understanding must not be applied but the meaning assigned to them in the law must be followed. Place of supply, similar to time of supply, is that which the legislature has appointed.

Place of supply determines the State or Union Territory to which the SGST portion of the revenue accrues.

Place of supply of goods other than supply of goods imported into, or exported from India [Sec. 10 of the IGST Act]

Situation	Place of Supply
Where the supply involves movement of goods, whether by the supplier or the recipient or by any other person [Section 10(1)(a)]	The place of supply of such goods shall be the location of the goods at the time at which the movement of goods terminates for delivery to the recipient **E,g.** A supplier located in Kolkata supplies goods to the recipient in Delhi. In this case place of supply shall be Delhi
Goods are delivered by the supplier to a recipient or any other person on the direction of a third person, whether acting as an agent or otherwise, before or during movement of goods by way of transfer of documents of title to the goods or otherwise. [Section 10(1)(b)]	The place of supply of such goods shall be the principal place of business of third person **E.g.,** Burman of West Bengal supplied goods to Raman of Tamilnadu. When goods start moving, Raman instructs the supplier i.e. Mr. Burman to deliver the goods to Chaman at Kerala on his behalf. The place of supply will be Tamilnadu
Where the supply does not involve movement of goods [Section 10(1) (c)]	The place of supply will be the location of the goods at the time of its delivery to the recipient **E.g.,** Ramesh took a building on rent from Raja. He installed the centralized AC in the building. After three years, Ramesh vacated the building but agreed with Raja to leave behind the AC without dismantling it. The supply of AC by Ramesh to Raja does not involve movement of goods and the place of supply shall be where the AC is fixed.

Situation	Place of Supply
W.e.f. 01-10-2023, supply of goods purchased Over the Counter in one State and transported to another State by the unregistered buyer [Section 10(1)(ca)]	The place of supply shall be the location as per the address of the said person recorded in the invoice issued in respect of the said supply and the location of the supplier where the address of the said person is not recorded in the invoice. **Taxpoint:** Recording of the name of the State of the said person in the invoice shall be deemed to be the recording of the address of the said person. **Case** Mr. A (unregistered person) located in X State places an order on an e-commerce platform for supply of a mobile phone, which isto be delivered at an address located in Y State. Mr. A, while placing the order on the e-commerce platform, provides the billing address located in X state. In such a scenario, what would be the place of supply of the said supply of mobile phone, whether the State pertaining to the billing address i.e. State X or the State pertaining to the delivery address i.e. State Y? **Clarification** It is clarified that in such cases involving supply of goods to an unregistered person, where the address of delivery of goods recorded on the invoice is different from the billing address of the said unregistered person on the invoice, the place of supply of goods shall be the address of delivery of goods recorded on the invoice i.e. State Y in the present case where the delivery address is located. Also, in such cases involving supply of goods to an unregistered person, where the billing address and delivery address are different, the supplier may record the delivery address as the address of the recipient on the invoice for the purpose of determination of place of supply of the said supply of goods – [Circular No. Circular No. 209/3/2024-GST]
Where the goods are assembled or installed at site [Section 10(1)(d)]	The place of supply will be the location of such installation or assembly **E.g.,** X Ltd., Karnataka, purchases a lift to be installed in their Chennai office from a vendor located in Karnataka. In this case, the place of supply would be considered as Chennai as the lift has been installed in Chennai.
Where goods are supplied on-board a conveyance [Section 10(1)(e)]	The place of supply will be the location at which the goods are taken on-board. **E.g.,** Mr. Jain boarded the train at Kolkata for its destination Bhopal, MP. He is carrying certain goods with him for the purpose of sale during the journey. When the train reaches Tatanagar, Jharkhand, he sells certain goods. Now, in this case the place of supply of such goods will be Kolkata (the location at which the goods are taken on board).

Place of supply of goods imported into, or exported from India [Sec. 11 of the IGST Act]

Place of supply of goods imported into, or exported from India shall be determined as under:

Case	Place of Supply
Import	The place of supply of goods imported into India shall be the location of the importer
Export	The place of supply of goods exported from India shall be the location outside India

3.3 Value of Supply

GST is computed as a certain percentage of the value of taxable supply. Thus, valuation of such supply is utmost important aspect for determining the liability.

Value of taxable supply [Sec. 15(1)]

The value of a supply of goods or services or both shall be the transaction value, which is the price actually paid or payable for the said supply of goods or services or both where the supplier and the recipient of the supply are not related and the price is the sole consideration for the supply – Sec. 15(1)

In other words, transaction value shall be considered as a value of taxable supply provided following conditions are satisfied:

a. the supplier and the recipient of the supply are not related; and

b. the price is the sole consideration for the supply.

Determination of Value :

Value of taxable supply = Transaction Value + Certain Inclusions – Certain Exclusions

Particulars	Amount	Amount
The price actually paid or payable for the said supply of goods or services or both		xxx
Add: Inclusions as per sec. 15(2) Any taxes, duties, cesses, fees and charges levied under any law (excluding GST), if charged separately by the supplier **Taxpoint :** TCS under the Income-tax Act shall not be considered as it is an interim levy and not the final tax.	xxx	
Any amount that the supplier is liable to pay in relation to such supply but which has been incurred by the recipient of the supply and not included in the price actually paid or payable for the goods or services or both.	xxx	
Incidental expenses, including commission and packing, charged by the supplier to the recipient of a supply and any amount charged for anything done by the supplier in respect of the supply of goods or services or both at the time of, or before delivery of goods or supply of services.	xxx	
Interest or late fee or penalty for delayed payment of any consideration for any supply	xxx	
Subsidies directly linked to the price **excluding** subsidies provided by the Central Government and State Governments.	xxx	xxx
Taxpoint : The amount of subsidy shall be included in the value of supply of the supplier who receives the subsidy.		
		xxx
Less: Exclusions as per sec. 15(3)		
Any discount which is given: a. before or at the time of the supply if such discount has been duly recorded in the invoice issued in respect of such supply; and b. after the supply has been effected, if- i. such discount is established in terms of an agreement entered into at or before the time of such supply and specifically linked to relevant invoices; and input tax credit as is attributable to the discount on the basis of document issued by the supplier has been reversed by the recipient of the supply		xxx
Value of Taxable Supply		**xxx**

Illustration 4 :

RG Pvt. Ltd. provides the following particulars relating to goods sold by it to GK Pvt. Ltd.:

Particulars	Amount in (₹)
List price of the goods (exclusive of taxes and discounts)	10,00,000
Tax levied by Municipal Authority in the sale of such goods	1,00,000
CGST and SGST chargeable on the goods	2,00,880
Packing charges (not included in price above)	20,000

RG Pvt. Ltd. received ₹ 40,000 as a subsidy from a NGO on sale of such goods. The price of ₹ 10,00,000 of the goods is after considering such subsidy. RG Ltd. offers 2% discount on the list price of the goods which is recorded in the invoice for the goods.

Determine the value of the taxable supply made by RG Pvt. Ltd.

Solution:

Computation of value of taxable supply :

Particulars	₹	₹
List price of the goods (exclusive of taxes and discounts)		10,00,000
i. Tax levied by Municipal Authority on the sale of such goods [Includible in the value as per section 15(2)(a)]	1,00,000	
ii. CGST and SGST chargeable on the goods [Not includible in the value as per section 15(2)(a)]	-	
iii. Packing charges [Includible in the value as per section 15(2)(c)]	20,000	
iv. Subsidy received from a non-Government body [Since subsidy is received from a non-Government body, the same is included in the value in terms of section 15(2)(e)]	40,000	1,60,000
Total		11,60,000
Less: Discount @ 2% on ₹ 10,00,000		20,000
Value of taxable supply		**11,40,000**

4.Basics of Customs Act

Entry No. 83 of the List I to the Schedule VII of the Constitution empowers the Union Government to legislate and collect duties on imports and exports. Accordingly, the Customs Act, 1962, effective from 1-2-1963 provides vide its section 12 for the levy of duties on goods imported into or exported from India. The items and the rates of duties leviable thereon are specified in two Schedules to the Customs Tariff Act, 1975. The First Schedule specifies the various import items in systematic and well considered categories, in accordance with an international scheme of classification of internationally traded goods known as 'Harmonized System of Commodity Classification' and specifies the rates of import duties thereon, as prescribed by the legislature. The duties on imported items are usually levied either on specific or ad-valorem basis, but in few cases specific-cum-ad valorem duties are also levied. The Second Schedule incorporates items that are subject to exports duties and the rates of duties thereof.

Levy of duties on ad-valorem (i.e., with reference to value) basis is the predominant mode of levy. For this purpose the value of the imported goods is required to be determined as per provisions of Section 14 of the Customs Act, 1962 read with the Customs Valuation (Determination of Prices of Imported Goods) Rules, 2007. These provisions are essentially the adoption of GATT based valuation system (now termed WTO Valuation Agreement) that is followed internationally. Likewise, in respect of export of the goods, the value is to be determined as per provisions of Section 14 of the Customs Act, 1962 read with the Customs Valuation (Determination of Value of Export Goods) Rules, 2007.

4.1 Source of Customs Law

Customs Act. 1962

The Customs Act contains the provisions governing the import and export duty imposed on imports and exports of goods.

Customs Tariff Act. 1975

It contains rate of customs duty levied on imports or exports of a goods.

Rules & Regulation

There are various rules and regulation has been issued. Few of them are Customs Valuation (Determination of Value of Export Goods) Rules, 2007; Customs Valuation (Determination of Value of Imported Goods) Rules, 2007; Baggage Rules, 2016; Re-export of Imported Goods (Drawback of Customs Duties) Rules, 1995; etc.

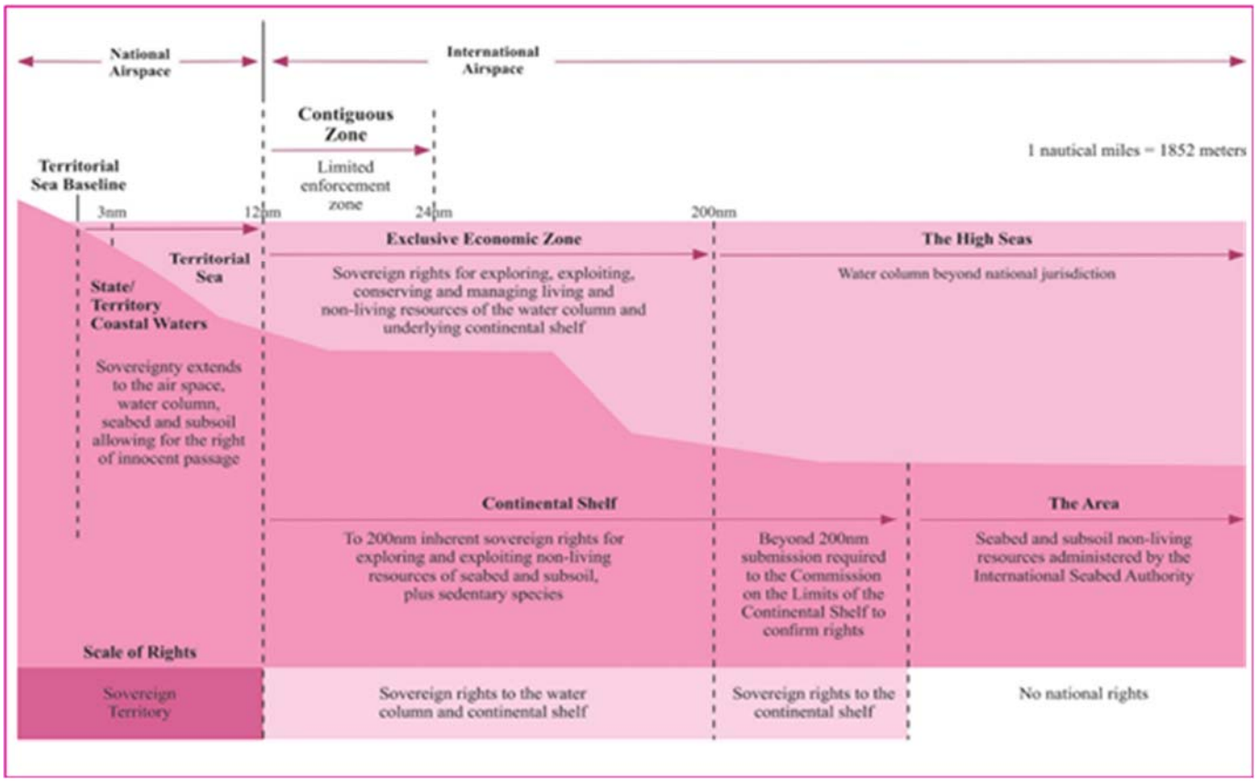
4.2 Levy of Customs Duty

Applicability

The Customs Act, 1962 extends to whole of India.

Meaning of terms

- **Baseline:** It is lower water mark along the coast.
- **Exclusive Economic Zone of India (EEZI):** The exclusive economic zone of India is an area beyond and adjacent to the territorial waters, and the limit of such zone is 200 nautical miles from the baseline.
- **Continental Shelf of India (CSI):** The continental shelf of India comprises the seabed and subsoil of the submarine areas that extend beyond the limit of its territorial waters throughout the natural prolongation of its land territory to the outer edge of the continental margin or to a distance of 200 nautical miles from the baseline, where the outer edge of the continental margin does not extend up to that distance.



Extension of the Customs Act, 1962 and the Customs Tariff Act, 1975 to EEZ and Continental Shelf

i. The **notified designated areas** in the Continental Shelf of India (CSI) and Exclusive Economic Zone of India (EEZI); and

ii. **Whole** of the EEZ and Continental Shelf of India for following purposes:

   a. the prospecting for extraction or production of mineral oils (including petroleum and natural gas) in the Continental Shelf and EEZ of India, and

   b. the supply of any goods in connection with any of the aforesaid activities.

Indian Customs Waters [Sec. 2(28)]

It means the water extending into the sea upto the limit of Exclusive Economic Zone u/s 7 of the Territorial Water, Continental Shelf, Exclusive Economic Zone and Other Maritime Zone Act, 1976 and includes any bay, gulf, harbour, creek or tidal river.

Chargeability [Sec. 12]

Duties of customs shall be levied at the rate specified under the Customs Tariff Act, 1975 or any other law for the time being in force on goods imported into or exported from India.

Some Important Definitions

Sec.	Term	Definition
2(1)	Adjudicating authority	Adjudicating authority means any authority competent to pass any order or decision under this Act, but does not include i. the Board, ii. Commissioner (Appeals) or iii. Appellate Tribunal

2(2)	Assessment	Assessment means determination of the dutiability of any goods and the amount of duty, tax, cess or any other sum so payable, if any, under this Act or under the Customs Tariff Act, 1975 or under any other law for the time being in force, with reference to: a. the tariff classification of such goods as determined in accordance with the provisions of the Customs Tariff Act; b. the value of such goods as determined in accordance with the provisions of this Act and the Customs Tariff Act; c. exemption or concession of duty, tax, cess or any other sum, consequent upon any notification issued therefor under this Act or under the Customs Tariff Act or under any other law for the time being in force; d. the quantity, weight, volume, measurement or other specifics where such duty, tax, cess or any other sum is leviable on the basis of the quantity, weight, volume, measurement or other specifics of such goods; e. the origin of such goods determined in accordance with the provisions of the Customs Tariff Act or the rules made thereunder, if the amount of duty, tax, cess or any other sum is affected by the origin of such goods; f. any other specific factor which affects the duty, tax, cess or any other sum payable on such goods, and includes provisional assessment, self- assessment, re-assessment and any assessment in which the duty assessed is nil ;
2(3)	Baggage	Baggage includes unaccompanied baggage but does not include motor vehicles;
2(3A)	Beneficial owner	Beneficial owner means any person on whose behalf the goods are being imported or exported or who exercises effective control over the goods being imported or exported;
2(4)	Bill of entry	Bill of entry means a bill of entry referred to in sec. 46. Sec. 46 provides that the importer of any goods, other than goods intended for transit or transhipment, shall make entry thereof by presenting electronically on the customs automated system to the proper officer a bill of entry for home consumption or warehousing in such form and manner as may be prescribed.
2(5)	Bill of export	Bill of export means a bill of export referred to in sec. 50. Sec. 50 provides that the exporter of any goods shall make entry thereof by presenting electronically on the customs automated system to the proper officer in the case of goods to be exported in a vessel or aircraft, a shipping bill, and in the case of goods to be exported by land, a bill of export in such form and manner as maybe prescribed.
2(6)	Board	Board means the Central Board of Indirect Taxes and Customs (CBIC) constituted under the Central Boards of Revenue Act, 1963
2(7)	Coastal Goods	Coastal goods means goods, other than imported goods, transported in a vessel from one port in India to another
2(9)	Conveyance	Conveyance includes a vessel (for sea), an aircraft (for air) and a vehicle (for land) *Taxpoint*: Vehicle means conveyance of any kind used on land and includes a railway vehicle – sec. 2(42)
2(13)	Customs Station	Customs station means any customs port, customs airport, international courier terminal, foreign post office or land customs station
2(10)	Customs Airport	Customs airport means any airport appointed u/s 7(a) to be a customs airport and includes a place appointed u/s 7(aa) to be an air freight station
2(11)	Customs Area	Customs area means the area of a customs station or a warehouse and includes any area in which imported goods or export goods are ordinarily kept before clearance by Customs Authorities;

<table>
<tr><td>2(12)</td><td>Customs Port</td><td>Customs port means any port appointed u/s 7(a) to be a customs port and includes a place appointed u/s 7(aa) to be an inland container depot;</td></tr>
<tr><td>2(21)</td><td>Foreign-going vessel or aircraft</td><td>Foreign-going vessel or aircraft means any vessel or aircraft for the time being engaged in the carriage of goods or passengers between any port or airport in India and any port or airport outside India, whether touching any intermediate port or airport in India or not, and includes –
i. any naval vessel of a foreign Government taking part in any naval exercises;
ii. any vessel engaged in fishing or any other operations outside the territorial waters of India;
any vessel or aircraft proceeding to a place outside India for any purpose whatsoever</td></tr>
<tr><td>2(24)</td><td>Arrival manifest or import manifest or import report</td><td>Arrival manifest or import manifest or import report means the manifest or report required to be delivered u/s 30.
Sec. 30 provides that the person-in-charge (or any other notified person) of-
i. a vessel; or
ii. an aircraft; or
iii. a vehicle,
carrying imported goods or export goods shall deliver following document (in the prescribed form and manner) to the proper officer:
<table>
<tr><th>In the case of</th><th>Document</th></tr>
<tr><td>a vessel or an aircraft</td><td>an arrival manifest or import manifest (in case of export, departure manifest or export manifest) by presenting electronically prior to the arrival (in case of export, before departure) of the vessel or the aircraft</td></tr>
<tr><td>a vehicle</td><td>an import report (in case of export, export report) within 12 hours after its arrival in the customs station (in case of export, before departure)</td></tr>
</table></td></tr>
<tr><td>2(31)</td><td>Person-in-charge</td><td>Person-in-charge means:
a. in relation to a vessel, the master of the vessel;
b. in relation to an aircraft, the commander or pilot-in-charge of the aircraft;
c. in relation to a railway train, the conductor, guard or other person having the chief direction of the train;
in relation to any other conveyance, the driver or other person-in-charge of the conveyance</td></tr>
<tr><td>2(33)</td><td>Prohibited goods</td><td>Prohibited goods means any goods the import or export of which is subject to any prohibition under this Act or any other law for the time being in force but does not include any such goods in respect of which the conditions subject to which the goods are permitted to be imported or exported have been complied with;</td></tr>
<tr><td>2(38)</td><td>Stores</td><td>Stores means goods for use in a vessel or aircraft and includes fuel and spare parts and other articles of equipment, whether or not for immediate fitting;</td></tr>
<tr><td>53</td><td>Transit of goods</td><td>Where any goods imported in a conveyance and mentioned in the arrival manifest or import manifest or the import report, as the case may be, as for transit in the same conveyance to any place outside India or to any customs station, the proper officer may allow the goods and the conveyance to transit without payment of duty, subject to such conditions, as may be prescribed.</td></tr>
<tr><td>54</td><td>Transshipment of goods</td><td>Where any goods imported into a customs station are intended for transshipment, a bill of transshipment shall be presented to the proper officer in such form and manner as may be prescribed.</td></tr>
</table>

Determination of duty where goods consist of articles liable to different rate [Sec. 19]

Where the goods consist of a set of articles, duty shall be calculated on the following basis:

Articles	Basis of chargeability
1. Articles liable to duty on the basis of quantity	Such articles shall be chargeable on the basis of quantity
2. Articles liable to duty on the basis of value:	
➢ If they are liable to duty at same rate	Such articles shall be chargeable at that rate
➢ If they are liable to duty at different rates	Such articles shall be chargeable at the highest of such rates
3. Articles not liable to duty	Such articles shall be chargeable on the basis mentioned in (2) above.

Re-importation of goods [Sec. 20]

If goods are imported into India after exportation therefrom, such goods shall be liable to duty and be subject to all the conditions and restrictions, if any, to which goods of the like kind and value are liable or subject, on the importation thereof.

Duty on Goods derelict, wreck, jetsam and flotsam [Sec. 21]

Meaning :

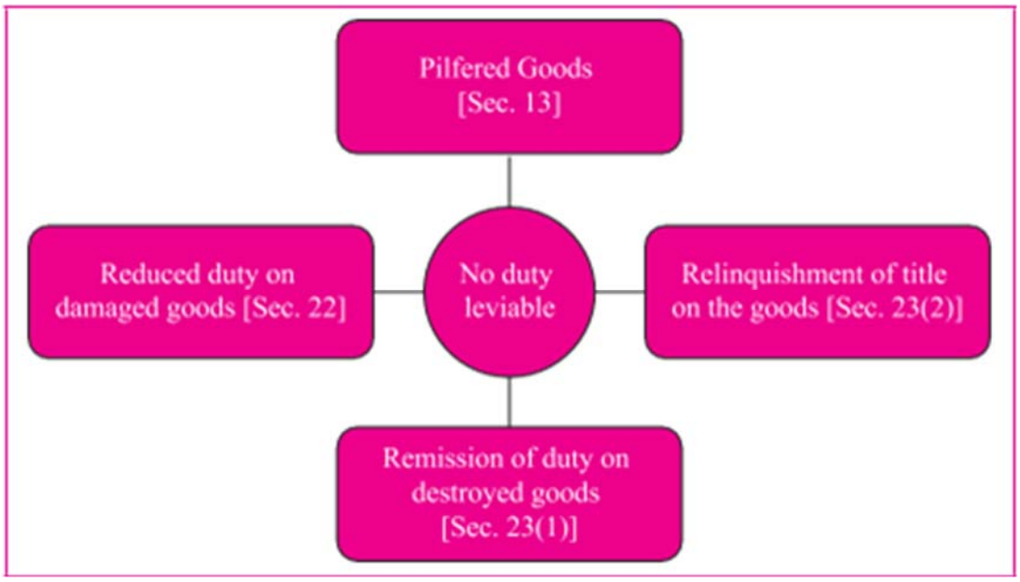
Derelict	Derelict means property abandoned at sea without hope of recovering.
Wreck	Wreck is the property cast ashore by tide after shipwreck.
Jetsam	Where goods are cast into the sea for lighten the ship to prevent it from sinking.
Flotsam	Goods separated from ship by some peril, which continue to float on sea.

Treatment

Goods being derelict, wreck, jetsam and flotsam brought or coming into India shall be dealt with as if they were imported into India. However, where it is shown to the satisfaction of the proper officer that they are entitled to be admitted duty-free, then proper officer may admit it as duty-free.

Customs Duty not leviable in certain cases

In following cases, duty is not leviable or leviable at reduced amount:



No Duty on pilfered goods [Sec. 13]

Conditions :

a. Imported goods are pilfered

b. Such goods are pilfered after the unloading thereof and before the proper officer has made an order for clearance for home consumption or deposit in a warehouse

c. The pilfered goods are not re-stored

Abatement of duty on damaged or deteriorated goods [Sec. 22]

Circumstances :

Where it is shown to the satisfaction of Assistant Commissioner of Customs or Deputy Commissioner of Customs –

1. That any imported goods had been damaged or had deteriorated at any time before or during the unloading of goods in India; or

2. That any imported goods (other than warehoused goods) had been damaged at any time after the unloading of goods in India but before its examination on account of any accident not due to any wilful act, negligence or default of the importer, his employee or agent; or

3. That any warehoused goods had been damaged at any time before clearance for home consumption on account of any accident not due to any wilful act, negligence or default of the owner, his employee or agent.

Treatment:

The duty to be charged on the goods shall bear the same proportion to the duty chargeable on the goods before the damage or deterioration, which the value of the damaged or deteriorated goods bears to the value before the damage or deterioration.

Mathematically,

$$\textbf{Duty on damaged goods} = \frac{\textbf{Value of damage / deteriorated goods * Duty on goods before damage}}{\textbf{Value of goods before damage / deterioration}}$$

Remission of duty on lost or destroyed goods [Sec. 23(1)]

Where it is shown to the satisfaction of the Assistant Commissioner or Deputy Commissioner that any imported goods have been **lost (otherwise than as a result of pilferage) or destroyed** at any time **before** clearance for home consumption, then the Assistant Commissioner or Deputy Commissioner shall remit the duty on such goods.

Remission of duty on relinquishment of title to the goods [Sec. 23(2)]

The owner of any imported goods may, before an order for clearance of the goods for home consumption or an order for permitting the deposit of goods in a warehouse, relinquish his title to the goods and thereupon he shall not be liable to pay the duty thereon.

Power to make rules for denaturing or mutilation of goods [Sec. 24]

The Central Government may make rules for permitting at the request of the owner the denaturing or mutilation of imported goods which are ordinarily used for more than one purpose so as to render them unfit for one or more of such purposes; and where any goods are so denatured or mutilated they shall be chargeable to duty at such rate as would be applicable if the goods had been imported in the denatured or mutilated form.

Exemption from Customs Duty

Power to grant exemption from duty [Sec. 25]

If the Central Government is satisfied that it is necessary in the public interest so to do -

a. It may by **notification** in the Official Gazette exempt **generally** (either absolutely or subject to certain conditions), goods of any specified description from the whole (or any part) of duty.

b. It may by **special order** exempt from the payment of duty under circumstances of an exceptional nature (being stated in such order) any goods on which duty is leviable.

Classification of imported / export goods

Import and export of goods are required to be assessed to duty which may include an assessment of nil duty. For this purpose, it is necessary to determine the classification of the goods, which basically means the categorization of the goods in a specific heading or sub-heading of the Schedules to the Customs Tariff Act, 1975.

Why Classification

Following is the importance of correct classification:

i. For determining rate of duty;

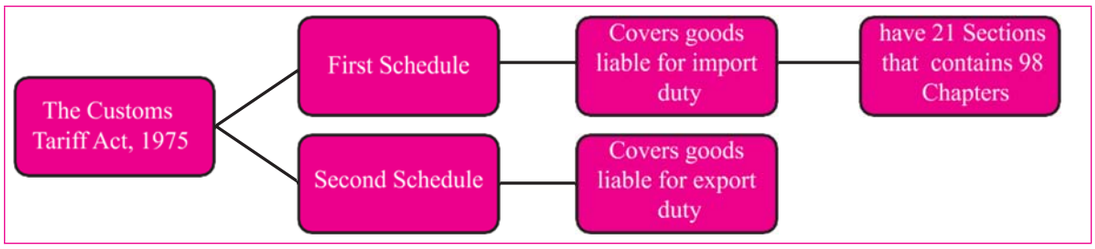
ii. For determining the eligibility of exemption notification, which are with reference to the tariff heading or sub headings. Wrong classification would either cause loss of revenue to the Central Government or impose unjustifiable loss to assessee.

iii. For applicability of other duties on goods like anti-dumping duty, safeguard duty, etc.

iv. For applicability of any restriction and control on import or export of goods

Scheme of Classification

In the Tariff Schedule, commodities/products are arranged in a fixed pattern with the duty rates specified against
each of them. It contains 2 Schedules:



MULTIPLE CHOICE QUESTIONS

1. The limit of exclusive economic zone of India is _ from the nearest point of the baseline
   a. 200 nautical miles
   b. 12 nautical miles
   c. 24 nautical miles
   d. None of the above

2. Which of the following is a taxable event for imported goods?
   a. Date on which the goods cross the customs barrier
   b. Date of presentation of bill of entry
   c. Date of entry into Indian territorial waters
   d. Unloading of imported goods at the customs port

3. A ship carries some goods K, L, M and N from Singapore to Dubai, via Chennai. L and M are moved at Chennai in another vessel. L being meant for Kochi and M to Dubai. As per customs law, the transhipped good(s) is/are:
   a. All four
   b. L only
   c. L and M
   d. None of the above

4. All goods, derelict, Jetsam, flotsam and wreck brought (or) coming into India, shall be dealt with as if they
   were into India.

a. Exported
b. Imported
c. No duty
d. Exempted from tax

5. As per Section 2(31) person in charge means
   a. Vessel - Master
   b. Train - Conductor (or) Guard
   c. Vehicle – Driver
   d. All of the above

Ans. 1. a 2. a 3. c 4. b 5. d