Lifecycle Costs and Economic Value to the Customer

Overview
A distinguishing feature of the successful strategies of many outstanding marketers is a strongly customer-oriented approach to product/market analysis. Although few would attempt to develop a marketing strategy without some analysis of customer needs and preferences and some attention to cost/benefit analysis, often this analysis is informal. Few companies consistently and explicitly analyze their product offerings against those of their competitors so as to quantify the “economic value to the customer” of what they are selling. This note presents one approach to that challenge. It defines, explains and illustrates LCC and EVC.

1. Defining LCC and EVC. In a narrow sense, product cost includes only what a purchaser spends to acquire a product (list price, less any discounts or allowances, plus freight, plus sales and use taxes, plus installation). In a broader sense, product cost goes beyond acquisition cost to also include what the purchaser spends to “start up” with the new product, plus all post purchase costs from start up to retirement, including final disposition cost. This broader concept of cost is called “Life Cycle Cost” (LCC)—the cost incurred over the “life cycle” from acquisition to installation to start up to use (over the product’s life time) to disposal.

LCC can be an important marketing tool. Familiar examples include:

• Maytag washers (the “lonely repairman,” because the product never breaks down);

• Toyota versus Chevy in the 1970s (purchase cost versus total cost of ownership—fuel efficiency, repairs, resale value...);

• Macintosh versus MS-DOS in PC operating systems in the 1980s. Exhibit 1 highlights a Mac advertisement from 1985 using the LCC theme.

EVC (Economic Value to Customer) uses the LCC concept to explicitly measure the value of products to current and potential customers. In the following paragraphs, we will carefully define the elements and potential uses of these concepts. But first, consider a preliminary example as a broad overview:

To illustrate how EVC is determined, compare the two new industrial products in the following Table to the product currently being used by the customer (the “reference” product). New product "X"
performs the same function as the reference product, but its start-up and post-purchase costs total only $400 instead of $700, yielding a $300 savings. Because the customer is accustomed to life-cycle cost of $1,000, product "X" offers value of $600 ($1,000 minus $400). That is, the customer should be willing to pay up to $600 for product "X".

An EVC Example

In some cases, an industrial product has features or performance characteristics which generate higher revenues for the customer, and, thus higher margins. For example, a new line of CAD/CAM computers may have features which allow the user to design products with higher revenue potential, for the same manufacturing cost. The economic value of those computers increases commensurately with the increase in contribution margin for the user. Product "Y" is a case in point.

Compared with $1,000 LCC for the “reference” product, product "Y" incurs $600 in start up and post-purchase costs and has improved features that generate $300 in incremental margins, resulting in a value to the customer of $700 ($1,000 + $300 - $600). In this example, the customer should be willing to pay up to $700 for “Y.” "Y" has a higher EVC than "X", despite its higher post-purchase costs, because it provides additional customer value. Incremental value may be tangible or intangible, as we shall see. For product “Y” it is measured by incremental contribution margin for the customer from using product Y versus the “reference” product.

We can now formally define the EVC of a new product: \( EVC = \text{the life-cycle costs of the current or "reference" product, less start-up and post-purchase costs of the new product, plus any incremental value offered by the new product.} \) Note that EVC is not the difference between the life-cycle costs of two product. That difference can be determined only after a price is set for the new product. EVC of the new product is determined before a price is set.
EXHIBIT 1

A MACINTOSH AD FROM 1985

This is a summary of selected information from two studies conducted among Fortune 1000 companies to learn how business computer decision makers and users compare the Apple-Macintosh and MS-DOS personal computer systems. The issues in each of the studies were 1) user productivity, 2) ease of use, and 3) training time. Among MIS managers a comparison was also made between Macintosh and MS-DOS systems on training costs.

The studies clearly indicate that Macintosh is seen to have significant advantages over MS-DOS systems in a number of key areas:

**User Productivity.** Macintosh makes the producers more productive—and makes them more productive more rapidly. More specifically, Macintosh is judged far easier for learning both the basic system and for learning new applications. And Macintosh is judged easier to install and use than are MS-DOS systems.

**Training Time and Costs.** Macintosh users learn the basic system twice as fast as do MS-DOS users. As a result, Macintosh cuts the training cost by more than half.

**Support Time and Costs.** Macintosh requires fewer than half as many hours of support time as an MS-DOS system. And MIS managers rate Macintosh significantly better than MS-DOS systems on support costs.

**Output.** Macintosh increases the visual effectiveness of the final product. MIS managers rate Macintosh significantly higher than MS-DOS on the quality of business graphics and the quality of printed output.

**Personal Fulfillment.** Macintosh is seen to be more personally fulfilling and satisfying than MS-DOS systems. More precisely, Macintosh users are significantly higher in their ratings than are MS-DOS users on the enjoyment of using the systems and on giving them confidence as users.

**In Conclusion . . .** Macintosh is easier to learn, is more enjoyable to use, and gives users more confidence. As a result, Macintosh users are more efficient
In practice, EVC facilitates strategic pricing by framing the price decision in terms of how to share the gap between costs and EVC. Consider the table below based on the prior example. Since product "X" has an EVC of $600. if it were priced at $600, the customer would have nothing to gain by choosing it over the product currently being used. If it were priced at $250, there would be $350 of value for the customer but zero profit for the producer. The price must be set to share the gap between producer cost and EVC. Similarly for product Y, the price must fall somewhere between cost of $275 and EVC of $700. How to share the gap is not an easy question.

### Measuring EVC

The starting point for an EVC analysis is a reference product: either the competing product currently used by the customer, or the supplier's own prior-generation product. Selecting the reference product is not trivial. Keep in mind that the consumer is attempting to satisfy a particular need, which may be narrowly or broadly defined. Any current product that is either accomplishing the same function or meeting the same need (though perhaps in a different way) could be chosen as the reference product. The analyst determines the EVC of a product by considering four elements: purchase price, start-up costs, post-purchase costs, and incremental value.
Because post-purchase costs and incremental value can differ among market segments, EVC must be calculated separately for each segment. Indeed, different market segments are sometimes defined by differences in the product's EVC. If data are hard to collect, or if a quick estimate of the “customer value proposition” (EVC less the purchase price) is all that is needed, only the differentials between the two products in cost and incremental value need be calculated.

We turn now to a more careful look at each of the four determinants of EVC.

a. **Purchase Price of the Reference Product.** Purchase price is defined to include the full amount the customer pays to the supplier at acquisition. Over and above the product price, this amount includes sales taxes, freight, shipping, installation charges, and any initial technical training provided by the supplier and charged to the customer. Customers who have traditionally based their buying decisions primarily on purchase price alone present a prime sales target to the manufacturer who can convincingly claim a positive EVC, based on lower LCC.

b. **Comparative Start-Up Costs.** Start-up costs are also costs incurred prior to use of the product. The distinction is that they are absorbed by the customer. They may include many of the items mentioned above, such as transportation, site engineering, and installation, if these have not been included in the purchase price. In addition, they include modifications of the present system, such as the costs of space, power, and heat or cooling required to accommodate the new product; lost production (downtime) while the system is being modified or the product is being installed; and initial technical training absorbed by the customer.

c. **Comparative Post-purchase Costs.** Post-purchase costs are defined as all operating costs over the life of the product, subsequent to start-up. Conceptually, these costs must be discounted back to their present value. If the products to be compared have different useful lives, these should be adjusted to arrive at comparative life-cycle costs.

Since inflation substantially affects the rate of increase in the costs of labor, fuel, and raw materials, these items may deserve special attention. Some are less uncertain than others, and hence different discount rates should be used to compensate for differing uncertainty.

Post-purchase costs include the following:

- Maintenance and repair.
• Continued technical training.

• Operating costs. It is important when analyzing these to examine the possibility of altering labor costs by reducing raw material costs, and/or changing the total labor content or altering the mix of skilled and unskilled labor. Such changes may in turn affect power consumption, inventory costs, and space requirements. If so, these too must be taken into account.

• Opportunity costs. Explicit attention should be given to any lost production resulting from problems with the reference product. Any differences in scrap and rework between the new product and the reference product must be considered.

Although ultimately borne by the customer, post-purchase costs are often not explicitly and fully evaluated at the time of purchase.

d. Incremental Value. The EVC of a product differs across market segments, not only because of post purchase cost differences, but also because of features that are valued differently by different customers. To uncover these features and to identify the customers who particularly value them, it is often necessary to conduct detailed field interviews. The analyst must consider key buying factors and competitive advantages, and be aware of both the tangible and intangible features that may create incremental value. Such features may:

• Increase a customer's functional capability by increasing capacity or throughput.

• Enable the customer to improve the quality or reliability of the end product, thus permitting a higher price.

• Increase end-product flexibility to allow for multiple applications. A product may be able to accommodate future technologies with minimum modifications.

Although the functionality of competing products may be roughly equivalent, customers may be willing to pay considerably more for one because of its associated intangible or psychological values. Consumer products (watches and automobiles for example), are often considered to exhibit larger intangible EVC differences among market segments than industrial products. Intangible values may include:

• Prestige associated with the product.

• Satisfaction of the customer's personal or social needs.
• Reduction of risks such as continuity of supply, or damage to the customer's reputation.

The EVC concept is certainly more difficult to use in consumer goods industries where the major portion of EVC may derive from hard-to-quantify intangible values. It is nonetheless always a useful means of getting the supplier to see the product from the customer's perspective and to consider how different customer groups derive value from the product. In any industry, understanding a product's EVC and finding ways to increase it will give a manufacturer a considerable strategic advantage.

3. Strategic Use of EVC

In general, EVC can be used in at least four ways to sharpen perceptions of strategic choices:

a. To help segment markets.
b. As a guide in focusing new product development efforts.
c. Pricing strategy. How much of the EVC do you try to capture and how much do you leave for the customer?
d. Selling and marketing emphasis. Push the EVC concept and LCC when they work in your favor.

We will next explore each of these potential uses of EVC in more depth.

a. Segmenting Markets. By focusing on the way a customer uses a product, EVC analysis helps to uncover the critical variables that can produce cost savings, add incremental value, or strengthen the customer's strategic position. To highlight these variables, the analyst may proceed as follows:

• Calculate the EVC of a product for a wide variety of customers.
• Tentatively define segments according to differences in EVC, so that these are minimized within, and maximized between, segments.
• Analyze each segment to discover those variables that underlie large differences from other segments.

This last phase of the analysis most often yields a breakthrough. In trying to account for the differences in EVC between segments, the analyst may discover significant aspects of the market or the product that had not been considered before. The focus of the search at this point will be less on differences in up-front costs and more on differences in post-purchase costs and/or incremental value. Usually, some characteristic of the customer or of the way they use the product will account for these differences. Such variables are usually situation-specific, but there are a few that have repeatedly turned out to be significant:
• **Intensity of product usage.** Post-purchase costs sometimes differ sharply between heavy and light users. For example, heavy duty components in a front-end loader will probably have greater value to a customer who uses it 8 hours a day in a mining operation than to a customer who uses it 6 hours a week on a construction site.

• **Geographic scope of usage.** A local contractor using earth-moving equipment may be less concerned about reliability and uptime than a multinational company with extensive operations thousands of miles away in the developing world.

• **Growth in the customer's business.** Fast-growing customers may be more receptive than slow-growing customers to a new product that can cut operating costs. Segmenting customers by growth may also highlight customers that are particularly receptive - or vulnerable - to new technology.

• **The way the customer uses the product.** Seemingly identical products may have quite different EVCs, depending on how they are used by the customer. For example, a manufacturer of off-highway vehicles found that, on average, the product had higher purchase cost and life-cycle cost versus a powerful competitor. However, in higher-tonnage, slower-speed applications, the fuel cost per ton-mile of the company's vehicle was actually lower. The competitor's vehicle was cheaper to use when operating at cruising speed with a lighter load. The company's sales strategy was accordingly redirected at customers who used the vehicle for short hauls with heavy loads, such as open pit mining.

By focusing on a few key variables that explain most of the variance in EVC, a supplier may come up with a creative (and counterintuitive) market segmentation that yields an important strategic advantage.

b. **New Product Development.** By highlighting the relative EVC of a product across market segments, the analysis can point out the need for cost cutting or product differentiation. Consider the EVC and the purchase price of a line of generators, as shown below:

<table>
<thead>
<tr>
<th>Segments (by application)</th>
<th>1</th>
<th>2</th>
<th>3</th>
<th>4</th>
</tr>
</thead>
<tbody>
<tr>
<td>EVC</td>
<td>$30</td>
<td>$60</td>
<td>$70</td>
<td>$100</td>
</tr>
<tr>
<td>Sales Price</td>
<td>$20</td>
<td>$35</td>
<td>$85</td>
<td>$90</td>
</tr>
<tr>
<td>Customer Savings</td>
<td>$10</td>
<td>$25</td>
<td>($15)</td>
<td>$10</td>
</tr>
</tbody>
</table>
In applications #1, #2, and #4, the purchase price was below the EVC, yielding positive customer savings. In the third segment, however, the product's purchase price was higher than its EVC, yielding a negative value. Thus, the company was in a very weak competitive position in this particular segment. The analysis led to a refocusing of the company's R & D program to improve operating performance for customers in the third segment.

When a product has multiple applications across multiple customer groups, the analysis becomes both more complex and more rewarding, frequently serving to spotlight opportunities for product differentiation. The benefits of "finding a niche where profits are plentiful and competition is not " have been exemplified by many companies that have consciously adopted a strategy of developing high-EVC products. For example, the overwhelming response to the introduction of microwave ovens was proof of the surprisingly high economic value that some consumers attached to speed and convenience. Another example is the boom in sales of sport/utility vehicles after Ford introduced the high price, but also high value, Explorer. Also, highly reliable components have a special value to electric utilities or steel mills, because of the high cost of maintaining reserve capacity to protect against equipment failures.

In addition to uncovering new market opportunities, EVC analysis can help the supplier to understand some of the specific financial concerns of customers and how these will affect the way they perceive a particular product's value. For example, EVC analysis can highlight product design alternatives for the supplier who has the option of designing a product with a lower initial price at the expense of higher post-purchase costs, or vice-versa. A customer will value lower initial price, even when coupled with higher post-purchase costs, when financial flexibility is limited or there is uncertainty about the product's long-term value. A manager who is experiencing a capital budgeting crunch or is being evaluated on short-term costs or asset control may choose to pay higher post-purchase costs out of future revenues, rather than increase the initial expenditure. Knowledge of this distinction is an important product design consideration.

A customer who is sensitive to life-cycle costs may, on the other hand, be willing to pay a higher initial price for a product with significantly lower post-purchase costs. After the phenomenal increase in fuel costs in the early 1970s, many suppliers designed and successfully marketed energy-efficient products with higher purchase cost but lower operating cost.
When faced with a competitive threat in a particular product/market segment, a company will usually respond directly to prevent loss of market share. Often, however, it may be more effective to capitalize instead on opportunities offered by other segments. EVC analysis can highlight such opportunities and help establish priorities for resource allocation.

In the case of one computer manufacturer, for example, EVC analysis showed that a shift in product development priorities could give the company a powerful indirect competitive advantage. Two of its business units shared the same underlying electronic component technology and were served in common by sales and manufacturing. Each business had annual sales of $100 million. Competitors had begun to invade the markets served by Business Y. Facing a potential loss of share, the company had tentatively planned to invest heavily in product development to extend Business Y’s product line and stave off the competition. The drawback was that this would have reduced Business Y’s profitability and required a cutback in Business X’s development budget.

EVC analysis revealed that Business X offered much more attractive opportunities. Its current EVC totaled $140 million versus $120 million for Y. It thus offered twice as much customer savings ($40 million versus $20 million). Moreover, after calculating the additional EVC that could be generated from comparable investment in product extensions in each business, it turned out that X could generate an additional $160 million and Y only $60 million. Thus, each product development dollar budgeted for X created a much higher potential EVC than the same dollar invested in Y.

Accordingly, management did not divert development dollars from X to Y. They left Y along and gave priority to developing product line extensions for X without raising prices. Business X soon gained 60 percent market share in its segment. Two years later, the company returned its attention to product line Y, using some of the extra profits from X and the technological insights gained from X. As a result, Y recaptured the market share it had lost, and improved its profitability and competitive position.

c. Pricing Strategy. An alternative definition of EVC is the maximum price an informed customer should be willing to pay for the product. EVC analysis is useful in pricing because it offers a means of identifying the market segments in which the product will have most appeal. When using segment pricing, the supplier usually tries to set price at some target percentage of EVC. The price may, for example, be targeted at 80% of EVC. Using this price, less desired margins, the supplier would arrive at the allowed
manufacturing cost of each product. The task of R & D and manufacturing would then be to develop attractive products for the target segments within those cost constraints. Pricing by EVC can thus be used to develop a product line "designed to cost." These ideas are illustrated in the following table:

### Segment Specific Pricing

<table>
<thead>
<tr>
<th>Segments (by end use application)</th>
<th>1</th>
<th>2</th>
<th>3</th>
</tr>
</thead>
<tbody>
<tr>
<td>Share of Revenue</td>
<td>10%</td>
<td>30%</td>
<td>60%</td>
</tr>
<tr>
<td>Current Price</td>
<td>$20</td>
<td>$20</td>
<td>$20</td>
</tr>
<tr>
<td>Producer Cost</td>
<td>$16</td>
<td>$16</td>
<td>$16</td>
</tr>
<tr>
<td>Current Profit</td>
<td>$4/Unit = 20% Margin</td>
<td>$4/Unit = 20% Margin</td>
<td>$4/Unit = 20% Margin</td>
</tr>
<tr>
<td>EVC</td>
<td>$50</td>
<td>$25</td>
<td>$20</td>
</tr>
<tr>
<td>Price at 80% of EVC</td>
<td>$40</td>
<td>$20</td>
<td>$16</td>
</tr>
<tr>
<td>Implied Price Change</td>
<td>+$20 (50%)</td>
<td>No Change</td>
<td>-$4 (20%)</td>
</tr>
<tr>
<td>Implied Cost Issues</td>
<td>Can spend $16 more if necessary</td>
<td>No Change</td>
<td>Need to cut cost by $3.20 to achieve normal margin</td>
</tr>
<tr>
<td>(goal = 20% margin)</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Successful segment pricing is not as simple as it might seem, since customers in a high-price segment will not be prepared to pay a premium for a given product unless they perceive its price to be justified by a higher EVC. Generally, it has been found that segment pricing is more likely to succeed in the case of a service or product with important intangible values, or a component intended for a very high-value end product.

Suppliers have found a number of ways to overcome obstacles to segment pricing. For example, a new product can be deliberately priced high and targeted only at a high-EVC market segment (Hewlett-Packard's original strategy in calculator pricing). Another approach, typified by Texas Instruments' famous "learning-curve pricing", is penetration pricing - that is, pricing low enough to penetrate most market segments. It may, however, be both difficult and risky to achieve long-term product development and cost-reduction that will
justify an initial low-pricing commitment. Such a commitment, moreover, will also reduce the total dollar volume of potential sales revenues, and thus potential profits as well.

In the case of “bundled” product lines where the customer's initial purchase ties them to the supplier for replacement parts and supplies, a supplier might choose to price the initial product low to achieve penetration, while pricing post-purchase items at a premium to assure overall profitability. Examples of this strategy in consumer marketing include such "loss leader" products as Gillette razors (versus blades) and Polaroid cameras (versus film).

An interesting extension of the concept is possible in the case of an item sold to OEMs (original equipment manufacturers). Here, the supplier may develop and price the product to penetrate the OEM market, deriving the bulk of profits from post-purchase sales to the end user. For example, manufacturers of aviation lighting equipment compete in the OEM market (the aircraft manufacturers) with low price and high quality. They make most of their profits from selling replacement parts to the airlines that purchase the planes and are thus tied to the particular manufacturer's technology. Thus, in calculating EVC and using it for pricing, it is important to identify the customer and the intended source of profits.

One pitfall in basing pricing decisions on EVC analysis is that it is easy to forget that the customer may not be able or willing to evaluate the product's quality and life-cycle costs. A coherent sales strategy is therefore a vital accompanying factor.

d. Selling Strategies. Once the market is segmented and the product developed and priced, the customer has to be reached and convinced of the product's value. EVC analysis can be helpful in developing a sales strategy to focus the sales message and the customer's attention on life-cycle costs. It can also help to identify the various key purchasers in an organization hierarchy and develop sales messages geared to their particular needs and concerns.

Changing the customer's focus from initial price to life-cycle costs is obviously important when the product in question is higher-priced but offers an overall advantage in life-cycle costs. For example, the manufacturers of computer control systems for energy conservation and monitoring in large buildings emphasize in their selling message that their products, despite high initial cost, permit a substantial reduction in fuel and operating costs. The examples cited earlier for Maytag, Toyota and Macintosh also demonstrate EVC-based selling strategies.
If the customer is a large organization, there may be several purchasing decision makers, each of whom uses a different set of product evaluation criteria. In such cases, the content of the sales message must be addressed to these key buying factors, and sales efforts must be carefully targeted to reach each category of decision maker. It takes a well-trained sales force to use EVC effectively. In addition to educating the customer, the sales force must understand how the individual customers derive value from the product, and channel this knowledge back to R&D.

A broad summary of LCC and EVC is shown in Exhibits 2, 3, and 4. Exhibit 4 shows nicely the “internal” versus “external” perspective on product (or customer, or channel) “attractiveness.” The internal measure of attractiveness is profitability – cost versus price. The external measure of attractiveness is the “customer value proposition” — price versus EVC.

Price must, of course, fall somewhere between producer cost and customer value. But, exactly where in between is as much an external issue as an internal one. The traditional accounting approach puts 100% of the analysis on cost issues and 0% of the analysis on customer value issues. This approach is clearly wrong! How much formal attention cost analysis should give to customer value issues (LCC/EVC) is clearly an open question. But “zero” is no longer an acceptable answer.
Life Cycle Costing (LCC)

What does it cost to buy the product?

versus

What does it cost to buy and use the product over its life cycle?

Life Cycle Costing is a much broader concept of product cost, useful for:

- Strategic analysis and product positioning (Maytag washers)
- Marketing strategy. Promote cost of ownership over the cycle (MAC vs. MS DOS)
- A selling tool. Invoice cost vs. Life Cycle cost (Toyota vs. Chevy)

Exhibit 2

“EVC” (based on “Life Cycle Costing”)

\[
EVC = \text{Referent Product LCC} + \text{Your Value Increment} - \text{Your Post Purchase Costs}
\]

\[
EVC - \text{Your Price} = \text{The value proposition to Your Customer}
\]

Uses of EVC

1. To help segment markets.
3. Pricing strategies: How much of EVC you try to capture vs. how much you leave for the customer.
4. Selling strategy. Sell the LCC notion (if it works in your favor!).
5. A guide for resource allocation choices: Where to push and where to pull back.
Price versus Cost?  
OR  
Price versus Value?

Exhibit 4

As seen by the PRODUCER

As seen by the one who pays for everything—The CUSTOMER