Operations management

IB DP Business Management Unit 5 Operations management full package

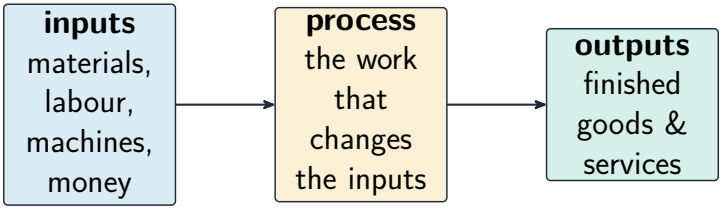
Operations management

- explain the role of operations and **value added**, and compare job, batch, **mass production** and **mass customisation**;
- analyse the factors that decide where a business locates, including outsourcing and reshoring;
- calculate contribution, break-even output, the margin of safety, target output and target price;
- at HL, explain lean production and quality management, plan stock and capacity, and evaluate crisis management, R&D and information systems.

The role of operations and operations methods

- **Operations management** is the part of a business that makes its goods or provides its services.
- It turns **inputs** (labour, materials, machines, money and information) into **outputs** that are worth more than the **inputs**.
- The extra value is **value added** .
- *Inputs are transformed into **outputs** worth more than the inputs: **value added***

Figure: The role of operations and operations methods



the output is worth more than the inputs $\Rightarrow$ value added

- **Inputs** (materials, labour, machines, money) flow into a process and out as **outputs** (finished goods and services)
- Match each part of the diagram to the text.

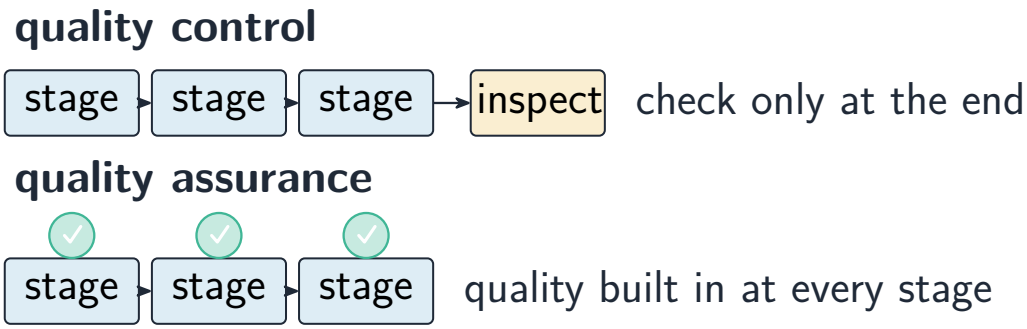
Lean production and quality management (HL)

- **kaizen** : continuous improvement in many small steps. Every worker suggests better ways of doing the job.
- **just-in-time** (JIT): parts arrive just when they are needed, so almost no stock is held.
- **kanban** : a card or signal that tells the earlier stage to send more parts. When a box of brake pads is empty, its card goes back to the store and a new box comes.

Lean production and quality management (HL) (2)

- **andon** : a signal, often a light or a cord, that any worker can use to stop the line when there is a problem, so faults are fixed at once.
- **Quality control** checks the finished product and rejects faulty ones. It finds faults after they happen, so the work is wasted.
- **Quality assurance** builds **quality** into every stage, so faults do not happen in the first place. It is usually cheaper in the long run.

Figure: Lean production and quality management (HL)



- **Quality control** checks at the end; **quality assurance** builds **quality** into every stage
- Match each part of the diagram to the text.

Location

- costs: land, rent, wages and transport;
- the labour available and its skills;
- nearness to customers (most important for services, such as repairs) and to suppliers (important for heavy materials);

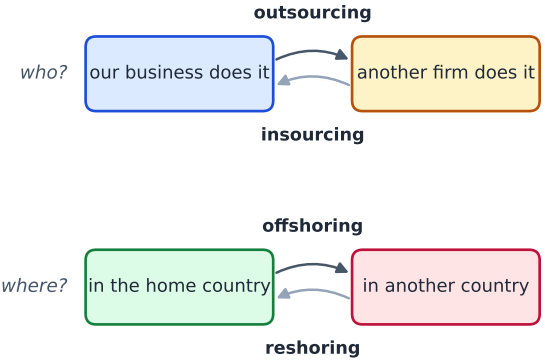
Location (2)

- infrastructure: roads, ports, power and internet;
- government: taxes, grants, rules and political stability;
- culture and language, for a business moving abroad.

Location (3)

- **Outsourcing** (subcontracting) gives a task to another firm, such as the repair business paying a firm to run its booking app. It is often cheaper and uses the other firm's skills, but the business loses some **control** over **quality**.
- **Offshoring** moves work to another country, for lower costs or to be near new markets.
- **Insourcing** brings an outsourced task back inside the business, usually for better control or quality.
- **Reshoring** brings work back to the home country, often after supply problems abroad.

Figure: Location



- Who does the work: **outsourcing** and **insourcing**.
- Where it is done: **offshoring** and reshoring.

Break-even analysis

- target output $= \dfrac{\text{fixed costs} + \text{target profit}}{\text{contribution per unit}}$. For a profit of 15,000: $(12{,}500 + 15{,}000) \div 10 = 2{,}750$ repairs.
- target price $= \dfrac{\text{fixed costs} + \text{target profit}}{\text{output}} + \text{variable cost per unit}$. For a profit of 10,000 at 2,000 repairs: $(12{,}500 + 10{,}000) \div 2{,}000 + 15 = 26.25$.

$$\text{contribution per unit} = 25 - 15 = 10$$

Production planning (HL)

- **Reorder level** = **buffer stock** + usage × **lead time**
  $= 200 + 500 \times 2 = 1{,}200$. When stock falls to 1,200, the business orders more.
- **Reorder quantity** = the amount ordered each time, here 2,000.
- Maximum stock = buffer stock + **reorder quantity** $= 2{,}200$.

$$\text{capacity utilisation rate} = \frac{\text{actual output}}{\text{productive capacity}} \times 100 = \frac{2{,}000}{2{,}500} \times 100 = 80\%$$

Production planning (HL) (2)

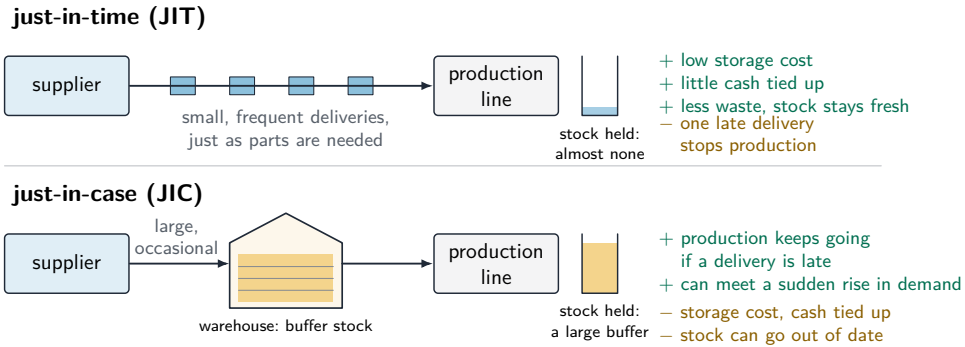
- **Labour productivity** = total output ÷ total hours worked. The mechanics work 4,000 hours a month, so $2{,}000 \div 4{,}000 = 0.5$ repairs per hour.
- **Capital productivity** = total output ÷ capital input. With 20 car lifts, $2{,}000 \div 20 = 100$ repairs per lift a month.
- **Productivity rate** = output ÷ input × 100, used to compare one period with another.

$$\text{defect rate} = \frac{\text{defective units}}{\text{total output}} \times 100 = \frac{50}{2{,}000} \times 100 = 2.5\%$$

Production planning (HL) (3)

- **Cost to buy** (CTB) $=$ price $\times$ quantity $= 9 \times 6{,}000 = 54{,}000$.
- **Cost to make** (CTM) $=$ fixed costs $+$ variable cost per unit $\times$ quantity $= 20{,}000 + 5 \times 6{,}000 = 50{,}000$.

Figure: Production planning (HL)

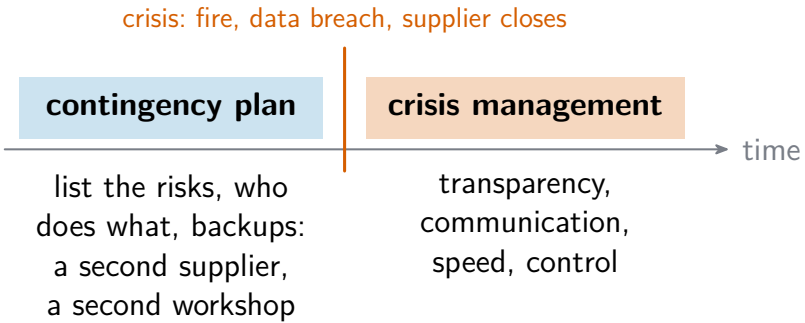


- JIT: small, frequent deliveries and almost no stock.
- JIC: large deliveries and a **buffer stock**.

Crisis management, R&D and information systems (HL)

- **transparency** : telling the truth about what happened;
- **communication** : keeping staff, customers, the media and the government informed;
- **speed** : acting quickly before rumours spread;
- **control** : a clear leader and a clear plan.

Figure: Crisis management, R&D and information systems (HL)



- Plan before; manage during.
- Match each part of the diagram to the text.

Sources for this lesson

- International Baccalaureate, *Business Management guide* (first assessment 2024).
- Toyota Motor Corporation, reports on the 2011 Great East Japan Earthquake and its supply-chain recovery; Reuters reporting on Toyota's chip stocks (2021).
- T. Ohno, *Toyota Production System: Beyond Large-Scale Production* (1988).
- International Organization for Standardization, ISO 9001:2015 ***Quality** management systems*.

Common errors

- Writing "**break-even** is where the business makes a profit"; at break-even, total revenue equals total costs and profit is zero.
- Using price instead of **contribution** in the break-even formula: divide fixed costs by contribution per unit (price minus variable cost).
- Rounding break-even output down; 1,291.7 repairs means 1,292 are needed to cover all costs.

Common errors (2)

- Confusing the **margin of safety** (actual output minus **break-even** output) with profit.
- Choosing a location on cost alone; markets, labour skills, infrastructure, government rules and **quality** of life all count.
- Treating outsourcing and offshoring as the same thing: outsourcing uses another firm; offshoring moves work abroad, inside or outside the firm.

Key terms

- **Value added**: the difference between the price of a product and the cost of the **inputs** bought to make it.
- **Batch production**: making a set number of identical products before switching to a different product.
- **Mass customisation**: making large numbers of products that can each be changed to suit one customer.

Key terms (2)

- **Contribution per unit**: price minus variable cost per unit; the amount each sale adds towards fixed costs and then profit.
- **Break-even output**: the output at which total revenue equals total costs.
- **Margin of safety**: actual output minus **break-even** output.

Key terms (3)

- **Offshoring**: moving part of the production process to another country.
- **Just-in-time (JIT)**: a stock system in which materials arrive only when they are needed, so the business holds very little stock.

Check yourself

- 1.
- A repair sells for 25 and uses 15 of parts and direct labour.
- Calculate the **contribution** per repair and the **break-even** output if fixed costs are 12,500 a month. 2.
- The business does 2,000 repairs a month.