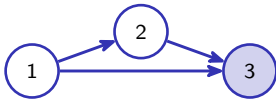


Operations Management

A-Level Business ■ Topic 9

A-Level Business



What we will cover

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

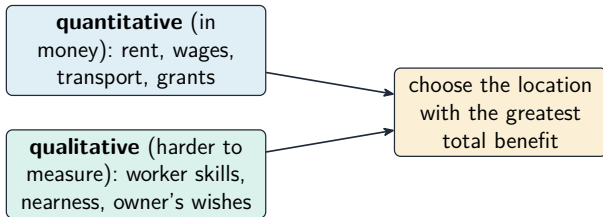


*automation drives modern
operations*

1

Location and scale

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

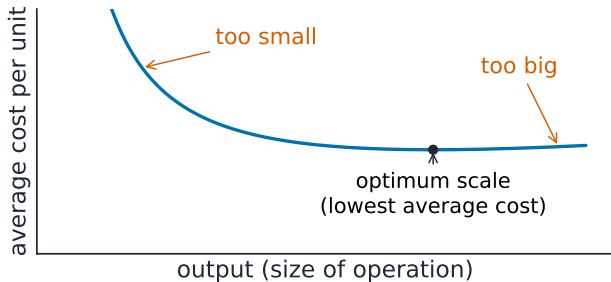
Offshoring 业务离岸转移 moves production abroad.

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 业务离岸转移	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.

The optimum scale of operation



optimum scale = min average cost

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

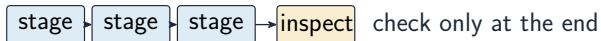
The **optimum scale** 最优规模 is the output where average cost is **low-est**.

2

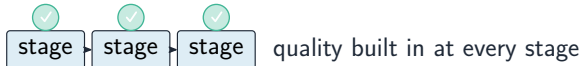
Quality and lean operations

Managing quality

quality control



quality assurance



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

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

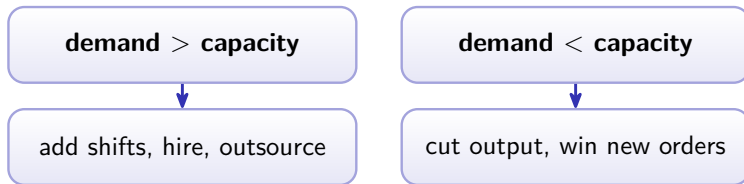
Control finds the fault; assurance prevents it. The saving is in the units that were never made wrong.

Lean production



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

Capacity management and technology



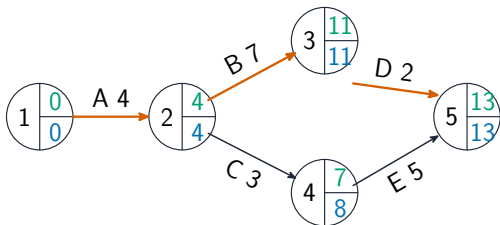
Capacity management 产能管理 matches output to demand; new **technology** 技术 (automation, data) lifts output, quality and cost together.

3

Project planning

Critical path analysis

top = earliest start time critical path (zero float)
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	$LFT - EST - \text{duration}$: 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.

- $\text{Float} = \text{LFT} - \text{duration} - \text{EST}$
- $= 15 - 4 - 8 = 3 \text{ days}$
- 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

1

Location

quantitative & qualitative factors;
offshoring

2

Optimum scale

lowest average cost; economies vs
diseconomies

3

Quality

control finds late; assurance &
TQM prevent

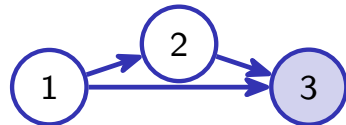
4

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