



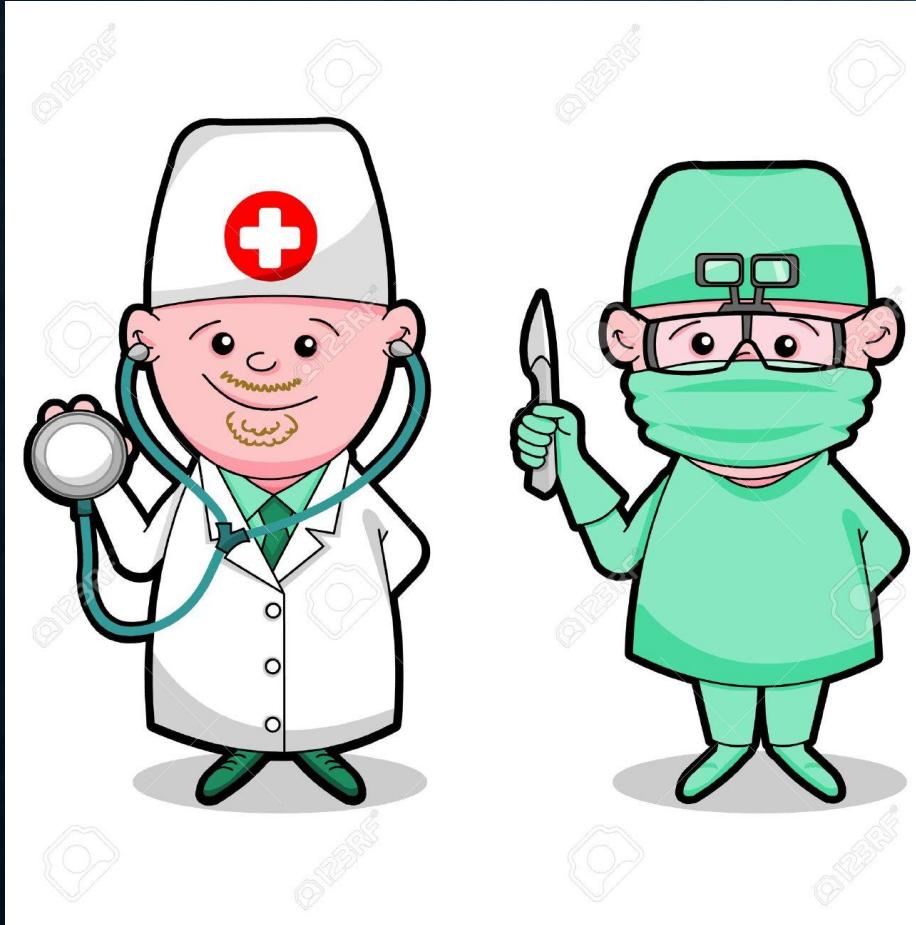
# **UNIT 7: PRODUCTION AND OPERATIONS**

If you can dream it, you can do it



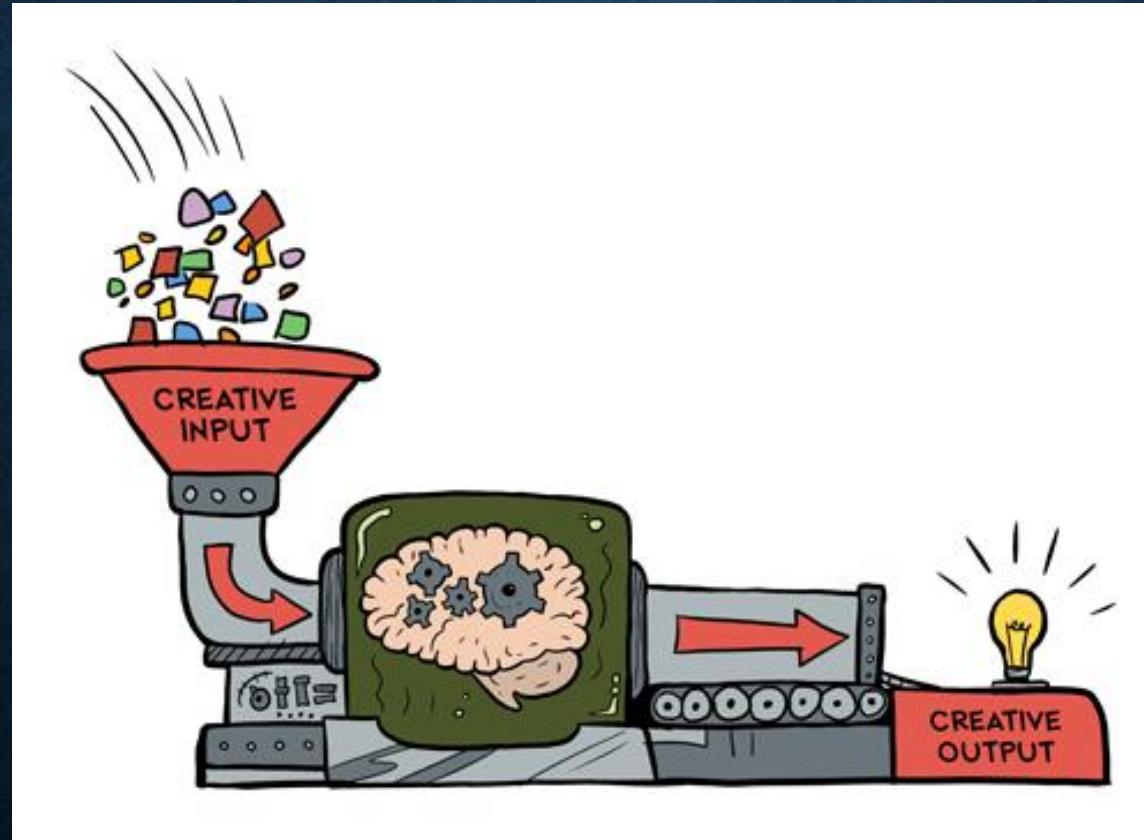
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# OPERATIONS?



# OPERATIONS

- The set of activities that **creates value** in the form of goods and services by **transforming** inputs into outputs.

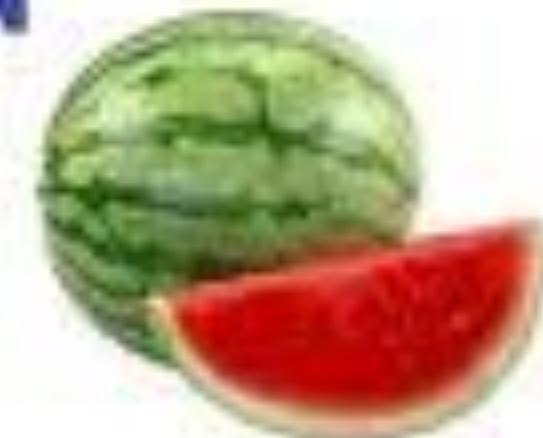




## BUSINESSMAN



₹50



₹75

VS



₹50



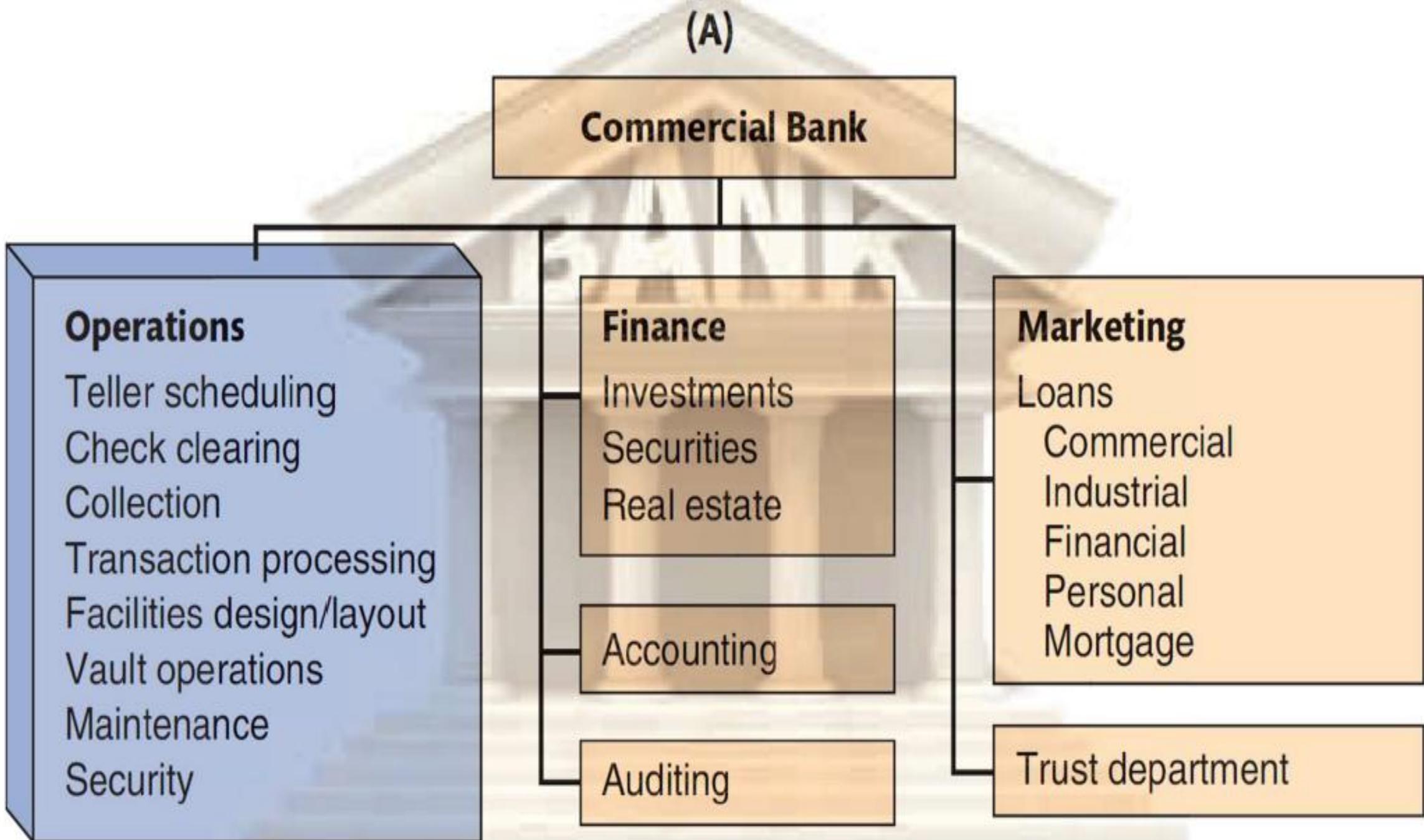
₹200

## ENTREPRENEUR

# OPERATIONS

- Most human resources and financial resources are invested on operations.
- Operations management is critical for any company's success.
- The role of operation management is to design, plan, direct and improve all activities involved in business' products or services.





## Airline

### Operations

Ground support equipment  
Maintenance  
Ground operations  
Facility maintenance  
Catering  
Flight operations  
Crew scheduling  
Flying  
Communications  
Dispatching  
Management science

### Finance/accounting

Accounting  
Accounts payable  
Accounts receivable  
General ledger  
Finance  
Cash control  
International exchange

### Marketing

Traffic administration  
Reservations  
Schedules  
Tariffs (pricing)  
Sales  
Advertising

## Manufacturing

### Operations

Facilities  
Construction; maintenance  
Production and inventory control  
Scheduling; materials control  
Quality assurance and control  
Supply-chain management  
Manufacturing  
Tooling; fabrication; assembly  
Design  
Product development and design  
Detailed product specifications  
Industrial engineering  
Efficient use of machines, space,  
and personnel  
Process analysis  
Development and installation of  
production tools and equipment

### Finance/accounting

Disbursements/credits  
Accounts receivable  
Accounts payable  
General ledger  
Funds management  
Money market  
International exchange  
Capital requirements  
Stock issue  
Bond issue and recall

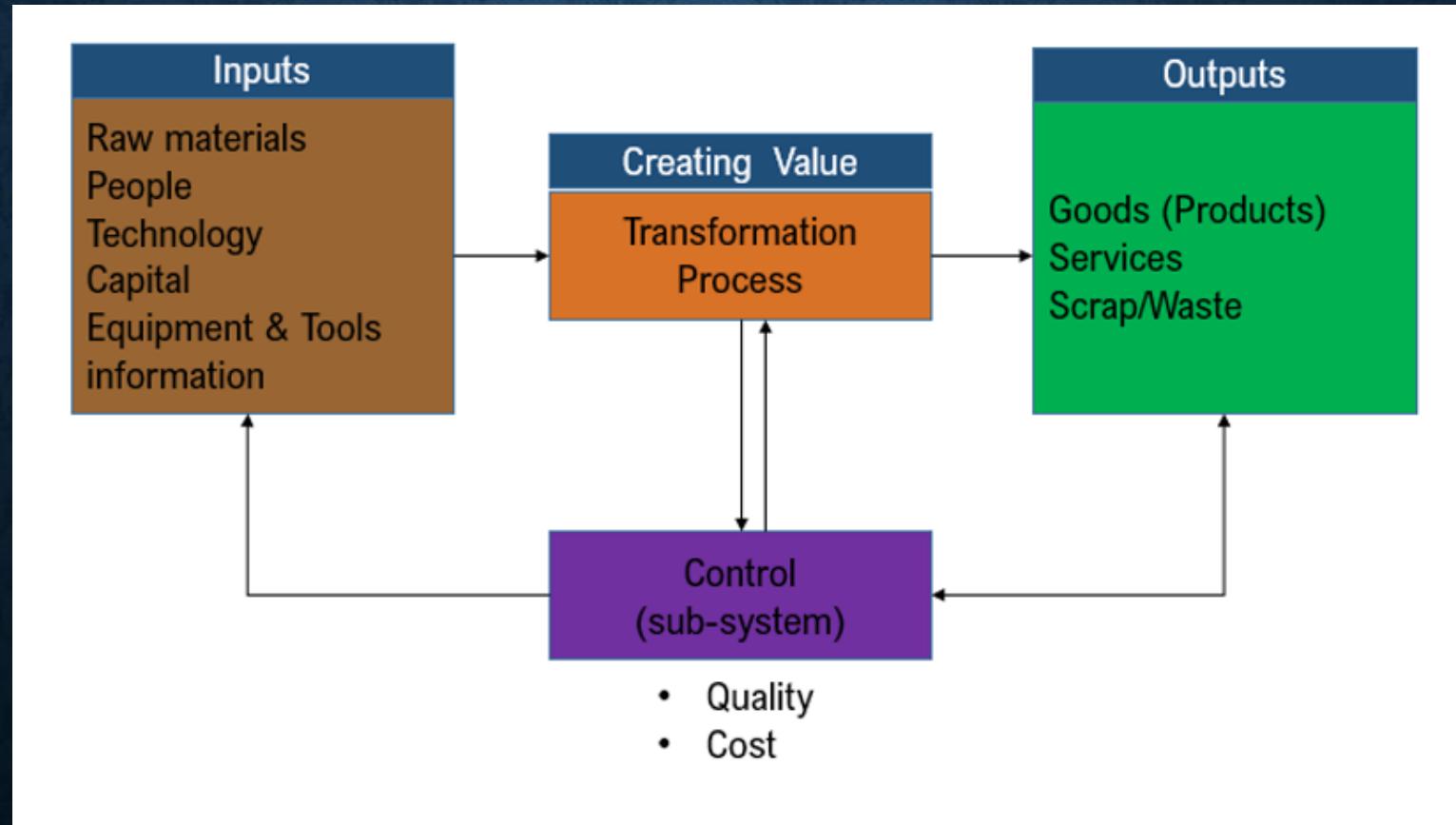
### Marketing

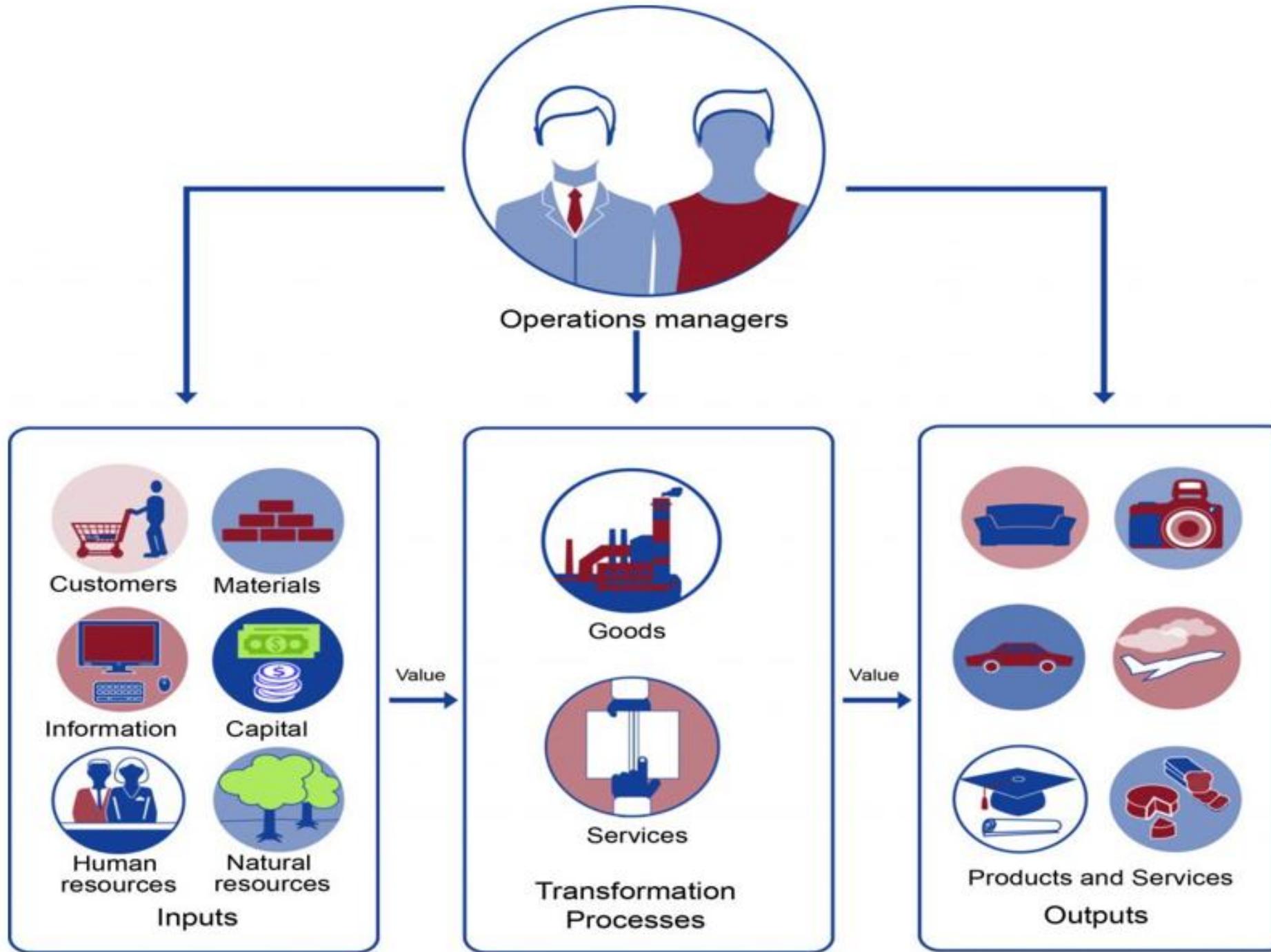
Sales promotion  
Advertising  
Sales  
Market research



# PRODUCTION SYSTEMS

- Production is the creation of goods and services
- A production system is a collection of people, equipment, and procedures organized to perform the manufacturing operations of a company.





# TRANSFORMATION PROCESS

- A series of activities along a value-chain extending from supplier to consumer.
  - **Superfluous** activities must be eliminated.
- **Value chain:** Set of activities that create and deliver products to customer.

# **TRANSFORMATION PROCESS**



→ Product flow (Order fulfilment)

← Information flow (Customer order)

# PRODUCTION DECISIONS

What to produce, how much,  
and when (**forecasting**)

How much can be produced  
(**capacity planning**)

How much do we have and  
how much do we need  
(**Inventory management**)

When to produce  
(**Production planning and  
scheduling**)

# **COMPONENTS OF PRODUCTION SYSTEM**

## **Facilities**

The factory and equipment and the way these are organized (plant layout).

## **Manufacturing support systems**

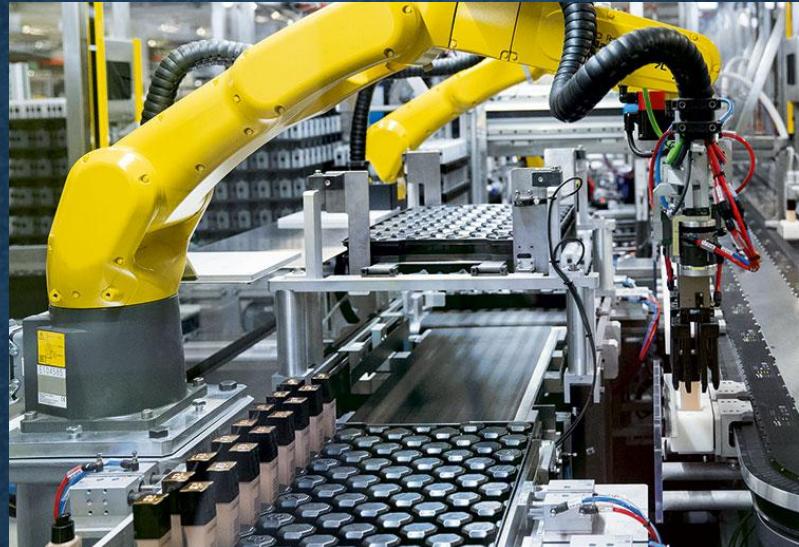
The set of procedures used by a firm to manage production and to solve technical and logistics problems in ordering materials, moving work through the factory, ensuring that products meet quality standards.

# FACILITIES

- Factory
- Production machines
- Tools
- Material handling equipment
- Inspection equipment
- Computer systems that control the manufacturing operations

For the facilities, plant layout (physical arrangement) is a significant factor for the production system to be efficient.

# FACILITIES

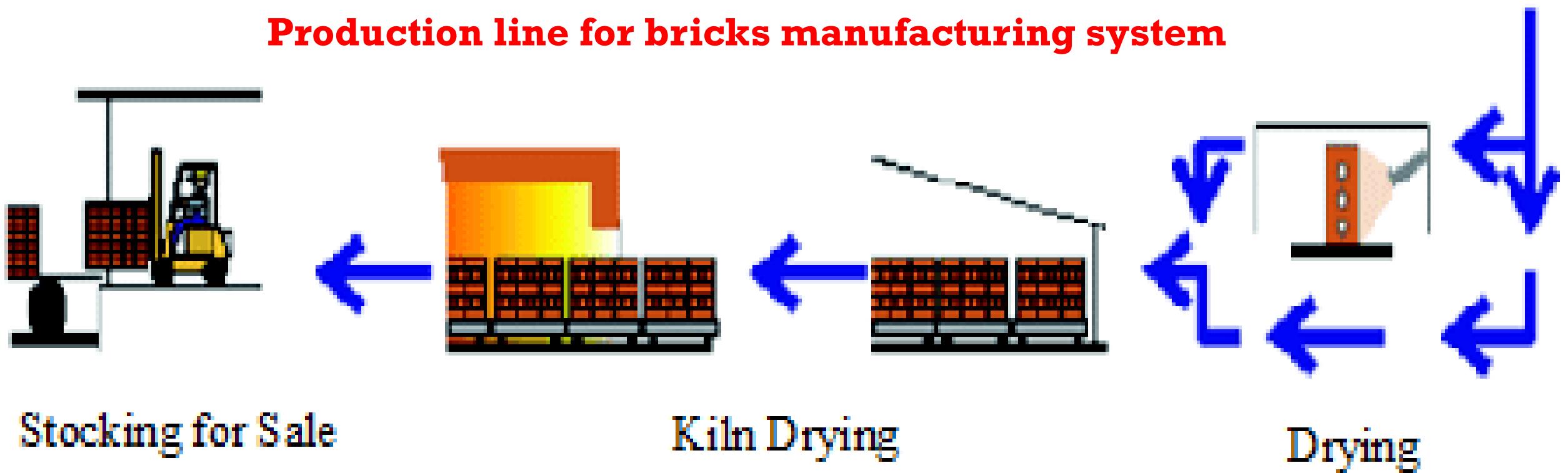


# MANUFACTURING SUPPORT SYSTEMS

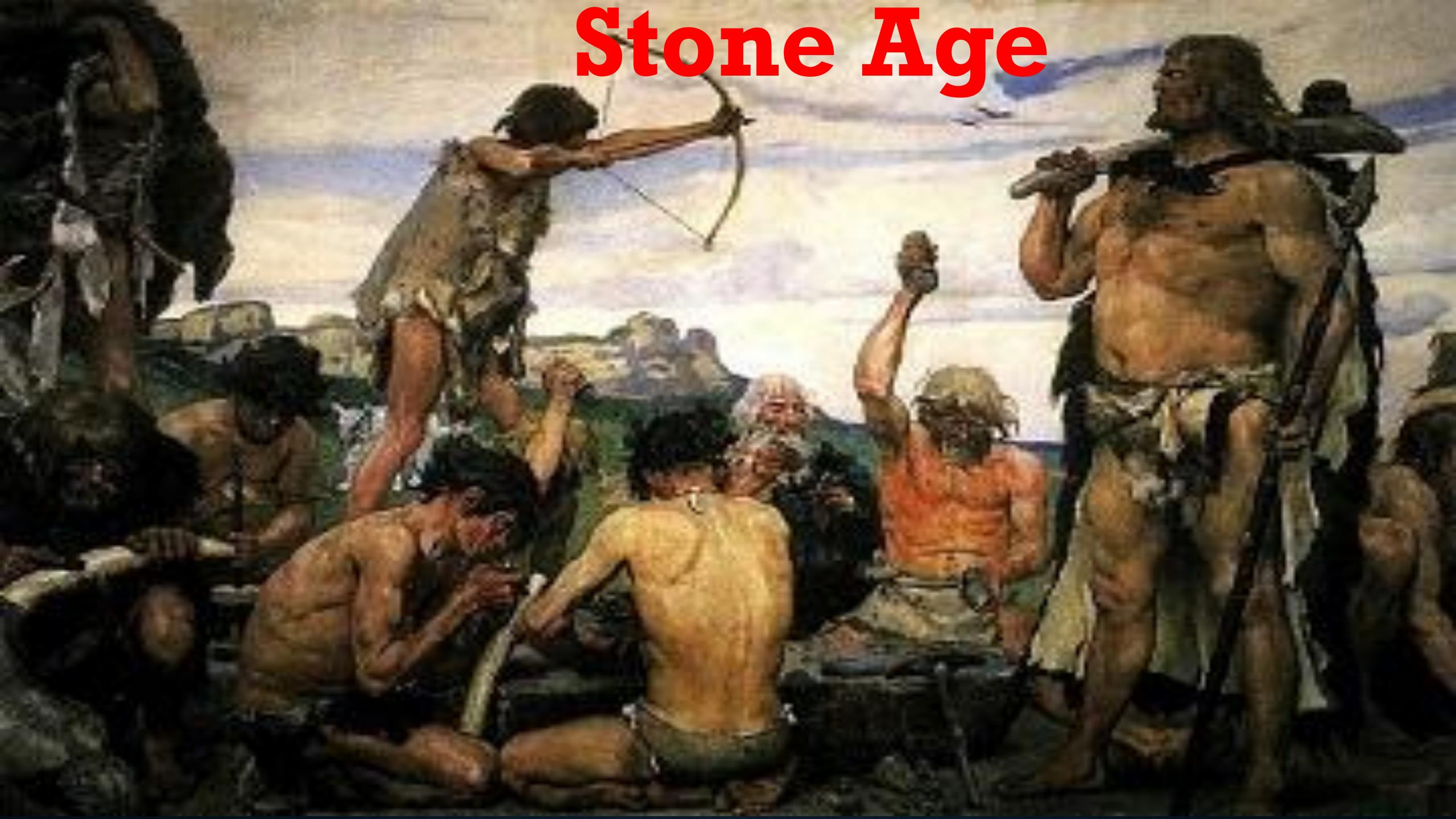
- The logical groupings of equipment and workers in the factory.
- A combination of a group of workers and machines termed as Production Line.
- Based on the human participation in the production processes, the manufacturing system can be classified:
  - I. Manual work system
  - II. Worker –Machine system
  - III. Automated system



### Production line for bricks manufacturing system



# Stone Age





# Early civilization

# Mechanized production





# Assembly lines and electricity

# IOT and Automation



# **Big Data and cloud computing**



# Industry 4.0

"a customer can have a car painted any color he wants as long as it's black"

Henry Ford

**1.0**



**MECHANISED  
PRODUCTION**  
Steam engines

**2.0**



**MASS PRODUCTION**  
Assembly lines and  
electricity

**3.0**



**AUTOMATION**  
IT and  
electronics

**4.0**



**CONNECTIVITY**  
'Smart'  
technologies;  
Cloud computing;  
Big data;  
Networked  
machines and  
processes

The stages of industrial development

Smart Factory  
Cyber-physical  
Self-organization



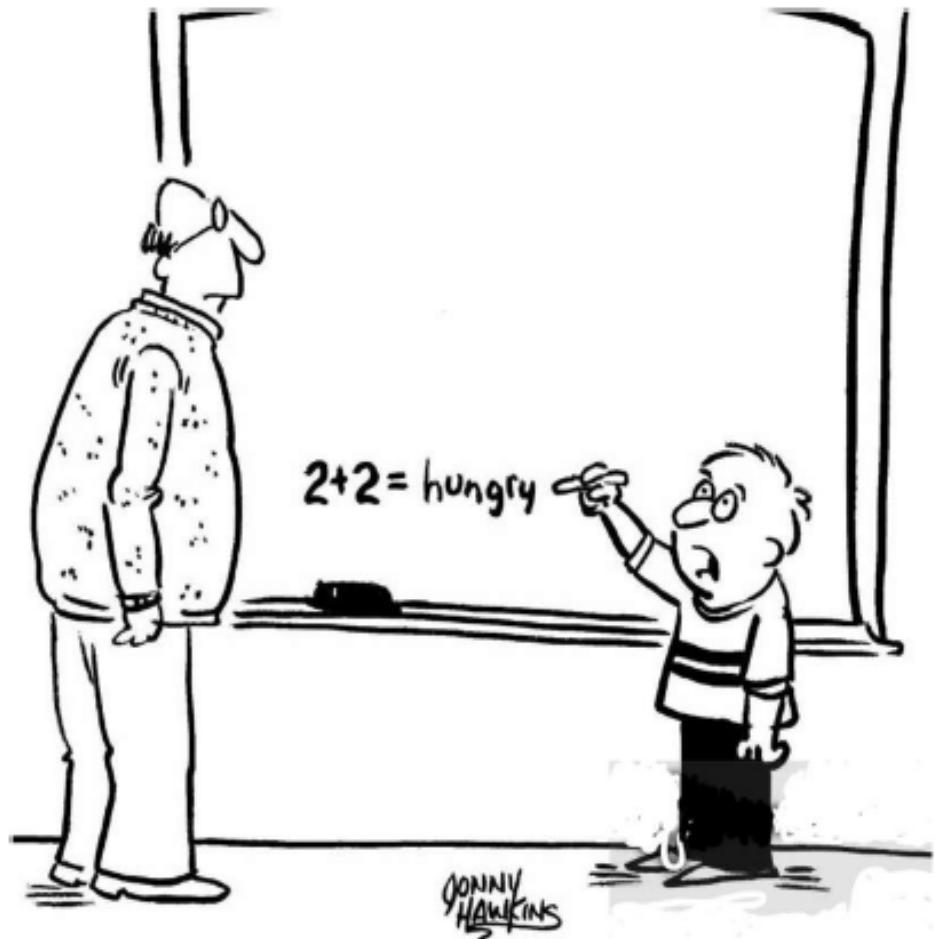
# **PRODUCTION PLANNING**

- It is a process of...
  - Deciding production goals,
  - Estimate needed resources for production,
  - Set action plan to integrate activities to achieve the production goal efficiently and on time.
- Can be done at three different time levels
  - Long-range planning
  - Medium-range planning
  - Short term planning

# **REASONS FOR PRODUCTION PLANNING**

To ensure right quantity and quality of raw material, equipment, etc. are available during times of production.

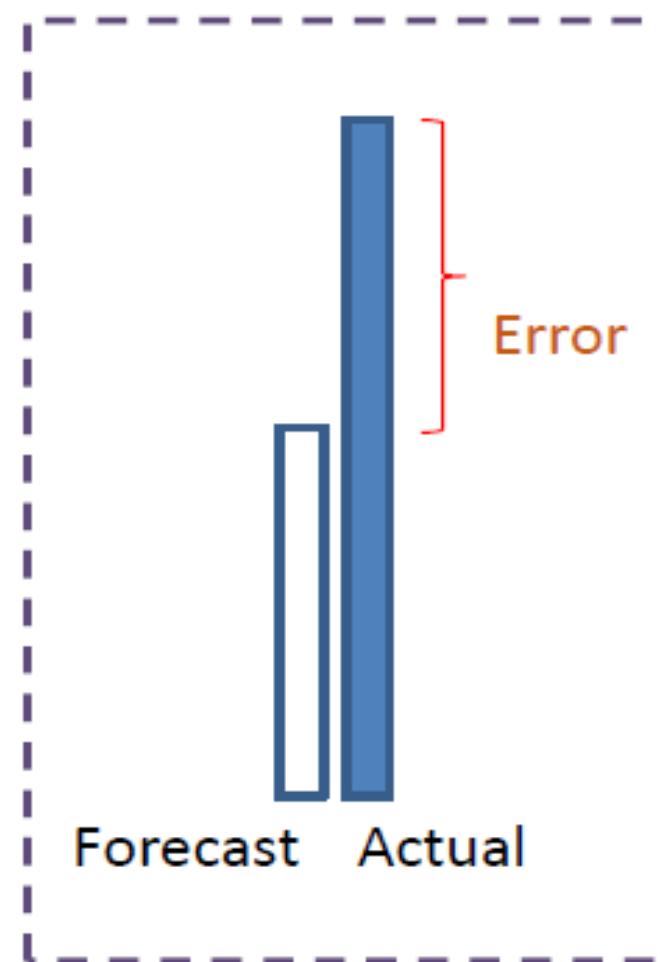
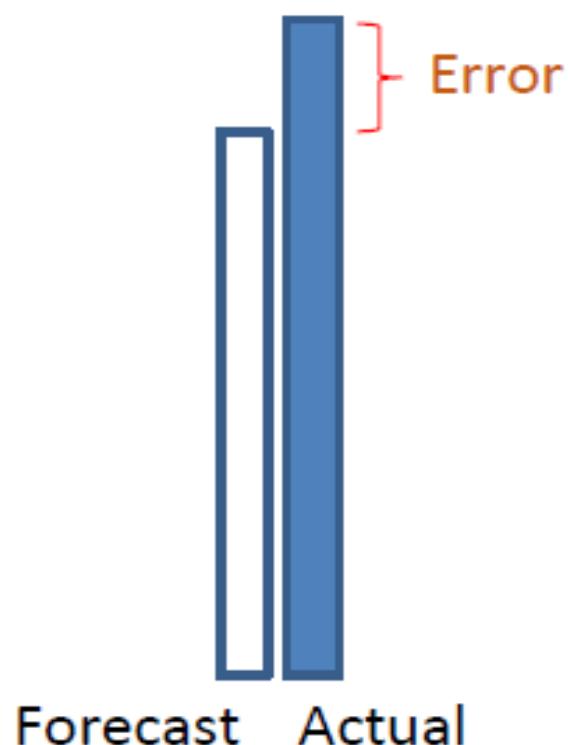
To ensure capacity utilization is in tune with forecasted demand at all the time.



**"I went with my gut feeling."**

**Can we rely on that 'gut feelings' to make the decision?**

Good forecast will reduce the chance of being wrong a lot



Good forecast will  
reduce the chance  
of this happening

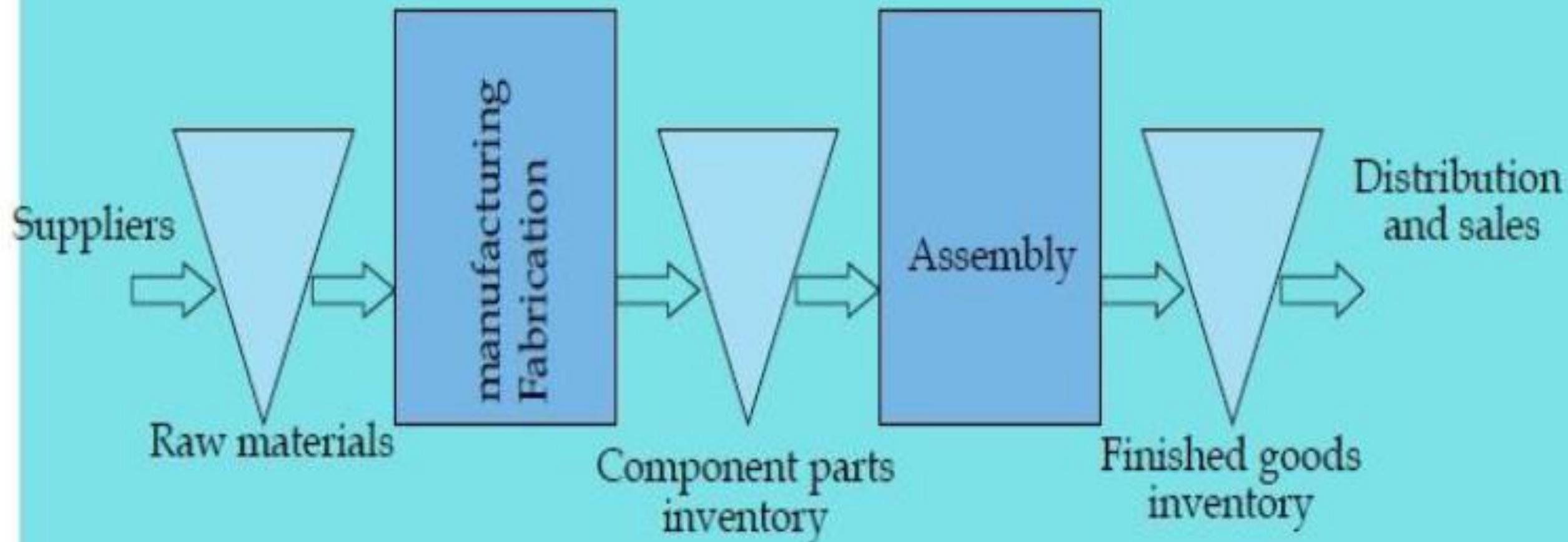
# PRODUCTION OPTIONS

- Determine the different production options available to meet the forecasted demand of your product or service. Different combinations of inputs can lead to different production times and costs.
- Human resources - Determine the number of staff needed for the production process, their availability, and the cost.
- Machinery and equipment - Identify the machines needed and their availability, including any maintenance or replacement that may be needed.

# PRODUCTION OPTIONS

- Materials – Prepare a list of all the materials needed for production and how you obtain them; consider the reliability of your suppliers, including delivery time.
- Inventory - keeping a large inventory is expensive, but keeping a low inventory is risky if demand fluctuates on a regular basis.

# ***PRODUCTION INVENTORY SYSTEM***



# MONITORING AND CONTROL

- Ensure that the plan is working in the way it is intended to work.
- Monitoring and controlling is about comparing what is happening with what should be happening.
- A control system helps you detect problems or deviations as soon as they occur so that you can correct it before it results into losses.

# PRODUCTION SCHEDULE

- Schedule is the process of arranging, controlling and optimizing work and workloads in a production line.
- Scheduling is used to allocate plant/machinery, human resources, and material resources in the production line.
- Create schedule of tasks and activities for a specific period.
- Consider resources such as materials and other resources needed for the production.
- Set a reasonable timeline to accomplish the schedule; be practical when setting the timeline.

# PRODUCTION SCHEDULE

## Timeline

# OPERATIONAL EFFICIENCY

Make your business  
leaner and profitable.

Eliminate waste and  
maximize value creation.

Have the right  
combination of people,  
processes and  
technology.

Prepare non-current assets requirement with their cost: What fixed assets do you require for the production facility? How much will they cost?

	Particular	Spec.	Quantity	Unit Price	Amount	Depreciation
1		---	--	---	---	---
2						
3						
4						

# Prepare raw material requirements with cost

	Particular	Spec.	Quantity	Unit Price	Amount/month	Amount/year
1		---	--	---	---	---
2						
3						
4						

# Direct labor and administrative requirements and cost (2 separate tables)

	Job Title	Qualification Experience	No. of	Salary/wage per month
1		---	--	---
2				
3				
4				

What are the estimated production quantities for the current year and next three years?  
State assumptions?

