Profitability, Costs and Unit Economics

Interview preparation summary · SC track

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INT.KP.1.a · Why has profit changed

Build a profit tree that fits the business, use it to say whether a profit change comes from revenue or cost, and choose the order in which to open the branches.

A profit tree turns the question 'why has profit fallen' into a short run of data requests. Profit is revenue minus cost; revenue is price times volume, summed over products or segments; cost is variable cost, which moves with volume, plus fixed cost, which does not. The tree is a tool, not a script to recite. Adapt the branches to the business: an airline's volume is seats times load factor, a hospital's is beds times occupancy, a subscription business's is customers times months retained. Branches must not overlap (price, volume and 'competition' do, because competition acts through the other two). Open the tree with a hypothesis and one request that separates revenue from cost across two years, because that single comparison tells you which half to open. Then follow the largest movement in money, not in percentage, and say aloud what you have ruled out. Typical mistakes are reciting a generic tree whatever the problem, chasing small items, and explaining a fall in profit with a fall in margin, which is the same fact in other words.

WORKED EXAMPLE: LOCATING THE FALL IN PROFIT AT CALDER BAKERIES

Calder Bakeries, an invented regional bread maker, saw profit fall from 18.0m to 12.6m. Last year it sold 10.0m loaves at 12.00 each, with variable cost of 7.20 a loaf and fixed cost of 30.0m. This year it sold 10.5m loaves at 12.00, with variable cost of 7.60 a loaf and fixed cost of 33.6m. Say which branches of the profit tree explain the fall of 5.4m. Convention: all figures are annual, in £, and tax is ignored.

Answer: Profit fell 5.4m because costs rose, not because sales weakened. Volume added 2.4m, variable cost per loaf took away 4.2m and fixed cost took away 3.6m. Price was flat, so the question is why unit cost rose and whether the company could have passed it on.

> **Interview tip:** Say the answer first: 'This is a cost problem, not a sales problem', then give the two numbers that prove it and name the branch you would open next. Always reconcile the pieces back to the total change, so the interviewer sees you are not leaving anything out.

INT.KP.1.b · Why has profit changed

Split a change in revenue or profit into price, volume and mix effects, calculate each, and say what the split implies for the next question.

Price, volume and mix is the standard way to split a change in revenue or profit when a company sells more than one product. Volume is the change in total units, valued at last year's average price (or margin). Price is the change in each product's price, applied to this year's units. Mix is what is left: the effect of selling a different proportion of high- and low-value products, even when total units and every price are unchanged. The three add up exactly to the change, which is your check. Always say which base you used, because the order of calculation moves a little revenue between effects. Why it matters: a rising average price may be mix and not pricing power, and a mix shift towards cheaper products can hide healthy volume. The same split works on contribution, which is better for profit because products differ in margin. The usual mistakes are comparing average prices without checking mix, and treating volume growth as good news without asking which products grew.

WORKED EXAMPLE: PRICE, VOLUME AND MIX AT HOLLIN FOOTWEAR

Hollin Footwear, an invented shoemaker, sells two lines. Last year: Trail 40k pairs at 50 and Urban 160k pairs at 20. This year: Trail 60k pairs at 52 and Urban 140k pairs at 20. Revenue rose from 5.20m to 5.92m. Split the rise of 0.72m into volume, price and mix. Convention: volume at last year's average price, price on this year's units, mix as the remainder by product.

Answer: Revenue rose 0.72m: volume contributed nothing, price 0.12m and mix 0.60m. Sales were not stronger, they were richer, so the next question is whether the shift to Trail is a lasting customer trend and what happened to the lost Urban customers.

> **Interview tip:** Quote the check out loud: 'the three effects add up to the change'. Then tell the interviewer what the split means: here most of the growth is mix, which is a different story from pricing power.

INT.KP.1.c · Why has profit changed

Compare the profitability of segments or products using the right cost measure, and decide whether a weak segment is an internal problem, an external one or an allocation artefact.

Segment profitability asks which products, customers, channels or regions make the money. The answer depends on the cost measure. Contribution (revenue less variable cost) shows what a segment adds to covering fixed cost. Direct profit also deducts fixed cost that disappears if the segment closes. Fully allocated profit also deducts a share of shared overhead, spread by a rule such as revenue, which is arbitrary and stays in the business if the segment goes. A segment that is loss-making after allocation but positive after direct costs should usually not be closed. Diagnose causes in a fixed order: confirm the numbers, locate the segment, then ask whether the cause is internal (price discounts, cost per unit, mix, execution) or external (input prices, demand, competitors). The test is a benchmark: if competitors moved the same way, look outside; if only this company moved, look inside. The usual mistakes are closing segments on allocated profit, ignoring that segments share customers, and blaming the market without checking peers.

WORKED EXAMPLE: SHOULD NORTHVALE CABLES CLOSE LINE C

Northvale Cables, an invented maker, has three product lines. Revenue, variable cost and fixed cost that would disappear if the line closed (all in millions) are: A 40, 24, 6; B 30, 18, 5; C 20, 14.5, 3. Shared overhead of 12m is allocated by revenue. The board sees C as loss-making. Should it close C? Convention: shared overhead does not fall if C closes.

Answer: Do not close C yet. It earns 2.5m after its own costs and only looks loss-making because it is charged 2.67m of overhead that would stay. Closing it would cut company profit from 7.50m to 5.00m. The better question is how to lift C's contribution or fill its capacity.

> **Interview tip:** Name the cost measure you are using before you answer, then say which costs disappear if the segment goes. Showing that you separate avoidable from unavoidable cost is the point of the question.

INT.KP.2.a · Unit economics and cost

Calculate contribution per unit and break-even volume, use them to test a plan, and say how the answer changes when price, variable cost or fixed cost moves.

Contribution is price minus variable cost per unit: what each sale leaves to cover fixed cost and then to become profit. Break-even volume is fixed cost divided by contribution per unit, and the volume needed for a target profit is (fixed cost plus target profit) divided by contribution. Contribution margin is contribution as a percentage of price and is the better measure of how a business behaves, because it tells you how much each extra pound of sales is worth. The method needs a clear line between fixed and variable cost, and the line depends on the time horizon and the range: rent is fixed within a site but becomes a step cost when capacity runs out. Interviewers use break-even to test whether you can reduce a plan to one number and judge it: is the break-even volume plausible against market size, capacity and current sales? The usual mistakes are dividing fixed cost by margin in percentage points, forgetting that a price cut raises break-even volume more than proportionately, and treating a step cost as fixed.

WORKED EXAMPLE: BREAK-EVEN FOR LINDEN BIKE REPAIR

Linden Bike Repair, an invented workshop, charges 60 per repair on average. Parts and payment fees cost 22 a repair. Fixed cost (rent, two mechanics, insurance) is 228k a year. How many repairs a year does it need to break even, to earn 57k of profit, and to break even if it cuts the price to 54? Convention: annual figures, tax ignored, costs behave as stated within the range.

Answer: Break-even is 6,000 repairs a year, 7,500 for 57k profit, and 7,125 if the price falls to 54. The price cut raises break-even by 18.8%, so it only makes sense if it brings in clearly more volume than that and capacity allows it.

> **Interview tip:** State contribution first, then break-even, then judge it against capacity and the market. A number alone is only half an answer; the interviewer wants to hear 'is that achievable?'.

INT.KP.2.b · Unit economics and cost

Calculate customer lifetime value, acquisition cost, payback and the effect of scale and learning on unit cost, and judge whether a business is worth growing.

Unit economics asks whether one customer, order or unit makes money before overheads. Customer acquisition cost (CAC) is the sales and marketing spend divided by new customers won. Lifetime value (LTV) is the contribution a customer produces over their life: monthly contribution divided by monthly churn is a quick estimate, since average life is one over churn. Payback is CAC divided by monthly contribution, the number of months before the customer has repaid the spend; it matters when cash is tight. A common rule of thumb is that LTV of at least three times CAC and payback within about a year is healthy, but treat it as a prompt for questions, not a verdict. Use contribution after variable cost, not revenue, and use marginal CAC (the cost of the next customer) not just the average. Scale and learning effects lower unit cost as volume grows: scale spreads fixed cost, while learning cuts cost with cumulative experience, often a fixed percentage for each doubling. The usual mistakes are using revenue for LTV, ignoring churn differences between cohorts, and assuming cost curves continue for ever.

WORKED EXAMPLE: IS QUILLBOX WORTH GROWING

Quillbox, an invented language-learning app, charges 12 a month. Variable cost (payments, content licences, support) takes 25% of revenue. Monthly churn is 4%. Acquiring a subscriber costs 90 on average. Calculate contribution per month, average lifetime, LTV, LTV to CAC and payback. Then show what happens if churn improves to 3%, and what a 100 unit cost becomes after two doublings of cumulative volume on a learning curve that cuts cost 15% per doubling. Convention: ignore discounting and tax.

Answer: Each subscriber earns 9 a month and lasts 25 months, so LTV is 225 against CAC of 90: 2.5 times, payback 10 months. That is healthy but not generous, and churn is the lever: moving to 3% lifts LTV to 300. Growth is worth funding if marginal CAC stays well below LTV.

> **Interview tip:** Give the ratio and the payback, then say what you would do about them. Mention that you used contribution, not revenue, and ask whether the next customer costs more than the average one.

INT.KP.2.c · Unit economics and cost

Choose and size cost reduction levers, separate one-off from structural costs, and put a risk-adjusted value and a cost to achieve on a saving.

Cost reduction levers fall into five families: volume and scale, procurement (price paid per unit of input), process (yield, scrap, downtime, automation), headcount and organisation, and complexity (fewer products, variants, suppliers and sites). Pick levers by where the money is: take the cost base, rank lines by size, and apply a realistic percentage to the addressable part of each. Then separate costs that will not recur (a one-off charge, a spike in freight that is reverting) from structural ones, because cutting a one-off saves nothing and extrapolating one inflates the problem. Size a saving gross, then risk-adjust it for the chance of delivery, then deduct the one-off cost to achieve, and state timing: run-rate saving is not in-year saving. Name the risks: service levels, quality, supplier reaction, morale, savings that reappear as other costs. The usual mistakes are quoting a total saving without a cost to achieve, applying a percentage to the whole cost base rather than the addressable part, and cutting growth capability to hit a number.

WORKED EXAMPLE: SIZING SAVINGS AT BRACKENRIDGE PACKAGING

Brackenridge Packaging, an invented box maker, has an annual cost base of 200m: materials 90m, labour 50m, logistics 30m and overhead 30m. A team proposes four levers: Procurement of materials: 3.6m gross, 80% chance of delivery, 1.0m one-off cost; Process: reduce scrap and downtime: 3.0m gross, 60% chance of delivery, 2.0m one-off cost; Headcount in overheads: 3.0m gross, 90% chance of delivery, 3.0m one-off cost; Complexity: cut slow-moving items: 1.5m gross, 50% chance of delivery, 0.5m one-off cost. What is the gross saving, the risk-adjusted saving, the cost to achieve and the payback? Convention: savings are annual run-rate, one-off costs are paid up front, ignore tax.

Answer: The programme offers 11.1m gross, about 8.1m once risk-adjusted, for 6.5m of one-off cost, a payback of under a year at run-rate. I would plan on the risk-adjusted figure, start with procurement and headcount where delivery is most likely, and test the complexity cut against lost sales before committing.

> **Interview tip:** Always give three numbers: gross saving, risk-adjusted saving, and cost to achieve. Then say what you would start first and why. Candidates who give only a total saving sound as if they had not thought about delivery.

Summary of the Charta interview-preparation topic. Companies and figures in the examples are invented. Draft content, not yet expert reviewed.