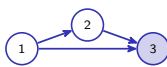


Operations Management

A-Level Business • Topic 9

A-Level Business



Operations Management

What we will cover

- 1 Location & relocation
- 2 Optimum scale
- 3 Managing quality
- 4 Lean production
- 5 Critical path analysis
- 6 Recap



automation drives modern operations

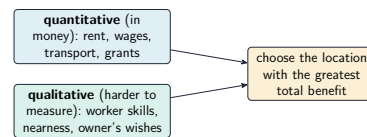
1 Location and scale

Operations Management

Location and scale

Location and relocation

Choosing a place (location 选址) or moving (relocation 迁址) weighs:



- **quantitative factors** 定量因素 – rent, wages, transport, grants
- **qualitative factors** 定性因素 – skills, nearness, owner's wishes

Offshoring 离岸外包 moves production abroad.

Operations Management
Location and scale

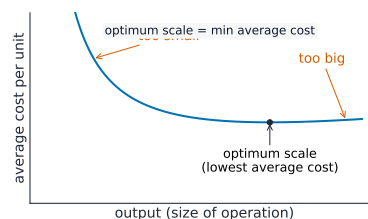
What decides where a business locates

quantitative factors	costs that can be measured – land, wages, transport, taxes, grants
qualitative factors	judgements that cannot – infrastructure quality, the owner's preference, local reputation
nearness to market	cheap for a bulk-gaining product, essential for a service
nearness to supply	cheap for a bulk-reducing product, or a perishable input
offshoring 离岸外包	moving production to another country – usually for lower wages , nearer markets, or looser regulation
the risk	longer supply chains, quality control at a distance, and reputational cost

Location is chosen on the **whole** cost, not the wage rate. A cheap site with poor transport can cost more than a dear one beside a port.

Operations Management
Location and scale

The optimum scale of operation



Average cost falls then rises as a firm grows:

- **economies of scale** 规模经济 – savings from size (bulk buying)
- **diseconomies of scale** 规模不经济 – costs rise if too big

The **optimum scale** 最优规模 is the output where average cost is **lowest**.

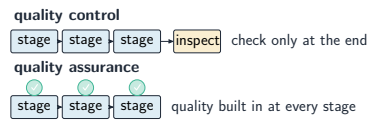
2

Quality and lean operations

Operations Management
Quality and lean operations

Managing quality

Quality 质量 is how well a product meets the customer's needs.



- **quality control** 质量控制 – check at the **end**
- **quality assurance** 质量保证 – build in at every stage
- **TQM** 全面质量管理 – everyone owns quality
- **benchmarking** 标杆管理 – copy the best

Operations Management
Quality and lean operations

Why quality matters, and how it is managed

quality 质量	how well a product meets the customer's needs – not how expensive it is
what good quality wins	repeat custom, a higher price, a protected brand, and fewer returns
quality control 质量控制	inspecting at the end and removing faulty goods – the waste is already made
quality assurance 质量保证	building checks into every stage to stop faults happening
TQM 全面质量管理	total quality management: every employee responsible for quality, aiming at zero defects
the cost	assurance and TQM need training and cultural change, and neither is quick

Control finds the fault; assurance prevents it. The saving is in the units that were never made wrong.

Operations Management
Quality and lean operations

Lean production



Lean production 精益生产 makes products with the least possible **waste** 浪费 – of time, materials, space and effort.

Operations Management
Quality and lean operations

Capacity management and technology



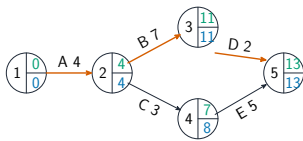
Capacity management 产能管理 matches output to demand; new **technology** 技术 (automation, data) lifts output, quality and cost together.

3

Project planning

Critical path analysis

top = earliest start time
bottom = latest finish time



CPA 关键路径分析 plans a project as a network of tasks.

$$\text{float} = \text{LFT} - \text{duration} - \text{EST}.$$

The **critical path** 关键路径 is the chain with **zero float** – it sets the shortest project time.

Reading a critical path network

CPA 关键路径分析	plans a project of many tasks by drawing them as a network of arrows and nodes 节点
EST 最早开始时间	earliest start time – the soonest a task can begin, once everything before it is done
LFT 最晚完成时间	latest finish time – the last moment it can end without delaying the project
total float 总浮动时间	$\text{LFT} - \text{EST} - \text{duration}$: the slack a task has
the critical path	the tasks with zero float – delay any of them and the whole project slips
minimum project duration 最短工期	the length of that path

CPA shows which tasks matter and when to order resources – but it is **only as good as the time estimates** fed into it.

Exam tips

- Compare quality methods: **quality control** (inspect at the end) versus **quality assurance** / **TQM** (build quality in at every stage).
- Explain **lean production** (cutting waste – time, stock, defects) with a named method (kaizen, JIT).
- On a **critical path** network, work out the EST/LFT, the float, and the critical activities (zero float) that set the minimum time.

4 Recap

Worked example – float in a network

Activity C has EST 8, LFT 15 and a duration of 4 days. Find its float, and say what that means.

- Float = $\text{LFT} - \text{duration} - \text{EST}$
- = $15 - 4 - 8 = 3$ days
- C can be delayed up to 3 days without delaying the whole project.
- Activities on the **critical path** have **zero float** – delay them and the project slips.

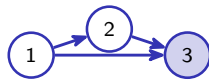
Float is **spare time**, and it shows where resources can safely be moved **from**.
Zero float = critical: those activities need the attention.

Topic 9 – key takeaways

- Location**
quantitative & qualitative factors; offshoring
- Optimum scale**
lowest average cost; economies vs diseconomies
- Quality**
control finds late; assurance & TQM prevent
- CPA**
critical path has zero float; sets project length

Check yourself

- 1 Rent is a quantitative or qualitative factor?
- 2 At the optimum scale, what is lowest?
- 3 Which quality method prevents faults at every stage?
- 4 What is the float of a critical activity?



Answers 1. quantitative 2. average cost per unit 3. quality assurance 4. zero