

Product Volume Variance

$$PVV = BFOH - FOH \text{ Allocated}$$

$$PVV = BFOH - (AQ \times BFOH \text{ Rate})$$

$$PVV = BFOH - \left(AQ \times \frac{BFOH}{Den. level} \right)$$

Methods of Disposal:

1. Adjusted Allocation Approach
2. Proration Approach
3. Write-off to COGS Approach

Inventory Valuation Methods

Absorption Costing

Fixed manufacturing overhead costs are inventoriable (asset) and become expenses (COGS) only when a sale occurs (required under AASB 102)

→ non-manufacturing costs are expensed when incurred

- All manufacturing costs are absorbed into a unit product cost

Advantages

- Better reflects cost of inventories
- Both variable and fixed costs are necessary to produce the goods
- Satisfies the matching principle
- Avoids fictitious losses being reported

Income Statement

Revenue

less: Cost of goods sold
Under-allocated OH*

Gross margin

less: Non-mfg costs

Operating income

Break Even Point:

$$Q = \frac{\text{Total Fixed Mfg Costs} + \text{Total Fixed non-mfg Costs} + \text{Target Profit} + \left(BFMOR \times \left(\text{Sales in Units (Q)} - \text{Units Produced} \right) \right)}{\text{Unit Contribution Margin}}$$

→ in sales, target profit = 0

Variable Costing

Fixed manufacturing overhead costs are excluded from inventoriable costs and are a cost of the period in which they are incurred

→ non-manufacturing costs are expensed when incurred

- Emphasises cost behaviour

Advantages

- Highlights costs behaviour and is compatible with certain techniques (eg. CVP)
- Classifying costs by behaviour is more useful for management decision making
- Eliminates problems with allocation of Fixed OH and calculation of Fixed OH Rates
- Avoids manipulation of production in order to increase profit

→ Prohibited by AASB102

Income Statement

Revenues

less: Cost of Goods Sold

Variable non-mfg costs

Contribution margin

less : Fixed mfg costs

Fixed non-mfg costs

Operating income

Notes

- The Income Statement is in a "Contribution Margin" format
- No variances in variable costs therefore no adjustment to COGS

Break Even Point

$$Q = \frac{\text{Total Fixed Costs} + \text{Target Operating Income}}{\text{Contribution Margin Per Unit}}$$

Throughput

Only direct material costs are included as inventoriable costs

→ all other costs are period costs

Income Statement

Revenues

Less: Cost of goods sold

Throughput margin

Less: Other mfg. costs

Non-mfg. costs

Profit

Comparison

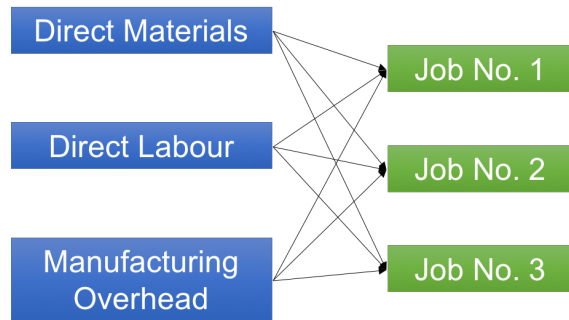
Production > Sales	Inventory Increases	Absorption Income > Variable Income
Production < Sales	Inventory Decreases	Absorption Income < Variable Income
Production = Sales	No Change	Absorption Income = Variable Income

$$\left(\begin{array}{c} \text{Absorption-costing} \\ \text{operating} \\ \text{income} \end{array} \right) - \left(\begin{array}{c} \text{Variable costing} \\ \text{operating} \\ \text{income} \end{array} \right) = \left(\begin{array}{c} \text{Fixed manufacturing} \\ \text{costs in} \\ \text{ending inventory} \end{array} \right) - \left(\begin{array}{c} \text{Fixed manufacturing} \\ \text{costs in} \\ \text{beginning inventory} \end{array} \right)$$

Cost Accumulation Methods

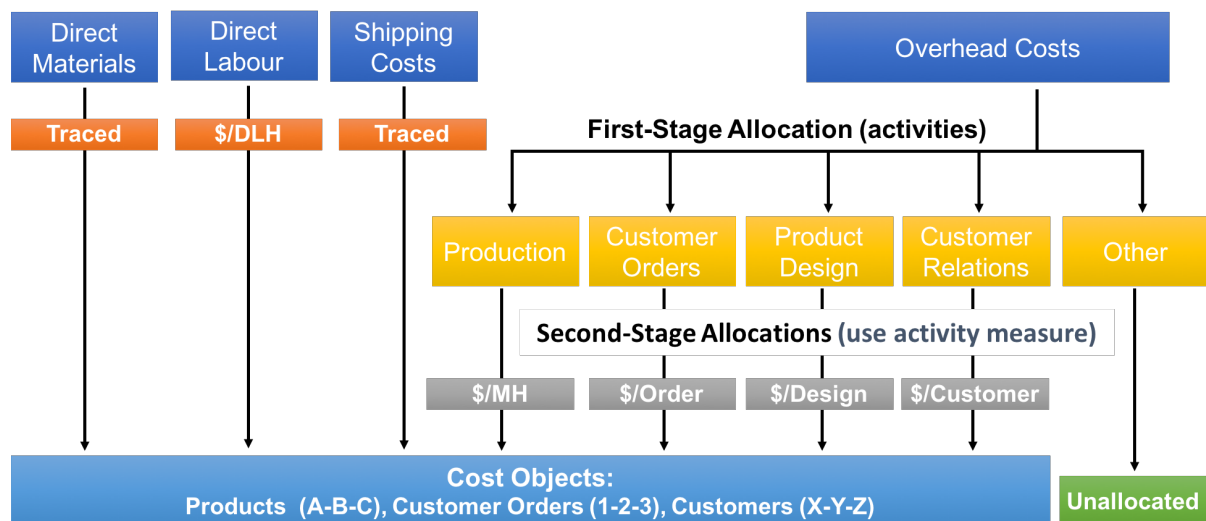
Job Costing

- Trace direct materials and labour to each job
- Allocate overhead to jobs using a rate



ABC Costing

- Attempts to cost products on the basis of the resources actually consumed by the output
- uses activities to link costs of resources consumed to products



Levels of Activity

- Unit-level
- Product-level
- Batch-level
- Facility-sustaining
- Consumer-level

Managing Inventory

Cost reductions: reliable suppliers that can meet desired criteria, not cheapest materials

Traditional Approach

Economic Order Quantity (EOQ)

Premise: managing inventories to increase net income requires effectively managing costs that fall into these 5 categories

1. Purchasing Costs
 - Cost of goods acquired, including freight inwards
 - Affected by quantity discounts and payment terms
2. Ordering Costs
 - Costs of preparing, processing and paying purchase orders
 - Costs of receiving and inspecting the items included in the orders
 - For in-house manufacturing, ordering costs include cost of placing the work order and setting up the plant to produce the item/s
3. Carrying Costs
 - Cost of carrying/holding inventory (incremental)
 - Cost of storage and handling (rental, insurance, spoilage, obsolescence)
 - Opportunity cost of investment tied up in inventory
4. Stockout Costs
 - Cost of running out of inventory
 - additional ordering and freight costs
 - opportunity costs – lost contribution margin on sale not made and future sales
5. Quality Costs
 - Costs of conformance/non-conformance
 - Prevention, appraisal, internal and external failure costs
6. Shrinkage Costs
 - Difference in count and quantity in records
 - Theft, embezzlement, breakage, misclassification, clerical errors

Assumptions:

- Fixed quantity is ordered and delivered at each reorder point
- Demand, ordering costs, and carrying costs are constant and known with certainty (on average one-half of inventory is in stock during the period)
- Purchase-order lead time is known with certainty
- Purchasing costs per unit is unaffected by quantity ordered (no quantity discounts)
- No stockouts occur; (stockout costs can be prohibitively high)
- Costs of quality (& *shrinkage*) considered only to extent that they affect ordering costs or carrying costs

EOQ Formula

$$EOQ = \sqrt{\frac{2DP}{C}}$$

Where,

D = known demand for specific time period

P = Relevant ordering costs per purchase order

C = Relevant Carrying cost of one unit for the specified time period

Deliveries

$$\text{Number of deliveries per time period} = \frac{D}{EOQ}$$

Relevant Total Costs

RTC = annual relevant ordering costs + annual relevant carrying costs

$$= \left(\frac{D}{Q}\right) \times P + \left(\frac{Q}{2}\right) \times C = \frac{DP}{Q} + \frac{QC}{2}$$

Reorder Point

The level of inventory on hand that triggers a new order

Reorder Point

$$= \text{number of units sold per unit of time} \times \text{purchase order lead time}$$

Safety Stock

Inventory held at all times regardless of quantity of inventory ordered using EOQ model → buffer against unexpected increases in demand or lead time, or short stock from suppliers

$$\text{Safety Stock} = \text{maximum demand} - \text{expected demand}$$

$$\text{ROP in presence of safety stock} = \text{ROP} + \text{safety Stock}$$

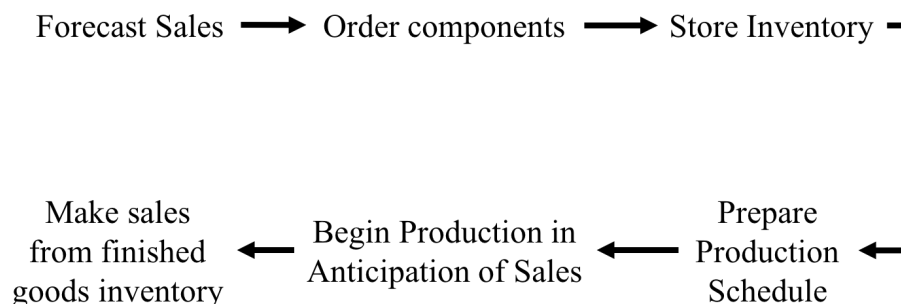
Materials Requirements Planning (MRP)

“push-through” system that manufactures finished goods for inventory on the basis of demand forecasts

- Takes lead time into account
- Sets a master production schedule
- Output of each department is pushed through – may result in accumulation of inventory
- Management accountant must maintain accurate records of inventory and costs

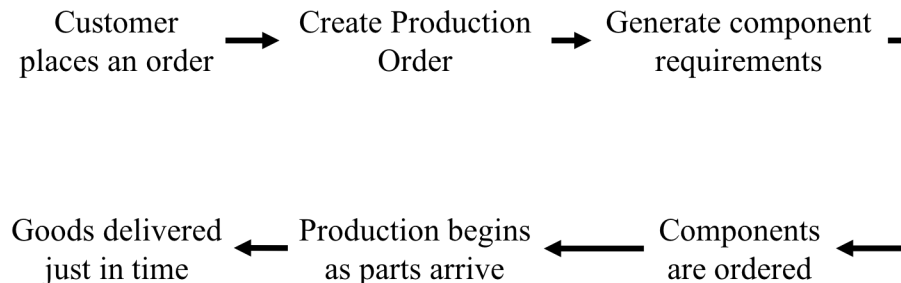
Inputs:

1. Demand forecasts
2. Bill of materials
3. Quantity of materials, components and product inventories



Just-In-Time (JIT)

Simplification of purchasing and production process by eliminating non-value-added activities → JIT should only be used when supply chain is properly managed



Goal: reduce or eliminate inventory at every stage of production from raw materials to finished goods – purchase materials, only as they are needed

1. Meet customer demand in a timely way
2. With high quality products
3. At lowest possible costs

Relevant Costs:

1. Purchasing Costs
2. Stockout Costs
3. Quality Costs

Steps to Answering Questions:

1. Recognise whether the items are costs or benefits to the current or a new JIT system
2. Calculate the total costs or benefits to that current and/or JIT system
3. Make schedule of relevant costs/benefits between current and new JIT system
4. Sum all the costs/benefits and calculate the difference

Enterprise Resource Planning (ERP) in JIT

- Integrated set of software modules covering accounting, distribution, manufacturing, purchasing, human resources and other functions
- Used in JIT production to improve information flows
- Gives managers, worker, customers and suppliers access to operating information
- Can be expensive, large and unwieldy

Benefits of JIT

- Reduced inventory costs
- Higher quality products
- Less warehouse space needed → reduced overheads
- Greater customer satisfaction
- More rapid response to customer orders → lower lead times

Performance Measures

- Personal Observation
- Financial
 - Inventory turnover

- **Non-Financial**
 - Number of days inventory on hand
 - Units produced per hour
 - % Defective units (reworked units)
 - Manufacturing cycle time
 - Setup time/total mfg time

Decision Making

Decision Model

Formal method for making a choice, involving quantitative and qualitative analysis

1. Identify the problem and uncertainties
2. Obtain information
3. Make predictions
4. Make decisions by choosing among alternatives
5. Implement the decision, evaluate performance, and learn

Relevant Costs and Revenues

- Occur in the future
- Differ among the alternative courses of action
- Avoidable – can be eliminated by whole or part by choosing another alternative

Cost Concepts

Historical Costs

Used for predicting future costs → Irrelevant to decision

Sunk Costs

Costs already incurred in the past, unavoidable → irrelevant to decision

Future Constant Costs Among Alternatives

Unavoidable → irrelevant to decision

Incremental Cost

Additional total cost incurred for an activity

Incremental Revenue

Additional total revenue from an activity

Differential Cost

Difference in total cost between two alternatives

Differential Revenue

Difference in total revenue between two alternatives

Business Function Costs

Sum of all costs in a particular business function of the value chain (variable and fixed)

Full Costs of the Product

Sum of all variable and fixed costs in all business function of the value chain

Differential Income

Net relevant income – the difference in total operating income when choosing between two alternatives

Opportunity Costs

The profit forgone by selecting one alternative over another – not an actual cash cost and not recorded in accounts

Avoidable Cost

Cost that can be avoided by choosing a different alternative

Unavoidable Cost

Cost that cannot be changed independently of the alternative chosen

Retain or Replace Equipment

Consider all costs and benefits of the old equipment

- Book value is a sunk cost – irrelevant
- Salvage value will occur if equipment is replaced – relevant
- Operating costs/benefits – the difference is relevant

Insource or Outsource an Activity (Make or Buy)

- If there is opportunity to use the productive capacity for another purpose → include opportunity costs in decision
- Eliminate sunk costs and unavoidable costs

Constrained Resources

Constraint: anything that prevents a business achieving higher performance versus its goal to add value today and in the future

- Demand for resource > resource supplied
- Creates opportunity cost – prevents further expansion
- External Constraints: market demand, material availability
- Internal Constraints: Machine hours, labour hours, internal policy

→ when there are no constraints, always produce when $SP > VC$

Product Mix with Constraints

RULE: Convert CM to CM per unit of constraint, then rank products by highest CM per unit of constraint

Multiple Constraints (Optimisation)

- Trial and error
- Linear Programming – graphic or simplex method