Operations management

IB DP Business Management Unit 5 Operations management full package

When Toyota ran out of parts

> How a business makes things is a set of choices.

- March 2011: an earthquake and tsunami stopped many of Toyota's suppliers.
- Toyota held very little stock, so factories in Japan and abroad soon had no parts.
- It kept its low-stock system and mapped every supplier behind its suppliers.

Inputs become outputs

> **Value added**: **outputs** worth more than **inputs**.

- Operations turns inputs into outputs worth more than the inputs.
- The extra value is value added.
- Operations links to marketing, finance and HR - and should be sustainable.

Four ways to produce

Method	**Example**	**Trade-off**
job	restoring a classic car	high **quality**, high cost
batch	40 taxis in one week	time lost switching
mass (flow)	a car factory line	lowest cost, little choice
mass customisation	a car ordered online	choice at low cost

Lean production

Four lean methods cut waste.

- HL: use fewer resources and cut waste.
- Waste: too much made, waiting, moving, too much stock, faulty work.
- **Cradle to cradle**: every part can be reused or recycled.

Catch faults or prevent them?

Quality control

Check finished work and reject faults.

Faults found after they happen - the work is wasted.

Quality assurance

Build **quality** into every stage.

Faults do not happen - usually cheaper in the long run.

Where to produce?

> Services must be near customers; heavy goods near suppliers.

- Costs, labour and skills, customers and suppliers.
- Infrastructure, government, culture and language.

Who does it, and where?

> Who does the work, and in which country?

- **Outsourcing** and **insourcing** change who does the work.
- **Offshoring** and reshoring change where it is done.

Contribution and break-even

1. **Contribution** 25 - 15 = 10 per repair.
2. **Break-even** 12,500 / 10 = 1,250 repairs a month.
3. **Margin of safety** 2,000 - 1,250 = 750 repairs.

Decision

Profit at 2,000 repairs: 2,000 x 10 - 12,500 = 7,500.

The break-even chart

> Revenue and cost cross at 1,250 repairs.

- Total revenue and total cost cross at **break-even**.
- Right of the crossing is profit; left is loss.

Aiming for a target profit

1. **Output** For 15,000 profit: (12,500 + 15,000) / 10 = 2,750 repairs.
2. **Price** For 10,000 at 2,000 repairs: 22,500 / 2,000 + 15 = 26.25.

Decision

Fixed costs plus profit must be covered by **contribution**.

Price up, rent up

1. **Break-even** 15,500 / 12 = 1,291.7, so 1,292 repairs.
2. **Profit** 2,000 x 12 - 15,500 = 8,500 (was 7,500).
3. **Margin** 2,000 - 1,292 = 708 (was 750).

Decision

More profit, but closer to a loss if customers leave.

The limits of break-even

> Real costs and sales are rarely this neat.

- Quick to work out and easy to show on a chart.
- Useful when planning prices or a new product.

Just-in-time or just-in-case?

Just-in-time

Parts arrive only when needed.

Saves storage and cash - one late delivery stops work.

Just-in-case

Keep a large **buffer stock**.

Protects production - costly, and stock can go out of date.

The stock control chart

> Order at 1,200; it arrives as stock hits the buffer.

- HL: **reorder level** = buffer + usage x **lead time** = 200 + 500 x 2 = 1,200.
- Maximum stock = buffer + **reorder quantity** = 200 + 2,000 = 2,200.

Measuring operations

Measure	Working	Result
capacity utilisation	2,000 / 2,500 x 100	80%
defect rate	50 / 2,000 x 100	2.5%
labour productivity	2,000 / 4,000 hours	0.5 an hour
capital productivity	2,000 / 20 lifts	100 a lift

Make or buy?

> Making is 4,000 cheaper - if **quality** and volume hold.

- HL: CTB = price x quantity = 9 x 6,000 = 54,000.
- CTM = fixed costs + variable cost x quantity = 20,000 + 5 x 6,000 = 50,000.

When a crisis hits

> Plan before; act fast and honestly during.

- HL: a **crisis** is a sudden threat - a fire, a data breach, a supplier closing.
- A **contingency plan** is written before: risks, roles, backups.

Four types of innovation

Type	Example
product	servicing electric-car batteries
process	booking and paying through an app
positioning	a sports drink relaunched for athletes
paradigm	ride-hailing apps change taxis

From data to decisions

> Better decisions - but data raises ethical questions.

- HL: databases, **big data**, **cloud computing**, AI, IoT and ERP.
- Ethics: consent, keeping data safe, **digital Taylorism**.

Check yourself

Your turn

Without notes,

A. Calculate break-even and the margin of safety.
B. Find the reorder level from usage, lead time and buffer.
C. Compare CTB and CTM, and one non-cost factor.
D. Explain quality assurance against quality control.