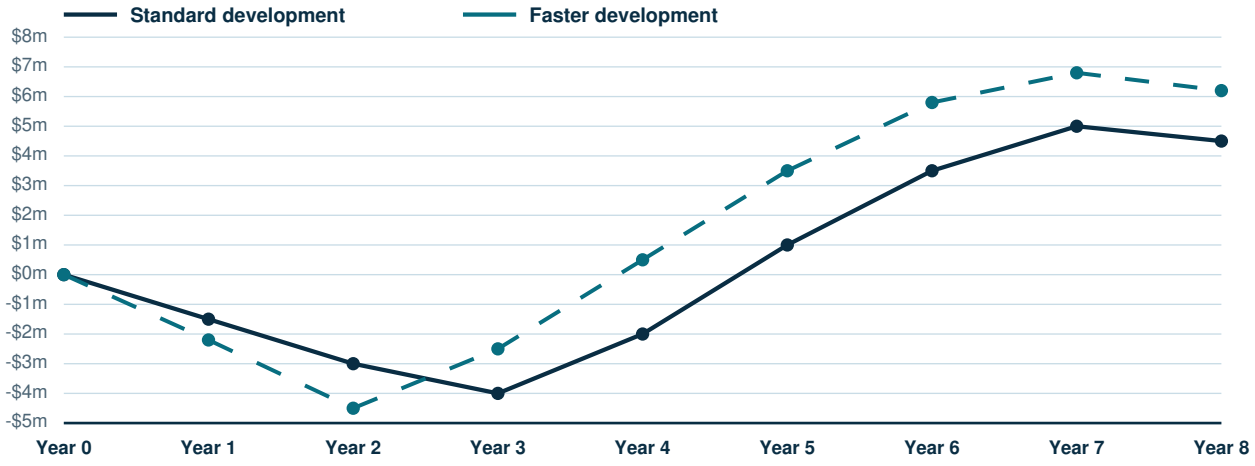
Costing 1: life cycle costing

MODULE 6 | PART D.2.1 | STUDENT COMPANION

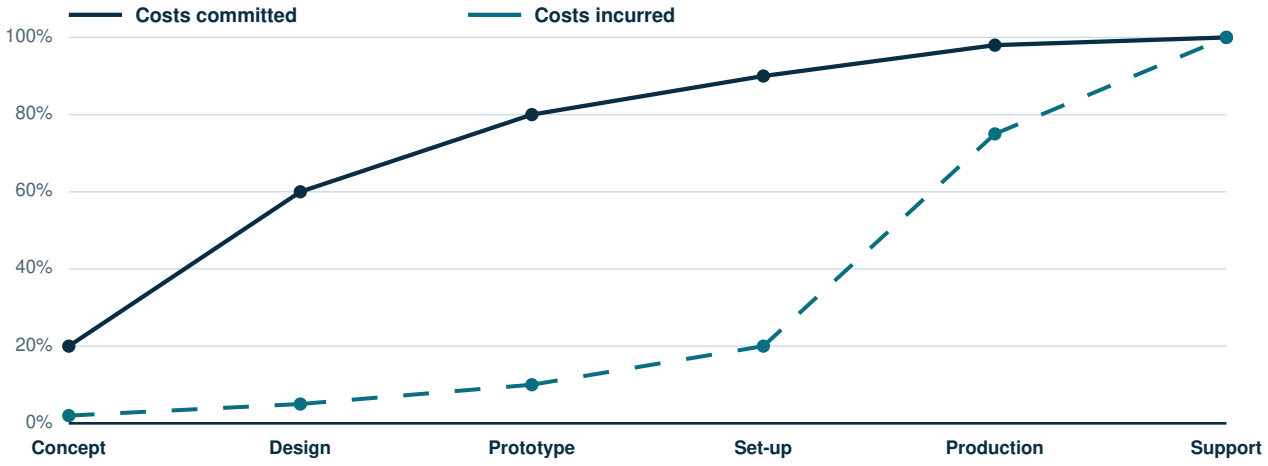
Life cycle costing treats each product as an investment: across introduction, growth, maturity and decline it must recover all costs - research, design, production, marketing, distribution, service and disposal - and earn a return that justifies the risk. A balanced portfolio uses mature products' cash to fund new ones.

The cash curve



Illustrative: faster development deepens the dip but brings positive cash forward

Costs committed versus costs incurred



Illustrative: most costs are locked in at design, long before they are spent

So what? Cutting costs during production has limited scope. The big opportunities lie before production (target costing); during production, continuous improvement (kaizen costing) takes over.

Reverse flows at the end of life



Design upstream to make every reverse step cheaper - or profitable

Case note: since 1973 Caterpillar has run a remanufacturing business. Customers buying a remanufactured part pay a core deposit, refunded when they return the old part (the core) in acceptable condition; Caterpillar rebuilds the cores for resale. Environmental impacts run through every stage - energy for extraction, manufacturing, transport, use and recycling, plus emissions and toxic by-products.

Sources: Caterpillar, 'The Cat Reman story' and core acceptance guidance.

Formulas and rules

Item	Rule
Life cycle cost	All costs from research and design to disposal, assessed per product
Cash curve	Negative during development and launch; positive through growth and maturity; falls in decline
Committed vs incurred	Design decisions lock in most costs before they are paid
Reverse flows	Returns, warranty, recalls, take-back; re-use, remanufacture, recycle, dispose
Design for end of life	Recyclable and fewer materials; easy disassembly

Question 1 - Zephyr's battery decision

Zephyr can glue its battery pack into the scooter frame, or use a screwed, modular pack that costs $14 more per scooter to build. List the life cycle costs the choice affects, and explain why the decision matters now rather than later.

Worked answers

MODULE 6 | PART D.2.1 | WORKED ANSWERS - ATTEMPT THE QUESTIONS FIRST

Question 1 - Worked answer

The choice affects: assembly time and cost; warranty repairs (a modular pack can be swapped in minutes rather than replacing the frame); spare parts and service revenue; customer satisfaction and resale value; product take-back and recycling costs (easy separation of the battery, a hazardous component); and compliance with any battery stewardship rules. The decision matters now because design commits these costs: once tooling is built and production starts, changing the design is slow and expensive, even though most of the costs will be paid years later. The extra $14 may well be repaid by lower warranty and end-of-life costs.