Module 3 - Technical Profile

Module 3 Technical Profile (Hours 9)

- Type of raw material to be used, Demand and supply position of raw material, Availability of substitutes of raw material, Details about production process and production methods, Technical details about production technology and availability of substitutes, Costs involved in operation and maintenance of technology.

Course Outcome

After finishing the course, the students will be able to:

1. Understand the nuts and bolts of preparing a business plan.
2. Remember and implement the business/management skills.
3. Understand and evaluate the content of business plan in detail.
4. Identify the tools and techniques involved in Business plan process.
5. Analyse the competitive structure and strategy development.
6. Launch a new venture company or start one an established organization

Topics covered

- Raw Material - Type of raw material to be used, Demand and supply position of raw material, Availability of substitutes of raw material
- Details about production process and production methods
- Technical details about production technology and availability of substitutes
- Costs involved in operation and maintenance of technology.

What Are Raw Materials?

Raw materials are **materials or substances** used in the primary production or manufacturing of goods.

Raw materials are commodities that are bought and sold on commodities exchanges worldwide. These materials undergo processing and transformation into **intermediate substances**, further used to make final products for sale. Examples include cotton, crude oil, coal, raw biomass, rubber blanks, mineral ores, wood, etc.

Traders buy and sell raw materials in the factor market because raw materials are factors of production, as are labor and capital.

Raw Materials….

- Raw materials are used in a multitude of products and can take many different forms.
- Raw materials are the input goods or inventory that a company needs to manufacture its products.
- For example, the steel used to manufacture vehicles would be a raw material for an automobile manufacturer.
- Lets see an example of manufacturing a guitar…

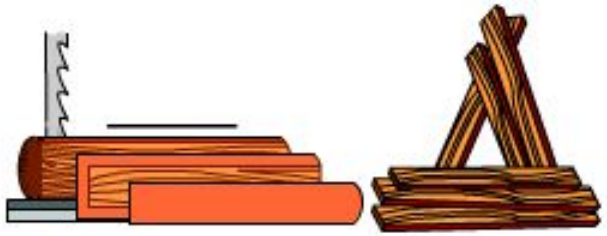
From Raw material to final product…

STAGE ONE - TREE FELLING

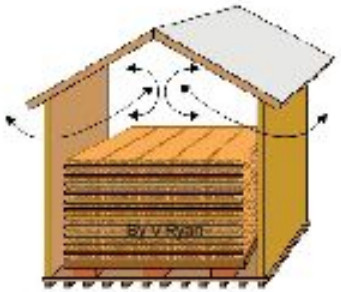
STAGE TWO - STORAGE

STAGE THREE - TRANSPORT TO SAWMILL

STAGE FOUR - BREAKING DOWN / ROUGH SAWING IN THE SAWMILL

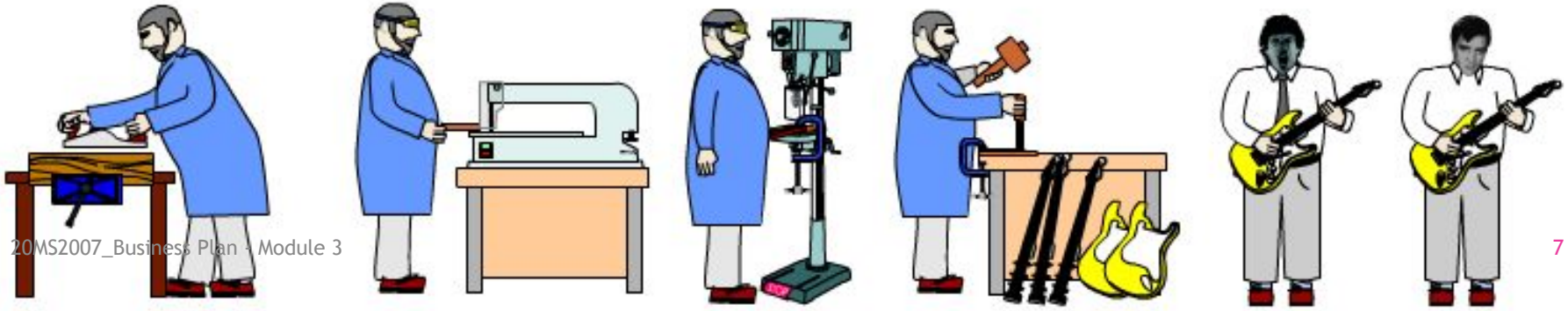


STAGE FIVE - SEASONING



STAGE SIX - RESAWING TO ACCURATE SIZES

STAGE SEVEN - MANUFACTURE A PRODUCT



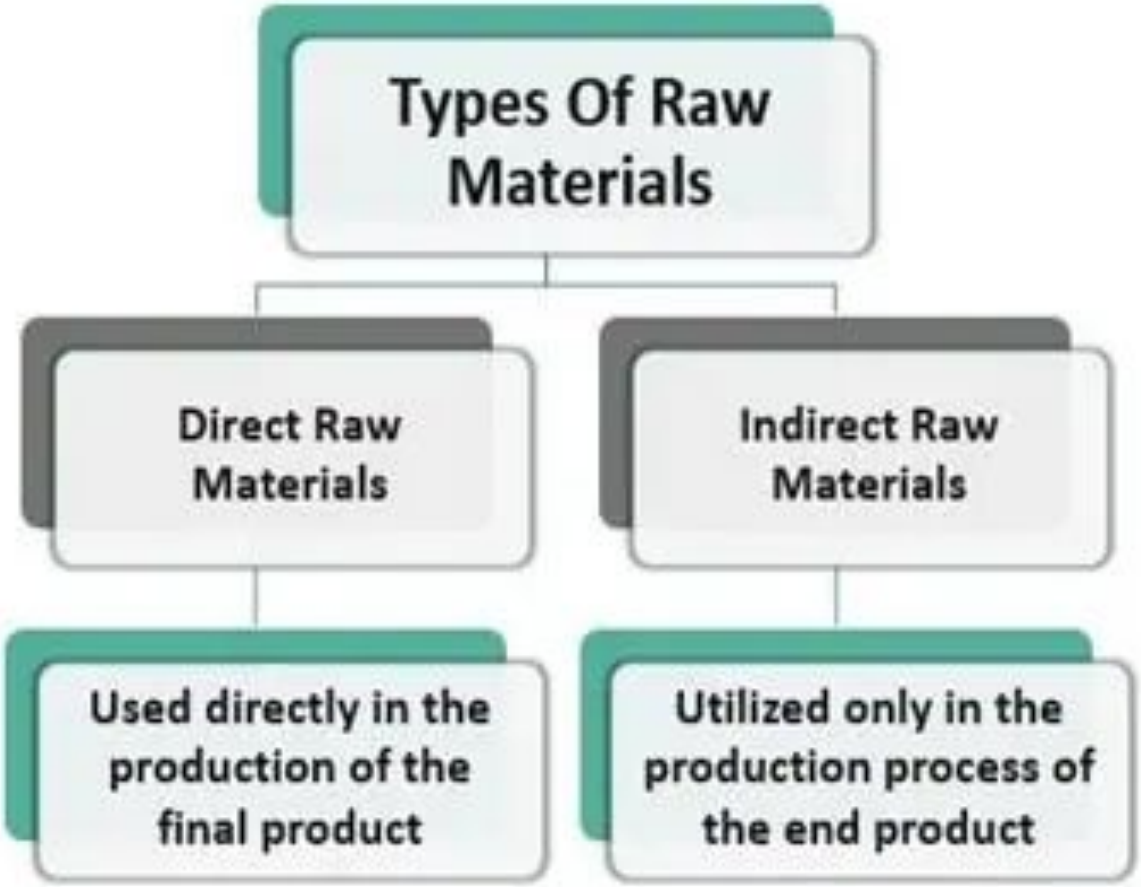
Sources of Raw Material

Plant Based : These are forestry and agriculture-derived materials. Sometimes referred to as vegetable-based unrefined resources, this category of unprocessed substances includes sugar, cellulose, cooking oil, corn, lumber, cork, cotton, etc.

Animal-Based: Agro-industries are the most common users of these commodities. Textile, leather, dairy, and other industries, process substances like leather, wool, silk, etc., to produce finished products.

Mineral-Based: These materials obtained through extraction include clay, sand, marble, iron ore, gasoline, natural gas, coal, precious metals, etc. Substances from this category are utilized in industrial settings or carving beautiful jewelry items.

Types of Raw Material



Types of Raw Material

- **Direct Materials -** These are primary input goods or unprocessed resources, such as wood, cotton, etc., used directly by companies to manufacture a finished product.

- **Indirect Materials -** These are unprocessed materials that do not directly form a part of the end product. Instead, they contribute to its production only. Examples of these long-term factory supplies include glue, tape, oil, etc.

Methods of Production

- Business must decide on the most suitable method of production. The objective is to minimize the cost per unit. i.e productive efficiency

- Methods of Production are
  - Job
  - Batch
  - Flow

Job Production

- https://www.youtube.com/watch?v=9iSidNUngoI

Job Production

- Production of a single product at a time
- Small number of unit required
- Entire job is completed. Example: birthday cake, dental treatment, Saloon
- Found both in the manufacturing and service industries
- As the number of units produced is small, production process is highly labour intensive
- Workforce usually skilled craftsmen
- Many small business start this way

Job Production - Advantages

- Can product unique “one-offs’ specification can constantly be modified
- Workers more likely to be motivated, tasks require high degree of skill and expertise. Work more demanding and interesting
- Organisation is simple, communication, coordination, supervision and inspection can be carried out

Disadvantages

- Labour costs high
- May be expensive to buy all the tools and equipments necessary
- Lead times can be lengthy
- Once demand for a firm’s product rises, job production may become costly. Firms may prefer to use a method more suited to producing large quantities.

Batch Production

- https://www.youtube.com/watch?v=lxdCRgE2h6A

Batch Production

- Used when demand for a product is regular rather than a one off. An example might be a bakery producing bread.
- Production is broken down into a number of operations
- A particular operation is carried out on each batch before moving to the next stage
- A great number of products are produced using this method, particularly in the manufacturing of components and in food processing

Batch Production - Advantages

- Flexibility – each batch can be changed to suit customer requirements
- Employees can concentrate on one operation rather than whole task
- Stocks of partly finished goods can be stored and completed when demanded by individual customers

Disadvantages

- Careful planning and cooperation required or machines may lie idle
- Workforce may be less motivated due to repetition
- If batches are small than unit costs are high
- A lot of money could be tied up in work in progress

Flow Production

- https://www.youtube.com/watch?v=RmItqvaJrMY

Flow Production

- Production is organised so that different operations can be carried out one after the other, in a continuous sequence

- The main features are as follows:
- Large quantities are produced
- A standardized product is made, ie all the same
- Semi-skilled workforce
- Large amounts of robotics, machinery and equipment (capital intensive)
- Large stocks of raw materials and component parts are required

Flow Production - Advantages

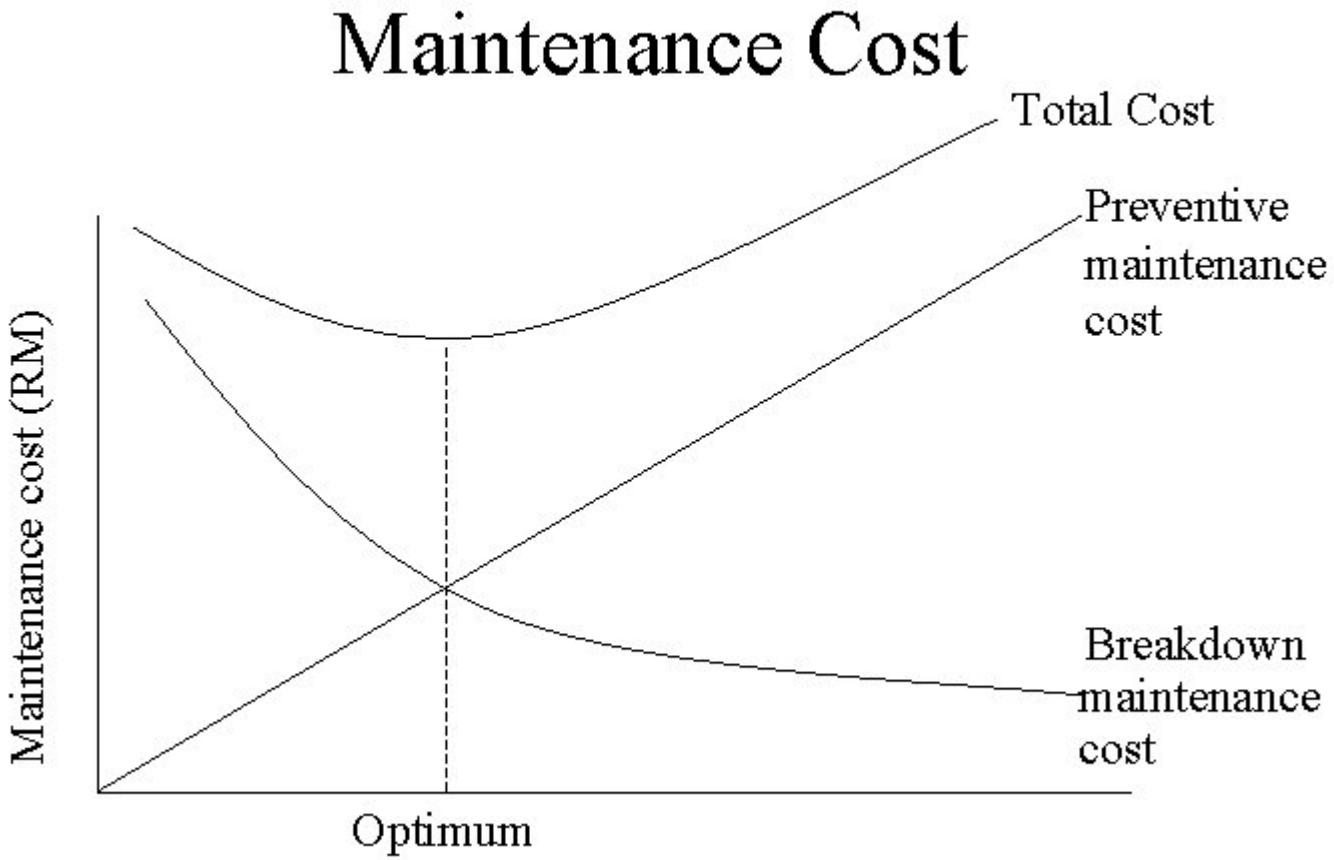
- Unit cost are reduced
- The process can be highly automated. Many operations carried out by robots and other types of machinery
- Quality systems can be build into production

Disadvantages

- Set up costs are high
- Product is standardized
- Worker motivation can be low
- Breakdowns can prove costly
- Supply may exceed demand

Combined Production Methods

- Some businesses may use a combination of the job, batch and flow
- Example, a brewery may make batches of special ale but it is then sent to a bottling plant where continuous flow is used


Maintenance Cost
Total Cost
Preventive maintenance cost
Breakdown maintenance cost
Maintenance cost (RM)
Optimum

Cost of Maintenance

- Spare parts
- Labour
- Down time (production loss)
- Overhead
- Consumables
- Hand tools, power tools and equipment

Who will do maintenance?

- In-house
- Out-source

Why to out-source the maintenance?

- Lack of expertise
- Too hazardous
- No experience
- Bound by contract
- Top management policy

Example

The record of computer breakdown for company PCK for past 20 months is shown below:

No. of breakdown	No. of months breakdown occurs
0	4
1	8
2	6
3	2
Total	**20**

Implication of breakdown (Example cont….)

- Each time computer breakdown – estimated loss is 300
- Contract preventive maintenance by company DK – 200 per month
- Should PCK contract out preventive maintenance to DK?

Solution to the Example

- Step 1: Calculate expected number of breakdown (based on past records) if the company continue without service contract
- Step 2: Compute breakdown cost per month with no. preventive maintenance contract
- Step 3: Compute the cost of preventive maintenance
- Step 4: Compare the two options and select the one which cost less

Solution (Cont…)

No. of Breakdown	Frequency
0	4/20 =0.2
1	8/20 = 0.4
2	6/20 = 0.3
3	2/20 = 0.1

Step 1:

Expected no. of breakdowns = ∑(No. of breakdown) x (frequency)

= (0)(0.2)+(1)(0.4)+(2)(0.3)+(3)(0.1)

= 1.3 breakdown per month

Solution (Cont…)

- Step 2: Calculate expected breakdown cost
- Expected breakdown cost = (expected no. of breakdown) x (cost per breakdown)

  = (1.3) x (300)

  = 390 per month
- Step 3: Calculate preventive Maintenance Cost

  = Cost of expected breakdown + cost of service contract

  = (1.3 breakdown per month x 300) + 200 per month

  = 590 per month
- Step 4: Compare

  Less expensive to suffer breakdown without service contract

  Breakdown = 390

  Service contract = 590

Need to consider

- Customer service
- Loss of production
- Loss of customer goodwill, reputation
- Machine life
- Availability of spare parts and expertise
- Safety to the user / customer
- Environmental problem (pollutant discharge etc)