





<u>Layout Choice</u>	<u>Manufacturing</u>	<u>Service</u>
 <p>1. Fixed Position Operators move to product / product does not move / can be more than one operation at the same time / each operation adds until job is done</p>	<i>Ship and aircraft building, construction</i>	<i>Surgeries, e.g., dentist</i>
 <p>2. Process Layout Product or client moves to groups of machines or services / not in a sequence but done in a process reqts / poised to do many different specialist things as and when required</p>	<i>Customisation and craft type products, low volume furniture, jewellery</i>	<i>Hairdressing, department store, hospital</i>
 <p>3. Hybrid Cell Processes in a <i>product family</i> layout / very flexible / easy to configure / Mass Customisation / agile / lean / strategic manufacturing / machines are not dedicated to any one product but provide elements of several</p>	<i>High tech manufacturing: PCs</i>	<i>Call centres and finance sectors</i>
 <p>4. Product Layout Dedicated to a product and procedural sequence <i>mass production - high volume, low variety</i>. Product moves through a sequence of dedicated machines or processes. Economy of Scale possible</p>	<i>Motor Vehicles, commodities, high volume furniture</i>	<i>Fast food delivery in house, airport check in.</i>

<u>Process</u>	<u>Characteristics</u>	<u>Layout</u>
Project	Large scale (fixed) and complex / unique / phased programme dominated by time and scheduling - start and end clear / no repetition / perception of customisation / may go over budget. <i>EG aircraft production . . . dentist / lawyer</i>	Fixed
Job	One off but mobile – prototypes / use general purpose machinery / high variety and low volume / perception of customisation Process Layout – many different products move during process through general purpose machines rather than product specific. Sequencing and skilled personnel but . . . <u>Problem:</u> As volumes increase, there is often a push for improved efficiency; the focus is on the process not the job and customer, resulting in a move from a Job approach towards a Batch one, with a consequent loss of uniqueness. Must remember uniqueness, despite perceived similarities - stay fresh in approach. <i>EG garage . . . service shop</i>	Process
Batch	A muddled approach, with different layout depending on volume / variety; <i>low volume~high variety = process layout, high volume~low variety = product layout</i> There will be a dominant process, but need to keep approaches separate or suffer complexities of scheduling. Example: <i>bread production</i> . Local corner-shop will use a process layout; a major manufacturer will use a process one. Processes using moulds are batch process. <i>Call centres</i> are batch processes. Flexibility crucial, firms must be prepared to change layout to suit, with short set up times. Need multi-skilling.	Process or Product
Line	Very high volume / low variety (standardised) using a product layout / each stage different from preceding one / value & cost added at each stage / process can be stopped / avoid stock out, but minimise inventory and WiP. <i>MRP and JIT</i> . Dedicated plant so variety increases complexity and required adaptation of technology. Fast process times, simplification to minimise costs, short transit between stations. Use mini-lines or U shape so that the workers understand the full process & see end product; improves quality, communication, ownership, team work. Overall: lack of flexibility, high investment in specialist technology. <i>EG airports . . fast food</i>	Product
Continuous	One product / very high volume / continuous by necessity / 24x7x365 / very similar to a line process but not designed to be stopped and expensive if stopped / “product” is everywhere all of the time. High investment in dedicated plant, dedicated to one product. <i>EG oil industry / steel . . . security guards / ISP</i>	Product

	The firm sells wide variety of products / designs. Perception of customerisation / order sizes small / new products required on an on-going basis / sells on Design & Innovation	Very middle ground / map products according to job (low volume) or line (high volume) / focus plant to support these cells	Firm sells narrow range of standard products but high volume / new product introduction takes longer since plant is dedicated around specific products		
	Project	Job	Batch	Line	Continuous
Dominant Technology	Labour				Plant
Variety	General	Universal	Dedicated	Very dedicated	
Volume	High	Low	High	Low	
Flexibility	High	Low	High	Low	

Strategic Importance

Process Choice . . . is the way technology transforms inputs into products within the plant; always a STRATEGIC DECISION – because no amount of reactive or tactical measures can compensate retrospectively for inappropriate investment decisions in process which do not match the requirements of the market. IE don't go into markets that do not 'FIT' with process (& those that it cannot compete !).

- Choice of process will dictate what the company *can and cannot* do. If using a Process layout and Job or Project Process to generate high variety, low volume products, it will not be possible to produce high volumes without changing layout and process choice. Equally true for a product layout for line process, trying to produce high variety.
- Firms often start with the right process choice and layout but then grow and fail to change process and layout to reflect operational requirement of growth, e.g., move from Job to Line layout, despite moving to high volume. Good firms are able to change layout quickly as required.
- Services are dominantly a 'process' but usually include other types of process in their service provided. A bank is a job layout upfront but the back office will have batch and line processes

Order-winning / Order Qualifying (Hill)

- Order qualifying in order to be able **to compete** in the market place.
- Order winning in order **to win** in the market place.
- Also pre-qualifying criteria, such as reputation (Brand), know how, expertise (particularly for Jobs and Projects).
- Different customers will have different attributes for the same product – flight simulators. Order winning become order qualifying *over time*. Must NOT see order qualifying as inferior ~ fundamental !
- Also *pre-qualifying criteria* (intangibles), reputation, brand, know how, expertise ~ hence, process choice and layout dictate basis of competition and customers ie McDonald vs. restaurant.

Process Choice	Type of Layout	Order Qualify	Order Win
Project	Fixed	Price	Design, quality delivery
Job	Process		
Batch	Hybrid	Design, quality delivery	Price
Line	Product		
Continuous	Product		

Flexible Manufacturing System FMS

- Porter said 'to make profit, need low cost or differentiation' . . . but now FLEXIBILITY is a consideration
- Requirement for High Volume / High Variety ~ very customer driven & can be applied to high/low volume Batch
- Technological advances allow competitive options . . . and Economies of SCOPE

Service Categorisation

Schmenner (1986) - categorisation in terms of degree of labour intensity / level of customer interaction and customisation:

		Customer interaction and customisation	
		High	Low
Labour intensity	High	Professional Service Doctors, lawyers, Investment Bankers	Mass Service Retailing, wholesaling, schools, dry cleaners, film developers
	Low	Service Shop Hospitals, auto-repair, upmarket restaurants, copy shop, dentists	Service Factory Airlines, hotels, trucking, fast food, amusement parks