Production Methods & Production planning and scheduling

production methods in business

Production Methods

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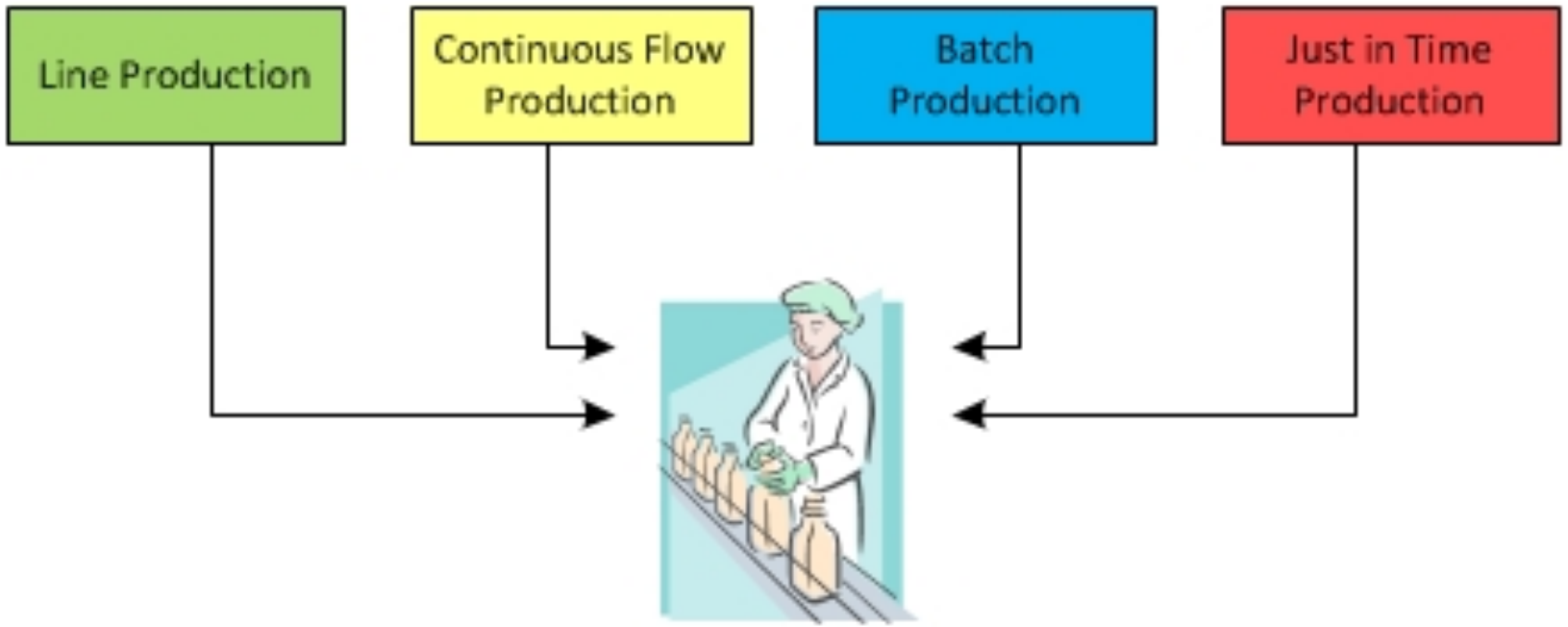

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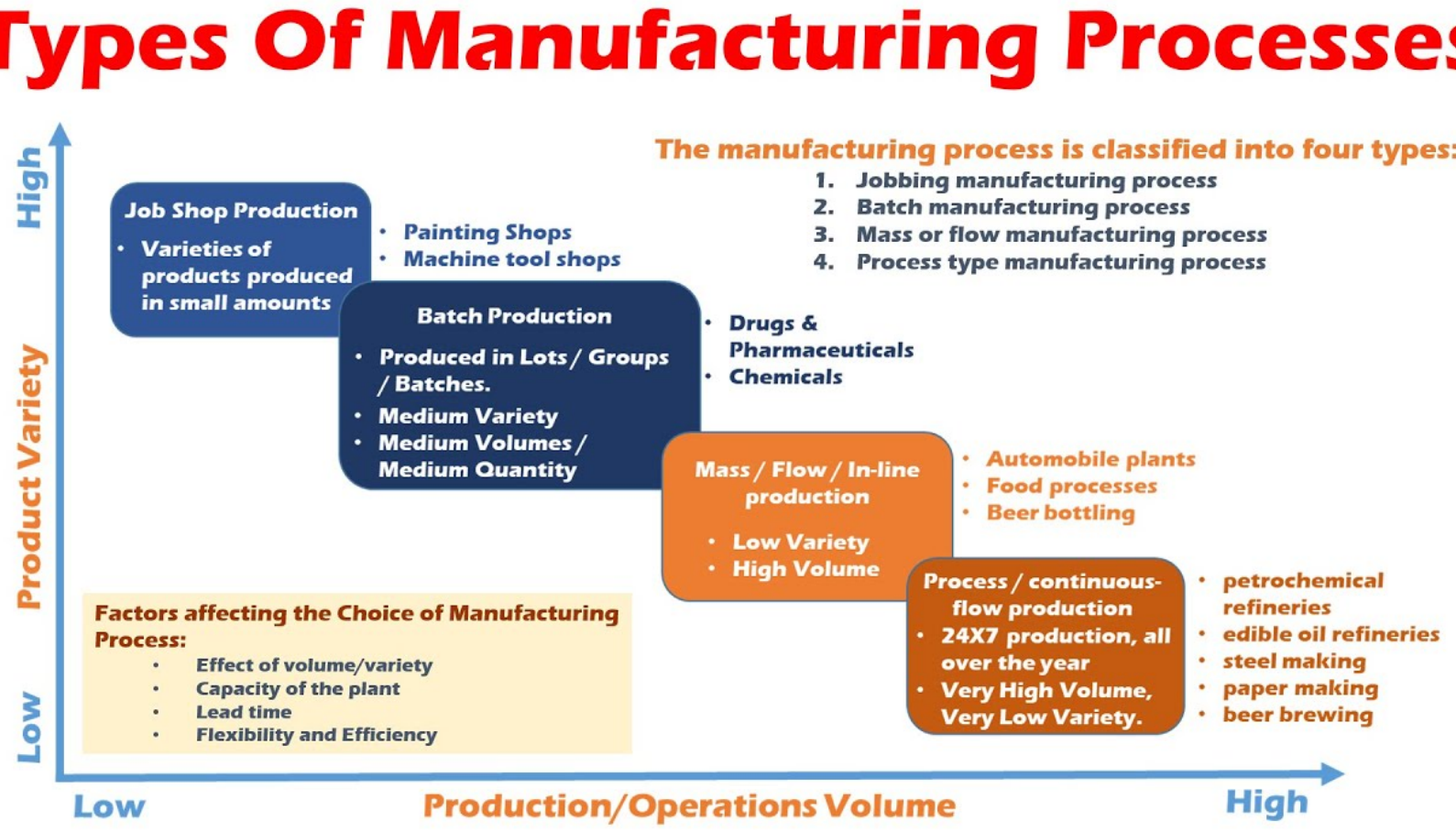


Method of Production

Type	Description	Example
Job	Production of special **one-off** products made to specific order.	Custom-made cars with individualized accessories.
Batch	Groups of a particular product made to order.	Car models with different features for each model.
Mass Flow Line	Standardized products made in large quantities, usually by assembly lines	Cars that are made to a standard design.
Cell	An adaption of mass production in which the flow is broken up by teams of workers who are responsible for certain parts of the line	Cars that are made to a standard design, but produced by a number of different cells.

Components of Production Methods

- **economic input or resources**
- **labor,**
- **capital equipment or land,**
- **To provide goods and services to consumers**

COMPARISON OF THE THREE PRODUCTION METHODS

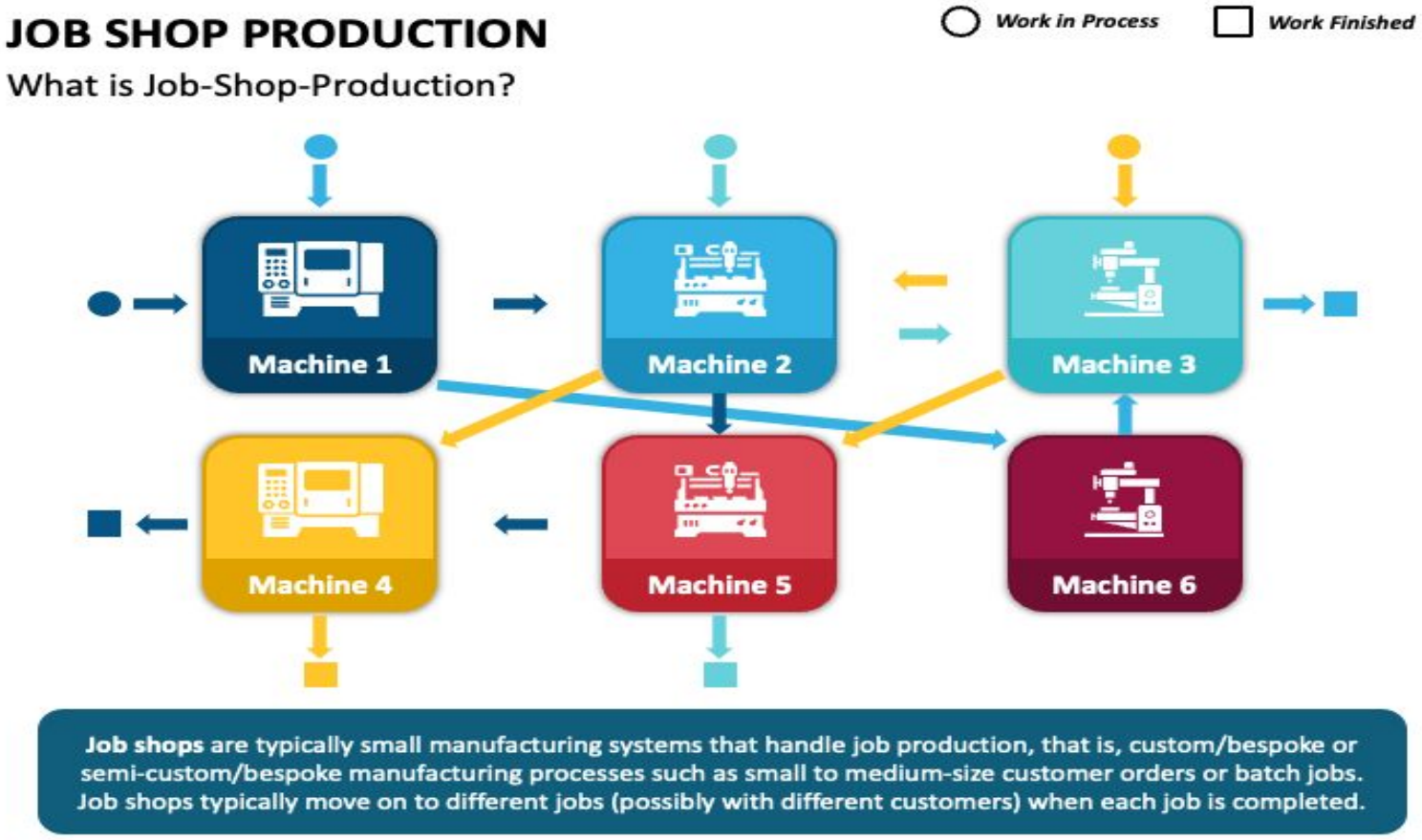
Criteria	Job Production	Batch Production	Mass Production
Set up time	Long set-up time as there is a new set up for every new job.	Can be reasonably fast as set up is usually a modification of an existing process. Otherwise as for mass production.	Very long set up as it takes time to synchronize the whole process.
Cost per unit	High	Medium	Low
Capital (machinery)	Can be flexible as it depends on specific use	A mixture of machines used, but this method is based on general purpose machines	Can involve large numbers of general purpose machines designed for a specific function
Labour	Highly skilled may be craft workers.	Semi-skilled and need to be flexible.	Unskilled & need medium training
Production time	Likely to be long	Once set up, production can be swift	Production is swift.
Stock	Low raw materials and finished stock, but high work in progress.	High raw materials-buffer stocks. Medium work in progress & finished stock	High raw materials & finished stock – low work in progress

Job Shop Production

The Job Shop Defined

- Job Shop
  - **An organization whose layout is process-oriented (vs. product-oriented) and that produces items in batches.**
  - **A functional organization whose departments or work center are organized around particular processes that consist of specific types of equipment and/or operations.**

Job shop Production



Job Production

- Designing and implementing an advertising campaign.
- Auditing the accounts of a large public limited company.
- Building a new factory.
- Installing machinery in a factory.
- Machining a batch of parts per a CAD drawing supplied by a customer.
- Building the Golden Gate bridge.

Job Production

JOB PRODUCTION

ADVANTAGES	DISADVANTAGES
Easy to organise staff	Production costs are likely to be high as there are fewer economies of scale
One-off orders can be easily accommodated	Production time longer as individual needs have to be met
Workers involved in entire production so they can see the end results	Capital investment is higher since specialist machinery may be required

Batch production

- Batch production is **a method of manufacturing where the products are made as specified groups or amounts, within a time frame**. A batch can go through a series of steps in a large manufacturing process to make the final desired product.

Batch Production Examples:

- Baked goods.
- Clothing.
- Computer chips.
- Computer software.
- Die- or mold-making.
- Electrical goods.
- Flat-pack furniture.
- Jet engine production.

Batch production

Batch Production

Advantages

- Workers may specialise to some degree
- Labour costs reduced so final price is lower
- Machinery may be used
- Production is faster
- Begins to take advantage of economies of scale

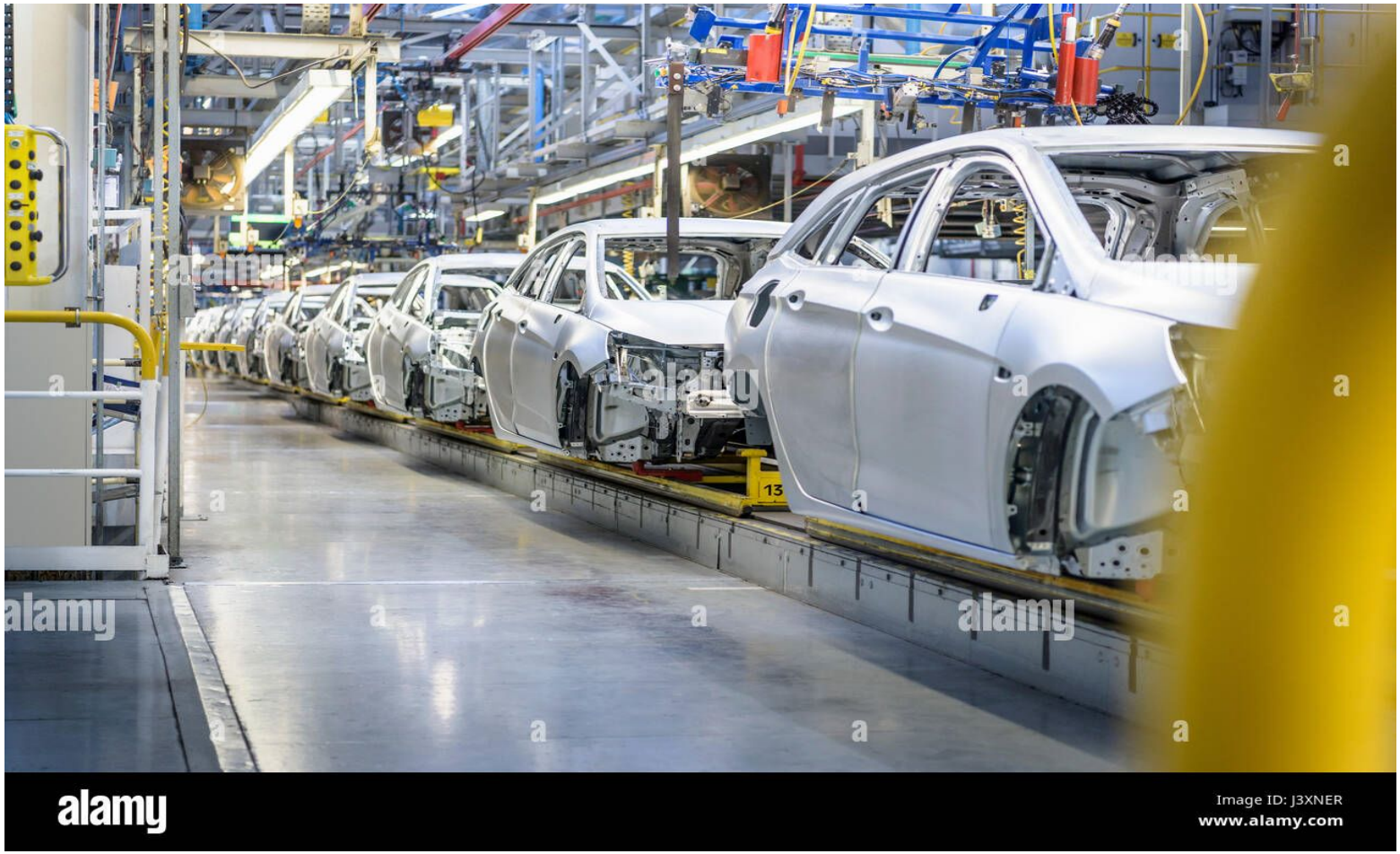
Disadvantages

- The work is less interesting and very repetitive
- More space is required for working and storage
- Larger stocks of raw materials must be kept
- Machines have to be re-set between batches, losing time

Mass production

- Mass production, also known as flow production or continuous production, is the production of substantial amounts of standardized products in a constant flow, including and especially on assembly lines. Together with job production and batch production, it is one of the three main production methods

Mass production



Mass Production

Mass Production

- **Disadvantages:**
  - Production halts if there is a problem.
  - Changing the line to making a different product or style can take a long time.

- **Advantages:**
  - Identical products made quickly
  - Reduction in costs
  - Interchangeable parts

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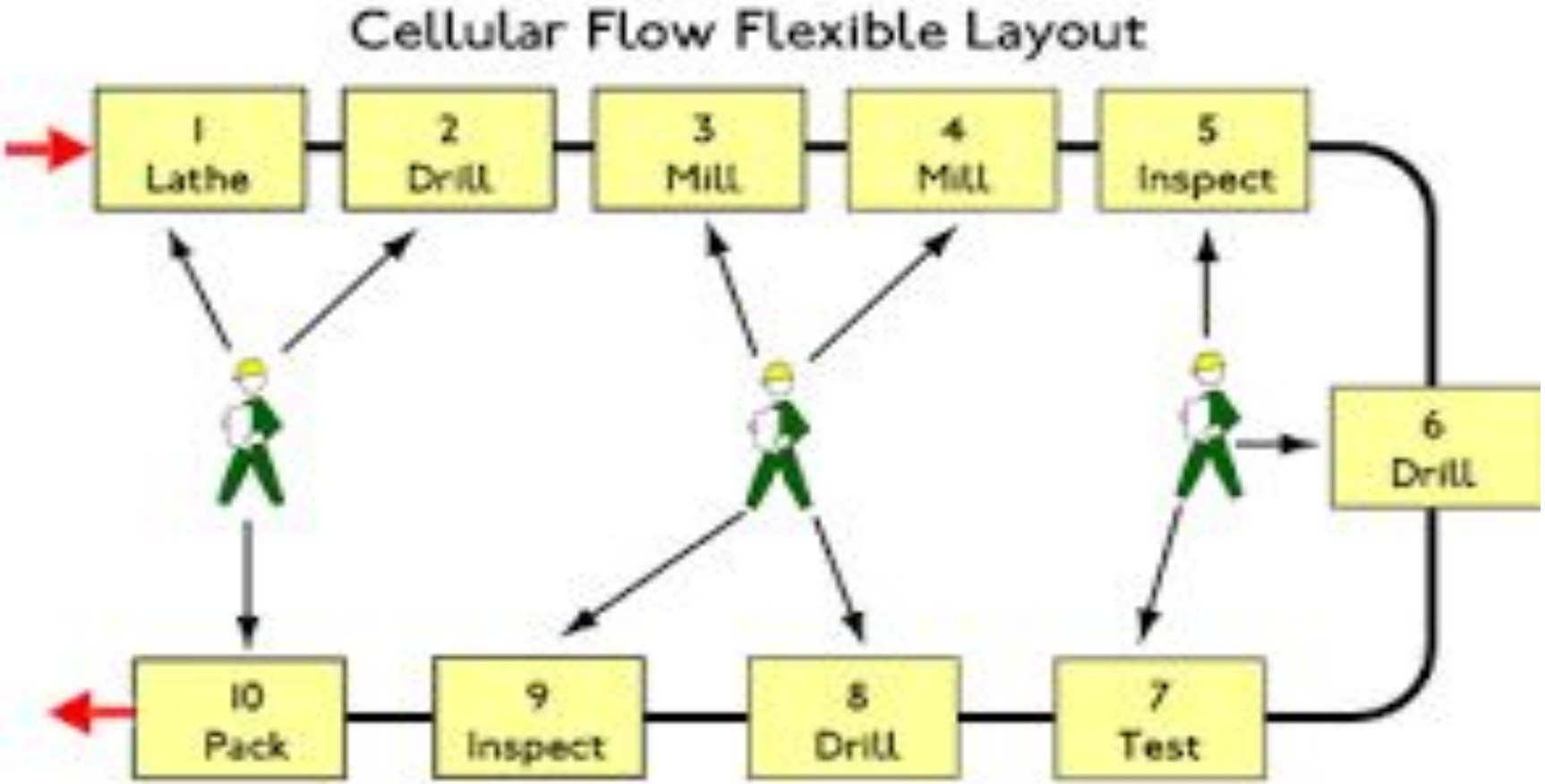
Cellular manufacturing

- Cellular manufacturing is a process of manufacturing which is a subsection of just-in-time manufacturing and lean manufacturing encompassing group technology. The goal of cellular manufacturing is to move as quickly as possible, make a wide variety of similar products, while making as little waste as possible

Cellular manufacturing



Production planning and scheduling

- Planning and scheduling is about finding the answers to 10 questions:
- **What**, **how many** and **where**…
- would you like to **sell**, **make** and **buy**?
- If you distribute products across multiple depots,

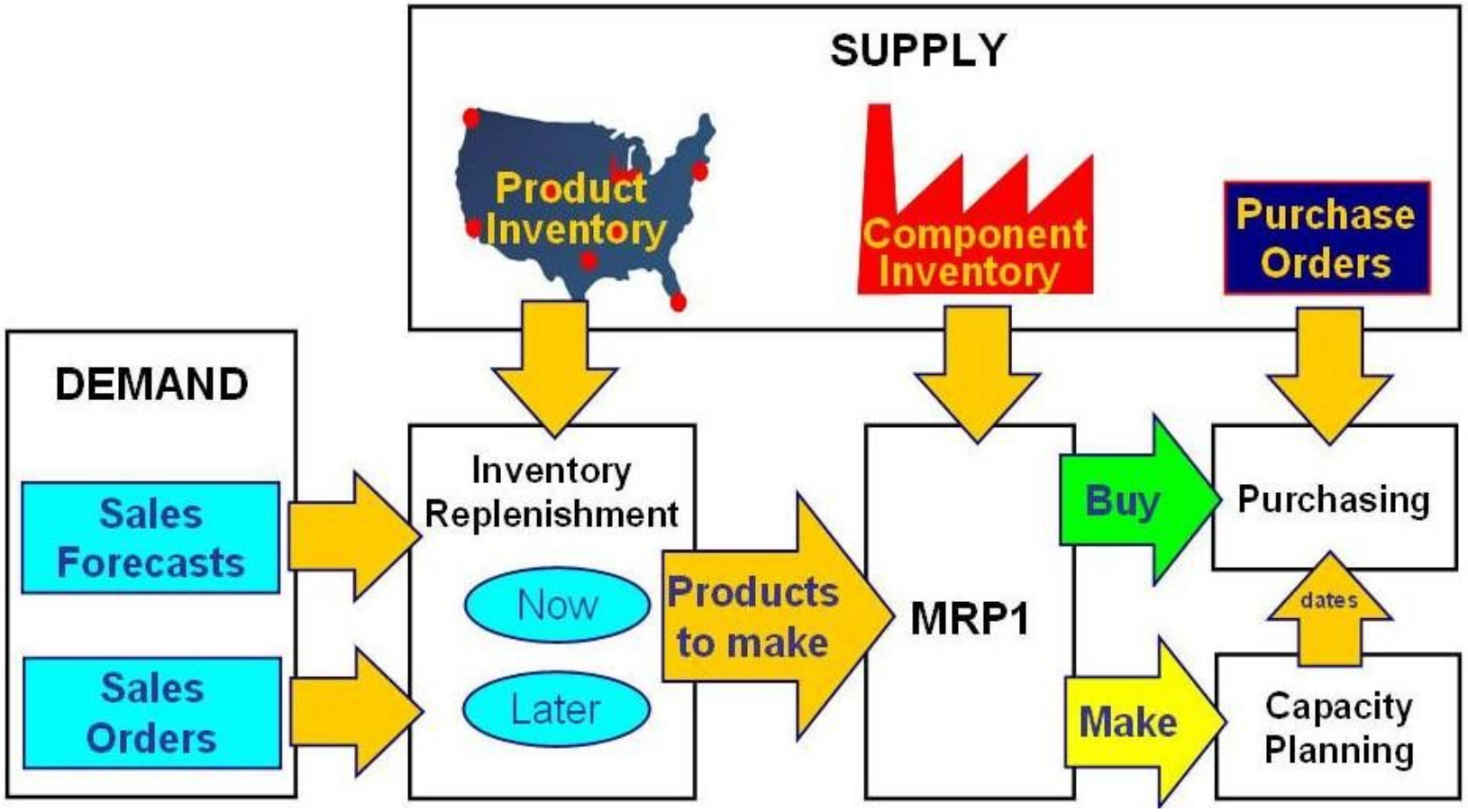
there is a 10th question
– **where** to send product to?

	What	How many	When	Where
Buy	?	?	?	
Make	?	?	?	
Send	?	?	?	?

Production Scheduling

- Scheduling is the process of arranging, controlling and optimizing work and workloads in a production process or manufacturing process.
- Scheduling is used to allocate plant and machinery resources, plan human resources, plan production processes and purchase materials.

Production Scheduling



Planning Data Flow

- **Planning Data Flow**
- The physical movement of material through a factory is buy, make, sell. With production planning, you work in the opposite direction to the material flow. First you plan what you are going to sell, then what you are going to make, and that determines what you are going to buy. All the time you consider the inventory buffers that you want to keep in between.

Integrated Planning

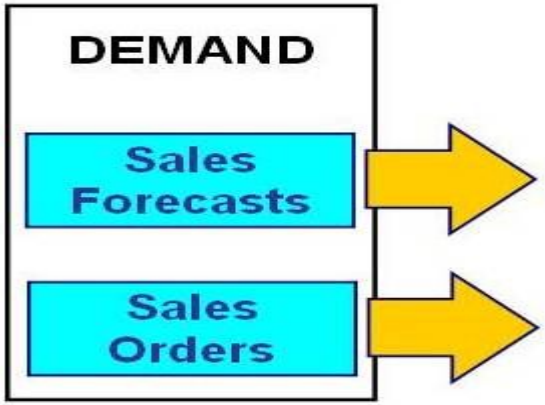
- **Integrated Planning**
- Integrated planning involves the balancing of supply and demand to answer the 10 questions. If you are just a buy/sell company, it is quite simple, but for a manufacturer, it is more complex.

Demand Management

- **Make-to-Order** companies typically do not use sales forecast for production.
- **Make-to-Stock** companies do not use sales orders to raise work orders.
- **Configure-to-Order** companies will forecast sales of the “base” product
- **Outstanding Sales Orders** – are maintained in your ERP system.

sales Forecasts

- **sales Forecasts** – are often maintained outside the Enterprise Resource Planning software system. Companies with established products, use sales history as the basis for the forecast. **Forecast Accuracy** – forecasts can never be 100% accurate,, but better accuracy, or “demand predictability”, improves your ability to deliver high service levels with low inventory.



Inventory Replenishment

- **Inventory Replenishment**
- Inventory holding policy is expressed in days or weeks of cover. The policy is influenced by:
- Demand predictability
- How quickly manufacturing can respond
- Supply lead time
- Supplier reliability

Rough-Cut Capacity Plan

- A **Rough-Cut Capacity Plan** – assesses whether there is approximately enough capacity to manufacture what is needed, and gives an indication of how lumpy the demand on manufacturing is.
- The list of components to make, is combined with the Routings to calculate *the number of hours required at each work centre. This is then compared with the hours available*. In this example, if we did some of November's work in October, we should be able to make everything that we need.

Production Scheduling