

2C

Life cycle costing

Topic list	Syllabus reference
1 What are life cycle costs?	A3 (a)
2 The product life cycle	A3 (c)
3 Life cycle costing in manufacturing and service industries	A3 (b)



Introduction

Life cycle costing is the third specialist cost accounting technique we will consider. It accumulates costs over a **product's life** rather than on a periodic basis and enables the determination of the **total profitability** of any given product.

cost ≈ like old style costing / price?

accounting

regular costing

management
required

- period base
- r&d-capitalized
- expensed

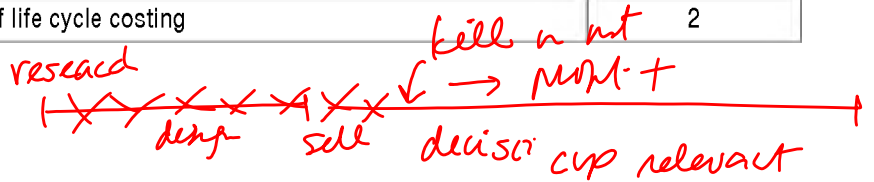
big difference

Tesla Truck



Study guide

		Intellectual level
A3	Life cycle costing	
(a)	Identify the costs involved at different stages of the life cycle	2
(b)	Derive a life cycle cost in manufacturing and service industries	2
(c)	Identify the benefits of life cycle costing	2



Exam guide

Life cycle costing will probably form part of a question on costing techniques but it has equal weighting in the syllabus as the other management accounting techniques, so could form an entire question.

1 What are life cycle costs?

12/08, 12/11

FAST FORWARD

Life cycle costing tracks and accumulates costs and revenues attributable to each product over the entire product life cycle.

A product's life cycle costs are incurred from its design stage through development to market launch, production and sales, and finally to its eventual withdrawal from the market. The component elements of a product's cost over its life cycle could therefore include the following.

- **Research & development costs**
 - Design
 - Testing
 - Production process and equipment
- **The cost of purchasing any technical data required**
- **Training costs** (including initial operator training and skills updating)
- **Production costs**
- **Distribution costs**. Transportation and handling costs
- **Marketing costs**
 - Customer service
 - Field maintenance
 - Brand promotion
- **Inventory costs** (holding spare parts, warehousing and so on)
- **Retirement and disposal costs**. Costs occurring at the end of a product's life

Life cycle costs can apply to services, customers and projects as well as to physical products.

Traditional cost accumulation systems are based on the financial accounting year and tend to dissect a product's life cycle into a series of 12-month periods. This means that traditional management accounting systems do not accumulate costs over a product's entire life cycle and do not therefore assess a product's profitability over its entire life. Instead they do it on a periodic basis.

Life cycle costing, on the other hand, tracks and accumulates actual costs and revenues attributable to each product over the entire product life cycle. Hence the total profitability of any given product can be determined.

Key term

Life cycle costing is the accumulation of costs over a product's entire life.

- ✓ target production cost
- price \$10
- required to be expensed
- buy - IP
- Intangible
- advertising
- media exposure
- online marketing
- KOL
- goodwill
- reputation

- capitalized & amortized
- tech capitalization cost
- * amortization & depreciation of capital cost = treatment in accounting & but sunk cost, partial irrelevant in decision making
- sunk cost
- cost even each year
- option based decisions, needs good planning

but sometimes decisions made might seem irrational based on accounting / financial numbers

2 The product life cycle

FAST FORWARD

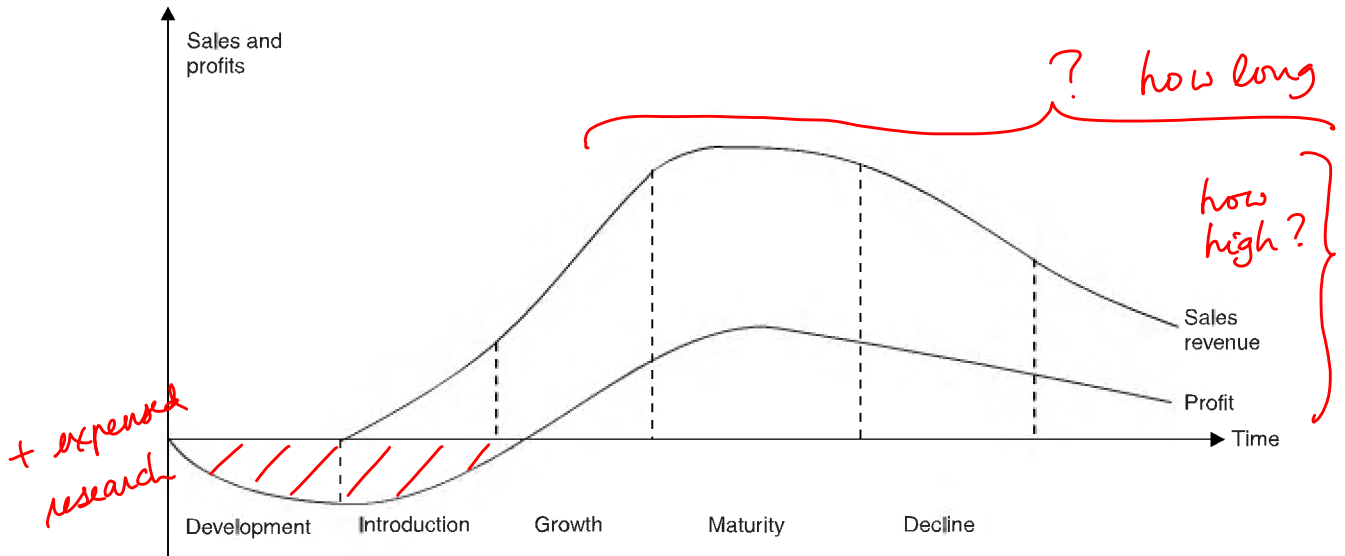
A product life cycle can be divided into five phases.

- Development
- Introduction
- Growth
- Maturity
- Decline

Every product goes through a life cycle.

- Development.** The product has a research and development stage where costs are incurred but no revenue is generated. *must keep but might be treated differently*
- Introduction.** The product is introduced to the market. Potential customers will be unaware of the product or service, and the organisation may have to spend further on advertising to bring the product or service to the attention of the market. *in decision making situations*
- Growth.** The product gains a bigger market as demand builds up. Sales revenues increase and the product begins to make a profit.
- Maturity.** Eventually, the growth in demand for the product will slow down and it will enter a period of relative maturity. It will continue to be profitable. The product may be modified or improved, as a means of sustaining its demand.
- Decline.** At some stage, the market will have bought enough of the product and it will therefore reach 'saturation point'. Demand will start to fall. Eventually it will become a loss-maker and this is the time when the organisation should decide to stop selling the product or service.

The level of sales and profits earned over a life cycle can be illustrated diagrammatically as follows.



The horizontal axis measures the duration of the life cycle, which can last from, say, 18 months to several hundred years. Children's crazes or fad products have very short lives while some products, such as binoculars (invented in the eighteenth century) can last a very long time.

2.1 Problems with traditional cost accumulation systems

Traditional cost accumulation systems do not tend to relate research and development costs to the products that caused them. Instead they write off these costs on an annual basis against the revenue generated by existing products. This makes the existing products seem less profitable than they really are. If research and development costs are not related to the causal product the true profitability of that product cannot be assessed.

Traditional cost accumulation systems usually total all non-production costs and record them as a period expense.

price 100
 r&d 10
 cost 60

 30
 product cost

research cost of future product expensed.

r&d \$100 - av 10/product
 expensary, research cost

unless fixed revenue in research like AMZN

2.2 The benefits of life cycle costing

There are a number of benefits associated with life cycle costing.

- (a) The life cycle concept results in earlier actions to generate revenue or to lower costs than otherwise might be considered.
- (b) Better decisions should follow from a more accurate and realistic assessment of revenues and costs, at least within a particular life cycle stage.
- (c) Life cycle thinking can promote long-term rewarding in contrast to short-term profitability rewarding.
- (d) The life cycle concept helps managers to understand acquisition costs vs. operating and support costs. It encourages businesses to find a correct balance between investment costs and operating expenses.

3 Life cycle costing in manufacturing and service industries

Both manufacturing and service industries take similar steps to ensure that returns are maximised over the product/service life cycle.

With life cycle costing, "non-production costs" are traced to individual products over complete life cycles.

- (a) The total of these costs for each individual product can therefore be reported and compared with revenues generated in the future.
- (b) The visibility of such costs is increased.
- (c) Individual product profitability can be better understood by attributing all costs to products.
- (d) As a consequence, more accurate feedback information is available on the organisation's success or failure in developing new products. In today's competitive environment, where the ability to produce new or updated versions of products is paramount to the survival of an organisation, this information is vital.

3.1 The importance of the early stages of the life cycle

It is reported that some organisations operating within an advanced manufacturing technology environment find that approximately 90% of a product's life cycle cost is determined by decisions made early within the cycle at the design stage. Life cycle costing is therefore particularly suited to such organisations and products, monitoring spending and commitments to spend during the early stages of a product's life cycle.

In order to compete effectively in today's competitive market, organisations need to redesign continually their products with the result that product life cycles have become much shorter. The planning, design and development stages of a product's cycle are therefore critical to an organisation's cost management process. Cost reduction at this stage of a product's life cycle, rather than during the production process, is one of the most important ways of reducing product cost.

3.2 Maximising the return over the product life cycle

3.2.1 Design costs out of products

Between 70% to 90% of a product's life cycle costs are determined by decisions made early in the life cycle, at the design or development stage. Careful design of the product and manufacturing and other processes will keep cost to a minimum over the life cycle.

* benefits also:
not treated as period expense like advertising

hande
Japan 660cc
"K-Car"

Problem:
- reward on performance is no life cycle cost competition
- our cost higher, lower margins at same price

research
target costing
intangible road
- perishable - dentist
- cannot stock / medical school cost
inventorized

longer?

* benefit based on different acti

similar concept in target costing

other quality tools

FB IG

TikTok $\frac{1}{2}$

app/software
low

1st to market
- higher "switching cost"
- earlier feedback to improve

3.2.2 Minimise the time to market

- speed based competition
- might shorten total cycle

This is the time from the conception of the product to its launch. More products come onto the market nowadays and development times have been reduced over the years. Competitors watch each other very carefully to determine what types of product their rivals are developing. If an organisation is launching a new product it is vital to get it to the market place as soon as possible. This will give the product as long a period as possible without a rival in the market place and should mean increased market share in the long run. Furthermore, the life span may not proportionally lengthen if the product's launch is delayed and so sales may be permanently lost. It is not unusual for the product's overall profitability to fall by 25% if the launch is delayed by six months. This means that it is usually worthwhile incurring extra costs to keep the launch on schedule or to speed up the launch.

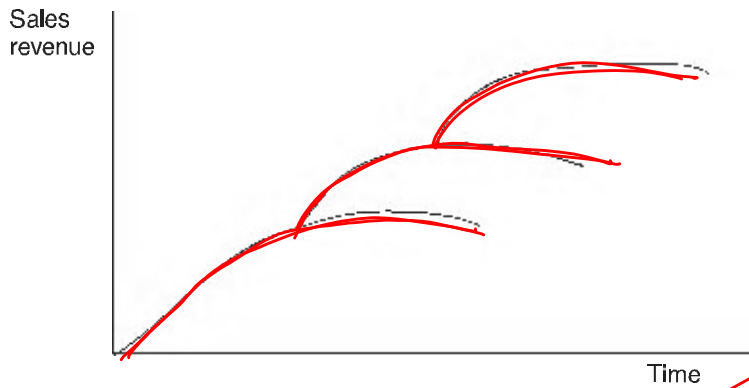
3.2.3 Minimise breakeven time (BET)

CVP in sales & units, if sell earlier & faster, earlier faster break-even

A short BET is very important in keeping an organisation liquid. The sooner the product is launched the quicker the research and development costs will be repaid, providing the organisation with funds to develop further products.

3.2.4 Maximise the length of the life span

Product life cycles are not predetermined; they are set by the actions of management and competitors. Once developed, some products lend themselves to a number of different uses; this is especially true of materials, such as plastic, PVC, nylon and other synthetic materials. The life cycle of the material is then a series of individual product curves nesting on top of each other as shown below.



option based future benefits

- brand name
- distribution network

By entering different national or regional markets one after another an organisation may be able to maximise revenue. This allows resources to be better applied, and sales in each market to be maximised. On the other hand, in today's fast moving world, an organisation could lose out to a competitor if it failed to establish an early presence in a particular market.

3.2.5 Minimise product proliferation

less diff version

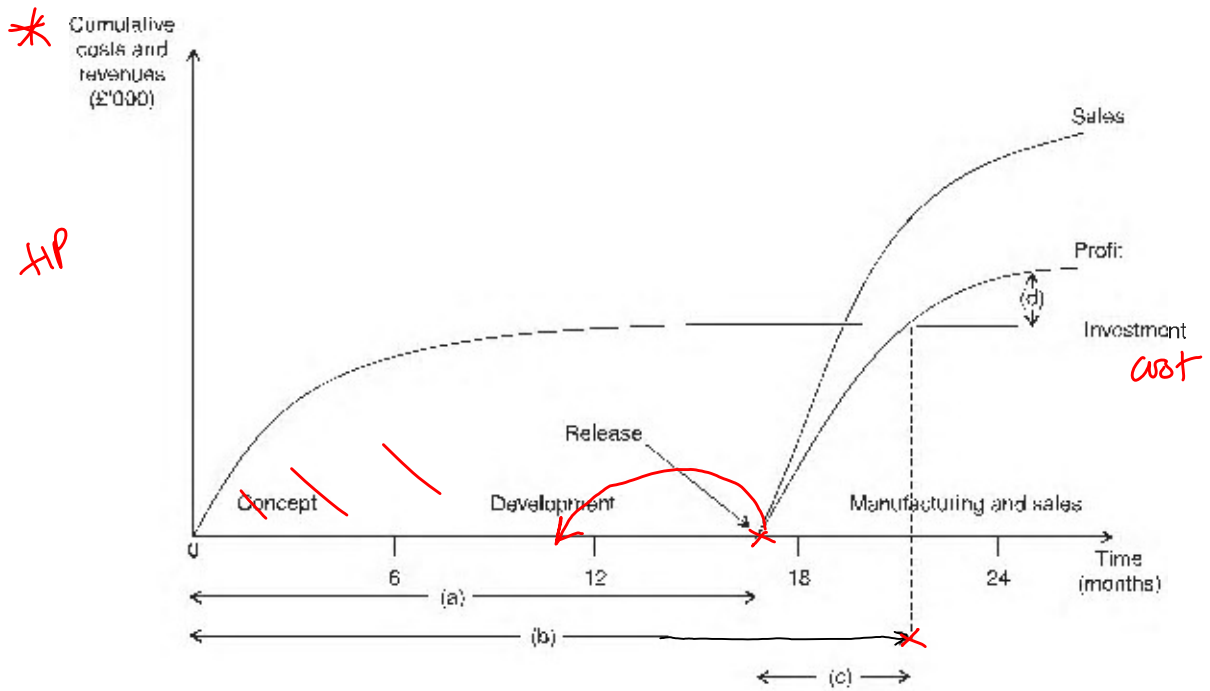
unless common platform / components

If products are updated or superseded too quickly, the life cycle is cut short and the product may just cover its R and D costs before its successor is launched.

like k-car, watches, hot pots

3.2.6 Manage the product's cashflows

Hewlett-Packard developed a **return map** to manage the lifecycle of their products. Here is an example.



Key time periods are measured by the map:

- (a) Time to market ↓
- (b) Breakeven time ↓
- (c) Breakeven time after product launch ↓ as sales ↑ due to early to market + higher profit margin when early
- (d) Return factor (the excess of profit over the investment)

(folding phone)

Changes to planned time periods can be incorporated into the map (for example, if the development plan takes longer than expected) and the resulting changes to the return factor at set points after release highlighted.

3.3 Service and project life cycles

A service organisation will have services that have life cycles. The only difference is that the R & D stages will not exist in the same way and will not have the same impact on subsequent costs. The different processes that go to form the complete service are important, however, and consideration should be given in advance as to how to carry them out and arrange them so as to minimise cost.

Products that take years to produce or come to fruition are usually called projects, and discounted cash flow calculations are invariably used to cost them over their life cycle in advance. The projects need to be monitored very carefully over their life to make sure that they remain on schedule and that cost overruns are not being incurred.

how?
- intangibles
- perishables
NPV in FM

why?

NPV in FM
see later in risk management

3.4 Customer life cycles

Customers also have life cycles, and an organisation will wish to maximise the return from a customer over their life cycle. The aim is to extend the life cycle of a particular customer or decrease the 'churn rate, as the Americans say. This means encouraging customer loyalty. For example, some supermarkets and other retail outlets issue loyalty cards that offer discounts to loyal customers who return to the shop and spend a certain amount with the organisation. As existing customers tend to be more profitable than new ones they should be retained wherever possible.

- should combine with CPA
- see article on value of customer later

* cheaper to retain customers than to find new customers

because cost to service ↓

Customers become more profitable over their life cycle. The profit can go on increasing for a period of between approximately four and 20 years. For example, if you open a bank account, take out insurance or invest in a pension, the company involved has to set up the account, run checks and so on. The initial cost is high and the company will be keen to retain your business so that it can recoup this cost. Once customers get used to their supplier they tend to use them more frequently, and so there is a double benefit in holding on to customers. For example, you may use the bank to purchase shares on your behalf, or you may take out a second insurance policy with the same company.

future benefits + profits
- bank sell insurance investment customer info
cross-sell

The projected cash flows over the full lives of customers or customer segments can be analysed to highlight the worth of customers and the importance of customer retention. It may take a year or more to **recoup the initial costs of winning a customer**, and this could be referred to as the **payback period** of the investment in the customer.

" see article in customers in advanced sma-4 \$ tools

Question

Life cycle costing

Solaris specialises in the manufacture of solar panels. It is planning to introduce a new slimline solar panel specially designed for small houses. Development of the new panel is to begin shortly and Solaris is in the process of determining the price of the panel. It expects the new product to have the following costs.

	Year 1	Year 2	Year 3	Year 4
Units manufactured and sold	2,000	15,000	20,000	5,000
	\$	\$	\$	\$
R&D costs	1,900,000	100,000	-	-
Marketing costs	100,000	75,000	50,000	10,000
Production cost per unit	500	450	400	450
Customer service costs per unit	50	40	40	40
Disposal of specialist equipment				300,000

The Marketing Director believes that customers will be prepared to pay \$500 for a solar panel but the Financial Director believes this will not cover all of the costs throughout the lifecycle.

Required

Calculate the cost per unit looking at the whole life cycle and comment on the suggested price.

Answer

Life cycle costs

R&D (1,900 + 100)	\$'000
Marketing (100 + 75 + 50 + 10)	2,000
Production (1,000 + 6,750 + 8,000 + 2,250)	235
Customer service (100 + 600 + 800 + 200)	18,000
Disposal	1,700
Total lifecycle costs	300
Total production ('000 units)	22,235
Cost per unit	42
	<u>529.40</u>

" 529.40 " + profit - price

The total life cycle costs are \$529.40 per solar panel which is higher than the price proposed by the marketing director. Solaris will either have to charge a higher price or look at ways to reduce costs.

- short term decision
- special project
- should consider marginal pricing?

It may be difficult to increase the price if customers are price sensitive and are not prepared to pay more. Costs could be reduced by analysing each part of the costs throughout the life cycle and actively seeking cost savings. For example, using different materials, using cheaper staff or acquiring more efficient technology.

pricing - cost - input

marginal costing / price

- **Life cycle costing** tracks and accumulates costs and revenues attributable to each product over the entire product life cycle.
- A **product life cycle** can be divided into five phases.
 - Development
 - Introduction
 - Growth
 - Maturity
 - Decline
- Both manufacturing and service industries take similar steps to ensure that returns are maximised over the product/service life cycle.

1 *Match the following costs to the appropriate life cycle cost classification.*

Costs

Design

Energy costs

Warehousing

Transportation

Customer service

Classifications

Inventory costs

Acquisition costs

Maintenance costs

Operation costs

Product distribution costs

2 Life cycle costing is the profiling of cost over a product's production life. **True or false?**

3 Life cycle costing is particularly useful in an AMT environment, where 10% of a product's life cycle costs might be determined by decisions made early within the cycle at the design stage. **True or false?**

- | | | |
|---|---|---|
| 1 | <i>Cost</i>
Design
Energy costs
Warehousing
Transportation
Customer service | <i>Classification</i>
Acquisition costs
Operation costs
Inventory costs
Product distribution costs
Maintenance costs |
| 2 | False. It also looks at development costs and so on which are incurred prior to production, and any dismantling costs, which are incurred once production ceases. | |
| 3 | False. The percentage is usually much higher. | |

Now try the question below from the Exam Question Bank

Number	Level	Marks	Time
Q4	Introductory	17	31 mins

intro - target
 life cycle

advance [compare