Democratic People's Republic of Algeria
Ministry of Higher Education and Scientific Research
Ibn Khaldoun University of Tiaret
Faculty of Economic, Commercial and Management Sciences

Department of Management Sciences

Lectures in the Course:

Management Accounting

Directed to second-year License students
Branch: Management Sciences

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Educational Material Guide Syllabus			
Course Name: Management Accounting			
The Field	Economics, Management, and Business Studies	Branch	Management Sciences
Specialization	/	Level	Bachelor's degree
Hexagon	Third	Academic year	2026/2025
Getting to know the subject/module			
Name of substance	Management accounting	Education Unit	Basic
Number of balances	6	Coefficient	3
Weekly hourly volume (applications)	/	Lecture (number of hours per week)	3 hours
Course leader			
Name, surname	Douis Abdelkader	Grade	Senior Lecturer (Class A)
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Phone number	/	Lesson timing and location	Thursday: 8:30-10:00 a.m. Auditorium 200 Thursday: 10:00-11:30 a.m. Auditorium 200

Course description	
Learning outcomes	**In order for students to study the content of management accounting, they must be familiar with: Financial Accounting 1 and Financial Accounting 2.**
General objective of the course	**The overall objective of this course is to enable students to use accounting information as a management tool. This course introduces students to the fundamentals of management accounting, explains how to allocate costs to products or services, and introduces them to .analytical techniques**
Learning objectives (intended (outcomes/skills)	**After studying this course, the student will be able to Calculate costs and determine analytical results using various methods. Choose the most effective method for cost calculation. Control different cost control techniques**

Course content	
The first axis	Introduction to Management Accounting
The second axis	Introduction to inventories and inventory (valuation methods (CMUP, FIFO
The third axis	Total cost method by homogeneous section
The fourth axis	Variable cost method
The fifth axis	Rational method of allocating fixed costs
Sixth axis	Standard and predetermined costing metho
The seventh axis	Marginal cost method
The eighth axis	Activity-based costing (ABC) method
The ninth axis	Target Cost Method
The tenth axis	Hidden Cost Method

Method of evaluation					
Percentage assessment	The sign		Relative weight of assessment		
Exam	20/20		Lecture weight	60%	
Partial exam	12		Weight of directed and applied work	40%	30%
Guided work (solving sequences)	4				30%
Applied work	-				-
Individual project	1	-			5%
Group work (within a team)	-				-
Fieldwork	-				-
Attendance (presence/absence)	2				30%
Other elements (participation)	1				5%

The course is taught in the form of lectures and guided/practical work, and is assessed through exams and continuous assessment. The course grade is calculated based on the weighted average of the lecture and guided work:

Material rate	= Lecture points * 0.6 + Directed/applied work points * 0.4
Moy.M	*=(Note Ex * 0.6) + (Note Td * 0.4)*

Personal work assigned for the subject

1. Office work and duties, solving exercises and sequences.
2. Assigning students to periodically prepare reading cards for scientific articles, books, or chapters within the subject's topics.
3. Evaluating interactive questions for students via the Moodle platform.
4. Attendance and interaction on the Moodle platform.
5. Create a chat and forum on the Moodle e-learning platform.

Approval by administrative and pedagogical bodies

Head of Department	Field, Branch, or Specialization Manager ((depending on level	Subject teacher	Vice Dean in charge of pedagogy or Director of Studies

Important note: After approval of the course guide at the beginning of each semester, it is .published on the official website of the university

Introduction:

This pedagogical publication aims to enable students in the fields of Economic, Commercial, and Management Sciences to familiarize themselves with and learn the subject of Management Accounting, particularly second-year License students in Management Sciences, in accordance with the curriculum prescribed by the training field in the aforementioned specialization. We have adhered to the axes of modern training presentations as per the new ministerial program, where this subject is part of the fundamental unit. Accordingly, we have presented the theoretical concepts of the program's content, supported by practical examples specific to each axis. In addition, to deepen understanding for university students and all researchers in Management Accounting, and to facilitate managerial decision-making based on the accounting information provided by Management Accounting, we have supplemented this publication with solved exercises covering various and diverse cases for multiple methods of cost calculation.

This publication also aims to train students in cost calculation and determining analytical results using several methods, selecting the most effective method for cost calculation, controlling various cost pressure techniques, and choosing the lowest to maximize profit—all presented in a simplified and clear style.

Furthermore, we have organized this publication into axes, comprising ten sequential and arranged axes in accordance with the approved and modern curriculum prescribed by the Ministry of Higher Education and Scientific Research for second-year License students specializing in Management Sciences. We will address in detail and with reinforcement the following axes:

In the first axis, we addressed an introduction to Management Accounting. The second axis dealt with an introduction to inventories and inventory valuation methods (CMUP, FIFO). The third axis was dedicated to the full cost method according to homogeneous sections. The fourth axis covered the variable costing method, followed by the fifth axis, which discussed the rational imputation of fixed costs method. The sixth axis was devoted to the standard and predetermined cost method. The seventh axis was allocated to the marginal costing method, the eighth axis to the Activity-Based Costing (ABC) method, the ninth axis to the target costing method, and the tenth and final axis, with which we concluded, was dedicated to the hidden cost method.

In conclusion, we hope that this work receives the satisfaction of our students and acceptance from all specialists in accounting, particularly cost accounting and managerial decision-makers.

Axis One: Introduction to Management Accounting

Definition and Historical Evolution of Management Accounting

Analytical accounting emerged in its initial form and was used since the Babylonian era, aiming to organize and arrange financial and economic information. In the late fifteenth century, specifically in 1494, double-entry accounting appeared through the Italian Luca Pacioli, after single-entry accounting had been used for a long period prior. Management accounting for operations did not emerge as an independent branch until the early nineteenth century, with the purpose of solving accounting issues accompanying the Industrial Revolution.

Since the nineteenth century, management accounting has evolved in parallel with the development of functions and objectives of economic enterprises. It initially encompassed profit-oriented industrial enterprises, then extended to other commercial and service enterprises. After World War II, operational management accounting no longer played a significant role due to the diverse objectives that managers aimed to achieve. Thus, there was a shift from analytical accounting for operations to analytical accounting for management.

Managerial Accounting

It generally aims to provide internal management with the necessary financial and non-financial information for decision-making and achieving organizational objectives. Below are the most prominent definitions issued by leading professional bodies:

Definition by the Institute of Management Accountants (IMA): "Management accounting is a profession that involves partnering in management decision-making, devising planning and performance management systems, and providing expertise in financial reporting and control to assist management in the formulation and implementation of an organization's strategy."

Definition by the Management Accounting Practices (MAP) Committee: "Management accounting is the process of identification, measurement, accumulation, analysis, preparation, interpretation, and communication of financial information used by management to plan, evaluate, and control within an organization and to assure appropriate use of and accountability for its resources. It also comprises the preparation of financial reports for non-management groups such as shareholders, creditors, regulatory agencies, and tax authorities."

Definition by the Chartered Institute of Management Accountants (CIMA): "Management accounting is the analysis of information to contribute to strategy formulation and drive sustainable business success."

Definition by Horngren, Datar, and Rajan: "Management accounting is the process of measuring, analyzing, and reporting financial and non-financial information that helps managers make decisions to fulfill the goals of an organization."

Management accounting can also be defined as "a technique for processing information obtained from financial accounting and various other sources to reach results upon which the administrative apparatus bases decisions directly related to activities (purchasing, production, distribution), allowing for the analysis of profitability and determination of the enterprise's efficiency. It also enables monitoring responsibilities at both executive and administrative levels."

It is also known as an important analytical and control tool governed by a set of methods, principles, rules, and other theoretical foundations, providing various administrative levels with important internal information and data that enable performance evaluation and control over operational efficiency and the use of cost elements by comparing actual data with predetermined planning or standard indicators, detecting deviations, their causes, and perpetrators within each cost center, process, or specific product, in order to make appropriate and effective decisions to eliminate deficiencies.

Importance, Objectives, and Components of Management Accounting

Importance

While the presence of a general accounting system in any enterprise is mandatory by law, the presence of a management accounting system in the enterprise remains optional, depending on the extent to which the enterprise's management appreciates the importance of such a system. In light of developments and changes in the business environment, new administrative ideas and concepts have emerged, making the existence of a management accounting system in economic enterprises necessary due to its increasing importance. Management relies on it to provide the necessary data and information for administrative processes, whether in planning, control, or decision-making, enabling the enterprise to remain in the market, continue competing, and increase profitability rates.

The importance of management accounting lies in the objectives it seeks to achieve, which can only be realized through a set of the following functions:

Functions of Management Accounting

Management accounting techniques, through the results obtained, aim to enlighten the manager's opinion for formulating effective decisions. These techniques assist the manager in obtaining information about the enterprise's management in the past, present, and attempting to estimate future scenarios. Thus, we can say that management accounting techniques perform the following functions:

Management accounting as a tool for what has happened: In this case, management accounting studies data from previous cycles and processes them using necessary management techniques. The information obtained will benefit officials in gaining an idea about the quality of past management in terms of resulting costs and production volume. Additionally, this information is used to determine the volume of resources needed for managing the enterprise.

In addition to what has been outlined, there are direct objectives of management accounting as follows:

- Providing necessary information for administrative decision-makers within the enterprise to carry out planning operations;
- Guiding control operations within the enterprise;
- Motivating managers and employees in ways that serve the achievement of the enterprise's objectives (analyzing deviations, appropriate cost for the type of activity, rewarding implementers and innovators, etc.);
- Evaluating performance and ensuring the achievement of the enterprise's objectives at the lowest possible cost;
- Assessing the enterprise's competitive position;
- Contributing to investment decision-making and planning necessary funds and controlling them to ensure the enterprise's profitability;
- Measuring the performance of responsibility analysis centers;

Management accounting as a tool for managing what is happening: In this regard, management accounting compares what is currently happening with what has happened before to deduce differences and pinpoint responsibilities for correcting any imbalances if they exist. To this end, management accounting relies on organizing the enterprise's activity and dividing it into responsibility centers. These centers will receive distributed costs to facilitate pinpointing responsibility and identifying weaknesses.

Management accounting as a tool for managing what will happen: Management accounting allows the manager to employ information obtained

from previous and current cycles to build estimation models for what will happen. These models will focus on most potential events to accommodate developments and prepare for various possible scenarios due to the volatile environment in which various enterprises operate.

Components

There are several key components upon which any management accounting system is based to perform its functions efficiently, and these components have conditions that must be observed, as follows:

- Simplicity and clarity to prevent errors.
- Reducing the number of books and documents that negatively affect workflow in a way that achieves the specified objectives.
- Achieving the purpose for which the document, report, or record was designed.

After meeting the above conditions, these components can be summarized as follows:

- Determining a sound set of documentary and bookkeeping materials.
- Determining the basis for cost measurement.
- Determining the cost guide.

Determining the cost period.

- Cost reports.

Relationship Between Management Accounting and Financial Accounting

Similarities and Differences Between Management Accounting and Financial Accounting

Similarities	Management accounting	Financial Accounting
Preparation of Closing Accounts Using the Same Procedures and Principles	Provision of Data on Various Costs and Inventory Positions, Contributing to the Preparation of Closing Accounts and the Statement of Financial Position	Preparation of Asset-Related Data for the Preparation of Closing Accounts and the Statement of Financial Position
Achieving mutual oversight	Analytical Treatment of Amounts at the Level of Cost Centres, Inventory Items, and Production Units	Aggregated Treatment of Amounts Without Detail in the Financial Statements

Differences between management accounting and financial accounting:		
Differences	**Financial Accounting**	**Management accounting**
Users of financial reports and statements	External parties to the institution (owners, creditors, investors, financiers)	Internal parties (all administrative levels)
Reports	Mandatory and governs the amount of information in reports Controls and instructions	Optional, depending on management's need for it, and the amount of information in the report determines the cost and benefit.
Reporting standards	International accounting standards are used in preparing reports.	The report is not based on international standards but rather on internal rules and instructions of the entity that relies on these reports.
Historical and forward-looking information	It relies on historical (actual) data about events that have actually occurred, and is more accurate because it relies on documents and records.	It focuses on the past, present, and future. It uses actual data to benefit from it and takes proactive measures (for the future). It is less accurate because it is subject to prediction and personal judgment.
Amount of data and information	The data and information in financial accounting are comprehensive and present the results of the institution in aggregate form and in value only.	Management accounting provides detailed information and data on all aspects of an organization's activities and presents that information in terms of value and quantity.
Main objective	Preparation of accurate financial reports for external parties	Determining production costs and analyzing internal performance
Users	External parties (such as investors, banks, regulators(	Internal administration only
Scope of work	Refers to the facility as a whole.	Focus on products, processes, or units
Form of reports	Consolidated financial	Flexible reports tailored to

	reports (income statement, balance sheet, etc(.	management needs
Repetition	Often every quarter or year	Daily, monthly, or as needed
Level of detail	General and non-detailed	Accurate and detailed at the activity or product level

Introduction to Costs (Distinguishing Between Different Concepts Such as Expense, Cost, Burden, and Cost Price)

Costs and cost price are the first step in understanding cost accounting (management accounting) and its applications in industrial, commercial, and service enterprises, as profitability determination and strategic decision-making depend on them.

Calculating costs and cost price are fundamental processes in cost accounting, aiming to determine the total cost of producing a good or providing a service to assist in product pricing and making sound administrative decisions.

Accordingly, before delving into cost calculation and cost price, we must address some concepts related to cost, which are:

- **Expenses**: These are amounts expended or part of the enterprise's assets that resulted in a benefit or service after their use.
- **Burden**: This is the depletion of the enterprise's resources or part of them, or an outflow of monetary units not corresponding to any tangible product, such as transportation expenses, for example. The difference between expense and burden is that the former corresponds to revenue or benefit, while the latter is resource depletion and does not achieve any tangible product.
- **Loss**: If no benefit or service results from the depleted part of the enterprise's resources, it is considered a loss.
- **Cost**: This is an economic sacrifice of part of the enterprise's resources, expressed in monetary or financial units, to obtain a future benefit that in turn seeks to achieve the objectives for which the enterprise was established. Thus, cost is the total of what is spent in money and resources in the form of expenses and burdens to accomplish a task or perform a function during a specific time period.
- **Cost Price**: This is the final cost of products or services provided, i.e., the total of all costs borne by the service or product from the beginning of the process until the distribution or sale process. From this perspective, the enterprise can determine the minimum selling price for the product or service at the break-even point, i.e., without realizing profit or loss.

Illustrative Example:
An enterprise produces product "A" using raw material "N".
Purchases: Material "N" at 120 DZD/kg.
Production and Uses: To produce one unit of product "A", 5 kg of material "N" is used.
Produced: 150 units of product "A" using 900 kg of material "N".
Beginning inventory of raw material "N": 1000 kg.
Required: Calculate the production cost of product "A", the expense, and the loss.
Calculate Expense: The expense is what is required to produce 150 units of "A", meaning: 150 x 5 x 120
Expense = 90,000 DZD.

The loss is the difference between what was spent and what should have been spent in the production process.
900 x 120 = 108,000 DZD.
108,000 - 90,000 = 18,000 DZD.
Loss = 18,000 DZD
Cost: This is the value of the raw material not depleted in the activity and beginning inventory:
1000 x 120 = 120,000 DZD.
Cost = 120,000 DZD
Thus, for cost calculation, we have:
Cost Price = Production Cost + Distribution Expenses + Administrative and Financial Expenses.
Production Cost = Cost of Purchasing Used Raw Material + Production Expenses.

Distribution Cost includes all burdens and expenses outside the production activity related to the selling process.
Important:

A distinction must be made between considered burdens, which are burdens related to the activity and called operating burdens (from account 60 to 68 in the financial accounting system), entering the cost price calculation and shared between the financial accounting system and management accounting (e.g., provisions). There are also burdens not recorded in the financial accounting system but entering the cost price, called additional expenses (e.g., manager's salary).

We conclude from the above that burdens recorded according to the financial accounting system, when added to additional expenses and subtracted from non-considered burdens, give us management accounting burdens, which can be illustrated as follows:

Management Accounting Burdens = Considered Burdens + Additional Elements.

Commercial Enterprise: Cost Price = Purchase Cost + Distribution Expenses (Direct + Indirect).

Various Classifications of Costs

We know well that costs are diverse within the enterprise and have multiple classifications according to several criteria, the most important and famous of which we mention:

Classification by Nature of Cost:

- ❖ Direct Costs: Those that can be directly allocated to a product or service, such as raw material costs and direct labor wages.
- ❖ Indirect Costs: Those that cannot be directly allocated to a specific product, such as rent, general services, and administrative salaries.

Classification by Behavior Relative to Activity Volume Change:

- ❖ Fixed Costs: Those that do not change with changes in production or activity volume, such as rent costs.
- ❖ Variable Costs: Those that change directly with production volume, such as raw material costs.
- ❖ Mixed Costs (Semi-Variable): Include a fixed part and a variable part.

Classification by Purpose or Use:

- ❖ Operating Costs: Related to the enterprise's daily operations.
- ❖ Controllable Costs: Those that management can control, such as bonus and donation costs.
- ❖ Uncontrollable Costs: Those that management cannot control, such as long-term rent.

Additional Classifications Important for Decision-Making Purposes:

- ❖ Opportunity Cost: The lost value resulting from choosing a particular alternative.
- ❖ Sunk Costs: Costs that have been incurred and cannot be recovered.
- ❖ Marginal Costs: The change in cost resulting from producing an additional unit.

These classifications help in effectively analyzing costs to support administrative decisions, financial planning, and control in the short, medium, and long term.

Methods Adopted in Management Accounting

Management accounting relies on several traditional and modern methods aimed at measuring and analyzing costs and improving administrative decision-making. The most important of these methods are mentioned, and we will detail each method according to the prescribed curriculum in the training presentations for second-year Bachelor's in management sciences:

Traditional Methods: Include the following methods:

- ❖ Cost accounting based on homogeneous sections.
- ❖ Full costing (full cost).
- ❖ Variable costing.
- ❖ Standard Costing.
- ❖ Marginal costing.

Modern Methods: Include the following methods:

- ❖ Activity-Based Costing (ABC) system.
- ❖ Target Costing.
- ❖ Hidden Costing.

There are modern methods not prescribed in the training presentations for the second-year Bachelor's in management sciences cohort, which we will mention for informational purposes only, and they are the following three methods:

- ❖ Using Total Quality Management.
- ❖ Process Engineering and Value Engineering.
- ❖ Balanced Scorecard.

These methods are used to identify cost elements and analyze their behavior, in addition to supporting management in planning, control, and improving the enterprise's financial and economic performance. Management accounting combines financial and non-financial information to provide a comprehensive picture that aids effective management and appropriate decision-making. These methods also aim to enhance the enterprise's competitiveness, reduce costs, improve quality, and achieve strategic objectives.

Axis Two: Introduction to Inventories and Inventory Valuation Methods (CMUP, FIFO)

Introduction to Inventories and Inventory Valuation Methods (CMUP, FIFO)

To provide a comprehensive introduction to inventories and inventory valuation methods, I will analyze the basic concepts of inventory and types of valuation methods such as the Weighted Average Unit Cost (CUMP) and First In First Out (FIFO), focusing on practical application and considering differences between methods through explaining theoretical principles and practical examples.

Inventories are the collection of goods, materials, and products held by the enterprise for sale or use in production processes, including raw materials, finished products, and any intermediate products produced by the enterprise and used in its production processes.

Inventories are considered a fundamental element in calculating the cost price for any enterprise, as sometimes the material cost has a significant impact that may exceed 30% of the cost price. Inventory is also one of the current assets, and therefore, every enterprise must monitor inventory movement of materials, whether in quantity or value, and predetermine methods for issuing or valuing outflows from these inventories that suit the materials or products in each enterprise separately, to achieve good control over the final cost price that determines the product's or good's path in terms of profit and the amount of monetary units obtained.

Types of Inventories: In accounting, inventories are divided into several main types:

The Financial Accounting System (SCF) has detailed the types of inventories (knowledge acquired by the student) existing in the enterprise according to its type, size, and nature of activity, and we will review them as follows:

- Merchandise: This is the good purchased for resale in its form without any change, whatever the type.
- Raw Materials and Supplies: This element consists of two parts:
- Raw Materials: Materials acquired for transformation and manufacturing to obtain finished or semi-finished products, and this part concerns production enterprises.
- **Supplies**: A type of goods purchased for assembly into finished or semi-finished products, where these supplies cannot be transformed or sold but are for use in the composition of finished products, and this type is also found in production enterprises.

- **Other Supplies**: Represent auxiliary goods for the production process or operation without a direct relationship between them and the obtained products, divided into:

- Consumable Materials: Such as lubricating oils, cleaning materials, etc.
- Consumable Supplies: Such as office supplies, workshop supplies, etc.
- Disposable Packaging: Packaging used once in the production process, and its cost is included in the cost of manufactured products.

- Work-in-Process (Goods in Progress): Products under manufacturing that have not reached the final stage of complete or semi-complete manufacturing.
- Products in Production: This type is linked to the time factor that directly enters into calculating produced units, where this type has not reached its final stage due to time, not due to lack of material, financial, or human capabilities.
- Works in Progress: Various transformation operations on raw materials in the initial production stages, where the production cycle has ended, and the product has not reached its initial form due to not reaching the first stage yet.
- Services in Progress: (Similar to work-in-process) Services provided to others where the accounting cycle has ended but not yet completed, divided into:
- Studies in Progress: Studies assigned to the enterprise, where the accounting cycle has ended but not completed or not yet started.
- Services in Delivery: Services assigned to the enterprise, where the accounting cycle has ended but not fully delivered.
- **Products**: Various types of products that can be in the production enterprise, divided into:

- Intermediate Products: Products that have completed a full manufacturing stage relative to the set objective, and this type of inventory exists in enterprises following sequential production stages.

- Manufactured Products: Final products ready for sale.

- **Residual Products or Recovered Materials**: Residues from production processes that can be reused or sold for monetary value.
- **Residual Products (Waste and Scrap):** Various products with different defects, and this type of inventory is either reused in the next production process or sold at a monetary value less than that of sound products.
- **Inventories from Fixed Assets**: Fixed assets that can be partially or fully obtained for reuse.
- **Inventories Outside**: Inventories owned by the enterprise but not yet received, which may be on their way to the enterprise or stored with third parties.

Importance of Inventories in the Enterprise

The importance of inventories stems from their vital role in ensuring operational continuity and achieving the enterprise's strategic objectives:

- **Ensuring Operational Continuity**: Inventory plays an important role in ensuring the continuity of production and sales operations, allowing the enterprise to meet its needs for goods and materials without waiting for arrivals from suppliers.
- **Meeting Customer Needs**: Sufficient inventory helps meet customer orders quickly and completely, enhancing their satisfaction and maintaining loyalty.
- **Reducing Shortage Risks**: Inventory reduces risks of shortages of goods and materials, especially in cases of delayed arrivals from suppliers or fluctuations in demand.
- **Achieving Cost Savings**: By purchasing large quantities of goods and materials at discounted prices, considering the enterprise's ability to store them without spoilage.

Inventory Counting (Concept of Inventory, Its Importance, Types)

Inventory counting means the systematic process through which all the enterprise's assets, such as materials and goods available in the enterprise's warehouses, are counted and valued physically, and it is a pivotal element for ensuring the accuracy of financial records and the quality of operational management.

Concept of Inventory Counting:

Inventory counting is the process by which companies enumerate and track all materials and goods they have, whether raw materials, products under manufacturing, or finished products ready for sale, to ensure the accuracy of accounting records and their consistency with what is actually present. This process represents an opportunity to evaluate and document the company's stored assets and ensure the availability of required inventory for production or sale.

Importance of Inventory Counting:

Ensuring Accuracy of Financial Data: Without physical counting, it becomes difficult to confirm that accounting figures reflect the reality of inventory.

Detecting Theft or Spoilage: It helps monitor differences between what is actually present and what is recorded in the records, revealing cases of theft, spoilage, or manipulation.

Improving Inventory Management: Through counting, shortages or surpluses are identified, enhancing purchase, storage, and manufacturing decisions.

Supporting Administrative Decisions: It provides accurate information that helps management in planning and developing effective policies to avoid inventory depletion or accumulation.

Types of Inventory Counting

Periodic Inventory: Conducted at specific periods such as the end of the financial year, where quantities are physically counted, then accounting data is updated.

Perpetual Inventory: Inventory data is updated automatically and immediately after each sale or purchase operation through specialized electronic systems, allowing precise real-time tracking.

Spot Inventory: Executed unannounced in advance to check the accuracy of records and combat manipulation or thefts, relied upon by audit committees or control departments.

Physical Inventory: Involves manual and field counting of all inventory units and comparing results with accounting records to ensure matching actual and theoretical figures.

Inventory counting represents one of the essential control means to preserve the enterprise's assets and contribute to achieving efficiency in operational and financial processes.

Inventory Differences (Practical Cases)

Inventory differences are the variances between the actual quantity or value of inventory counted during the count and the quantity or value recorded in the enterprise's accounting records, often resulting from administrative errors, spoilage, loss, or theft.

Concept of Inventory Differences:

- **Inventory Surplus**: When the actual inventory is greater than the recorded inventory in the books.
- **Inventory Shortage**: When the actual inventory is less than the recorded due to errors, loss, spoilage, or theft.

Valuation of Inventories in the Enterprise

Given the importance of inventories in the enterprise and their impact on the final cost of the product or good, the enterprise must track inventory movement (inflows to and outflows from the enterprise) to achieve precise and effective control over these inventories' costs. Accordingly, inflows or arrivals to the enterprise are valued at their purchase cost, i.e., purchase price plus various

other purchase expenses. Outflows or exports from the enterprise are valued using specific methods to address the issue of inflow costs.

Valuation of Inventory Inflows:

Three types of inflows can be distinguished as follows:

- **Purchased Inflows**: These are recorded according to purchase cost, which includes elements such as purchase price, receipt and purchase expenses like transportation, loading and unloading, insurance, etc.
- **Finished Product Inflows**: These are directly valued at their production cost.
- **Returned Inflows**: This type is valued at the same value as when outflowed.

Valuation of Inventory Outflows:

If the valuation of inventory inflows is as indicated above, the valuation of inventory outflows is not as straightforward, due to the main reason being differences in purchase cost from one supplier to another, from one market to another, and supply periods, etc.

Accordingly, there are a set of methods relied upon for valuing inventory outflows, and we will review what is prescribed in the second-year Bachelor's training presentations only.

Real Valuation Methods:

Real valuation methods are characterized by relying on real storage information obtained from reality, where these methods are divided into two branches:

- Weighted Average Unit Cost (CUMP)
- Inventory Depletion Method: Weighted Average Unit Cost Method: CUMP (Coût Unitaire Moyen Pondéré)

Inventories are valued using this method by calculating the weighted arithmetic mean by quantities as follows:

$$CUMP = \frac{\sum \text{PxQ}}{\sum \text{Q}}$$

There are three cases for the weighted average unit cost method:

Weighted Average Cost After Each Inflow: This method is easy to use, as inventory is characterized by price fluctuations upon inflow. According to this method, outgoing inventories (exports) from warehouses are priced based on calculating the average unit cost of outgoing materials. The weighted average cost after each inflow is calculated using the following relation:

$$\textbf{Weighted Average Cost After Each Inflow} = \frac{\textbf{New entry Cost} + \textbf{Remaining stock Cost}}{\textbf{New Entry Quantity} + \textbf{Remaining stock quantity}}$$

Illustrative Example:

The movement of raw material "K" for one of the enterprises during January 2024 was as follows:

- January 1: Beginning inventory estimated at 800 kg at 20/kg.
- January 3: Outflow note: 200 kg.
- January 5: Inflow note: 200 kg at 22 DZD/kg.
- January 8: Outflow note: 480 kg.
- January 11: Outflow note: 120 kg.
- January 24: Inflow note: 80 kg at 24 DZD/kg.
- January 30: Outflow note: 150 kg.

Solution:

The Foundation:							Inventory card number:			
January 2024							**Article "K"**			
the date	Statement	Entries			Outputs			Inventory		
		Q	PU	AM	Q	PU	AM	Q	PU	AM
01/01	Beg-inv*	800	20	16000				800	20	16000
01/03	output				200	20	4000	600	20	12000
01/05	Input	200	22	4400				800	20.5	16400
01/08	output				480	20.5	9840	320	20.5	6560
01/11	output				120	20.5	2460	200	20.5	4100
01/14	Input	80	24	1920				280	21.5	6020
01/30	output				150	21.5	3225	130	21.5	2795

***: Beginning inventory**

Weighted Average Cost for Total Inflows: According to this method, the valuation of total outflows (exports) is with a common unit cost calculated after all purchases or production of the period enter. Therefore, outflows are recorded by quantities only, and at the end of the period, when all inflows are enumerated and confined, the weighted average cost for total inflows is calculated and valued for outflows using the following relation:

$$\textbf{Weighted average cost of total inputs} = \frac{\textbf{Cost of entries}}{\textbf{Number of entries}}$$

Illustrative Example:

Same previous example, required to prepare the inventory card using the weighted average cost method for total inflows.

Solution:

According to this method, outflows are valued with a common unit cost calculated after all inflows to the warehouse enter. Therefore, outflows are recorded during outflow by quantities only, and at the end of the period, when all inflows are confined, the weighted average cost is calculated and valued for outflows as illustrated in this example:

$$\textbf{Weighted average cost of total inputs} = \frac{\textbf{Cost of entries}}{\textbf{Number of entries}}$$

$$= \frac{(200x22)+(80x24)}{(200+80)} = 22.57$$

Therefore, the weighted unit cost used to evaluate output using this method is approximately 22.57 dinars, after counting all entries for the period (January).

Weighted average cost for the period (entries + beginning inventory)

This method calculates a weighted average cost once at the end of the month, taking into account all entries for the period plus the opening inventory. This method is used by organizations that supply inventories with relatively stable prices during the utilization cycle and across utilization cycles. Therefore, it is preferable to calculate this cost once at the end of the cycle using the following formula:

$$\textbf{Weighted average cost for the period} = \frac{\textbf{Period Cost entries+Duration of initial inventory Cost}}{\textbf{Period Quantity entries+Duration of initial stock quantity}}$$

Practical example:

Same as the first example, but we need to calculate the weighted average cost of total inputs + opening inventory.

Solution:

According to this method, the total outputs are valued at a common unit cost calculated after all purchases or products are entered with the opening inventory as follows:

Weighted average cost of total inputs with opening inventory = (opening inventory value + inputs value) / (opening inventory quantity + inputs quantity)

Weighted average cost of total inputs with opening inventory

Weighted average cost of total inputs with opening inventory

=(16,000 DA + 4,400 DA + 1,920 DA) / (800 + 200 + 80)

Weighted average cost of total inputs with initial inventory = 20.66 DZD/unit

Advantages and disadvantages of the weighted average cost method:

The weighted average unit cost method is used to evaluate inventory and calculate the cost of goods sold based on the average cost of all inventory units available during the period. It has notable advantages and disadvantages, which we will review below:

Advantages of the weighted average cost method

- Simplicity of application: An easy method to calculate and implement in accounting systems, especially when dealing with homogeneous or standardized materials.

- Reduced volatility: Helps reduce price volatility in financial statements because it relies on averages rather than individual transactions, resulting in more stable financial reports.

- Suitability for undifferentiated products: Suitable for companies that deal in similar goods or products where it is difficult to distinguish between purchase dates or prices.

- Logical cost results: Provides a realistic approximation of the cost of ending inventory and goods sold, especially if there are no significant price changes.

Disadvantages of the weighted average cost method:

- Inaccuracy of costs during times of inflation or volatility: It does not accurately reflect the current market cost compared to methods such as FIFO (first in, first out) or LIFO (last in, first out), and therefore may not give a true picture when prices rise or fall.

- Not suitable for unique or diverse products: Not suitable for companies with inventories that vary greatly in specifications or prices.

- Delayed information: Sometimes the weighted average is calculated at the end of the period, which does not allow for accurate and immediate costing to aid in quick decision-making.

- Possibility of concealing loss or theft: Because average cost valuation may hide differences that are not apparent in direct tracking methods.

This method is suitable for industrial or commercial enterprises that deal with homogeneous inventory and experience little fluctuation in purchase prices.

Inventory depletion method: This type of inventory disposal is based on ensuring that all incoming inventory retains its characteristics (price and quantity), without combining inventories. The only way to distinguish between them is for the manager to arrange the inventory chronologically according to the date of entry into the warehouse. This method is divided into two branches: First In, First Out (FIFO) and Last In, First Out (LIFO). We will only cover the first type, as specified in the second-year bachelor's degree curriculum.

First In, First Out (FIFO) method:

Under this method, inventory items, whether raw materials or products, are valued at the cost of the inventory in the warehouse and are consumed gradually according to the order in which they entered the warehouse until they are completely depleted. Then, the inventory that entered second and third are consumed, taking care not to use the new cost until the old inventory is depleted. The basic rule is that the inventory that enters first is the first to be dispensed from the warehouses, i.e., according to seniority, and this method is used for inventories that are quickly affected by the time factor.

Advantages and disadvantages of the first-in, first-out method:

- The most important advantages of this method are:
- The physical flow of inventory is logical and reasonable.
- Inventory moves in a way that indicates effective control, as older materials are disposed of or not used so that they do not spoil or become obsolete.
- The costs of end-of-period inventory are close to their market value, as they are recent costs.
- The physical flow of inventory is consistent with the flow of costs, and this flow is not subject to the wishes of the consumer or manager.
- This method provides a consistent basis for determining the cost of ending inventory, which allows for comparison with previous years' results.
- Inventories are valued at the latest prices for the purpose of closing accounts.

Disadvantages of the first-in, first-out method:

- It does not take into account the matching principle for determining income, as historical costs are matched with current revenues.
- It does not distinguish between the normal profits and losses of the enterprise and those resulting from price changes.
- This method should not be used when prices are continuously rising, as it will lead to an apparent increase in profits and, consequently, an increase in taxes.

Practical example:

Here is some information about the movement of stock of material "F" in a manufacturing company during March 2024.

- 01/03/2024 Beginning inventory: 200 units with a total value of 5,000 DZD.
- 03/03/2024 180 units received at a price of 21 DZD per unit.
- 04/03/2024 250 units issued.
- 06/03/2024 70 units entered at a price of 22 DZD per unit.
- 10/03/2024 150 units removed.
- 15/03/2025 120 units entered at a price of 24 DZD per unit.
- 18/03/2024 130 units received at a price of 23 DZD per unit.
- 25/03/2024 220 units shipped.
- 27/03/2024 320 units received at a price of 24 DZD per unit.
- 29/03/2024 250 units removed.

Required: Prepare a stock movement card for the raw material using the first-in, first-out (FIFO) method.

Solution:

The Foundation:								Inventory card number:		
January 2024								**Article "K"**		
The Date	Statement	Entries			Outputs			Inventory		
		Q	UP	AM	Q	UP	AM	Q	UP	AM
03/01	Beg-inv	200	20	5000				200	20	5000
01/03	Input	180	21	3780				200 180	20 21	5000 3780
03/04	Output				200 50	20 21	5000 1050			
03/06	Input	70	22	1540				130 70	21 22	2730 1540
03/10	Output				130 20	21 22	2730 440	50	22	1100
03/15	Input	120	24	2880				50 120	22 24	1100 2880
03/18	Input	130	23	2990				50 120 130	22 24 23	1100 2880 2990
03/25	Output				50 120 50	22 24 23	1100 2880 1150	80	23	1840
03/27	Input	320	24	7580				80 320	23 24	1840 7680
03/29	Output				80 170	23 24	1840 4080	150	24	3600

Axis Three: The Full Cost Method According to Homogeneous Sections

Axis Three: The Full Cost Method According to Homogeneous Sections

The full cost method according to homogeneous sections is a cost accounting or management accounting methodology that involves aggregating all costs (distinguishing between direct and indirect) and then systematically distributing indirect costs across homogeneous sections or centers based on technical or quantitative criteria, in order to accurately determine the product cost and evaluate performance.

Direct Costs: These are costs that directly relate to a specific product, function, or activity, making their integration into various cost elements straightforward.

Indirect Costs: These are shared costs among multiple products or activities, which are processed before being allocated to specific costs. Therefore, they are subject to distribution through the homogeneous sections method and then charged to the various costs.

Concept of the Method:

This method relies on dividing the enterprise into homogeneous sections (analysis centers), where indirect costs are collected at the level of each section and then distributed according to specific units of work (such as labor hours).

Definition of the Homogeneous Sections Method: These are homogeneous work centers in terms of function, aimed at achieving the enterprise's overall activity. They are classified according to their importance into:

-Principal Sections: These are sections directly linked to the enterprise's core functions, such as: supply, production, and nomenclature sections.

Auxiliary Sections: These are sections that assist the principal sections in performing their tasks, such as: administration, maintenance, transportation, etc.

Units of Work or Measurement (Distribution Keys): These are tools for distributing indirect costs among the enterprise's sections.

Note: The selection of units of work must be compatible with the nature of the section.

Basic Steps:

✓ **Identifying Homogeneous Sections**: Dividing the enterprise into production (principal) sections and auxiliary (secondary) sections.

✓ Aggregation of Indirect Costs: Recording all indirect costs for each section.

✓ Primary Distribution: Directly allocating primary indirect costs to all sections.

✓ Secondary Distribution: Redistributing the costs of auxiliary sections to principal sections.

✓ Calculation of Unit of Work Cost: Dividing the total expenses of the section by the activity or work units in the same section.

✓ Cost Imputation: Charging each principal section with its final share of indirect costs according to the unit of work, then allocating them to the products.

Advantages of the Method:

✓ Provides the enterprise with greater accuracy in distributing indirect costs and controlling cost sources.

✓ Facilitates measuring product cost and efficiently reveals areas of waste.

✓ Suitable for industrial enterprises with diverse activities and multiple sections.

Primary Distribution of Indirect Costs: Costs are distributed according to their nature between the enterprise's principal and auxiliary sections.

Example: Here is the table for the distribution of indirect costs. Complete the required parts.

The statement	The amounts	Secondary sections		Main sections		
		Administration	Maintenance	Purchase	Production	Distribution
External Services	30000	(15000)%50	(3000) %10	(6000 %20	–	6000 %20
User Charges	80000	(32000 %40	(16000)%20	(4000 %05	–	8000 %35
Taxes and Fees	5000	(250) %05	–	(750) %15	(20000)%40	2000 %40
Operational Cha	18000	(1800) %10	(2700) %15	(2700 %15	(6300) %35	4500 %25
Financial Charges	16000	–	–	(6400 %40	(3200) %20	6400 %40
Depreciation provi	20000	–	–	(6000 %30	(10000) %50	4000 %20
Total primary allocation	169000	49050	21700	25850	21500	50900

Secondary Distribution of Indirect Costs: This follows the primary distribution and involves distributing the costs of auxiliary sections among themselves and to the principal sections. There are several cases:

- Descending Distribution of Services;
- Distribution with Exchange of Services Between Auxiliary Sections;
- Distribution with Exchange of Services Between Principal Sections;
- Distribution with Exchange of Services Between Auxiliary and Principal Sections.

Descending Distribution of Services (Non-Reciprocal):

Example: Here is the following table for the distribution of direct costs. Complete the required parts.

The statement	Secondary sections			Main sections				
	Administration	Maintenance	Energy	Purchase	Preparation	Installation	Finishing	sales
TA. I	23000	25000	12000	14500	20000	13000	10000	10500
II.A dministration Maintenance Energy	-100%	12% -100%	10% 20% -100%	15% 10% 15%	18% 20% 20%	15% 15% 26%	20% 10% 24%	10% 25% 15%
TA II*								

***:Total secondary allocation**

Solution: Completing the Indirect Costs Distribution Table

The statement	Secondary sections			Main sections				
	Administration	Maintenance	Energy	Purchase	Preparation	Installation	finishing	Sales
TA. I	23000	25000	12000	14500	20000	13000	10000	10500
II.A dministration Maintenance Energy	**(23000)**	2760 (27760)	2300 5552 (19852)	3450 2776 2977.8	4240 5552 3970.4	3450 4164 5461.52	4600 2776 4764.48	2300 6940 2977.8
TA II	0	0	0	23703.8	33762,4	25775,52	22040,48	22717,8

Distribution with Exchange of Services Between Auxiliary Sections:

Example: Here is the table for the distribution of indirect costs. Complete the required parts.

Statement	Supporting Departments		Main sections		
	Administration	Maintenance	Purchase	Preparation	Sale
TA. I	2800	10000	12400	14300	11200
II.A Administration Maintenance	(4000)%100 1200 %10	2000 %50 (12000)%100	800 %20 3000%25	800 %20 4800%40	400 %10 3000%25
TA II	0	0	16200	19900	14600
N.U.M*			kg of purchased material	Direct working hours	Business number
N.M.U**			4110	2014	141000
C.UM***			3.94	9.88	0.1

: Nature of the Unit of Measurement
****: Number of Measurement Units***
*****: Cost per Unit of Measurement***

We denote Administration by: X
We denote Maintenance by: ..... Y
We have:
…… (1) X = 2800 + 0.1Y
Y = 10000 + 0.5X ……..... (2)
By substituting (2) into (1), we get:
X = 2800 + 0.1(10000 + 0.5X)
X = 2800 + 1000 + 0.05X
0.95X = 3800
X = 3800 / 0.95 …….. X = 4000
By substituting X into equation (2), we get:
Y = 10000 + 0.5(4000)
Y = 10000 + 2000 …… Y = 12000
Administration = 4000;
Maintenance = 12000.

Distribution with Exchange of Services Between Principal Sections:
Example: Here is the table for the distribution of indirect costs. Complete the required parts.

Statement	Basic sections				
	Purchase	Cutting	Assembling	Finishing	Sale
TA. I Cutting Assembling	15000	6840 -20% +10%	10000 +20% -10%	12000	11000
TA II	15000			12000	11000

We denote Cutting by the symbol: X
We denote Assembly by the symbol: Y
We have:
X = 6840 + 0.1Y …….(1)
Y = 10000 + 0.2X …….(2)
By substituting (2) into (1), we get:
X = 6840 + 0.1(10000 + 0.2X)
X = 6840 + 1000 + 0.02X
0.98X = 7840
X = 7840 / 0.98 ……. X = 8000
By substituting X into equation (2), we get:
Y = 10000 + 0.2(8000)
Y = 10000 + 1600 …….. Y = 11600
Therefore, the Cutting ratio: 20%, Assembly ratio: 10%
Cutting = 20% × 8000 ..... Cutting = 1600 DA
Assembly = 10% × 11600 ..... Assembly = 1160 DA

Statement	Basic sections				
	Purchase	Cutting	Assembling	Finishing	Sale
T.A.II Cutting Assembling	15000	6840 -1600 +1160	10000 +1600 -1160	12000	11000
T.A.II 2	15000	6400	10440	12000	11000

Distribution with Exchange of Services Between Auxiliary and Principal Sections:

Example: Here is the table for the distribution of indirect costs. Complete the required parts.

Statement	Secondary sections			Main sections			
	Administration	Maintenance	Energy	Purchase	Workshop 1	Workshop 2	Sale
T.A.II	180000	11400	19100	11900	24600	25100	13000
	-100% 20%	10% -100%	15% 10% -100%	10% 5% 10%	20% 30% 20%	30% 10% 25%	15% 25% 45%
A.II.2 Sale Workshop 1		-20% +10%	+20% -10%				

Solution:

First:

Administration = 180,000 + 0.2 Maintenance .....(1)

Maintenance = 11,400 + 0.1 Administration .....(2)

By substituting equation (2) into equation (1), we get:

Administration = 180,000 + 0.2(11,400 + 0.1 Administration)

Administration = 180,000 + 2,280 + 0.02 Administration

0.98 Administration = 182,280. Administration = 186,000.

By substituting Administration into equation (2), we get:

Maintenance = 11,400 + 0.1(186,000)

Maintenance = 30,000.

Second:

Purchasing = 37,000 + 0.1 Workshop 1 .....(1)

Workshop 1 = 80,800 + 0.2 Purchasing .....(2).

After solving the system of two equations, we get:

Purchasing = 46,000

Workshop 1 = 90,000.

Purchasing ratio: 46,000 × 0.2 = 9,200

Workshop 1 ratio: 90,000 × 0.1 = 9,000

Statement	Secondary sections			Main sections			
	Administration	Maintenance	Energy	Purchase	Workshop 1	Workshop 2	Sale
T.A.II	180000	11400	19100	11900	24600	25100	13000
	-186000 6000	18600 -30000	27900 3000 -50000	18600 1500 5000	37200 9000 10000	55800 3000 12500	27900 7500 22500
T.A.II	0	0	0	37000	80800	96400	70900
Purchase Workshop 1				+9200 -9000	-9200 +9000		
T.A.II.2	0	0	0	36800	81000	96400	70900

Calculation of Costs and Cost Price According to the Full Cost Method in a Commercial Enterprise and in an Industrial (Production) Enterprise:

How to Calculate the Cost Price in a Commercial Enterprise:

In a commercial enterprise, the full cost method aims to determine the full purchase cost of merchandise sold, which includes all direct and indirect costs related to purchasing and making the goods ready for sale. Then, a markup (commercial margin) is added to determine the selling price. The cost price here is essentially the purchase cost of merchandise.

The calculation is done using the following scheme:

Cost Price = Purchase Cost + Distribution Expenses (Direct + Indirect)

How to Calculate the Cost Price in a Production (Industrial) Enterprise:

Purchase Cost = Purchase Price + Purchase Expenses (Direct + Indirect)

As previously indicated, the cost price is calculated after determining the cost of purchasing the raw materials used in the production process for manufacturing a specific product. This includes the purchase price of the raw materials plus direct purchase expenses and indirect purchase expenses. Then, the cost of raw materials consumed in the production process for this product is calculated, to which direct and indirect production expenses are added. In the final stage, direct and indirect selling (distribution) expenses are added to the cost of sold products to obtain the cost price or the full final cost of the product.

To reinforce the previous theoretical explanation, we will present simplified and easy-to-understand equations as follows:

Purchase Cost = Purchase Price + Direct Purchase Expenses + Indirect

Production Cost = Cost of Consumed Raw Materials + Direct Production Expenses + Indirect Production Expenses

Cost Price = Cost of Production Sold + Direct Distribution Expenses + Indirect Distribution Expenses

Practical Example:

An industrial enterprise produces two types of drawing pens "A" and "B" using wooden materials (X) and chemical materials (M). It applies the homogeneous sections method to analyze its costs. The information for the month of December of year N200 is provided as follows:

1- Purchases for the month:

Wooden material (X): 300 kg at 50 DA/kg.

Chemical material (M): 200 kg at 35 DA/kg.

2- Production and consumption:

All purchased materials were consumed, producing:

25,000 pens of type "A" using 188 kg of material (X) and 125 kg of material (M).

15,000 pens of type "B" using the remaining quantities of both materials.

3- Sold production:

490 boxes of "A" at 165 DA/box (each containing 50 pens).

300 boxes of "B" at 185 DA/box (each containing 50 pens).

4- Direct expenses:

On production: Direct labor: 1,240 hours at 15 DA/hour, of which 775 hours for "A" and the remainder for "B". In addition, other production expenses amounting to 7,100 DA, of which 5,330 DA for "A".

On distribution: 5 DA/sold box for each type.

5- Indirect expenses: Distributed across the homogeneous sections as shown in the following table:

Statement	The amount	Secondary sections			Basic sections		
		Administration	Maintenance	Energy	Supply	Preparation	Completion
Account61 Account62 Account63 Account64 Account68	18600 15000 24000 6000 4729.5	10% 10% 20% 05% 540	20% 05% 10% 10% 530	15% 20% 05% 05% 430	05% 20% 15% 40% 750	25% 30% 20% 20% 520	25% 15% 30% 20% 1959.5
Energy Maintenance Administration		-100%	10% -100%	20% 20% -100%	30% 15% 25%	25% 40% 40%	?% ?% 35%
Units of measurement					kg of materials purchased	100 pens produced	Direct working hours

Required: - Complete the indirect cost table.

- Determine the various costs and cost price.

Solution: First, we complete the indirect burden distribution table.

Indirect burden distribution table

Statement	The amount	Secondary sections			Basic sections		
		Administration	Maintenance	Energy	Supply	Preparation	Completion
Account61 Account 62 Account 63 Account 64 Account 68	18600 15000 24000 6000 4729.5	1860 1500 4800 300 540	3720 750 2400 600 530	2790 3000 1200 300 430	930 3000 3600 2400 750	4650 4500 4800 1200 520	4650 2250 7200 1200 1959.5
T.A. I	68329.5	9000	8000	7720	10680	15670	17259.5
Energy Maintenance Administration		(9000)	900 (8900)	1800 1780 (11300)	2700 1335 2825	2250 3560 4520	1350 2225 3955
T.A. II	/	0	0	0	17540	26000	24789.5
N.U.M					kg of materials purchased	100 pens produced	Direct working hours

N.M. U					500 kg	400	1240
C.UM					35.08	65	20

Secondly, we calculate the purchase cost, which, as mentioned earlier, is calculated as follows:

Purchase cost = purchase price + direct purchase expenses + indirect

In order to organize the process, we draw up a model table for solving all exercises related to management accounting when calculating mixed costs, including the number of units, unit price, and total amount in the columns, and showing the process in the rows as follows:

Calculating the purchase cost:

Statement	Raw material: wood			Raw materials Chemicals		
	Q	**UP**	**A**	**Q**	**UP**	**A**
Purchase price	300	50	15000	200	35	7000
Direct Purchase Expenses	/	/	/	/	/	/
Indirect Purchase Expenses	300	35.08	10524	200	35.08	7016
Purchase Cost	300	85.08	25524	200	70.08	14016

After calculating the total purchase cost as explained in the previous section and dividing it by the number of units purchased, we obtain the purchase cost per unit, as shown in the table above.

Third: We now calculate the production cost using the following equation:

Production cost = cost of purchasing raw materials used + direct

.production expenses + indirect production expenses

We tabulate the data in a table to organize the process, as was done when calculating the purchase cost in the following form:

Calculating production costs:

Statement	Pen type A			Pen type B		
	Q	**UP**	**A**	**Q**	**UP**	**A**
C.P. R.M.U	188	85.08	15995.04	112	85.08	9528.96
Wood	125	70.08	8760	75	70.08	5256
Chemical	775	15	11625	465	15	6975
D.Produc.Exp						
IND.Produc.Exp						
Preparation	250	65	16250	150	65	9750
Completion	775	20	15500	465	20	9300
Other Produ. Exp			5330			1770
Production cost of a pen	25000	2.93	73460.04	15000	2.83	42579.96
Production cost per box	500	146.92	66460.04	300	141.93	42579.96

We note from the above discussion that the production cost per box and per pen was calculated at the end of the discussion by dividing the total production cost by the number of pens produced when calculating the cost per pen, and dividing the total cost by the number of boxes produced to calculate the production cost per box.

Fourth: To calculate the cost price, we use the following formula:

Cost price = cost of goods sold + direct distribution expenses + indirect .distribution expenses

Cost price:

Statement	Pen type A			Pen type B		
	Q	**UP**	**A**	**Q**	**UP**	**A**
COGS*	490	146.92	71990.8	300	141.93	42579
Distribution Expe	490	5	2450	300	5	1500
Cost price	490	151.92	74440.8	300	146.93	44079
Pen production cost price	24500	3.03	74440.8	15000	2.93	44079

***:Cost of Goods Sold**

Importance of cost accounting and cost price:

- Accurate determination of unit cost.

- Assistance in product pricing.

- Evaluation of product profitability.

- Cost control and efficiency improvement.

Calculating the total analytical result and the net analytical result:

To calculate the total analytical result, we use the following equation:

Total analytical result = sales figure – cost price

Where turnover is sales expressed in monetary units and is calculated using the following formula:

Business volume = Number of units sold x Selling price per unit

To calculate the net analytical result, we use the following relationship:

Net analytical result = Total analytical result + Additional items – Non-recognized charges

Practical example:

Using the data from the previous example, calculate the total analytical result and the net analytical result, noting that the unloaded costs are 5,000 DZD and the additional items are 3,100 DZD.

Solution:

Analytical result:

Statement	Pen type A			Pen type B		
	Q	**UP**	**A**	**Q**	**UP**	**A**
Business Number Cost Price	490 490	165 151.92	80850 74440.8	300 300	185 146.93	55500 44079
Analytical result	490	13.08	6409.2	300	38.07	11421

Net analytical result:

Statement	Amounts
Analytical result for pen type A Analytical result for pen type B Additional elements Unloaded loads	6409,2 11421 **3100** **(5000)**
Net analytical result	15 930.2 da

Processing of Semi-Finished Products:

Semi-finished products are products that have reached an advanced stage of manufacturing but are not yet complete to become final products ready for consumption or sale. They are used as inputs in additional manufacturing stages to transform them into finished goods. These products can be stored or transferred between different production stages.

Concept of Processing Semi-Finished Products:

✓ It is the process of adding value stage by stage to products that are not yet fully manufactured.

✓ It involves calculating the specific cost of these products at each manufacturing stage, accumulating costs from raw materials, direct labor, and associated industrial overheads.

✓ Accurately determining the cost of semi-finished products is essential, as it impacts the valuation of consumption, storage, and pricing of final products.

Methods of Accounting for Semi-Finished Products:

✓ The production cost is calculated up to that stage, taking into account both direct and indirect costs.

✓ The degree of completion of semi-finished products is monitored to determine their value within inventory or work-in-progress.

✓ Accounting may involve calculating the cost of semi-finished products at the end of specific manufacturing stages or on an estimated basis based on production quantity and time spent.

Importance of Processing Semi-Finished Products:

✓ Provides a clear view of production costs at each stage.

✓ Enables management to monitor resource utilization efficiency and measure performance.

✓ Assists in pricing decisions, inventory control, and profitability analysis.

It is well known that the production process in an enterprise passes through a limited and clear number of stages, represented by the stage of purchasing raw materials and calculating purchase costs, followed by the stage of transforming raw materials in the workshop and calculating production costs, and finally, as the last stage, selling the product by bearing distribution costs and calculating the cost price. However, in some cases, the production process in the enterprise is not as clear and straightforward; rather, it can be somewhat complex due to the emergence of special stages and uncommon situations, such as the appearance of semi-finished products, work-in-progress, or residues and waste. This is what we explain here by defining the concept of these situations and their accounting treatment.

Semi-Finished Product (Semi-Manufactured Product):

The semi-finished product is a product that has reached a specific stage of completion and is ready for use in a subsequent stage in the manufacturing of the finished product. It is also referred to as an intermediate product. One of its key characteristics is that it enters into the realization or assembly of the final product; thus, it is suitable for consumption and storage, and in some cases, it may even be subject to sale.

Calculating the production cost of the semi-finished product is essential for the following reasons:

- To incorporate it into the overall production cost of the final product;

- To value the inventory of semi-finished products in cases where not all produced units are consumed;

- To determine the selling price in the event of selling the semi-finished product.

Since the semi-finished product has a final form and has completed a stage of production, it is necessary to calculate its unit production cost, then

evaluate the uses of the semi-finished product in the cost of the finished product at the previously calculated unit cost. The accounting treatment of the semi-finished product is as follows:

The cost of producing a semi–finished product = the cost of purchasing the raw materials used + direct and indirect production expenses.

Therefore, in the case of semi-finished production in the final production structure intended for sale, the total production cost becomes as follows:

Total production cost = cost of semi–finished products used + cost of raw materials used + direct and indirect production expenses.

Work-in-Progress Product (Product in Process):

Work-in-progress products, or products in process, refer to production units that are not completed to 100%, meaning they have not become finished products by the end of the operating cycle. Accordingly, a product in process is therefore a product that is not ready and not fully manufactured at the end of the accounting period. However, it will be fully manufactured in the subsequent accounting period. The unfinished products located within the workshops are thus in the manufacturing pipeline, and this process may range from 1% to 99% completion of the product's manufacturing. Moreover, the product in process is not suitable for storage or sale. Nevertheless, at the end of each accounting period, its value is recorded in the "Products and Works in Progress" account.

This type of product is characterized by a set of features, the most important of which include:

- The incompleteness of the work-in-progress production is not due to a lack of resources; rather, the reason stems from a temporal barrier represented by the end of the operating cycle, at which point we must stop to take inventory of what the enterprise possesses and owes during that cycle;

- Work-in-progress can be obtained at the semi-finished product manufacturing stage or in the final stage when producing the fully finished product;

- There are no inventory discrepancies for work-in-progress products, as the reason for this is that it has only a real ending inventory value;

- Work-in-progress is generally undesirable, and the emergence of this type of product in the operating cycle highlights a mismatch between available resources and the set objectives;

- The work-in-progress at the end of a given operating cycle is considered work-in-progress at the beginning of the period immediately following that cycle.

Therefore, in the case of production in progress (in progress) at the beginning of the period and production in progress at the end of the period in the final complete production mix intended for sale, the complete production cost becomes as follows:

Total production cost = current production cost at the beginning of the period + production cost of semi-finished products used + purchase cost of raw materials used + direct and indirect production expenses – current production cost at the end of the period.

Residues and waste:

Some production processes generate residues and waste. Residues are found, for example, in the leather, plastics, and textile industries, etc. Waste, on the other hand, refers to any product that does not have the characteristics of a sound product. The presence of this waste affects the calculation of production costs. We will discuss the cases that we may encounter in waste and scrap and their impact on the calculation of production costs.

Residues and waste that are discarded (disposed waste):

In this case, these residues and waste have no direct impact on the cost of production, but the enterprise incurs additional expenses, such as disposal costs, shipping and transportation costs, for example, which are added to the cost price if they are disposed of during the accounting period for calculating the cost price. Conversely, if they are disposed of after the accounting period for calculating the cost price, they are considered an element of the result and are deducted from the analytical result at the end of the operating cycle. The accounting treatment of residues and waste that are discarded is carried out according to the following relationship:

Total production cost = total cycle costs + Expenses for disposal costs for residues and waste

Sold scraps and waste:

When scraps and waste obtained from the production process are sold, the sale price can be considered either as additional profit or as a reduction in the cost price of the basic finished product. The accounting treatment for this type of scrap and waste is to calculate its cost and then deduct this cost from the production cost of the primary product according to the following relationship:

Total production cost = Total production costs for the cycle – Production cost of sold Residues and Waste

The cost of producing sold residues and waste can be calculated using the following formula:

Cost of Sold Residues and Waste = "Estimated Selling price – distribution costs and profit margin – processing costs (if any)

Residues and waste recovered (reused) in the production process:

If residues and waste are reused in the same production unit, they are valued as inputs at market price or approximate price, so that this price or value is deducted from the cost of producing the finished products that gave us these residues and waste and added to the cost of the products in which these residues and waste are used. In this case, the enterprise does not need to purchase the raw material, and therefore the residues and waste recovered in the production process are considered as compensated raw materials and are treated accounting as follows:

Total production cost = Production expenses for the period – Cost of recovered residues and waste

Whereas:

Cost of recovered residues and waste = cost of purchasing replacement raw materials + "Treatment Expenses (if any)

Practical example:

Al-Rayyan Corporation produces product P in two stages, as follows:

- The first stage (workshop 1) produces a semi-finished product. S

- Stage 2 (Workshop 2) produces the finished product P.

The production process leaves behind waste F, which is reused in Workshop 1 as raw material. During March 2014, the following expenses were incurred:

Statement	Workshop 1	Workshop 2
Raw materials A1	12000	————
Raw materials A2	10000	————
Raw materials A3	————	3000
Consumables	9250	2700
Direct labor	22500	17650
Indirect workshop expenses	7250	12350

The current production for the first period in workshop (1) is estimated at 6,000 dinars, and in workshop (2) at 5,000 dinars. The waste obtained in workshop (2) and reused was estimated at 1,200 DA. The current production for the last period in workshop (1) was estimated at 3,000 DA, and in workshop (2) at 2,500 DA. The production log showed the following:

• The quantity of semi-finished product S produced was 800 kg in workshop (1).

• The quantity of finished product P produced was 1,000 units using 800 kg of product S.

Required: Calculate the production cost of both semi-finished product S and finished product P.

During April 2014, the new expenses for the same company were as follows:

Statement	Workshop 1	Workshop 2
Raw materials A1	12550	———
Raw materials A2	11100	———
Raw materials A3	—	3530
Consumables	9500	2770
Direct labor	23000	18220
Indirect workshop expenses	9850	12550

The current production for the end of April in workshop (1) is estimated at 2,350 dinars, while in workshop (2) it is estimated at 2,820 dinars. The F residues obtained in workshop (2) were estimated at 1,350 DA recovered, and the F residues used in workshop (1) were estimated at 1,000 DA. The production log for this month showed the following:

- The quantity of semi-finished product produced was estimated at 825 kg in workshop (1).
- The quantity of finished product produced was estimated at 1,010 units using 800 kg of semi-finished product S.

Required:

- Calculate the production cost of both semi-finished product S and finished product P.

Solution:

Calculate the production cost of semi-finished product S **for March**:

Statement	Quantity	Price	Cost
Production in progress at the beginning of the month			6000
Cost of raw materials used:			
A1	———	———	12000
A2	———	———	10000
Consumed goods			9250
Direct labor:			22500
Indirect expenses:			7250
Production in progress at the end of the month:			(3000)
Period production cost	800	80	64000

Calculate the total production cost of **product P for March**:

Statement	Quantity	Price	Cost
Production in progress at the beginning of the month			5000
Production cost of the semi-finished product S used	80	800	64000
Cost of raw materials used:	——	——	
3A			3000
Consumed goods:			2700
Direct labor:			17650
Indirect expenses:			12350

Recovered residues			(1200)
Production in progress at the end of the month:			(2500)
Period production cost	1000	101	10100

Calculating the production cost of **semi-finished product S for the month of April**:

Statement	Quantity	Price	Cost
Production in progress at the beginning of the month			3000
Cost of raw materials used:			
A1	———	———	12250
A2	———	———	11100
Residues used as raw materials			1000
Consumed goods			9500
Direct labor:			23000
Indirect expenses:			9850
Production in progress at the end of the month:			(2350)
Period production cost	825	82	67650

Calculation of the total production cost of product **P for the month of April:**

Statement	Quantity	Price	Cost
Production in progress at the beginning of the month			2500
Production cost of the product			
Half of the used S factory:	82	800	65600
Cost of raw materials used:			
3A	———	———	3530
Consumed goods			2770
Direct labor:			18220
Indirect expenses:			12550
Recovered residues F			(1350)
Production in progress at the end of the month:			(2820)
Period production cost	1010	100	101000

The Relationship Between Financial Accounting Results and Management Accounting Results (Practical Case):

The relationship between the results of financial accounting and management accounting can be understood through the following explanation: Financial accounting aims to provide a comprehensive picture of the enterprise's financial position by recording, summarizing, and preparing financial statements that reflect the overall result of the enterprise's activity (profit or loss). It is primarily used for external purposes, such as reporting to regulatory authorities and investors. In contrast, management accounting (or cost accounting) focuses on the detailed analysis of costs across various units and responsibility centers within the enterprise, thereby supporting management in making internal decisions, such as cost control, performance improvement, and evaluating the profitability of different products or departments.

The Analytical Result:

The analytical result expresses the relationship between turnover (sales revenue) and the cost price (the full final cost of the product or merchandise). The result is in favor of the enterprise—i.e., a profit—when turnover exceeds the cost price. Conversely, it is negative or unfavorable—i.e., a loss—when the cost price exceeds turnover.

A positive result impacts the enterprise's viability and can contribute to increasing its size and growth. It also reflects the degree of control over production and effective management within the establishment.

Furthermore, the analytical result reveals the contribution rate of each product type to its formation, which allows for identifying the most significant sales and those with the highest profitability. This facilitates strengthening them and addressing any weaknesses if present, as well as identifying loss-making sales, should they exist.

The components of the analytical result differ from those of general (financial) accounting. The former consists of:

✓ Results from sales of various products.

✓ Results from sales of residues and waste.

✓ Results from sales of circulating packaging, in cases where it is not recovered.

In contrast, the components of the general accounting result are:

✓ Result from operating activities.

✓ Result from non-operating activities.

✓ Result from financial operations.

These results are represented by the difference between the revenues from the aforementioned operations and their expenses, namely operating expenses, non-operating expenses, and financial expenses. Accordingly, the general accounting result is a composite result comprising the operating result and the non-operating result.

Practical Example: Girls' Suit Children's Suit

The SONITEX enterprise, with a capital of 1,800,000 DA, is engaged in the production and sale of two types of men's suits: "BR" and "BA", using fabric, thread, and other accessories. From its accounting records in the finance department, the following information was obtained for the month of February 2025:

Beginning Inventory:

600 meters of fabric at a cost of 75,800 DA and 50 units of thread at 260 DA/unit.

15,000 DA for various accessories, and 1,200 commercial packaging units totaling 12,000 DA.

55 "BR" suits at a cost of 34,320 DA and 123 "BA" suits at 20,900 DA.

Work-in-progress amounted to 9,155 DA for "BR" and 2,250 DA for "BA".

Purchases for the Period:

20 units of fabric, each unit consisting of 100 meters at 120 DA/meter, with purchase expenses of 600 DA per unit.

250 units of thread at 200 DA/unit, with total purchase expenses of 2,000 DA.

Various accessories valued at 35,000 DA.

Production and Consumption: The production process passes through three stages: tailoring (cutting), sewing, and finishing.

First Stage: Tailoring (Cutting):

1.5 meters of fabric were used to cut one "BR" suit and 0.8 meters of fabric to cut one "BA" suit. The cutting process produced fabric residues suitable for sale.

Second Stage: Sewing:

One unit of thread yields 3 "BR" suits or 5 "BA" suits, with the addition of 60 DA of accessories for each "BR" suit and 45 DA for each "BA" suit.

Machine operations lasted 1,550 hours, of which 550 hours were for "BR" suits.

Third Stage: Finishing:

1,000 commercial packaging units were used, with 60% allocated to "BR" suits and the remainder to the second type of product. Note that each commercial packaging contains only one suit, whether for the first or second product.

Direct Labor:

1,500 hours of direct labor, of which 400 hours for the product "BA" at 75 DA/hour, and the remainder for the product "BR" at 85 DA/hour.

Expenses by Nature: Account 61 for non-production purposes: 8,000 DA; Account 62 services: 24,050 DA. Accounts 63 to 68: to be calculated.

Sales:

600 units of the product "BR" at 820 DA/unit, 500 suits of "BA" at 500 DA/suit, with each suit bearing 5 DA as direct distribution expenses.

Indirect Expenses summarized in the table below, noting that the interest rate on capital is 5% annually and non-allowable expenses amount to 5,400 DA.

Statement	Administration	Maintenance	Purchase	Tailoring	Sewing	Completion	distribution
T.A.II	13000	12100	41775	4875	95750	29375	14875
Administration	-100%	20%	5%	15%	20%	25%	15%
Maintenance	10%	-100%	20%	15%	25%	20%	10%
Other Distribution				-10% +20%	+10% -20%		
N.U.M			100 DA Purchase	Meter of Fabric Used	Machine operations hours	Produced Suit	100 DA Revenue

Note:

- The residues are estimated at 0.25 meters per tailored "BR" suit and 0.15 meters per tailored "BA" suit, sold at 30 DA/meter. Note that the profit margin and distribution expenses represent 20% of the selling price.
- Work-in-progress at the end of the month amounted to 5,800 DA for "BR" and 7,760 DA for "BA".
- The enterprise applies the weighted average cost method.

Required:

- Calculate the number of units produced from allowances.
- Complete the indirect burden distribution table.
- Calculate the net analytical result and the general accounting result.

Solution:

Calculation of the Number of Produced Suit Units:

From the given data: 1,000 units of packaging were used, with each packaging allocated to one produced unit of either the first type or the second type.

The used packaging: 1,000 units, of which 60% for "BR" suits.

Therefore:

Number of produced units of the first type "BR" = 1,000 × 0.6 = 600 units.

Number of produced units of the type "BA" = 1,000 - 600 = 400 units.

Fabric Used per Suit:
"BR": 600 × 1.5 = 900 meters.
"BA": 400 × 0.8 = 320 meters.

Indirect Costs Distribution Table:

We have:
Administration = 13,000 + 0.1 Maintenance .....(1)
Maintenance = 12,100 + 0.2 Administration .....(2)
After solving the system of equations, we obtain:
Administration = 14,500 DA
Maintenance = 15,000 DA
Other Distribution:
Cutting = 39,300 + 0.2 Sewing .....(1)
Sewing = 102,400 + 0.1 Cutting .....(2)
After solving the system of equations, we obtain:
Cutting = 61,000 DA
Sewing = 108,500 DA
Therefore:
Cutting ratio = 61,000 × 0.1 = 6,100 DA
Sewing ratio = 108,500 × 0.2 = 21,700 DA

Statement	Administration	Maintenance	Purchase	Tailoring	Sewing	Completion	Distribution
T.A.I	13000	12100	41775	34875	95750	29375	14875
administration	14500	2900	725	2175	2900	3625	2175
Maintenance	1500	15000	3000	2250	3750	3000	1500
T.A.II	0	0	45500	39300	102400	36000	18550
Other Distribution				(6100) 21700	6100 21700		
T.A.O.D	0	0	45500	54900	86800	36000	18550
N.U.M			100 DA Purchase	Meter of Fabric Used	Machine operations hours	Produced Suit	100 DA Revenue
N.M. U			3250	1220	1550	1000	7420
C.UM			14	45	56	36	2.5

Calculation of Units of Measurement:

Purchase Price = 240000 + 50000 + 35000 = 325000 DA / 100 = 3250 DA
Fabric: 20 × 100 × 120 = 240000 DA
Thread: 250 × 200 = 50,000 DA

Various Accessories = 35000 DA
Uses: 900 + 320 = 1,220 meters
Turnover/ Revenue = 742000 DA / 100 = 7420 DA
600 × 820 = 492000 DA
500 × 500 = 250000 DA

Calculating the purchase cost:

Statement	Fabric	The thread	Various supplies	Commercial Packaging
Purchase price 20x100x120 250x200	– 240000 –	– – 50000	35000 – –	12
Direct Purchase expenses 20x600	– 12000	2000 –	– –	
Indirect Expenses 14x 2400 14x 500 14x 350	33600 – –	– 7000 –	– – 4900	
Period purchase cost	285600	59000	39900	/
Stock 1 Duration	75800	13000	/	/
Weighted cost	139	240	39900	10

Cost of Sold Waste (Residues):

Calculation of Quantity: (600 × 0.25) + (400 × 0.15) = 210 meters
Selling Price: 30 DA/meter.
Profit Margin + Distribution Expenses = 20% of Selling Price.

Statement	"B R" suit	"BA" suit	Total amount
Potential business number 150 x 30 60 x 30	4500	1800	6300 DZD
P/M + distribution costs 4500x 0.2 1800x 0.2	(900)	(360)	(1260)
Cost of waste sold	3600 DZD	1440 DZD	5040 DZD

Total production cost:

Statement	"B R" suit			"BA" suit		
	Q	**UP**	**A**	**Q**	**UP**	**A**
W.I.P.a.b.o.t.p*			9155			2250
C. P. R. M.U**						
Fabric	900	139	125100	320	139	44480
	600	60	36000	400	45	18000
Supplies Commercial Packaging	600	10	6000	400	10	4000
The thread:	$\frac{600}{3}$	240	48000	$\frac{400}{5}$	240	19200
Direct Prod-Expe	1100	85	93500	400	75	30000
Indirect Prod-Expe	900	45	40500	320	45	14400
Tailoring	550	56	30800	1000	56	56000
Sewing Completion	600	36	21600	400	36	14400
Waste sold			(3600)			(1440)
Pr in p. 2. duration			(5800)			(7760)
Period production cost	600	668,75	401255	400	483,825	193530
Stock 1 Duration	55	/	34320	123	/	20900
Weighted cost	655	665	435575	523	410	214430

***: Work in Progress at the Beginning of the period**
****: Cost of Purchased Raw Materials Used**
Cost price:

Statement	"B R" suit			"BA" suit		
	Q	**UP**	**A**	**Q**	**UP**	**A**
COGS	600	665	399000	500	410	205000
Distribution expenses	600	5	3000	500	5	2500
Indirect Exp-Distribu	4920	2,5	12300	2500	2,5	6250
Cost price	600	690,5	414300	500	427,5	213750

Overall analytical result:

Statement	"B R" suit			"BA" suit		
	Q	**UP**	**A**	**Q**	**UP**	**A**
Business Number	600	820	492000	500	500	250000
Cost price	600	690,5	(414300)	500	427,5	(213750)
O. A.R*	600	139,5	87700	500	72,5	36250
Overall analytical result				113950		

***: Overall Analytical Result**

Calculation of additional items:

1,800,000 x 0.05 = 90000 DZD per year

Monthly amount: 90000/12 = 7500 DZD

Net analytical result:

Statement	Amounts
Analytical result for product "B R"	77700
Analytical result for product "B A"	36250
Additional elements	7500
Non-considered burdens	(5400)
Net Analytical Result	**116050**

Calculation of the General Accounting Result:

Account 71: Sold Production = Cost of Sold Production for the Two Products

Account 71 = 401,255 + 193,530 = 594,785 DA.

Account 72: Stored Production = (Cost of Production for the Period – Cost of Sold Production) + (Ending Work-in-Progress – Beginning Work-in-Progress) + Cost of Sold Residues.

Account 72 = -2,020 DA (debit balance).

Account 61 = Cost of Purchasing Materials and Supplies Consumed in Production + Account 61 Non-Production Purposes

Account 61 = 300,780 + 8,000 = 308,780 DA.

Account 62 = 24,050 DA.

Accounts 63 to 68 = Direct Production Expenses + Indirect Production Expenses + Direct Distribution Expenses + Indirect Distribution Expenses + Non-Allowable Expenses – Additional Elements – Account 61 Non-Production Expenses – Account 62

Accounts 63 to 68 = 291,100 DA.

Statement	Debt	Creditor
Production sold	742000	
Production Stock		(2020)
Consumables and supplies		308780
Services		24050
Added value	407150	
Other miscellaneous expenses		291100
Result of exploitation	116050	

From the solution of the practical example, we observe that the net analytical result and the general accounting result (operating result) are equal.

From the foregoing, it can be stated that:

✓ Financial accounting provides management accounting with the primary data (cost of materials, wages, expenses).

✓ Management accounting offers internal details that assist in preparing accurate financial reports.

✓ The results of management accounting explain and support the figures appearing in financial accounting.

✓ Financial accounting shows the overall result for the enterprise, while management accounting reveals detailed results that aid in internal control and decision-making.

Axis Four: The Variable Costing Method

Definition of the Variable Costing Method:

After reviewing various references on the definition of the costing method, we noted several definitions, all of which emphasize that it is based on the principle of separating variable costs from fixed costs that make up the cost price. Only the variable portion is used for calculation. We will list some definitions from certain professors of management accounting.

Variable costs refer to all expenses that change proportionally with the volume of activity, such as direct materials, variable direct wages, variable indirect manufacturing expenses, and variable selling and distribution costs. The core idea of this method is the separation between fixed and variable costs, charging the product only with the variable portion, while recording the fixed costs in full in the period's result to maintain the validity of managerial analysis.

The variable costing method is also defined as a method that fundamentally relies on separating fixed costs from variable costs and calculating the cost price based solely on variable costs.

The margin on variable costs is determined by subtracting the total variable costs from net turnover as a first stage.

Then, the break-even point (threshold of profitability) is determined, with a focus on studying the profitability level more than on the cost price level and its components, through the relationship between sales volume and profit, relying on the break-even threshold.

It is also defined as a partial costing approach that charges products only with the cost elements that vary with the volume of activity, while fixed costs are treated as period expenses and are not included in inventory costs. The variable costing method is primarily used for analyzing the cost-volume-profit relationship, measuring the margin on variable costs, and making short-term decisions.

Importance:

The variable costing method is primarily used for break-even analysis and profitability threshold, making pricing decisions in the short term, in addition to comparing alternatives and sensitivity analysis.

It also has the advantage of avoiding distortion of the period's result due to inventory changes, and suitability for decision-making.

We also note that the variable costing method is generally not accepted for external financial reports, which require charging fixed manufacturing costs to inventory, and its suitability may decrease when it is difficult to accurately separate fixed from variable costs.

Profitability Threshold (Break-Even Point):

It is defined as the point at which revenues equal expenses, in other words, it is the equality of total production costs with total turnover, which means reaching a zero result, i.e., result = 0, or the equilibrium point that implies that any increase beyond this equilibrium is considered profit, and any decrease before it is considered a loss.

It is calculated mathematically using the following relationship:

$$\frac{Fixed\ costs}{Variable\ marginal\ cost} = Threshold$$

The profitability threshold is calculated in terms of quantity according to the following formula:

$$\frac{Fixed\ costs}{Variable\ unit\ cost\ at\ margin} = Yield\ threshold\ quantity$$

$$Q* = \frac{CF}{P - CV\mu}$$

Where:

CF = fixed costs;

P = selling price;

CVμ Variable unit cost.

Margin on variable cost = Turnover – Variable cost

Margin on variable unit cost = selling price – variable unit cost.

Principles of the Variable Costing Method:

✓ The variable cost consists of expenses that vary proportionally with changes in the volume of activity, known as variable expenses, which are distributed to products to determine the variable cost for each product;

✓ Fixed expenses are not charged to product costs but are treated in aggregate for calculating the result;

✓ Variable costs are classified according to the homogeneous sections method;

✓ The variable costing method allows for easy preparation of estimates related to cost calculation, results, and the profitability threshold.

When applying the variable costing method, it is necessary to:

§ Separate costs into fixed and variable, with the total fixed cost remaining constant within a relevant range of activity.

§ Maintain constancy of the variable cost per unit and the selling price per unit during the analysis period.

§ Ensure equality between produced and sold units, or constancy of the sales mix in the case of multiple products.

Calculation of the Cost Price and Result According to the Variable Costing Method:

The cost price of the product is calculated under the variable costing method in the usual manner, following the stages of the full costing method (homogeneous sections), taking into account that product charging is done only with variable costs. When calculating the analytical result according to the variable costing method, we use the differential operating table, where total variable costs are subtracted from turnover to obtain the margin on variable costs, from which total fixed costs are then subtracted to arrive at the result. This is illustrated in the following table:

Differential analysis table:

Statement	Amounts	Ratio
Net business number	××××××××	%100
Variable costs	(×××××)	%
Margin on variable costs	×××××××××	%
Fixed costs	(×××××)	%
Result	××××××××	%
Margin on variable costs = Net sales – Variable costs		
Result = Margin on variable costs – Fixed costs		

Practical Example: From the operating activities of Al-Falah Enterprise during the period "N", the following information is available, and the required is to prepare the functional operating table.
Number of units sold: 78,956 units of product "L".
Selling price per unit: 12 DA.
Unit variable costs: 6.8 DA.
Total fixed costs: 164,420.2 DA.

Solution:

Statement	Amounts	Ratio
Net Turnover : 78956 x 12	947472	100%
Variable costs 6.8 x 78,956	(536900,8)	56.66%
Margin on variable costs	**410571,2**	43.37%
Fixed costs	(164420,2)	17.35%
Result	**246151**	25.97%

Criticisms Directed at the Variable Costing Method:

Like the previous methods, it has some drawbacks or criticisms that we consider objective and logical. The most important ones include:

✓ Difficulty in separating variable costs from fixed costs due to the linkage between cost elements and the volume of production and sales, in addition to the existence of semi-variable costs and others that are semi-fixed, making it difficult to separate the fixed portion from the variable portion;

✓ The method is not practical for strategic (long-term) decisions;

✓ Decline in the proportion of variable expenses in favor of fixed expenses.

Practical Example: From the financial accounting records of Al-Najah Enterprise, the following information is available:

Selling price per unit: 90 DA

Fixed costs: 70,000 DA

Unit variable cost: 50 DA.

Required Task: Determine the profitability threshold (break-even point).

Solution:

We have: Result = (Selling Price × Quantity Sold) – (Variable Costs + Fixed Costs)

The profitability threshold means: Result = 0

Therefore:

RT = (P × Q) – (CV + CF)

RT = 0

P × Q – (CV_u × Q + CF) = 0

90 × Q – (50 × Q + 70,000) = 0

40 Q - 70,000 = 0

Q = 70,000 / 40 = 1,750.

Therefore, the profitability threshold SR = 1,750.

Using our marginal cost method:

$$\frac{\textbf{\textit{Fixed costs}}}{\textbf{\textit{Variable unit cost on margin}}} = \textbf{Threshold of profitability}$$

$$SR = \frac{CF}{M/\ CV\mu}$$

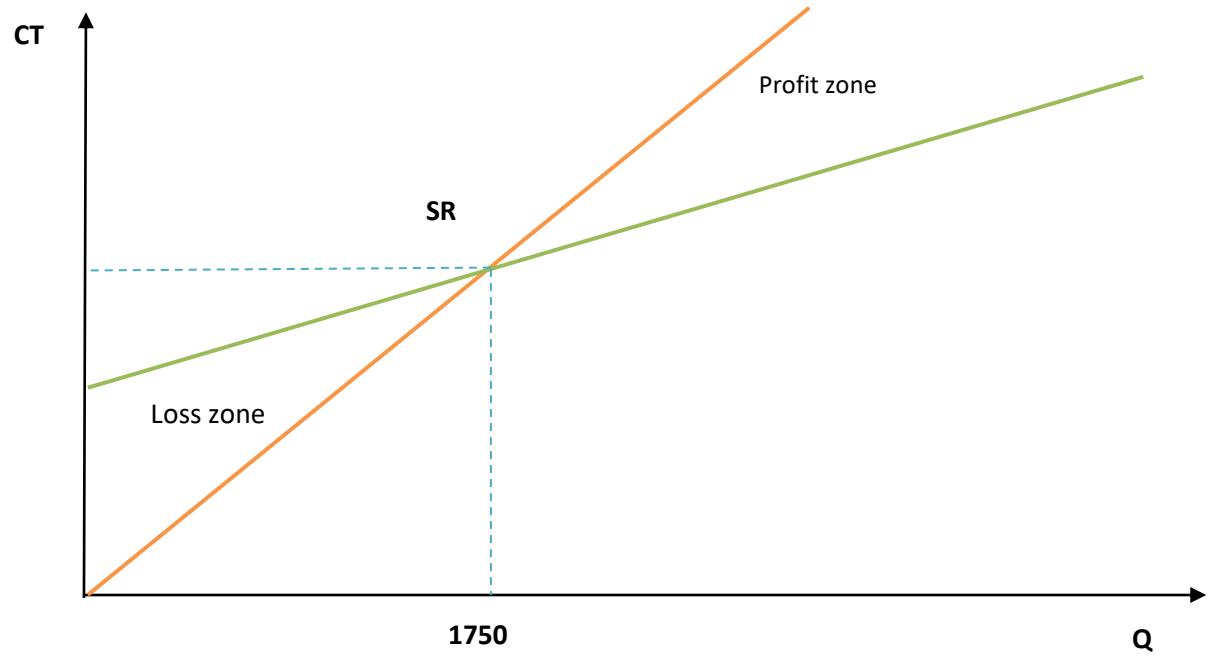
M/ CVμ = P – CVμ

M/ CVμ= 90 – 50 = 40DA

$$SR = \frac{70000}{40}$$

SR = 1750 DA

Graphical representation of the threshold of profitability :



Fifth axis: Rational loading method for fixed costs

Concept of Fixed Costs, Variable Costs, and Semi-Fixed/Semi-Variable Costs

The Rational Imputation Method for Fixed Costs

The rational imputation method for fixed costs is a modern accounting approach used to charge fixed costs to produced units in a realistic and fair manner, thereby eliminating the impact of changes in activity levels on the unit cost of production. This is done to enhance the accuracy of managerial decisions and the evaluation of the enterprise's performance.

Thus, the rational imputation method charges fixed expenses in a rational way to achieve a stable unit cost and reduce fluctuations in the cost of the produced unit. This contributes to estimating product costs at different activity levels within the establishment.

According to the rational imputation method for fixed costs, the total cost price and the unit cost price change with changes in the activity level. We observe that as the activity level rises (an increase in the quantity of produced units), the total cost price increases while the unit cost price decreases. Conversely, as the activity level falls (a decrease in the quantity of produced units), the total cost price decreases while the unit cost price increases. This is due to the direct influence of fixed costs, which remain constant regardless of whether the activity volume increases or decreases. In contrast, the unit cost varies inversely with the activity volume: the higher the activity level, the lower the unit production cost; the lower the production level, the higher the unit production cost.

Concept of the Rational Imputation Method for Fixed Costs

The concept of rational imputation of fixed costs lies in dividing total costs into variable and fixed, then charging fixed costs in a balanced manner that reflects the actual economic activity compared to the enterprise's normal activity. Thus, products do not bear all fixed costs unless normal activity is achieved, keeping the unit cost relatively stable regardless of changes in production volume.

Many accounting professors have indicated in their scientific publications—and what we support in this axis—that it is a method that relies, in its treatment for cost calculation, on the principle of distinguishing between fixed and variable costs. This is to determine the utilized portion of fixed costs

and charge it to product costs in addition to variable costs. The rationally charged fixed expenses are calculated by multiplying the actual fixed expenses by a coefficient called the rational imputation coefficient, and the result is added to the variable expenses. The goal of this method is to make the rationally charged fixed costs vary with changes in activity volume, whether increasing or decreasing.

We conclude that, according to the rational imputation method for fixed costs, it represents the relationship between the total cost price and the unit cost price with changes in activity level. If the activity level rises, the total product cost rises or increases proportionally with it, while the unit product cost decreases. If the activity level falls, the total cost price decreases while the unit cost price increases. We attribute this relationship to the fact that fixed costs remain constant regardless of changes in activity level, while the unit measurement cost (unit cost) varies proportionally with changes in activity level.

We conclude that the objective of this rational imputation method for fixed costs is to eliminate (isolate) the effects of activity changes on the total unit costs of activity centers and products, providing a realistic and logical picture of actual production conditions, and supporting the accuracy of measurement and analysis.

To illustrate this, we refer to a practical case.

Practical example:

A company specializing in the manufacture of mobile phones, where production activity is estimated at between a low volume of 500 units and a maximum volume of 1,000 units per month, bearing in mind that the company's normal activity represents 700 units.

Analysis of normal activity costs revealed the following:

- The variable cost per unit CVμ is 50 DZD.
- The monthly fixed costs amount to 65,000 DA.

Required: Calculate the cost price of producing phones at three different activity levels, 500 units, 700 units, and 1,000 units, and what do you observe?

Solution:

Production Volume Q	500unit	700unit	1000 unit
Variable unit cost VuC= VC/Q	50	50	50
Total variable cost TVC=Q x VuC	500x 50 25000	700x50 35000	1000x50 50000
Fixed Costs FC	65000	65000	65000
Total Cost TC = VC+FC	90000	100000	115000
Unit Cost UC = TC/Q	180	142.85	115
Variable Unit Cost VUC= VC/Q	50	50	50
Fixed Unit Cost FUC = FC /Q	130	92.85	65

We observe that the unit variable cost (CuV) remains constant at 50 DA regardless of changes in the activity level. In contrast, the total variable cost (VC) varies proportionally with the activity volume: the higher the number of mobile phones produced, the higher the total variable costs. For instance, variable costs amounted to 25,000 DA at an activity level of 500 produced units; they rose to 35,000 DA when production increased to 700 units; and further increased to 50,000 DA at the highest activity level of 1,000 units.

As for the total fixed costs (FC), they remain constant at 65,000 DA across all activity levels.

However, the unit fixed cost (FuC) decreases as the activity level rises: it was estimated at 130 DA at a production level of 500 units, dropped to 92.5 DA at the 700-unit level, and fell below 65 DA at the maximum production level of 1,000 units. This phenomenon does not reflect logical cost behavior. Therefore, a rational imputation of fixed costs is necessary, adjusted according to the activity level.

Important

The rational imputation method for fixed costs relies on separating the fixed portion of expenses from the variable portion, then charging only a "rational" part of the fixed costs to products in proportion to the actual activity level compared to normal activity. This maintains stability in the unit cost despite changes in production volume, while accounting for the cost of idle capacity (unemployment cost) in cases of under-utilization or excess activity when exceeded.

Principles of the Rational Imputation Method for Fixed Costs

✓ Determining two activity levels: the normal level as a reference for capacity under normal operating conditions, and the actual level as what was achieved during the period.

✓ Using the rational imputation coefficient, which reflects the degree of utilization compared to the reference capacity.

✓ Separating costs into fixed and variable, with full charging of variable costs since they vary proportionally with production.

✓ Charging only the rational portion of fixed costs to products, while isolating the idle capacity cost resulting from under-utilization of capacity.

✓ Keeping the unit cost relatively stable across periods despite volume changes, to improve fairness in comparisons and short-term pricing.

Basic formulas:

$$K = \frac{\textbf{Actual activity}}{\textbf{Normal Activity}} \text{ :Rational loading factor}$$

Rational Imputation Coefficient = Actual Activity Volume / Normal Activity Volume

· Charged Fixed Costs: CF × K

The charged fixed costs equal the fixed costs × the rational imputation coefficient.

Normal Activity Volume and Actual (Real) Activity Volume:

In the enterprise, we distinguish certain states of normal and actual activity within any establishment, as we observe:

First Case: The normal activity level, which relies on a realistic reference capacity based on the actual operations in the enterprise. This is what is produced despite the influence of workers' attendance and absence, machine breakdowns, or power outages—known as production fluctuation cases. It is usually less than the maximum production capacity by 15% to 25%.

Second Case: The actual activity level, which may equal or be less than the normal activity level during a specific time period.

Statement	Actual activity volume	Normal activity level
Definition	What was actually achieved during the period (production/sales)	Targeted or stable average normal operating power
Objective	Measuring performance achieved	Reference for budgets, pricing, and loading factors
Sources of appreciation	Production orders, sales data, working hours/machine hours	Average 3–5 years, standard capacity, stable plans after excluding exceptions
Unit of measurement	Production units, direct working hours, machine hours, turnover	The same actual unit of measurement for proper comparison
Relationship with the rational loading factor	Simplify the loading factor K	Load factor K

Rational Imputation Coefficient K

It is a measure of the degree of utilization of production capacity, used to adjust the charging of fixed expenses so that the charged amount is proportional to the achieved activity level compared to a stable reference level.

Mathematical Formula: As previously indicated:

$$K = \frac{\textbf{\textit{Actual activity}}}{\textbf{Normal Activity}}$$

Based on the previously mentioned mathematical formula, we encounter three cases for the rational imputation coefficient K.

K = 1: This means that the actual activity volume equals the normal activity volume, implying that the numerator equals the denominator. Consequently, there is no difference in fixed costs, as the imputation coefficient equals the integer 1.

Since the costs calculated using the actual method and those calculated using the rational imputation method (or the rational approach) are equal, no difference arises. In other words, the enterprise records neither a loss nor a profit in terms of activity efficiency.

K < 1: This indicates that the actual activity volume is less than the normal activity volume. We observe under-utilization of capacity, leading to the emergence of idle capacity costs. Therefore, the enterprise must charge the cost price using the rational method with an amount less than the fixed costs under the actual method. In this case, the enterprise incurs a loss in activity efficiency or idle capacity cost.

K > 1: This signifies that the actual activity volume exceeds the normal activity volume. We observe over-utilization, resulting in an activity efficiency profit. Therefore, the enterprise must charge the cost price using the rational method with an amount greater than the fixed costs under the actual method. In this case, the enterprise achieves a profit in activity efficiency.

Imputation Differences:

Changes in the normal activity volume lead to calculating fixed costs that are higher or lower than the actual ones, thereby affecting the final cost. Therefore, imputation differences for fixed costs must be taken into account when calculating the analytical accounting result. If the normal activity volume is less than the actual activity volume, the difference represents a profit in efficiency, which leads to an increase in cost and a decrease in the result. Accordingly, the excess activity difference is added to the result. However, if the actual activity volume is less than the normal activity volume, we obtain an activity shortfall difference that must be subtracted from the result because it has reduced the cost price and increased the value of the analytical result for the products.

The activity shortfall that must be subtracted from the result because it has reduced the cost price and increased the value of the analytical result for the products.

Δ = Charged CF – Actual CF

Practical Example: The same example, and the required: Calculate the cost price using the rational imputation method for fixed costs.

Solution:

Activity volume Q	500 units	700 units	1000 units
Variable unit cost CVu CVu= CV/Q	50	50	50
Total variable cost CV=Q x CVu	50x500 25000	50 x700 35000	50 x1000 50000
Fixed cost CF	65000	65000	65000
Load factor $K = \frac{Actual\ activity}{\text{Normal Activity}}$	0,714 $= \frac{500}{700}$	$1 = \frac{700}{700}$	1,428 $= \frac{1000}{700}$
Rationally Applied Costs	46410	65000	92820
Variance of Rational Loading	18590-	0	27820
Total costs after rational loading	71410	100000	142820
Unit cost after rational loading	142,8	142,8	142,8

We conclude that the rational imputation method for the final costs of the product works by incorporating only the necessary fixed expenses into the costs of normal production.

Common Errors:

- Using an optimistic plan instead of a realistic normal capacity when estimating the denominator.

- Mixing different units of measurement between actual and normal levels, which distorts the meaning of the ratio.

- Readjusting the normal activity too frequently or failing to update it despite structural changes in capacity.

Inventory Differences:

Calculating the production cost according to the rational imputation method differs from the actual costing method. Therefore, at the end of the accounting period, the difference between the inventory values calculated using the actual costing method and the rational imputation method must be computed. If the difference is positive, it is added to the result; if negative, it is subtracted from the result.

Inventory Difference = Inventory Value at Actual Cost – Inventory Value at Rational Imputation

Partial Costing Method:

Partial costing is based on separating costs into costs with different behaviors, then incorporating the portion causally linked to the volume of activity into the product cost, while excluding what is not directly affected by the volume from the valuation. This is done to distinguish between strategic decisions related to the enterprise's operations and short-term decisions related to the operating period.

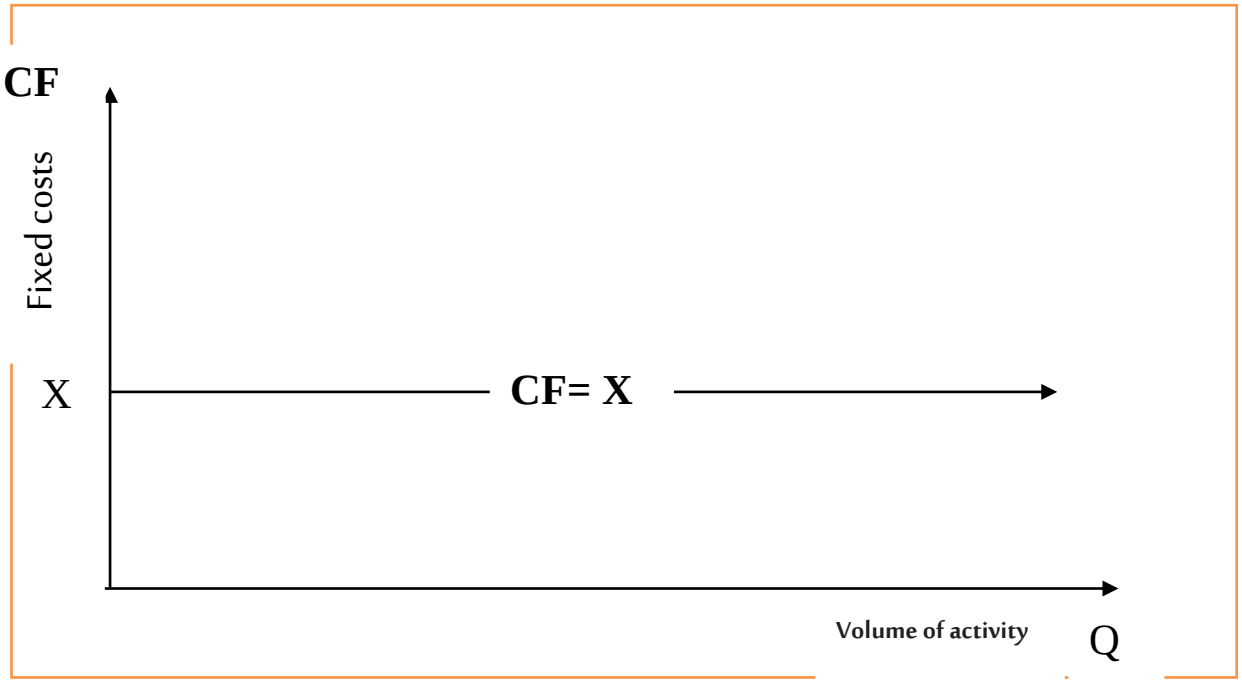
Costs are divided according to changes in activity into:

✓ Fixed costs;

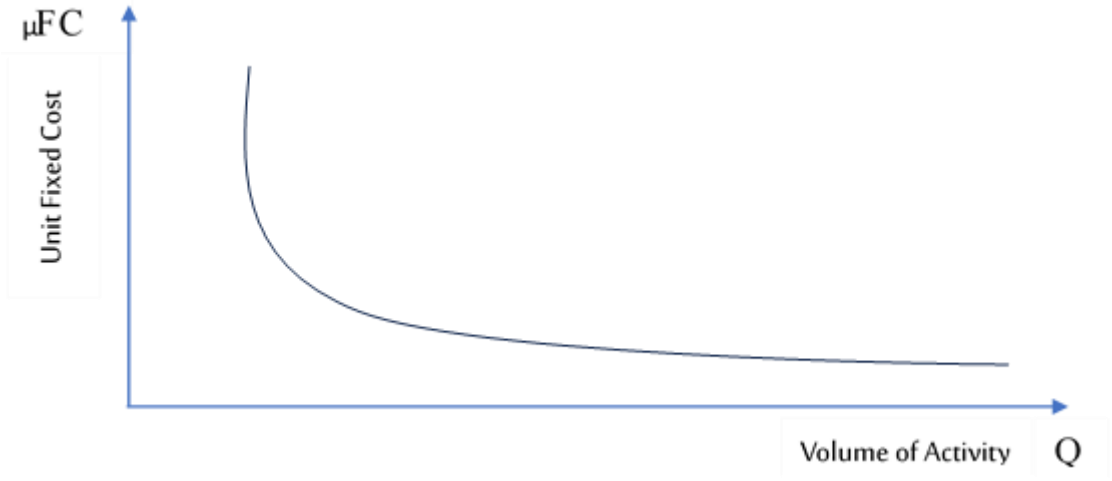
✓ Variable costs;

✓ Mixed costs.

Fixed Costs: These are costs that do not change with changes in the volume of activity. These costs are incurred whether there is production or not. The most common examples include rent expenses, equipment depreciation, salaries and wages, etc. They are expressed mathematically by the following formula:

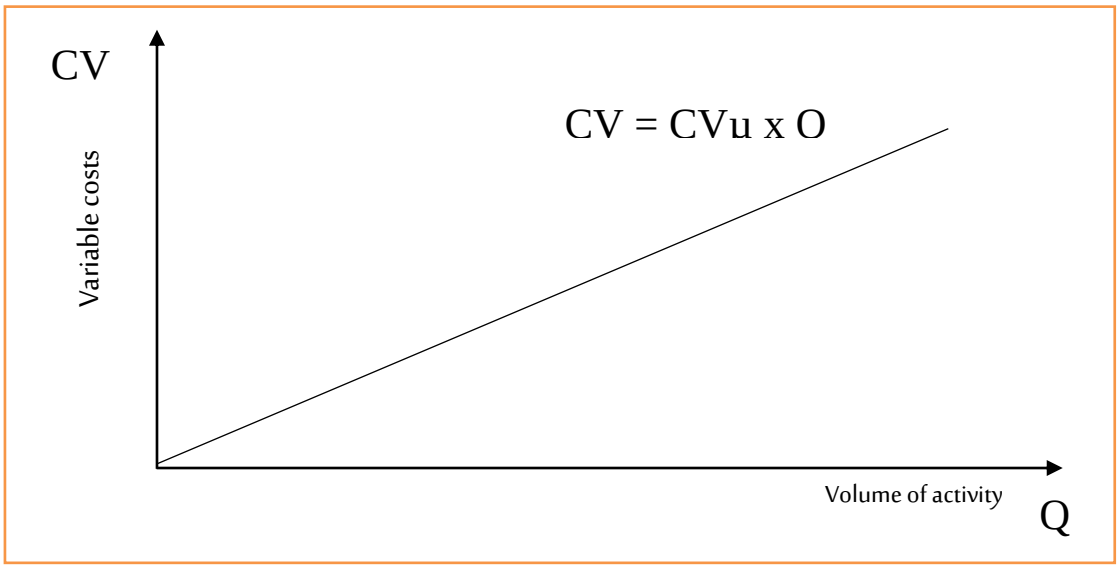


Although the total fixed costs remain constant at (X) regardless of changes in production volume or activity level, the fixed cost per unit varies with changes in production volume or activity level. The fixed cost per unit increases as the production volume or activity level decreases, and decreases as the production volume or activity level expands. This relationship can be expressed mathematically as follows

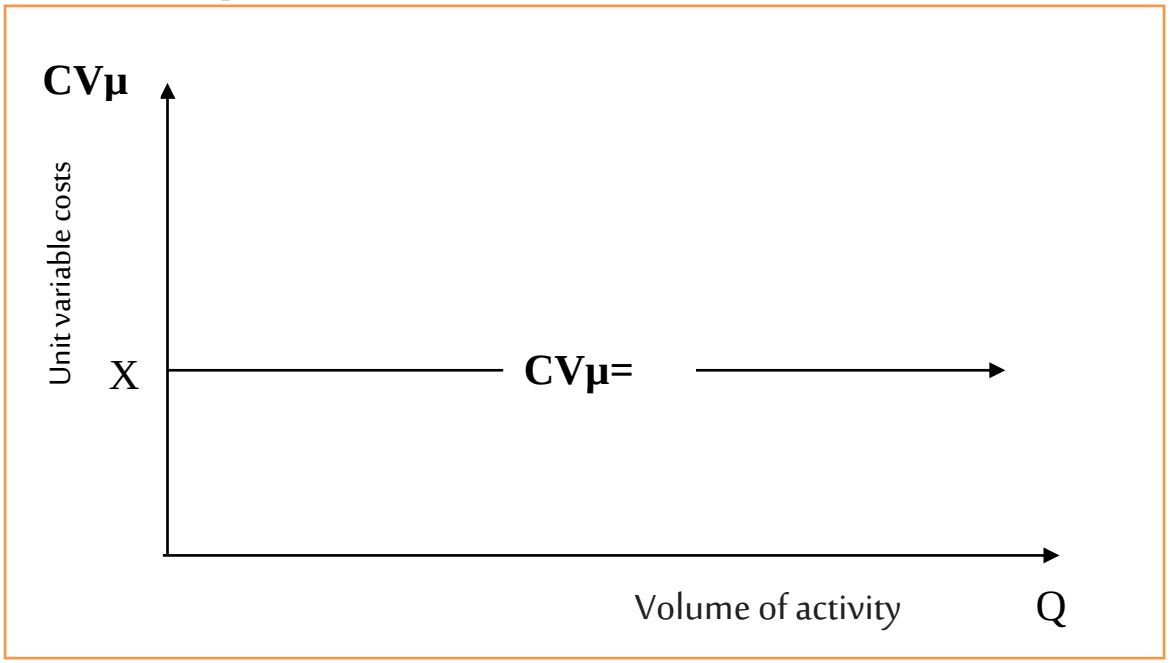


Variable Costs:

These are the costs that change with changes in the production volume or activity level. Accordingly, total variable costs change with changes in the activity level and by the same proportion, as the relationship between variable costs and the activity level is directly proportional. Variable costs can be expressed mathematically as follows:



The figure shows that unit variable costs remain constant and total variable costs change proportionally with changes in production volume. Unit variable costs can be expressed as follows :



Mixed costs:

Semi-variable costs are costs that combine fixed and variable characteristics, i.e., they include a fixed portion and a variable portion, such as electricity expenses, maintenance expenses, commissions for sales representatives, etc.

Methods for Separating Costs:

There are three methods for distinguishing between the fixed and variable portions in mixed expenses, which are:

- ✓ The High-Low Method
- ✓ The Graphical Method
- ✓ The Least Squares Method.

The High-Low Method:

This method, as its name "High-Low" suggests, follows steps to calculate fixed costs or separate the fixed and variable portions from total costs. As indicated, this method involves selecting the highest and lowest values for production levels (quantities) and their corresponding costs.

Steps of the High-Low Method:

Identify the highest production value and its corresponding costs.

Identify the lowest production value and its corresponding costs.

Calculate the difference between the highest and lowest production levels.

Calculate the difference between the costs of the highest production value and the costs of the lowest production value.

To obtain the unit variable cost rate, divide the difference in costs by the difference in production levels.

Practical Example:

From the records of the finance department of a manufacturing enterprise, you have been provided with the following information regarding raw materials used in production during the second semester of 2024, as follows:

Duration	Cost of raw materials	Production units
July	2900	6000
August	3000	6300
September	3200	6500
October	3800	7300
November	4300	7900
December	5900	8700

Required: **Determine the semi–variable cost equation**.

Statement	Amounts	Statement	Amounts
Highest production level:	5900	Highest production cost	8700
Lowest production level:	2900	Lowest production cost	6000
Difference between highest and lowest production levels	3000	Difference between highest and lowest production costs	2700

Rate of change = $\frac{2700}{3000} = 0,9$

At activity level 5900 units **CM = CVμ x Q + CF** **8700 = 0.9 x 5900 + CF** **8700= 5310 +CF**	**At activity level 2900 units** **CM = CVμ x Q + CF** **6000= 0.9 x 2900 + CF** **6000= 2610 + CF**
CF = 3390	**CF = 3390**
Semi-variable cost equation	**CM = 0,9 Q + 3390**

The Graphical Method (Scattergraph Method):

The graphical method refers to a visual approach for decomposing mixed costs into their fixed and variable components by plotting observations of total costs against activity levels, then drawing a trend line that represents cost behavior. The intercept on the vertical axis represents the fixed cost at zero (0) production level, while the slope of the line represents the variable cost per unit of activity.

- The Basic Idea
- The method relies on the assumption that cost behavior within the relevant range is approximately linear. Therefore, costs are modeled by the relationship:
- Total Cost = Fixed Cost + (Variable Cost per Unit × Activity Level),

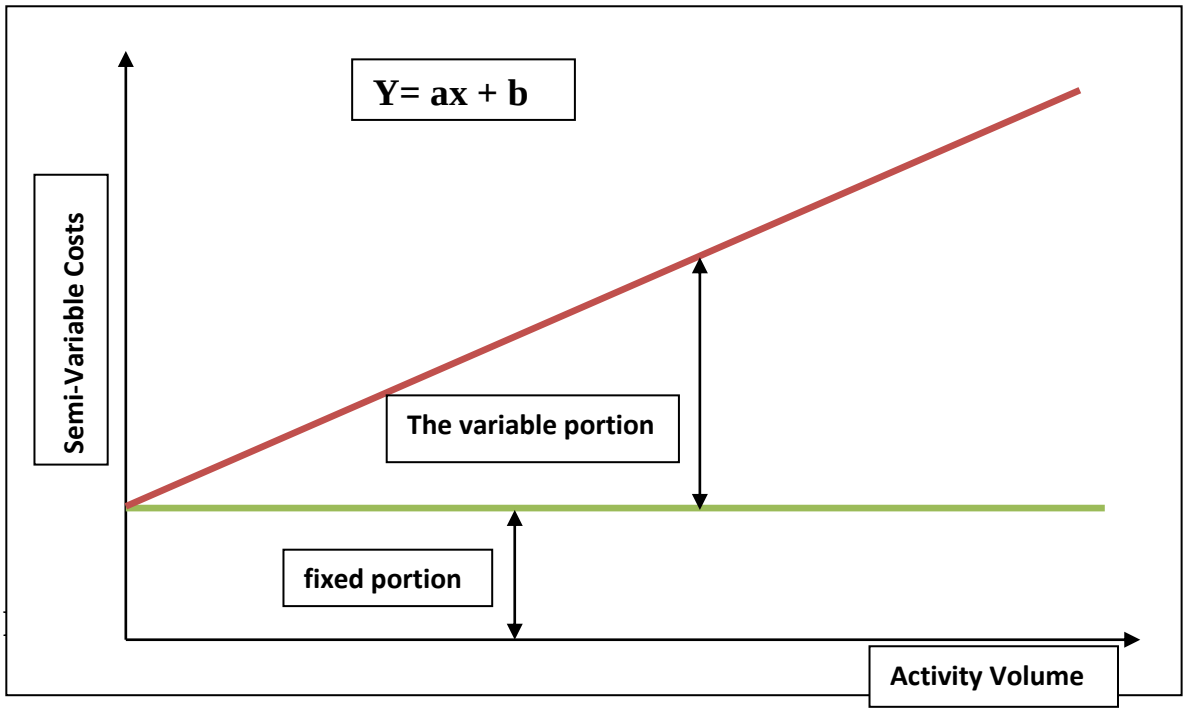
where:

Total Cost,

Fixed Cost,

Variable Cost per Unit, and

Activity Level.



From the records of the finance department of a production institution, you have been given the following information regarding the raw materials used in production during the second semester of 2024 as follows:

Duration	Cost of raw materials	Production units
July	6000	29000
August	12000	39000
September	15000	45000
October	20000	51000
November	24000	58500
December	30000	62000

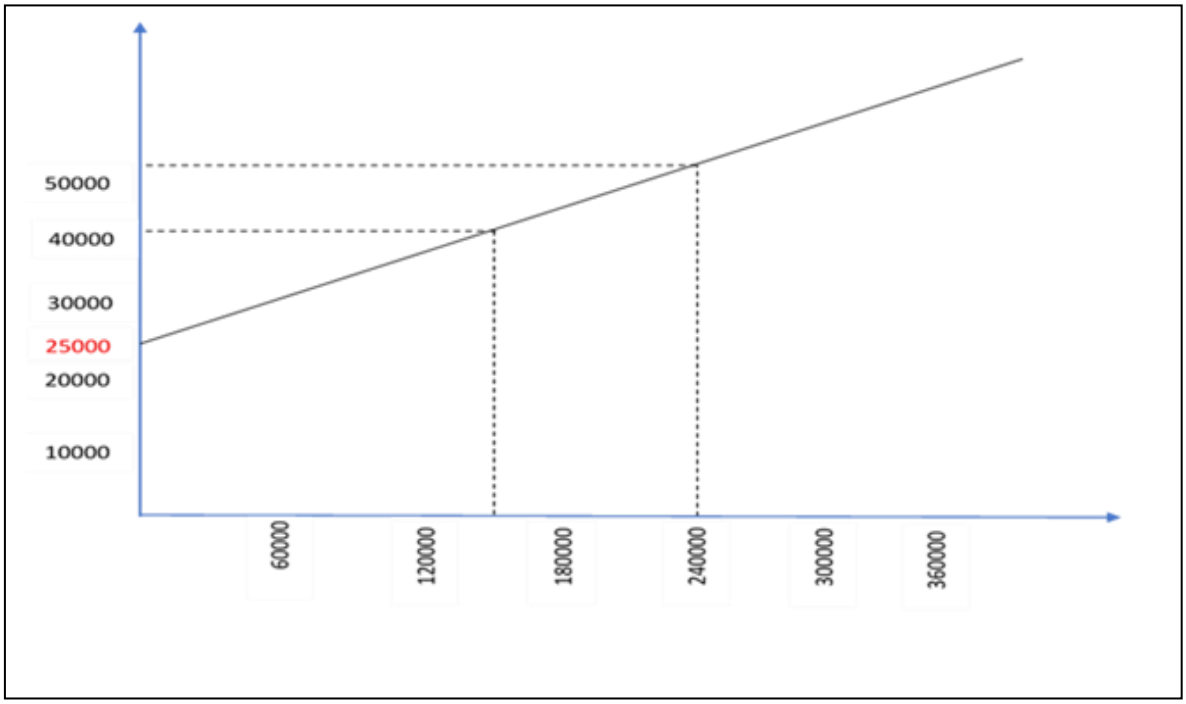
Solution:

$Y = ax + b$

$b = 25000$

$$a = \frac{58500 - 45000}{24000 - 15000} \; a = 1{,}5$$

Raw Materials Equation : ……. $CM = 1{,}5Q + 25000$



Least Squares Method:

It is a linear regression technique that estimates the mixed cost function to extract fixed costs and the variable cost per unit by minimizing the sum of the squares of the error differences. It is more accurate than simple methods like the high-low method because it uses all available observations.

The method is based on the assumption that total cost changes linearly with the level of activity according to the cost function, where:

Y = total cost,

X = level of activity,

a = fixed cost,

b = variable cost per unit.

We determine the best-fitting straight line by minimizing the sum of the squared vertical distances between the actual points and the cost line. This is the essence of the name "least squares" and its use in estimating a mixed cost function and forecasting at different activity levels.

Implementation

Implementation Steps:

We collect historical data in the form of pairs (X_i, Y_i) for activity levels and total costs across multiple periods, ensuring the sample represents the normal operating range.

Calculation of Necessary Sums: $\therefore \sum \mathbf{x}$ ،$\sum \mathbf{y}$ ،$\sum \mathbf{x^2}$ ،$\sum \mathbf{y^2}$ ،$\sum \mathbf{xy}$ ،and the number of observations n in preparation for deriving the function's coefficients. Where:

$$y = ax + b$$

$$a = \Sigma(x_i - \bar{x})(y_i - \bar{y})/\Sigma(x_i - \bar{x})^2$$

$$b = \bar{y} - a\bar{x}$$

Practical Example:

Here is the following information, and you are required to determine the semi-variable cost equation using the least squares method.

Duration	Cost of raw materials	Produced units
July	6000	29000
August	12000	39000
September	15000	45000
October	20000	51000
November	24000	58500
December	30000	62000

Solution:

Month	Production level**X**	Mixed cost**Y**	$x_i - \bar{x}$	$y_i - \bar{y}$	$(x_i - \bar{x})(y_i - \bar{y})$	$(x_i - \bar{x})^2$
1	80	2300	142-	2045-	290390	20164
2	130	2600	92-	1745-	160540	8464
3	160	3900	62-	445-	27590	3844
4	200	4200	22-	145-	3190	484
5	210	4670	12-	325	3900-	144
6	240	4770	18	425	7650	324
7	300	4905	78	560	43680	6084
8	330	5760	108	1415	152820	11664
9	348	6000	126	1655	208530	15876
Total	1998	39105	0	0	890490	67048

$$\bar{x} = (80 + 130 + 160 + 200 + 210 + 250 + 300 + 330 + 350)/9$$

$$\bar{x} = 222$$

$$\bar{y} = (2300 + 2600 + 3900 + 4200 + 4670 + 4770 + 4905 + 5760 + 6000)/9$$

$$\bar{y} = 4345$$

$$a = \Sigma(x_i - \bar{x})(y_i - \bar{y})/\Sigma(x_i - \bar{x})^2$$

$$a = 890490/67048$$

$$a = 13{,}28$$

$b = \bar{y} - a\bar{x}$

$b = 4345 - (13{,}28\ x\ 222)$

$b = 4345 - 2948{,}16$

$b = 1296{,}84$

emi-Variable Cost Equation.....:$CM = 13{,}28Q + 1296{,}84$

Axis Six: Standard Costing Method and Predetermined Costing

Standard and Predetermined Costing Method

Standard costs are a costing method in which quantitative and price standards for cost elements are predetermined under normal and efficient operating conditions. These standards are then used as a benchmark to compare actual performance, analyze variances, and serve purposes of planning, control, and pricing. The concept involves establishing a standard cost per unit of product before production begins, then measuring the differences between actual and standard costs to identify their causes and take corrective actions.

Definition of Standard Costs

Standard costs are defined as the reference costs against which actual costs are compared in order to identify variances, thereby facilitating effective control.

They represent costs predetermined on scientific and practical bases to determine the enterprise's activity in terms of quantity and value within management accounting, with the aim of extracting differences between actual costs and expected costs. Several types of standard costs can be distinguished, including:

- Theoretical Standard Cost: Determined based on the optimal combination of production factors within the enterprise.
- Competitive Model Standard Cost: Takes market conditions into account but does not always define the technical efficiency level that should be achieved, especially in low-competition environments.
- Historical Model Standard Cost: In this type, the previous period serves as the cornerstone for determining costs.
- Normal Model Standard Cost: Determined according to the normal operating conditions of the enterprise.

Scope of Application: The standard costing method is used across all branches of the economy, including industry, agriculture, and services, and is particularly applied in industrial enterprises.

Key Stages in Calculating Standard Costs

The practical stages of standard costing proceed sequentially: first preparing standards in advance, then measuring actual performance, followed by comparison and variance extraction, then variance analysis and responsibility assignment, followed by taking corrective actions, and finally periodic review and updating of standards.

- **Standard Preparation Stage**: Determining quantitative and price standards for each cost element under normal operating conditions, selecting a standard activity level, and establishing overhead loading rates.
- **Actual Measurement Stage**: Collecting actual costs for materials, labor, and overheads at the same activity level comparable to the standards.
- **Comparison Stage**: Preparing comparison tables between standard and actual costs at both unit and total levels to extract variances.
- **Analysis Stage**: Breaking down variances into causal components (price/quantity, rate/efficiency, spending/efficiency/volume) and linking them to responsibility centers.
- **Decision and Correction Stage**: Proposing operational, procurement, and production actions to address the causes of variances and improve efficiency.
- **Review Stage**: Updating standards when prices, technology, or work methods change to ensure standards remain realistic and relevant.

Objectives of Standard Costing:

- **Planning**: Results can be programmed more effectively under total standard costs, as they are based on future expectations rather than past events.
- **Control**: Control is achieved by comparing actual achievements with what was expected to occur in the future.
- **Pricing**: Standard costs can be used as a basis or reference for pricing products.
- **Reporting**: This method provides enterprise management with periodic reports and detailed statements of variances if they occur from predetermined expense standards, along with variance analysis.

How to Calculate and Analyze Variances in Standard Costing

Measurement Standards: These are an effective tool for costing, based on introducing and organizing a standard method on scientific, technical, and economic foundations, free from random estimation, derived from the enterprise's capabilities, and responsive to its operating conditions. Normal standard levels can be established for the elements of raw materials, labor, and indirect expenses in production departments.

During the management process, deviations from the predetermined standards occur due to various reasons. When a difference arises, it falls into one of two categories:

- **Favorable Variance**: Actual costs are less than standard costs.
- **Unfavorable Variance**: Actual costs are greater than standard costs.

The rule states that to calculate standard variances, we use the following formula:

$$\text{Variance} = \text{Standard Costs} - \text{Actual Costs}$$

Determination of Variances:

Material Variances:

$$\text{Total Variances} = \text{Value of Standard Materials} - \text{Value of Actual Materials}$$

Price Variances:

$$\text{Price Variances} = (\text{Actual Quantity} \times \text{Standard Price}) - (\text{Actual Quantity} \times \text{Actual Price})$$

or:

$$\text{Price Variance} = \text{Actual Quantity} \times (\text{Standard Unit Price} - \text{Actual Unit Price})$$

Quantity Variances:

$$\text{Quantity Variance} = (\text{Standard Quantity} \times \text{Standard Price}) - (\text{Actual Quantity} \times \text{Actual Price})$$

and the above can be expressed using the following formulas:

Equation No. 1...... $\Delta = Cs \times Qs - Cr \times Qr$

where:

Δ: Total Variance,
Cs: Standard Costs,
Qs: Standard Quantity,
Cr: Actual Costs,
Qr: Actual Quantity.

and we find that the quantity variance:

$$\Delta = Qs - Qr$$

$$Qr = Qs - \Delta Q$$

and the cost variance:

$$\Delta C = Cs - Cr$$

$$Cr = Cs - \Delta C$$

By substituting into Equation No. 1, we find:

$$\Delta = Cs \times Qs - [(Cs - \Delta C) \times (Qs - \Delta Q)]$$

$$\Delta = Cs \times Qs - Cs \times Qs + Cs\Delta Q + Qs\Delta C - \Delta C \times \Delta Q$$

Equation No. 2…….. $\Delta = Cs \times \Delta Q + Qs \times \Delta C - \Delta C x \Delta Q$

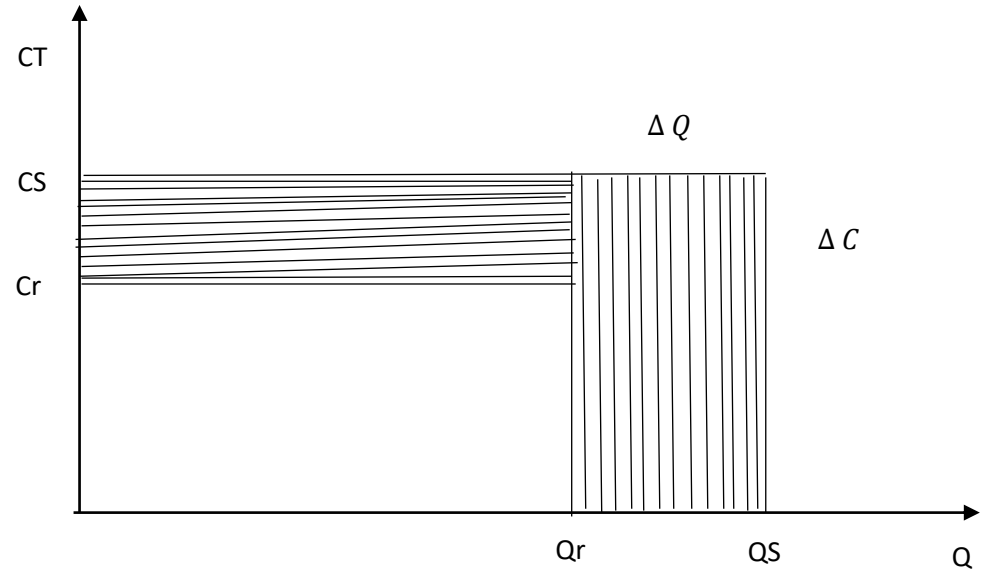
From Equation No. 2, we observe that the total variance has been divided into:

Quantity Variance: $Cs \times \Delta Q$

Cost Variance: $Qs \times \Delta C$

Joint Variance: $Qs \times \Delta C$

Additionally, this can be illustrated in the following diagram, assuming that: the standard cost is greater than the actual cost, and the standard quantity is greater than the actual quantity.



Practical Example:

Here is the standard card prepared based on 250 units, selected from the "Areej" furniture manufacturing enterprise for the month of May 2001:

- Raw materials used: 1,500 m² at 32 DZD/m².
- Direct labor: 300 hours at 20 DZD/hour.
- Indirect overheads: 300 hours at 35 DZD/hour.

Note that the unit of measurement is based on direct labor hours.

Actual production during May reached 1,200 units, with the following expenditures:

- Raw materials used: 7,300 m² at 30 DZD/m².
- Direct labor: 1,400 hours at 20 DZD/hour.
- Department overheads: Cost per hour reached 38 DZD.

Required:

-Prepare the standard cost card for one unit.

-Calculate the variances in a comparison table.

-Analyze the following variances with graphical representation:

* Raw materials
* Direct labor
* Department overheads

(Note: The unit fixed cost is 28 DZD, derived from normal activity of 1,200 hours.)

Solution:

Standard Cost Card for One Unit:

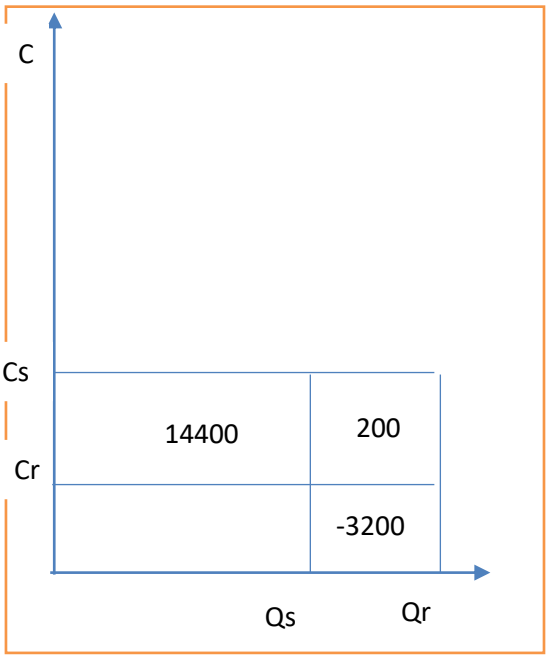
Statement	Unit quantity	Unit cost	Total
Raw Materials Used	6	32	192
Direct Labor	1,2	20	24
Departmental Expenses.	1,2	35	42
Standard Unit Cost	/	/	**258da**

Comparison Table :

						Actual activity 1200 units		
Statement	Standard costs			Real costs			Difference	
	Q	PU	A	Q	PU	A	+	-
Raw Material	7200	32	230400	7300	30	219000	11400	
Labor	1140	20	28800	1400	20	28000	800	
Departmental Expenses.	1440	35	50400	1400	38	53200		2800
Total costs	/	/	309600	/	/	300200	9400	
N / of units	/	/	1200	/	/	1200	/	/
U.C	/	/	258	/	/	250,16	/	/

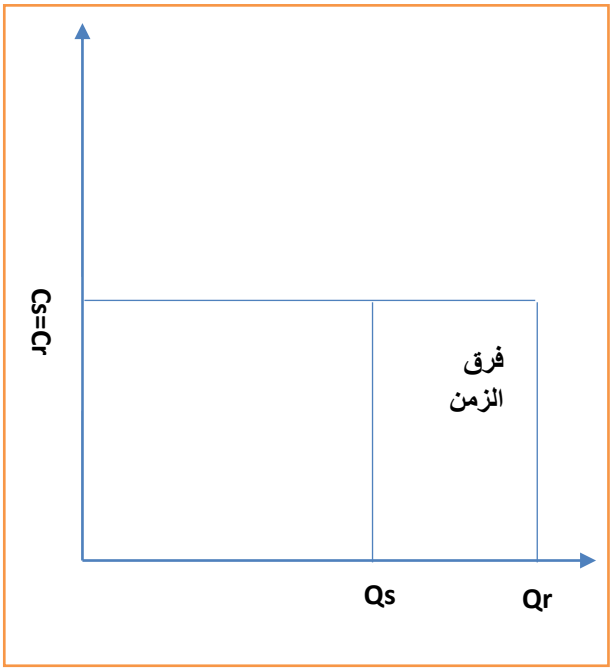
Variance Analysis :

- **Raw Materials :**



Statement	+	-
Quantity difference Cs x ΔQ (7200-7300)x32		3200
Cost difference: Qs x ΔC (32-30)x7200	14400	
Common difference: Qs x ΔC (7200-7300)x(32-30)	200	
Total difference		11400

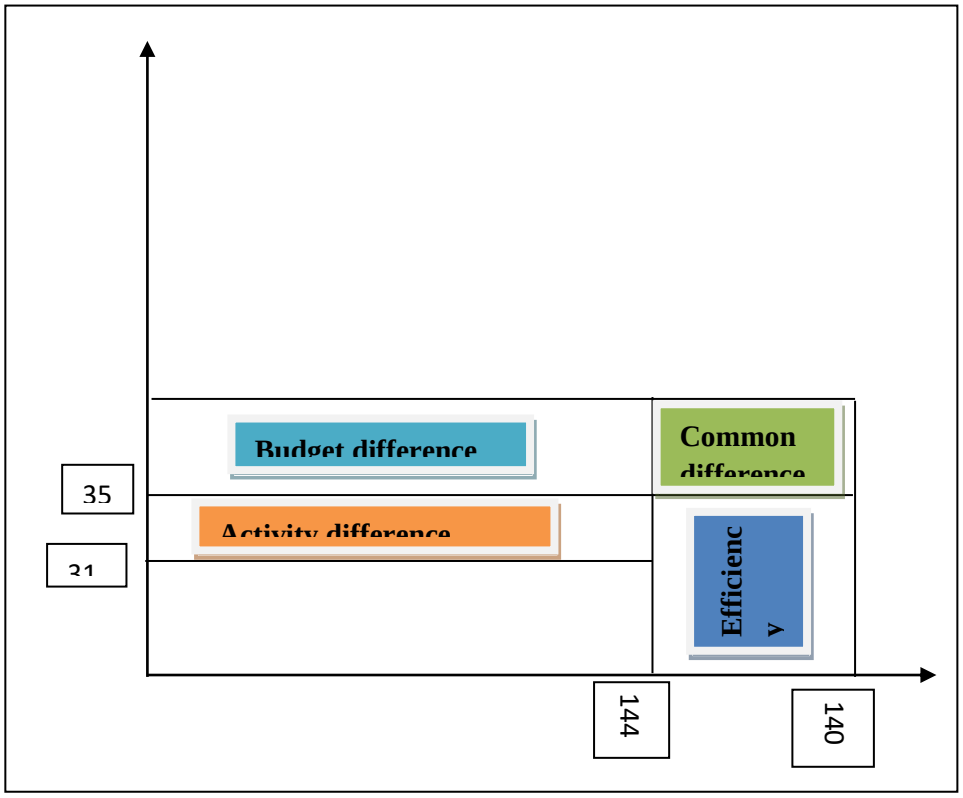
- **Direct Labor :**



Statement	+	-
Time difference Cs x ΔQ (1440-1400)x20	800	
Fare difference: Qs x ΔC (20-20)x1440		
Common difference: Qs x ΔC (20-20)x(1440-1400)		
Total difference	800	

The activity is measured in labor hours according to the data.

Statement	+	-
Activity difference (Cs-C*) Qs (35-31) x1440		5760
Budget difference: (C*-Cr)Qs (31-38)x1440		10080
Efficiency difference : Cs x ΔQ (1440-1400)x35	1400	
Common difference : ΔQxΔC (35-38)(1440-1400)	120	38
Total difference		2800



Department Overheads: We denote the flexible cost by the symbol: C^*

$CV\mu = CT - CF\mu$

$CV\mu = 35 - 28 = 7$

$$C* = CV\mu + \frac{CF}{Qr} = \frac{(28x1200)}{1400} = 31$$

Axis Seven: Marginal Costing Method

Marginal Costing Method

Concept of Marginal or Incremental Cost: We will list various definitions of marginal cost to shed light from different perspectives relevant to cost accounting, particularly those related to pricing policy, short-term decision-making, or operational policies, as follows:

- Marginal Cost Pricing means setting the price at the level of the additional cost of producing one more unit in the short term when there is excess capacity, with the aim of achieving a positive contribution to cover fixed costs.
- It is the differential or incremental cost associated with a specific decision, such as accepting a special order or make-or-buy decisions, focusing on relevant costs that will change as a result of the decision while ignoring sunk costs.
- It is the minimum cost required to expand production by a limited amount immediately using currently available resources without new capital investments.
- Marginal cost is the cost of producing one additional unit of output, i.e., the increase in total cost resulting from increasing the quantity produced by one unit within the relevant operating range.

We conclude that marginal cost is the increase in total cost when producing one additional unit—that is, the increase by exactly one unit—or, in a clear concept, it is the increase in total costs resulting from increasing production units by exactly one unit, or conversely, the decrease observed in total costs due to a reduction in production by exactly one unit.

Types of Marginal Costs:

Three types of marginal costs can be distinguished:

Total Marginal Cost: Represents the marginal cost price and consists of the costs resulting from the difference when shifting production volume from one level to another. These are often broken down into fixed and variable costs for use in analysis.

- **Marginal Production Cost**: Refers to the additional costs incurred in producing one extra unit.
- **Marginal Distribution Cost**: Refers to the additional costs incurred in distributing one extra unit.

Marginal cost arises from changes in the number of units—either an increase or a decrease. It may thus be positive when expanding activity volume or negative when reducing activity volume by one unit.

Relationship Between Production Cost and Production Quantity:

To achieve a certain production quantity, the enterprise incurs various costs, including fixed costs, variable costs, and semi-variable costs, all of which contribute to determining the marginal cost. For this purpose, their averages can be calculated:

$$\textbf{Average Fixed Cost} = \frac{\textbf{Total Fixed Costs}}{\textbf{Production Quantity}}$$

$$\textbf{Average Variable Cost} = \frac{\textbf{Total Variable Costs}}{\textbf{Production Quantity}}$$

$$\frac{\textbf{Total Costs}}{\textbf{Production Quantity}} = \textbf{Average Total Cost}$$

Marginal Cost: It is the difference between the total production cost for the item at the produced units and the total production cost for (n-1) units.

Practical Example:

An enterprise produces 50 boxes of product "A", where each box consists of 10 units, with a total cost of 1,000 DZD. When production is increased to 51 boxes, the cost becomes 1,100 DZD. For producing 49 boxes, the total cost amounts to 920 DZD.

Required: Calculate the marginal cost with changes in production volume.

Solution:

Total Marginal Cost when increasing production to 51 boxes = 1,100 DZD – 1,000 DZD = 100 DZD.

Unit Marginal Cost = 100 / 10 = 10 DZD.

Total Marginal Cost when reducing production to 49 boxes = 920 – 1,000 = –80 DZD.

Unit Marginal Cost = –80 / 10 = –8 DZD.

Basic Elements of Marginal Cost

- Direct Raw Materials: Represents the cost of materials used in producing each additional unit.
- Direct Wages: Refers to the wages paid to production line workers for producing one additional unit.
- Variable Manufacturing Overheads: Includes items such as energy, packaging, and fuel directly linked to production volume.
- Other Variable Costs: May include marketing or transportation expenses allocated to each new unit as needed.

Components of the Marginal Costing Method:

- The components of marginal cost vary depending on the relationship linking them to production volume. In general, the marginal cost of the last unit is composed as follows in different scenarios:
- When fixed costs remain constant and variable costs change proportionally with production volume, the marginal cost of the last unit includes only variable costs and equals the unit variable cost.
- When variable costs change at a rate greater or less than proportional, while fixed costs remain unchanged, the marginal cost consists of variable costs only, but does not equal the unit variable cost.
- When variable costs change proportionally with production volume, and fixed costs shift to a new level due to restructuring, the marginal cost in this case includes variable costs plus the incremental fixed costs.
- When costs change at a rate greater or less than proportional to production volume, and fixed costs shift to a new level, the marginal cost consists of variable costs (which do not equal the unit variable cost) plus the incremental fixed costs.

Calculation of Marginal Cost (Total Cost, Marginal Cost, Average Cost, Profit)

Practical Example:

Here is the production volume for an industrial enterprise, and you are required to calculate the marginal cost and analyze its components.

Production volume	80	81	82	83	84	84	84
Total costs	120000	122000	124000	126000	127000	133500	134900
Fixed costs	50000	50000	50000	50000	50000	55000	55000
Variable costs	70000	72000	74000	76000	77000	78500	79900

Solution:

production quantity	Total costs	Fixed costs	Variable costs	Unit cost			
				unit	Fixed	Variable	Marginal
80	120000	50000	70000	1500	625	875	/
81	122000	50000	72000	1506,17	617,28	888.88	2000
82	124000	50000	74000	1512,19	609,75	902,43	2000
83	126000	50000	76000	1518,07	602,4	915,66	2000
84	127000	50000	77000	1511,90	595,23	916,66	1000
84	133500	55000	78500	1589,28	654,76	934,52	1500
84	134900	55000	79900	1605,95	654,76	951,19	1400

From the solution of the previous practical example, we record the following observations:

When moving from a production volume of 80 units to 81 units, then to 82 units, there was no increase in fixed costs, accompanied by an increase in variable costs. This allows us to conclude that marginal cost consists only of variable costs and equals the unit variable cost.

At a production volume of 83 units, we observed that fixed costs remained constant, while variable costs increased at a rate greater than the proportional change in production volume. This scenario typically occurs in practice when overtime hours are used to produce an additional unit without changing the number of machines in use. This results in the cost of the overtime hour being higher than the regular hour cost. In this case, marginal cost includes only variable costs, but does not equal the unit variable cost.

At the same production volume of 84 units in the second case, we noted that fixed costs increased, allowing variable costs to rise proportionally with production volume, similar to the earlier cases when increasing from 80 to 81 to 82 units. This corresponds in practice to the use of new machinery to increase

production volume without resorting to overtime hours. Here, marginal cost consists of both fixed and variable costs.

In the last row of the table, we observed an increase in fixed costs, but variable costs increased at a lower rate than the change in production volume. This case combines the characteristics of the two previous scenarios.

Mathematical Relationship of Marginal Cost

It is observed that total costs are a function dependent on the variable Q, which represents the activity volume. This function can be denoted by the following mathematical formula:

$$\boldsymbol{CT = f(Q)}$$

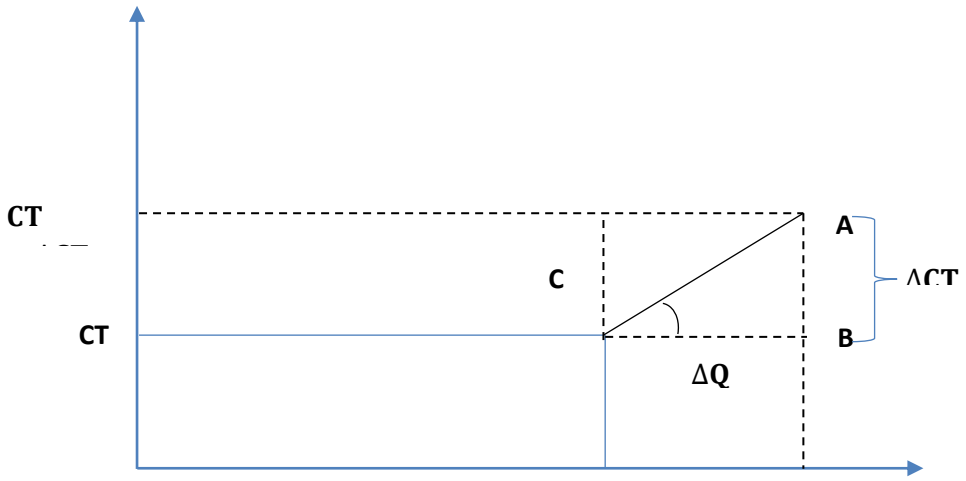
and if we take the derivative of this function, it becomes as follows:

$$\mathbf{dCT = f'(Q)dQ} \Rightarrow \quad \mathbf{f'(Q)} = \frac{\boldsymbol{dCT}}{\boldsymbol{dQ}}$$

Marginal cost is the first derivative of the total cost function with respect to the activity volume:

$$\mathrm{Cm} = \frac{dCT}{dQ}$$

If P > Cm, the additional unit can be produced, and production can continue.
If P ≥ Cm, the enterprise must stop production.
Geometric Interpretation of Marginal Cost:



From the previous figure, we can calculate the marginal cost by determining the slope of the angle C, which represents its tangent. This can be computed using the following relationship:

From the previous figure, we can calculate the marginal cost by determining the slope of the angle C, which represents its tangent. This can be computed using the following relationship:

$$C' = \frac{AB}{BC}$$

$$AB = C` \times BC = AB = C' \times \Delta Q$$

Since 1ΔQ =, it follows that C' =ΔCT , which represents the increase in costs and is approximately the marginal cost.

Practical Example:

The unit production cost equation for an industrial enterprise is as follows:

$$CT\mu = 6x^2+10+(200/x)$$

where "X" represents the number of units produced and sold, while the unit selling price is 460 DZD.

Required Tasks:

- Determine the relationship representing total costs.
- Determine the relationship representing marginal costs.
- Calculate the production volume at which unit profit is maximized.
- Calculate the optimal production volume for this enterprise.
- Compute the result at this production volume.

Solution:

Total Cost Equation: $CT=6x^3+10x+200$

Marginal cost is the first derivative of total costs.

Marginal Cost Equation:

$(CT)'=(6x^3+10x+200)'$

$(CT)' = 18x^2+10$

Calculation of the Production Volume at Which Unit Profit Reaches Its Maximum Value

This is achieved algebraically at the point where the derivative of the unit cost is zero, and graphically at the point where the unit cost curve intersects the marginal cost curve.

$(CT\mu)'= (6x^2+10+(200) /x)'$

$(CT\mu)' = 12x-(200)/x^2)$

$(CT\mu)' = (12x^3-200)/x^2$

Academic translation:

The derivative of the unit cost function equals zero when the numerator of its expression is zero.

$(12x^3-200) = 0$

$(12x^3-200) = 0$

$x^312 = 200$

$x^3 = 200/12$

$$x = \sqrt[3]{200/12}$$

X = 2.55.

Calculating the Optimal Production Volume for This Enterprise:

The production volume for this enterprise is algebraically determined at the point where the marginal cost equals the selling price, i.e.:

$18x^2 + 10 = 460$

$x^2 = (460- 10)/18$

$x^2 = 25$

$$X = \sqrt[2]{25}$$

X = +5

X= -5

The value (-5) is rejected, and therefore: X = +5

Academic English Translation:

Calculating the Profit at This Production Volume:

The profit = (unit selling price – unit cost) × number of units.

$R=(PV\mu - CT\mu)*X$

$R= (460-(6x^2+10+(200/x))*x$

$R=(460x-(6x^3+10x+(200))$

$R=(460*5-(6*(5)^3+10*5(200))$

R=1300 DA

Axis Eight: The Activity-Based Costing Method (ABC)

Activity-Based Costing (ABC) Method:

The earliest studies that referred to the process of allocating indirect costs to products were those of Cooper and Kaplan in 1987. This study is considered a foundational entry point for the development of the Activity-Based Costing (ABC) system, aimed at addressing the growing and diverse information needs within the business environment. The ABC system represents a tangible advancement in the allocation of indirect costs and provides a precise methodology for determining the costs of diverse products and services.

The Activity-Based Costing system has garnered significant attention in both accounting and financial circles due to its ability to accurately enhance the volume of high-quality information that supports decision-makers in economic enterprises, particularly through the precise allocation of indirect costs. The ABC system serves as a bridge to achieving the enterprise's objectives on one hand, and as a means to establish a relationship between the costs of performing activities within the enterprise and the customers, as well as all beneficiaries of those activities, on the other.

Concept and Importance of Activity-Based Costing (ABC)

Activity-Based Costing (ABC) is a methodology for identifying and allocating indirect costs to products and services by tracking their consumption of specific activities, rather than relying solely on general volume-based measures such as direct labor hours or machine hours.

The ABC system aims to enhance the accuracy of unit cost determination and pricing by linking total costs to appropriate cost drivers that reflect the true underlying causes of cost incurrence or expenditure.

Definition of Activity-Based Costing (ABC):

We cite the definition provided by the International Society for Advanced Manufacturing as follows: "The approach that measures the performance and cost of activities related to cost objects such as products and services, where the cost of each activity is determined by the extent of its resource consumption and the bearing of activity costs. It is a method that recognizes the causal relationship between cost drivers and activities."

It is also defined based on the idea that designing, producing, and distributing products requires performing numerous activities; accomplishing these activities necessitates purchasing or utilizing resources; and purchasing or utilizing resources leads to the incurrence or realization of costs. Thus, it is defined as: "A system that identifies activities across all levels of the value chain, subsequently calculates the costs of these activities, and then allocates

them to cost objects—such as products or services—based on the mix of activities required to produce each product or service."

Another definition states: "A system that aggregates indirect cost elements within the enterprise into cost pools, which are then distributed to the final product using cost drivers, thereby achieving a more accurate final product cost and facilitating sound managerial decision-making."

It is further defined as: "An accounting method that identifies activities within the organization and assigns the cost of each activity to products and services according to the degree of their consumption of those activities and their causal drivers."

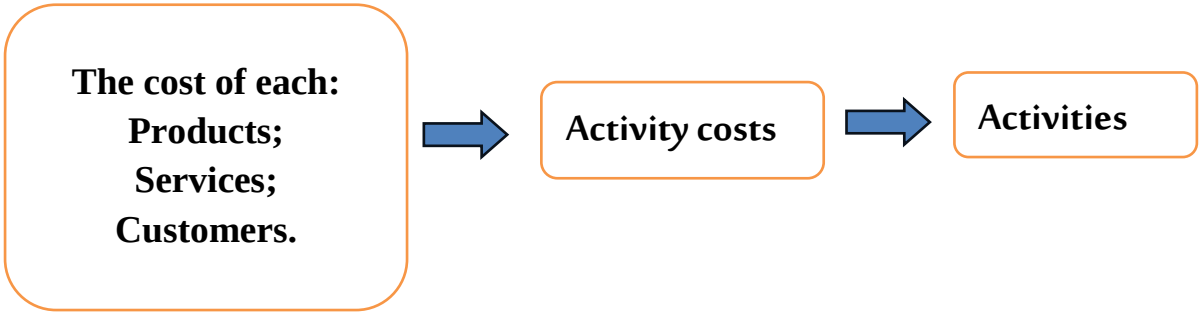
The system is also described as: "A modern approach compared to traditional procedures for allocating overhead costs, centered on the causal linkage between activities and costs when determining product cost."

"A form of management accounting that identifies the activities incurring expenses and allocates costs accordingly through steps involving activity definition, driver identification, and rate calculation."

"A costing system that transcends traditional models for calculating indirect costs by focusing on activities and their drivers rather than relying solely on volume-based measures."

In conclusion, it can be inferred that this system posits that products consume activities rather than economic resources directly, and that the latter are consumed by the activities. Therefore, it is essential to identify the enterprise's primary activities, then track the allocation of costs to these activities based on the actual quantity of resources consumed by those activities, and subsequently to the final cost objects—represented by the products—based on the proportion of activity consumption attributable to each product.

The following figure illustrates the operating principle of the ABC system.



Objectives of the Activity-Based Costing (ABC) System:

- Enhance the accuracy of overhead cost allocation by linking costs to causal cost drivers rather than general volume-based measures, thereby directly improving unit cost precision and profit margins;
- Eliminate cost distortions arising from traditional volume-based allocation and clearly reveal the costs of complexity, batches, and product/service diversity;
- Support pricing decisions, product mix optimization, and keep/drop analyses through more reliable cost information at the product and service levels;
- Analyze profitability across customers, channels, and orders while measuring "cost-to-serve" to guide differential pricing policies and service level strategies;
- Identify value-added and non-value-added activities to streamline operations, reduce waste, and lower hidden costs embedded in support activities;
- Improve capacity management and allocation, and uncover unused capacity—particularly with time-driven ABC models;
- Strengthen activity-based budgeting and link costs to operational performance to measure and sustain managerial improvements;
- Focus cost-reduction efforts on "high-cost activities" and constrained resources through transparent cost pool and driver visibility;
- Eliminate randomness in the allocation of indirect costs among different products;
- Achieve fairness in the distribution of indirect costs across diverse products.

Practical Benefits:

- Improve pricing and bidding decisions through cost driver rates that reflect the actual consumption of activities, rather than merely direct labor hours or machine hours;
- Enhance the accuracy of product/customer profitability and reduce distortions resulting from arbitrary allocation, thereby directing investments toward the most valuable segments;
- Uncover improvement opportunities across value chains and reduce cycle time and cost per transaction when adopting time-driven ABC.

Fundamental Steps of the Activity-Based Costing Method

The Activity-Based Costing (ABC) system proceeds through four fundamental stages:

- Identification of Activities;
- Allocation of Costs to Activities;
- Determination of Cost Drivers for Each Activity;
- Distribution of Activity Costs to Products.

Identification of Activities:

In this stage, the nature of operations within each department and the flow of the production process are examined. The activities that give rise to work aggregates across departments and organizational units are identified and analyzed. It is noted here that most studies indicate that as the number and diversity of activities increase, the complexity of the relationship between the activity and the production unit intensifies, thereby elevating the cost of implementing this method. Activities are classified into:

- Value-Added Activities: These are essential activities within the enterprise, the existence of which is fundamental to completing production, marketing, and sales operations. Examples include the procurement of raw materials.
- Non-Value-Added Activities: These are non-essential activities within the enterprise that do not contribute to adding value to the product. Their elimination does not affect the product's value. For instance, the storage of finished goods is considered a non-value-added activity from the customer's perspective, and just-in-time production is preferred.

Allocation of Costs to Activities:

Costs are allocated through the following stages:

- Collecting the costs associated with the production factors employed in each activity where they can be directly traced;
- Tracing costs by establishing the causal relationship between resources and the outputs of each activity;
- Pooling activities that are interrelated into a single activity center.

Determination of Cost Drivers for Each Activity:

A cost driver is defined as the cause or primary factor that triggers the incurrence of a cost expense. It represents the principal reason for the level or volume of output. The analysis of cost drivers involves scrutinizing the underlying cause of cost occurrence, with the clarification that the cost driver precedes the activity itself.

Allocation of Activity Costs to Products:

In this stage, the costs associated with activities within a cost pool are allocated to the final products using the cost rate of each pool. This rate enables the calculation of the quantity of resources and costs consumed by each product. The product is charged with the costs of the activities it consumes, and costs are allocated to products by multiplying the cost driver rate by the amount of the cost driver utilized in the product.

Product's Share of Activity Costs = Cost Driver Rate per Activity × Volume of Cost Driver Consumed by the Product

Cost Driver Rate per Activity = Estimated Total Indirect Costs / Estimated Volume of Cost Drivers

Cost Driver Rate per Activity = Activity Cost / Volume of Cost Drivers

Practical Example:

A manufacturing enterprise produces three products. The activity analysis process required for the manufacturing operation has identified six (6) primary activities. These activities consume indirect costs at varying proportions, as illustrated in the following table:

The statement	*The amount*	*Preparation of raw materials*	*Assembly*	*Welding*	*Quality control*	*Packaging*	*Shipping*
Indirect wages	140000	%20	%35	%15	%5	%15	%10
Maintenance and fuel	280000	%10	%40	%20	/	%15	%15
Miscellaneous expenses	50000	%5	%10	%20	%30	%25	%10
Total	470000	/	/	/	/	/	/

The cost drivers for each activity, along with the volume of these drivers for the activity and for the three products, were as follows:

Activity	Cause of activity	Number of activity triggers	Product 1	Product 2	Product 3
Preparation of the raw material	Number of units entered	75,000 units	30,000	25,000	20,000
Composition	Number of parts assembled	55,000 parts	20,000	17,000	18,000
Welding	Number of units produced	35,000 units	8,000	12,000	15,000
Quality control	Number of units inspected	30,000 units	Unit	Unit	Unit
Quality control	Quantity of packaging materials	19,000 kg	12,000	12,000	6,000
Packaging	Weight of units shipped	350 kg	Unit	Unit	Unit
Shipping	Cause of activity	Number of activity triggers	5,000 kg	8,000 kg	6,000 kg

Required:

- Determine the cost of each activity.
- Calculate the allocation rate for each activity.
- Determine the share of each product in indirect manufacturing costs.

Solution:

Determination of the Cost of Each Activity.

Statement	Amount	Preparation of raw material	Installation	Welding	Quality control	Packaging	Shipping
Indirect wages	140,000	28,000	49,000	21,000	7,000	21,000	14,000
Maintenance and fuel	280,000	28,000	112,000	56,000	/	42,000	42,000
Miscellaneous expenses	50,000	2,500	5,000	10,000	15,000	12,500	5,000
Total	470,000	58,500	166,000	87,000	15,000	75,500	61,000

Calculation of the Allocation Rate for Each Activity:

Loading rate for the activity	*Number of activity cost drivers*	*Activity cost*	*Activity*
Preparation of raw materials	58500	75000unit	1.14da/unit
Assembly	166000	55000part	3.01da/part
Welding	87000	35000unit	2,48da/unit
Quality control	15000	30000unit	0,5da/unit
Packaging	75500	19000kg	3,97da/kg
Shipping	61000	350kg	174,28da/kg

Share of Each Product in Indirect Manufacturing Costs

Activity	Product 1	Product 2	Product 3
Preparing the raw material 1.14x30000 1.14x25000 1.14*x*20000	34200	28500	22800
Assembly 3,01*x*20000 3,01*x*17000 3,01*x*18000	60200	51170	54180
Welding 2,48*x*8000 2,48*x*12000 2,48*x*15000	19840	29760	37200
Quality control 0,5*x*12000 0,5*x*12000 0,5*x*6000	6000	6000	3000
Packaging 3,97*x*5000 3,97*x*8000 3,97*x*6000	19850	31760	23820
shipping			

147,28*x*160 147,28*x*90 147,28*x*100	23564,8	13255,2	14728
Total cost according to: ABC	**163654,8da**	**160445,2da**	**155728da**

Axis Eight: The Target Costing Method

Target Costing Method

The target costing approach is relatively straightforward in terms of comprehension and application. Despite this, it exerts a substantial influence on the profitability of industrial and commercial enterprises. It does not necessitate a large cadre of specialists or professionals for implementation, nor does it require extensive software applications or complex administrative arrangements and procedures. Rather, it generally constitutes a logical application that translates the enterprise's existing procedures and operations.

The initial emergence of the target costing system dates back to the early 1960s in Japan. Although this method remained in practice within Japanese companies for an extended period, its widespread recognition occurred in the 1980s, which accounted for the international competitive superiority of Japanese industrial firms. Subsequently, interest in this approach grew among other Western nations, with numerous major companies in both the United States and Europe attempting to adopt the system to strengthen cost management and enhance competitiveness. This gave rise to variations in the adoption of the system across different countries.

Target costing is a cost management technique that commences with the market price acceptable to the customer, from which the desired profit margin is subtracted to arrive at the "allowable cost" prior to design and production, thereby ensuring profitability upon launch and throughout the entire product life cycle. This method emphasizes proactive cost planning and value engineering during the design phase, rather than attempting cost reduction after production has begun, when the capacity for influence is significantly diminished.

Accounting theorists have not reached a consensus on a precise definition of target costing, as numerous divergent definitions and concepts exist, reflecting varied perspectives. Some of these are presented below:

The Chartered Institute of Management Accountants defines target costing as: "An estimate of product cost derived by subtracting a desired profit margin from a competitive market price."

Target costing is defined as "determining the production cost of a proposed product in such a way that the product, when sold, achieves the desired profit margin."

It is also defined as “one of the most important modern tools for cost management, which aims to allocate the total costs of the product throughout its life cycle by assisting those responsible for production engineering, design, and marketing research.”

It is further defined as “a process aimed at reducing the costs of new products across all stages of their life cycle while ensuring product quality and meeting consumer requirements, by examining all possible ideas to reduce costs in advance during the planning, development, and design phases.”

Additionally, it is defined as “a management method that targets aligning the estimated total cost of products with the organization’s price and profit objectives.”

Based on the foregoing definitions, target costing can be defined as a pivotal component of the product development process, commencing from the design phase through to the post-sale phase. It involves market analysis, competitor assessment, and customer preferences to determine a competitive price, followed by the desired profit margin, and subsequently the cost, thereby adapting the product or service to the predetermined and studied prices.

Principles of Target Costing:

The target costing method aims to manage business operations to remain profitable in competitive markets where the market determines the price. Therefore, the product is managed on a “design-to-cost” basis rather than the traditional “cost-then-price” approach. The principle is that the product is not produced unless it can be designed to achieve the allowable cost that ensures profit at the price acceptable to the customer.

The target costing approach encompasses several principles, including the following:

- **Price-Led Target Costing Leadership:** To determine the target cost, the first step is to establish the price at which the product can be sold. Subtracting the targeted profit from this price yields the cost within which the product must be manufactured.
- **Customer Focus:** Emphasis must be placed on customer requirements in terms of quality, price, and timely delivery of the product.

•**Product Design Focus**: Design engineering is the primary element in target costing, as engineers must design the product in a manner that enables its production within the target cost limits.

•**Process Design Focus:** This involves examining all aspects of the production process to ensure the product is manufactured with the highest possible efficiency. All process facets must be designed in accordance with the product's target cost.

•**Life-Cycle Costing:** Analysts, when determining the target cost, should consider the importance of accounting for all costs related to the product's life cycle. Efforts should be made to reduce the total life-cycle cost, including distribution, procurement, operation, maintenance, and disposal costs after the product's useful life ends.

•**Cross-Functional Teams:** Manufacturing the product within the target cost requires the use of a multidisciplinary team drawn from various departments of the organization, including specialists in marketing research, sales, production engineering or equipment, and cost management.

Value Chain Orientation: In some cases, the planned cost may exceed the target cost. In such instances, efforts are made to eliminate non-value-adding costs to reduce the planned cost. In certain situations, a thorough examination of the value chain across all organizational activities can help managers identify opportunities for cost reduction.

Determining Target Cost (Implementation Steps)

- **Market Exploration and Determination of Target Selling Price:** Based on what customers are willing to pay, competitor analysis, and perceived value.
- **Determination of Required Profit Margin:** In accordance with long-term profitability objectives and the product life-cycle plan.

Calculation of Allowable Cost = Target Selling Price − Target Profit, to determine the total cost ceiling.

Estimation of Current Expected Cost: Based on the initial design, and calculation of the "cost gap" between the estimate and the allowable cost.

Closing the Gap: Using value engineering, design simplification, selection of alternative materials, process improvement, and collaboration with suppliers.

Decomposition of Target Cost into Components and Parts: Transferring cost responsibilities to designers and suppliers through detailed cost objectives.
Life-Cycle Cost Control: With continuous review prior to launch to ensure the target cost is not exceeded.

Practical Application Example:

A manufacturing company specialized in electronic watch production is studying the feasibility of launching a new product in the market. A survey conducted by the company revealed demand for an electronic watch at a price of 45,000 DZD. However, the company's board of directors decided to launch this new product at a price 7% lower than the survey price.
The company targets a gross margin of 25% of sales.

The initial current cost calculated by the company using the Activity-Based Costing (ABC) approach is as follows:
- Sales volume: 60,000 units
- Direct material cost per unit: 20,000 DZD
- Direct labor cost per unit: 5,000 DZD
- Number of production orders: 3,500 orders
- Testing hours required per unit: 10 hours per produced unit
- Reworked units: 15% of total production

Activity data, cost drivers for each activity, and the overhead allocation rate used by the company to assign indirect costs to the product are provided below.

Activity	Nature of activity	Cost driver	Unit loading rate
Purchasing	Issuing purchase orders	Number of purchase orders	4000 DA per order
Quality testing and inspection	Product quality inspection	Number of test hours	200 DA/hour
Restart	Repairing defects	Number of units reactivated	2800 DA per unit

Required:
- Calculation of the target cost for the electronic watch.
- Calculation of the initial current cost for the electronic watch.
- Comparison between the two costs, with your commentary on the results.

Solution:

Calculation of the Target Cost for the Electronic Watch:
- Target Selling Price = Market Price − (Market Price × 0.07)

- Target Selling Price = 45,000 − (45,000 × 0.07) = 41,850 DZD
- Target Profit Margin = Target Selling Price × Target Profit Margin Rate
- Target Profit Margin = 41,850 × 0.25 = 10,462.5 DZD
- Target Cost = Target Selling Price − Target Profit Margin
- Target Cost = 41,850 − 10,462.5 = 31,387.5 DZD

Calculation of the Initial Current Cost for the Electronic Watch:

Statement	Unity	Total
Direct costs Raw materials Wages	20000 5000	
Total direct costs	25000	
Indirect costs Purchase of materials Quality testing Restarting	4000 200 2800	3500x4000= 14000000 6000x10x200= 12000000 6000x0.15x 2800=2520000
Total direct costs	7000	
Current initial cost	32000	

Comparison Between the Two Costs

Target cost	31,387.5 DZD
Initial cost	32,000 DZD
Difference	612.5 DZD

The results obtained indicate that the company does not wish to produce the new batch of electronic watches, as taking the gross margin into account would result in the company's prices being higher than those prevailing in the market, thereby preventing it from remaining competitive.

Should the company decide to proceed with the production of the new electronic watch product, the following measures must be adopted:

Formation of a task force to work on reducing the gap between the initial cost and the target cost to the lowest possible level.

Reassessment by the company of the manufacturing process, the distribution process, or both.

Prioritization by the company of the design phase to reduce costs to their lowest feasible levels.

Axis Ten: The Hidden Costing Method

The Hidden Costing Method

The hidden costing method refers, in management accounting, to a methodology for measuring and managing costs that do not appear directly in the organization's accounting records or information systems. These costs typically arise from internal dysfunctions such as poor work organization, absenteeism, or inadequate training.

Definition of the Hidden Costing Method

The hidden costing method represents an analytical approach to examining undeclared or non-transparent costs associated with operational activities, commonly referred to as "hidden costs". These include costs related to inefficient resource utilization, waste, low employee productivity, or the consequences of management errors. Such costs are not recorded in traditional financial statements or conventional accounting systems, yet they significantly impact the organization's financial performance.

Hidden costs are those for which no indicator or explanation exists within the information systems used by the organization, including estimated budgets, income statements, general accounting, traditional costing systems, and performance dashboards, among others.

Hidden costs have a direct impact on the organization's profitability. The term "hidden" does not imply any intentional concealment by the organization but rather reflects its inability to measure or account for these costs.

They represent a monetary translation of activities aimed at managing operational losses and are termed "hidden" because they are not observable within the organization's information systems.

The concept encompasses the aggregate of costs not recorded in the accounting information system due to their association with managerial or production dysfunctions within the organization, such as suboptimal resource utilization or costs of non-quality.

As represented in the following diagram:

Based on the foregoing definitions, it can be inferred that hidden costs are costs arising from production defects that do not appear in the accounting system. Although they are hidden, this does not justify excluding them from the final cost calculation; rather, they can be translated into monetary amounts.

Elements of Hidden Costs

According to Henri Savall's model, five interrelated elements stand out:

- Excess wages
- Excess time (time waste)
- Excess consumption of resources and energy
- Non-direct production
- Capital immobilization

Importance of the Hidden Costing Method

The significance of this approach lies in highlighting and financially analyzing invisible costs, thereby enabling the organization's management to identify sources of waste and dysfunctions and reduce them to achieve greater efficiency and higher profitability.

Causes of Hidden Costs

Henri Savall identified numerous and interrelated causes stemming primarily from the deterioration of various internal domains within the organization. These are considered the main drivers behind the emergence of hidden costs, which can be summarized as follows:

Working Conditions

Working conditions represent one of the key causes of hidden costs due to their critical importance and complexity, given the costs they generate. Consequently, providing suitable working conditions has become one of the organization's strategic objectives.

Work Organization

Poor work organization negatively impacts various relationships within the organization—whether between individuals, between management and employees, or among employees themselves. Work organization reflects the quality of relationships among all elements within the organization, both human and administrative.

Poor organization leads individuals to exhibit negative behaviors detrimental to the organization, resulting in the emergence of hidden costs accompanied by a decline in performance levels.

The more flexible the organization's work structure is in adapting to environmental changes, the more positive its impact on overall performance. Conversely, poor organization creates a mismatch between individual capabilities and assigned roles, leading to feelings of boredom and job dissatisfaction. These sentiments drive employees to adopt behaviors such as

absenteeism, raw material waste, and time loss, all of which are indicators reflecting the emergence and exacerbation of hidden costs.

Communication Effective communication contributes to achieving the organization's objectives, making it one of the fundamental factors that managers and organizations consider in managing their operations and attaining their defined goals. This is accomplished through the efficiency of their communication system. Conversely, ineffective communication generates erroneous information, which increases hidden costs.

Time Management: Time is regarded as one of the most critical factors enabling the organization to achieve its predetermined goals if properly controlled. As a rapidly depleting resource, failure to utilize it appropriately results in significant losses for the organization.

Training: Organizations prioritize training because expenditures on it represent an investment in human resources. The return on this investment may manifest as an increase in overall productivity. At the individual level, the importance of training lies in enhancing knowledge and skills, which in turn boosts motivation and work capacity.

Social Dimension: This involves job description, identification of strengths and weaknesses, and assessment of available capabilities and capacities, whether material or human.

Organizational Dimension: This entails creating a conducive work environment through measures such as health and safety protocols, medical teams, workplace risk management, and use of protective clothing.

Financial Dimension: This encompasses bearing all costs, studying, analyzing, measuring, and evaluating them.

Measurement and Indicators

- Absenteeism rate, labor turnover rate, workplace accident rate.
- Defect rate, rework percentage, productivity variance against standard.
- Actual versus standard consumption of materials, energy, and time.
- Available capacity versus utilized capacity, and machine downtime/waiting time.

Method for Calculating Hidden Costs

* Absenteeism Cost = (Absentee Hours × Hourly Cost) + (Disruption Factor × Reorganization Cost).
* Labor Turnover Cost = Number of Departures × (Recruitment Cost + Training Cost + Lost Productivity).

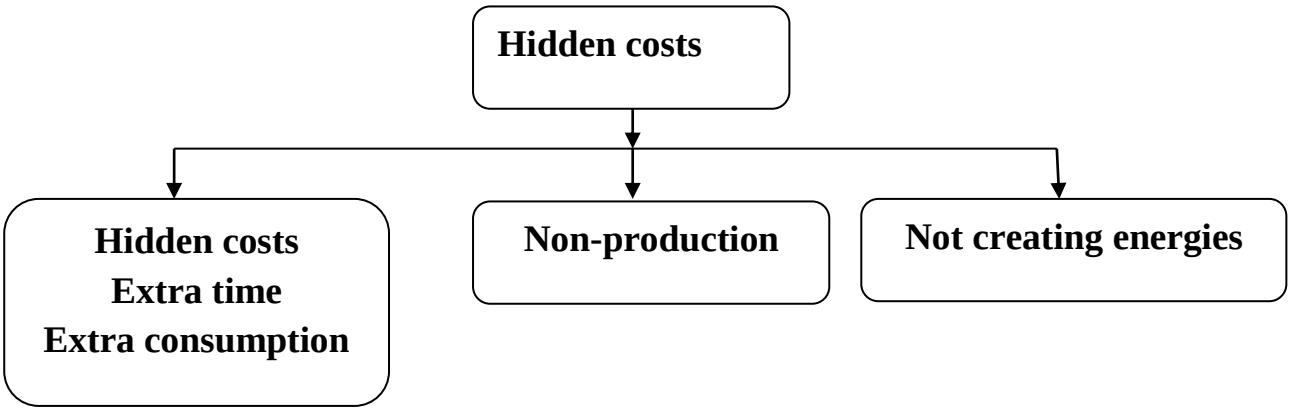
* Defect and Rework Cost = (Defective Units × Repair Cost) + Returns/Warranty Claims.
* Consumption Variance = (Actual Consumption − Standard Consumption) × Unit Cost.
* Idle Capacity Cost = (Available Minutes − Consumed Minutes) × Capacity Cost Rate.
* Time **Practical Application Example:**
- Productivity Variance = (Actual Time − Standard Time) × Cost Rate.
- A factory has a capacity of 100,000 minutes per month with a resource cost of 50,000 DZD, resulting in a capacity rate of 0.5 DZD per time unit.
- If 80,000 minutes are utilized, the idle time cost is:
20,000 × 0.5 = 10,000 DZD.
- With 1,000 hours of absenteeism at an hourly cost of 1,500 DZD, a disruption factor of 0.2, and a reorganization cost of 500 DZD per hour, the estimated absenteeism cost is:
- 1,000 × 1,500 + (0.2 × 1,000 × 500) = 1,750,000 DZD.
- These line items were not visible in direct cost reports, yet they directly impact profitability.
Detailed calculation:
1,000 × 1,500 = 1,500,000 DZD
1,000 × 1,500 × 0.2 = 300,000 DZD
- Resource cost = 50,000 DZDTotal hidden cost = 300,000 + 1,500,000 − 50,000 = 1,750,000 DZD

These costs were not apparent in direct cost reports, but they directly affect profitability.

SOF Model (Social, Organizational, Financial) for Calculating Hidden Costs

To facilitate the assessment of hidden costs, H. Savall proposed dividing the costs an organization may incur from managing aggregated losses—based on five indicators—into five components, namely:
- Net wages
- Excess time
- Excess consumption
- Non-production
- Non-creation of capacities

as follows:



The first three components on the left side of the diagram represent actual expenditures incurred by the organization (historical costs). In contrast, non-production and non-creation of capacities are not linked to historical costs but rather relate to lost profit opportunities resulting from operational losses (opportunity costs).

In terms of impact on results:

- Excess wages, excess consumption, and non-production directly affect the organization's results within a given period.
- Non-creation of capacities, however, impacts the subsequent period.

In addition to the effect of hidden costs on the organization's current and future results, the importance of studying them lies in adopting an evaluation model for hidden costs that interlinks all underperformance indicators with one another, and on the other hand, with the hidden costs generated from them.

It should also be noted that hidden costs require in-depth study and analysis to enable their evaluation and to determine the extent of their severity. In the framework of socio-economic theory, H. Savall proposed a method for assessing hidden costs comprising three main dimensions:

- Social Dimension: Le module Social «S»
- Organizational Dimension: Le module Organisationnel «O»
- Financial Dimension: Le module Financier «F»

Analysis of the Content and Objectives of the Three SOF Dimensions

These three dimensions represent distinct but complementary phases in which information and data are collected to identify the sources of hidden costs and subsequently evaluate them. Each dimension complements the one that follows, forming an integrated analytical sequence.

Social Dimension: Le module Social «S» :

This dimension relies on conducting interviews with workers, supervisors, and management staff, as well as collecting and analyzing documents containing relevant information and statistics (such as absenteeism, labor turnover, and workplace accidents). It may also involve direct observation of phenomena that disrupt workflow. This dimension serves as preparatory groundwork for the organizational dimension.

Organizational Dimension: Le module Organisationnel «O»

This constitutes a mandatory and foundational phase, as it provides the information on which the financial dimension subsequently relies. It is based on conducting a comprehensive inventory of the nature of operational losses, their sequence of occurrence, and their various effects over time. The organizational dimension also enables the identification of necessary remedial approaches aimed at reducing the gap in operational losses.

Financial Dimension: Le module Financier «F»

At this stage, reference is made to cost elements and prices recorded in the organization's accounting documents in order to conduct a financial evaluation of the quantity of time and materials consumed during the process of addressing operational losses.

Expected Objectives of the SOF Method Dimensions

The measure	**Objectives**
Social	**- Identify the existence of initial operating losses;** **- Explain the reasons for operating losses through the relationship:** **(structure ⇔ behavior)** **(operating ⇐ losses)**
Regulatory	**- Identify methods for addressing operational losses;** **Conduct an inventory of the economic impact of the methods used: amount of consumption, amount of time, loss of production, etc.**
Financial	**- Research on the costs and unit prices of treatment components;** **Financial assessment of the economic impacts of treatment methods.**

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