

Life Cycle Costing

(Relevant to Paper II – PBE Management Accounting and Finance)

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There are various costing methods in management accounting. Some of you are familiar with job order costing, process costing and activity based costing. The key concept is to apply the right costing method in the right situation. Life cycle costing offers another choice. It is usually found in manufacturing, product development, construction and software companies.

Life-cycle costing focuses on a product's entire value chain from a cost perspective. It tracks and evaluates costing from the research and development phase of a product's life, through design, manufacturing, marketing/distribution and finally customer services. This is called the cost life cycle. From the perspective of sales life cycle, it covers product introduction, growth and maturity through to the decline and withdrawal of a product's life. It ensures that prices are set to cover all costs in the value chain. To be profitable, a firm must generate sufficient revenue to cover all costs in the development, production and sales phases.

This makes sense as most product's costs are committed before the product is in the production phase. Life-cycle costing also looks at product costs in the sales and post-sales stages. Some of the costs include warranties, customer service, marketing and distribution. While other costing methods focus on costs in production and sales, life-cycle costing focuses on controlling costs throughout a product's life. It touches all aspects of a product. It is designed to eliminate activities that do not add value, and increase efficiency in activities that are necessary and do add value.

It is essential to manage cost before the production processes as much of the costs have been committed before production occurs. For example, in computer software as much as 75% of costs are incurred in the R&D phase, whereas in manufacturing commercial aircraft only 20% of costs are incurred in the R&D phase. The whole life cycle for computer software is five years while that for commercial aircraft is 25 years.

Let me give an example to illustrate the importance of life cycle costing. Suppose there are two products, PBE1 and PBE2. These are two models of batteries on sale in the market. PBE1 has a short life cycle and it lasts for one to two years while that PBE2 lasts for five years. The sales revenue of PBE1 and PBE2 in their life cycles are respectively \$4.5 million and \$2.5 million. The costs of sales are \$1.24 million and \$1.0 million. Total cost on research and development is \$2.15 million and on sales and services is \$1.85 million. The life cycle income statement is as follows:

	<u>PBE1</u>	<u>PBE2</u>	<u>Total</u>
Sales	\$4,500,000	\$2,500,000	\$7,000,000
Cost of Sales	1,240,000	1,000,000	2,240,000
Gross margin	<u>3,260,000</u>	<u>1,500,000</u>	<u>4,760,000</u>
R&D			2,150,000
Sales and services			<u>1,850,000</u>
Profit before tax			<u>760,000</u>

Given that the cost for R&D of PBE1 and PBE2 are \$1.55 million and \$0.6 million respectively, while sales and services cost for PBE1 and PBE2 are \$1.45 million and \$0.4million. It seems at first glance that battery PBE1 is more profitable as it has a gross margin of 72%. However, when life cycle costs are considered, PBE2 becomes more profitable.

	<u>PBE1</u>	<u>PBE2</u>	<u>Total</u>
Sales	\$4,500,000	\$2,500,000	\$7,000,000
Cost of Sales	1,240,000	1,000,000	2,240,000
Gross margin	<u>3,260,000</u>	<u>1,500,000</u>	<u>4,760,000</u>
R&D	1,550,000	600,000	2,150,000
Sales and services	1,450,000	400,000	1,850,000
Profit before tax	<u>260,000</u>	<u>500,000</u>	<u>760,000</u>

If we only consider the life cycle costs, the total for PBE1 is \$3,000,000 (\$1,550,000 + \$1,450,000) and that for PBE2 is \$1,000,000 (\$600,000 + \$400,000). The percentage breakdowns are as follows:

	<u>PBE1</u>	<u>Percentage</u>	<u>PBE2</u>	<u>Percentage</u>
R&D	1,550,000	51.7%	600,000	60.0%
Sales and services	<u>1,450,000</u>	48.3%	<u>400,000</u>	40.0%
Total life cycle cost	<u>3,000,000</u>		<u>1,000,000</u>	

PBE2 incurred more R&D cost than PBE1 while PBE1 incurred more costs for sales and services, at the later stage in the value chain. What is the implication?

Since we are given that PBE2 has a time horizon of five years while that for PBE1 is one to two years, then PBE1 is more risky than PBE2 as 51.7% of the life cycle cost is incurred in the R&D phase, which lasts for a short period of time. Since the time horizon is short, it may not be possible to recover all costs in the time horizon. On the other hand, we can also see that PBE1 focuses more on sales and customer service than PBE2 as almost 49% of the life cycle costs incurred in this process.

Life-cycle costing cannot be used for financial reporting. However, life-cycle costing is useful when a company is planning to introduce a new product. If the initial life cycle cost is huge but the time horizon is short, it is necessary for the management to assess whether they are able to generate sufficient revenue from that short time period to recover the costs incurred.

Life cycle costing explains the pricing decision of many products. For example, the mobile phone industry is a fast moving product. Life cycles are short, mobile phone manufacturers spent lots of money on R&D and they have to recover these costs in a short period of time. This explains why newly released mobile phones are sold at such high prices. On the other hand, aircraft such as the Boeing 747, which was introduced in 1969, is still being used today (it is only now being phased out due to its huge consumption of fuel). With that long life cycle, airlines are able to charge a lower price on air tickets. In Hong Kong, mobile phone network operators run in a different mode. Some charge higher monthly fees because they provide better customer services. On average, a customer contract lasts for two years. To recover the costs incurred, these mobile phone network operators have to charge a higher monthly fee to cover the costs in providing better customer services in the life cycle. For pharmaceutical

products, the product life cycle is becoming shorter and shorter as new products keep being developed. It is not surprising that new drugs are being sold at very high prices. For example, drugs which are used to fight cancer in targeted therapy can cost a patient on average \$20,000 to \$200,000 per month. Again, the life cycle is short (or uncertain), and pharmaceutical companies need to pay back the initial costs in R&D in a short period making high prices necessary. You can imagine how much the companies need to pay for a team of top tier scientists who have been working in the laboratory day and night for many years while developing the drug.

Finally, as a short revision on life cycle costing, suppose a new cancer curing drug PBX is expected to have sales of 100,000,000 units in the coming 10 years. The selling price is targeted at \$1,000 per unit. R&D is \$10,000,000,000, design cost is \$500,000,000, manufacturing cost is \$1,000,000,000, marketing \$100,000,000, distribution costs another \$100,000,000 and finally customer service \$50,000,000. Find the life cycle profit for PBX.

HK\$' million	PBX
Sales	100,000
R&D	10,000
Design	500
Manufacturing	1,000
Marketing	100
Distribution	100
Customer Services	50
Life cycle profit	<u>88,250</u>

The life cycle profit is HK\$88,250 million (or HK\$88,250,000,000). It is for 10 years and thus on average every year the profit is HK\$8,825 million which is quite normal for leading pharmaceutical companies. It can be seen that the total life cycle cost is HK\$11,750 million and HK\$10,000 million (or 85.1%) spent on R&D.