
Measuring and Selling the Value of Logistics

Douglas M. Lambert

The Ohio State University and University of North Florida

Renan Burduroglu

AC Nielsen ZET and Bosphorus University

In order to receive adequate rewards for the firm's innovations and performance in logistics, managers have to measure and sell the value that is being provided to customers. Value, once determined, must be sold to customers and also to top management within the firm. There are several value metrics mentioned in the literature, ranging in financial sophistication from customer satisfaction to shareholder value including: customer satisfaction, customer value-added (CVA), total cost analysis, segment profitability analysis, strategic profit model and shareholder value. While customer satisfaction and CVA may lead to the achievement of higher shareholder value, the specific connection to changes in value for the customer or the supplier are typically not made. The other measures focus on the measurement of value in financial terms. However, financial measurements such as total cost analysis only capture part of the value created by logistics. One of the problems faced by logistics professionals over the years is that logistics has been viewed simply as a cost that needs to be reduced. Segment profitability analysis and the strategic profit model are more complete measures of the impact of logistics, but they are used to evaluate historical performance and lack measures of risk and the time value of money that are included in shareholder value.

A major manufacturer of consumer durable goods implemented a rapid delivery system for its independent dealers whereby these customers could receive deliveries in 24 to 48 hours anywhere in the United States. The primary goal of the rapid delivery system was to improve on-time delivery performance and enable the dealers to increase service to their customers. Additionally, the rapid delivery system provided the dealers with an opportunity to dramatically reduce inventories. Third-party logistics providers operated the company's regional distribution centers and delivery vehicles. Six years later after implementing economic value added (EVA) measures, in an effort to improve financial performance, the company reduced the service to 48 to 72 hours and switched to one single third-party provider who was not one of the original three. What happened?

The value that was being provided by logistics was not being measured and sold.

The company's sales force was not trained to sell the economic benefits to the customer. The potential for much higher inventory turns and therefore lower inventory carrying costs per unit on every unit sold was not being explained to the dealers. In fact, the marketing organization still provided these customers with incentives to purchase in large volumes. Also, logistics neglected to estimate how much of the increase in sales experienced during the six years was the result of the rapid delivery system. Consequently, marketing took all of the credit for these sales increases. In this situation, the value of logistics was not sold externally to the customer or internally to top management.

It cannot be taken for granted that customers (in this article we are referring to business customers not consumers) will understand the value being provided and be willing to compensate the supplier for it.

It cannot be taken for granted that customers will understand the value being provided and be willing to compensate the supplier for it.

Customers must be shown on a regular basis the value that is being created by logistics, and so must top management within the organization. It is easy for management within the firm to ignore logistics and to underestimate its importance when logistics is performing well. For this reason, logistics managers must measure and sell the value created by logistics internally as well as externally throughout the supply chain. In this paper we will review the various methods of measuring value; describe the advantages and disadvantages of each method; and provide suggestions on how the value, once recognized, can be sold.

Key Value Metrics

As customers place demands on suppliers for more value-added services, it is becoming increasingly important to be able to measure the value of these services in terms that are meaningful to the customer. Failure to do so will result in erosion of profitability since it will cost to provide the services to customers, but the firm may not receive adequate compensation for these services. In most cases, it will be necessary to spend more money in order to achieve higher levels of customer satisfaction. However, if customers do not purchase more or are not prepared to pay more, providing more for the customers will leave the company's shareholders with less. Failure to justify a premium price as a result of offering value-added services will lead to profit erosion. It is not good enough to simply enumerate the superior levels of customer service that are being provided to the customer and assume that the customer will understand the financial benefits of this service. For example, the buyer might acknowledge the shorter lead times, better fill rates, and higher levels of on-time performance that the firm is providing over its competitors, but still say that the prices of the company's products are too high. In order to justify charging a premium price, it is necessary to convert the higher levels of customer service into a financial benefit such as an inventory turn improvement and use the associated reduction in inventory carrying costs per unit to offset the premium price. Alternatively, it may be possible to show how the higher levels of customer service are contributing to increased sales for customers

through better service to their customers or consumers. The most common options for measuring value are:

- Customer satisfaction.
- Customer value-added (CVA).
- Total cost analysis.
- Profitability analysis (includes revenue considerations).
- Strategic profit model.
- Shareholder value.

Customer satisfaction measures are the least quantitative in financial terms and shareholder value is the most comprehensive financial measure. In corporations such as Coca-Cola and General Electric, top management has bought into the idea that shareholder value is the best measure of how a corporation is performing. Shareholder value is a better measure than profitability because profitability can be manipulated in the short-term, and earnings per share does not consider the investment in assets required to achieve those earnings. Shareholder value measures all cash flows related to the profit and loss statement as well as the balance sheet, now and in the future. Future cash flows are discounted to a net present value on a risk-adjusted basis. Shareholder value considers not just earnings, but also the investment required to generate those earnings both now and in the future. This long-term orientation means that management is less likely to make myopic decisions.

Each of the six methods of measuring value will be described in detail.

Customer Satisfaction

Customer satisfaction occurs when businesses successfully fulfill their obligations on all components of the marketing mix: product, price, promotion and place. The place component represents the manufacturer's expenditure for customer service, which can be thought of as the output of the logistics system [1]. There are at least four reasons why companies should focus on customer service. First, satisfied customers are typically loyal and make repeat purchases. Second, it can be up to five times as costly to attract a new customer as it is to keep an old one. Third, customers who decide to defect are very likely to share their dissatisfaction with others. Fourth, it is more profitable to sell more to existing customers than it is to

Customer satisfaction occurs when businesses successfully fulfill their obligations on all components of the marketing mix: product, price, promotion and place.

find new customers for this same level of sales increase [2]. Therefore, in many businesses, research is periodically conducted in order to determine customers' needs and set customer service levels so that trade-off efficiencies between revenues and total logistics costs can be recognized.

Customer service audits can be used by management to identify the elements of service that are important in customers' purchasing decisions, and to evaluate the level of services being provided by each of the major suppliers in the market [3]. These data can be used to identify ways of improving customers' perceptions of the firm's service. Customer satisfaction is a critical measurement, because it allows management to align the company's service package with customers' needs. Higher levels of service can have a direct impact on customers' financial performance through higher revenues as well as lower costs as a result of the better service. However, providing higher levels of customer service will often increase costs for the supplier. Businesses can improve their market share by investing in logistics more efficiently and effectively than their competitors, thereby achieving higher levels of customer service in a cost-effective way. The advantages of customer satisfaction measures include: they are not complicated to implement; and, they enable management to align the company's service package with customers' needs.

While there are a number of approaches to the measurement and management of customer satisfaction, it is generally considered best to measure the firm's performance relative to specific competitors and identify gaps that represent opportunities for differentiating the company. Usually, customer satisfaction measures are collected using surveys. Table 1 illustrates the type of information that can be provided. This survey evaluated both customer service and other marketing mix attributes. The two columns on the left side of Table 1 show that the ranking of the attributes was not influenced by the order in which the questions appeared on the questionnaire.

In this example, 12 of the 18 attributes with the highest mean customer importance scores were customer service (logistics related) attributes, which reinforces the importance of customer service within the

firm's marketing mix. A small standard deviation in customer importance ratings means that there was little variation in the respondents' individual evaluations of an attribute's importance. For attributes with a large standard deviation, it is important to use the demographic information to determine which customers want which services.

However, if we are only using customer satisfaction scores to measure the value being provided to customers, these customers may recognize the firm's superior service performance, but they may not be willing to pay a premium price or reward the firm with a larger percentage of their purchases. They may say, for example, "yes, you are providing better service than your competitors and that's great, but your prices are too high". If the service improvement is not translated into a financial benefit for the customer, it may go unrewarded or at least the increase in sales or price premium paid will not be as large as possible. Higher fill rates, on-time deliveries and shorter lead times have financial consequences for the customer in terms of costs and revenues that must be estimated. If management does not measure and sell these financial benefits to the customer, it is relying on the customer to do so.

Our research in a number of industries has shown that some customers who give high satisfaction ratings to a supplier will purchase a greater percentage of their requirements for the product category from that supplier and/or are more likely to pay a price premium. However, the number of firms where this occurs is small which indicates that generally suppliers are not adequately compensated for incrementally better performance. As good as customer satisfaction measures are, they do not show the financial benefit of what the firm is providing for the customer.

Customer satisfaction measures by themselves are not adequate to sell the value of logistics internally. It is important to relate levels of customer service performance and the associated costs with revenue streams as well as costs. Failure to do so, will result in top management's recognition of the costs of logistics, but not the revenue-generating capabilities associated with outstanding customer service.

Customer Value-Added

If the service improvement is not translated into a financial benefit for the customer, it may go unrewarded...

Table 1
Importance Compared to Performance of Suppliers of a Consumer Product as Evaluated by Retail Buyers

Rank	Item	Description	Performance**											
			Importance*		Supplier 1		Supplier 2		Supplier 3		Supplier 4		Supplier 5	
			Mean	Std. Dev.	Mean	Std. Dev.	Mean	Std. Dev.	Mean	Std. Dev.	Mean	Std. Dev.	Mean	Std. Dev.
1	30d	Quality of sales force: honesty	6.6	1.0	5.8	1.3	6.1	1.4	5.9	1.5	5.4	1.8	5.6	1.7
2	19	Competitiveness of price	6.5	0.8	5.3	1.6	5.9	1.2	5.9	1.2	5.1	1.8	5.3	1.7
3	40	Accuracy in filling orders	6.5	0.8	6.0	1.3	6.1	1.0	5.8	1.3	5.7	1.2	6.0	1.1
4	10	Responsiveness of vendor to competitor's price reductions	6.4	1.0	5.1	1.6	5.0	1.8	5.2	1.8	4.6	1.8	4.8	1.9
5	33	Supplier's freight terms: prepaid	6.3	1.3	6.4	0.9	6.5	0.8	6.8	0.4	6.5	1.0	6.2	1.3
6	6c	Length of promised lead times on ASAP or emergency orders	6.3	1.9	5.6	1.4	5.8	1.4	5.7	1.2	5.6	1.3	5.6	1.5
7	4	Supplier absorbs cost of freight and handling on returns due to shipping damages or product shipped in error	6.3	1.4	5.9	1.6	6.1	1.8	5.9	1.7	5.6	1.8	5.8	1.7
8	15	Adequate advance notice of price changes	6.3	1.0	5.2	1.5	5.1	1.5	5.0	1.5	4.8	1.7	5.2	1.6
9	43c	High fill rate on emergency/ASAP orders	6.2	1.2	5.8	1.3	6.0	0.9	5.6	1.3	5.6	1.3	5.9	1.1
10	25b	Ability of supplier to handle defective product returns	6.2	1.2	5.5	1.7	5.8	1.8	5.4	1.5	5.4	1.8	5.5	1.5
11	3	Ability to expedite emergency orders	6.2	1.0	5.4	1.6	5.0	2.0	5.6	1.1	5.1	1.8	5.5	1.6
12	43b	High fill rate on ad promotional orders	6.2	1.4	5.5	1.5	5.8	1.0	5.6	1.2	5.3	1.4	5.8	1.1
13	43a	High fill rate on normal reorders	6.2	1.3	5.6	1.4	5.7	1.0	5.7	1.2	5.5	1.1	5.8	1.1
14	6a	Length of promised lead times on normal orders	6.1	1.1	5.4	1.5	5.7	1.6	5.8	1.0	5.3	1.2	5.5	1.4
15	2	Quality/durability of packaging	6.1	1.2	5.7	1.4	5.7	1.3	6.0	0.8	5.9	1.1	5.8	1.2
16	47	Supplier's adherence to your specific shipping instructions	6.1	1.2	5.4	1.5	5.5	1.6	5.3	1.5	5.3	1.5	5.5	1.5
17	6b	Length of promised lead times on ad/promotional order	6.1	1.5	5.4	1.5	5.5	1.5	5.5	1.2	5.5	1.2	5.6	1.4
18	34	Timely response to requests for assistance from supplier's sales representative	6.1	1.2	5.5	1.0	5.9	1.3	5.8	1.1	5.4	1.6	5.6	1.6

Key: * Mean (average score) based on a scale of 1 (not important) through 7 (very important).
 ** Scale of 1 (poor) through 7 (excellent).

Another popular value metric, customer value-added (CVA) also focuses on customer satisfaction. CVA measures were developed in the marketing literature as measures of value for end consumers, but are now being used by consultants such as Gale [4] with clients in a business-to-business setting. Customer satisfaction, as captured by CVA, is accomplished by providing value to the customer beyond price. As Naumann [5] showed in his book, *Creating Customer Value: The Path to Competitive Advantage*, price is only one component of value. Customers are interested in obtaining quality at a good price. They use product and service attributes to evaluate the expected benefits. The perceived benefits are divided by the perceived sacrifice (i.e., associated costs and risks) to calculate expected customer value:

$$\text{Expected Customer Value} = \frac{\text{Perceived Benefits}}{\text{Perceived Sacrifice}}$$

where:

Perceived Benefits = Product Attributes + Service Attributes

Perceived Sacrifice = Transaction Cost + Life Cycle Cost + Risk

A company can increase value for the customer by increasing the quality of product

or service attributes or by reducing transaction costs, life cycle costs or risk. Product quality and service quality provide the foundation that supports price. If a company produces poor-quality products or provides bad service, the value-based price will fall. If management sets prices too high for a given level of product and service quality, value is decreased and sales will suffer. Hence, from the company's perspective "the focus is on finding ways of adding value to a product where the price premium generated by the additional value is greater than the incremental cost to produce the value added" [6].

Gale [7], also linked market-perceived quality (both product and customer service quality) to exceptional customer value where value is defined as the market-perceived quality adjusted for the relative price of the company's products. According to Gale [8]:

- The customer buys based on value.
- Value equals quality relative to price.
- Quality includes all non-price attributes, both product and customer service.
- Quality, price, and value are relative.

...a customer's evaluation of the quality, price and value of a product offering will be dependent on a supplier's performance relative to its competitors.

That is, a customer's evaluation of the quality, price and value of a product offering will be dependent on a supplier's performance relative to its competitors.

Figure 1 shows Gale's perspective on how management creates value for the customer as well as how doing so leads to business results such as profitability, growth and shareholder value. The first step is to understand customer needs in well defined markets. Management should identify segments of customers and for each of those segments determine how customers make the decision to buy. With that information and effective design and quality control, the company can provide superior quality in areas that matter to the customer. Next, management will use advertising and other communications to inform customers that it has listened to them and met their needs, which will result in market-perceived quality. Effective design and quality control results in low "cost of quality" and cost leadership, which leads to exceptional customer value and business results including higher profitability, growth and shareholder value.

Companies, with products and services that represent better value than those customers could purchase from competitive companies, will have higher sales figures,

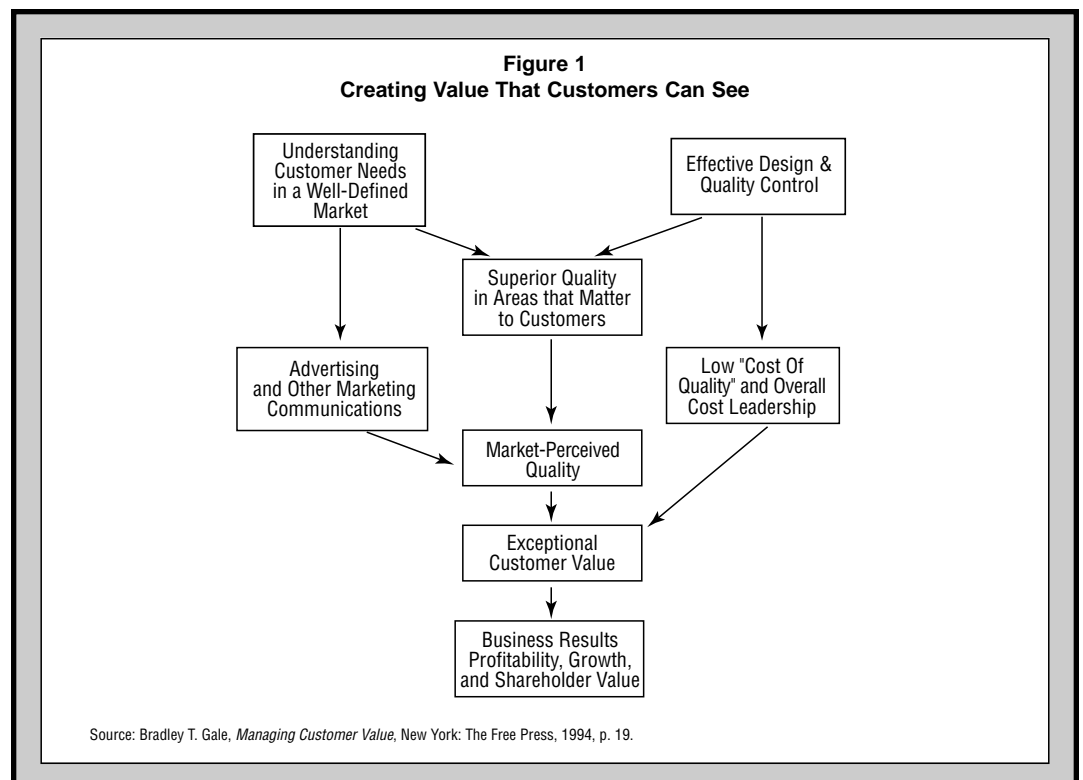
higher profit margins, higher market shares, and higher shareholder value than competitors. Customer value-added is the perceived value of company's offer divided by perceived value of the best competitive offers. Companies such as Lucent Technologies, Texas Instruments and Fletcher Challenge (New Zealand) use this metric to provide products and services to customers that are perceived as better value than those they can purchase from competitive companies in similar markets. In order to achieve an overall measure of value for each major competitor, a macro level question like the following is used:

Considering the products and services that you purchased, how would you rate them as being worth what you paid for them?

Next, the CVA measure is calculated as follows:

$$CVA = \frac{\text{Perceived Value of Company's Offer}}{\text{Perceived Value of Competitive Offers}}$$

Managers also collect data on specific attributes at a level of detail that allows them to make the changes necessary to achieve a higher CVA score (see Table 2).



In this example, management wanted to identify the firm's comparative performance on "delivering material when you wanted it". On this attribute the company scored 3.35 on average, and the best other vendor scored 3.32. When the company's score was divided by the best competitor's score, the result was above 1.0 (1.01). The company's score on "having the necessary information on all shipping documentation" was 3.67, but management was not able to obtain a best competitor score and could not compute a ratio. The company received a score of 4.00 for "having the correct materials delivered relative to what you ordered" and the best other vendor scored a 3.76 for a ratio of 1.05. However, "best other vendor" is not the same firm each time. With this approach, the company's performance is compared to the best vendor for each attribute. Since various competitors will most probably have different areas of strength, the best other vendor is unlikely to be the same firm each time, but rather the sum of the best traits of a number of suppliers. Of course, since this composite score does not represent any company, customers cannot actually purchase from this entity. Overall, on "delivery of materials", the company received a score of 3.89 and competitors received a score of 3.74 resulting in a ratio of 1.04.

The next step in evaluating the CVA is to multiply the ratio scores by 100 and compare them to the results from the Profit Impact of Marketing Strategy (PIMS) [9] database shown in Table 3. If a firm's score is greater than 10% better than the best of its competitors, the firm is considered to be "world class", which is 15% of the businesses in the PIMS database.

A firm with a score of 3% to 10% better is considered to be "above parity", which is 25% of businesses and so on.

It would seem that no matter how excellent a company is, if a major competitor is within 10% of its performance it would not be possible to be "world class" according to this method of measuring value. However, the major problem with CVA is that it will cost money to become "world class", but these CVA scores do not convert easily into customer benefits that justify a premium price or increased purchase volumes. For example, how much above 1.0 (100%) does a firm need to score in order to justify a 1% increase in price and what will it cost to achieve this level of performance?

Total Cost Analysis

In terms of selling value to the customer, the weakness in the first two measures is that the supplier leaves it to the customer to determine the economic benefit of the level of customer satisfaction or the CVA. Many customers will not do this. Some will admit that the customer service provided is superior, but will argue that the price being charged is too high. If management expects the customer to pay more for better service, then it is management's responsibility to express to the customer the benefits of the higher levels of customer service in financial terms. Total cost analysis can be defined as minimizing the total costs of logistics including transportation, warehousing, inventory, order processing and information systems, and purchasing and production-related lot quantity costs, while achieving a given

If management expects the customer to pay more for better service, then it is management's responsibility to express to the customer the benefits of the higher levels of customer service in financial terms.

Table 2
Order Fulfillment Customer Satisfaction
Survey Results Delivering Material

Questions/Attributes	Performance (1 poor...5 excellent)		Ratio Company/Best Other Vendor
	Company	Best Other Vendor	
Delivering Material When You Wanted It	3.35	3.32	1.01
Having the Necessary Info on All Shipping Documentation	3.67	NA	
Having the Correct Materials Delivered Relative to What You Ordered	4.00	3.76	1.05

Table 3
Distribution of CVA Levels

<u>Calibration Category</u>	<u>CVA Levels</u>	<u>% of Business By Category</u>
World Class	> 110	15%
Above Parity	103 - 110	25%
Parity	98 - 102	20%
Below Parity	< 98	40%

Source: Profit Impact of Marketing Strategy (PIMS) Database

customer service level [10]. The basic principle of total cost analysis is that managers should consider the total cost of all logistics activities instead of trying to reduce the cost of individual logistics activities so that real cost savings can be realized. Otherwise, cost reductions in one logistics activity can lead to cost increases in others, and this may result in increased total costs. Total cost analysis can be expanded to include all of the costs of ownership, not just those related to logistics. This is referred to as the "total cost of ownership" [11].

Table 4 shows the costs that might be included in total cost analysis in addition to the purchase price. With total cost analysis, the goal is to compare the costs of doing business with the firm to those of doing business with a competitor and to show the customer the financial benefits associated with the firm's higher service performance. For example, it is necessary to convert fill rates, lead times and on-time performance that are better than those of competitors to an

inventory turn advantage and therefore lower carrying costs per unit. Rather than telling customers that the firm provides better on-time delivery performance than competitors, that its fill rates are better and its lead time is shorter, management needs to show the customer how this performance affects its inventory investment. For example, if an item costs the customer \$100 and the customer's inventory carrying cost is 36%, the cost associated with one inventory turn is \$36. By dividing this number by the inventory turns actually achieved, it is possible to calculate the cost on a per unit basis. If the firm's better service results in 12 inventory turns for the customer compared to six turns for a competitor's product, the inventory carrying cost per unit would be \$3 ($\$36 \div 12$) versus \$6 ($36 \div 6$) for the competitor. The \$3 per unit savings can be used to justify a price premium over that competitor.

Total cost analysis can be used to show the performance of logistics internally as well as externally. Logistics costs are a major cost of doing business and logistics assets represent a significant portion of a firm's total assets. Thus, reducing the total costs associated with logistics represents value creation for the company. However, the ultimate goal should not be to reduce one entity's costs simply by shifting them to another firm. The goal should be to reduce total costs for the supply chain.

A shortcoming of total cost analysis as a measure of value creation either externally (from a customer's perspective) or internally (from top management's perspective) is that any revenue implications are ignored. Also, the more logistics professionals concentrate on

Table 4
Total Cost Analysis

- Purchase Price
plus:
- Transportation costs
 - Inventory carrying costs
 - Costs associated with alternative terms of sale
 - Ordering costs
 - Receiving costs
 - Quality costs (returns etc.)
 - Returned goods costs
 - Other costs (will depend on situation)

A shortcoming of total cost analysis as a measure of value creation either externally (from a customer's perspective) or internally (from top management's perspective) is that any revenue implications are ignored.

cost savings to justify their existence, the more top management will view logistics as simply a cost reduction opportunity. If logistics professionals want to receive full recognition for what they do, total cost analysis falls short.

Profitability Analysis

From the customer’s standpoint, total cost analysis assumes that the suppliers under consideration are revenue neutral, that is, the choice of supplier will not affect the level of sales achieved. If this is not the case, then total cost analysis does not go far enough. For example, if Toshiba sells more laptop computers because the computer has an “Intel Inside” label on it, then Intel would not want the customer to compare the total cost of an Intel microprocessor to the total cost of an Advanced Micro Devices microprocessor.

Segment profitability analysis using a contribution approach is a much better value metric when there are revenue implications to supplier selection. With this approach, only the variable out-of-pocket costs and the avoidable fixed costs are deducted from revenue (see Table 5). In order for a cost to

appear in the report, it must disappear if the revenue is lost. Segment profitability analysis helps managers accurately evaluate strategic options such as which product lines to add or drop as well as whether prices can be raised on products with inelastic demand or reduced on high-volume products [12]. Segment profitability analysis considers the impact not just on cost, but revenue as well since the customer service levels can influence the customer’s sales volume. Consequently, scarce resources of the firm can be allocated to those segments that are most profitable while unprofitable segments can either be eliminated or revitalized. For a customer, the segments might be Supplier A, Supplier B and Supplier C. The questions are: What revenue does the customer generate from the products of each of these suppliers? And, what are the out-of-pocket costs associated with each supplier?

Segment profitability reports can be used to capture both the revenue and cost implications of the firm’s value proposition for the customer. The same approach can be used internally to measure the impact of logistics on the profitability of business

Segment profitability reports can be used to capture both the revenue and cost implications of the firm’s value proposition for the customer.

Table 5				
Segment Profitability Analysis: A Contribution Approach with Charge for Assets Employed				
	Supplier A	Supplier B	Supplier C	Supplier D
Sales				
Cost of Goods Sold	_____	_____	_____	_____
Gross Margin	_____	_____	_____	_____
Plus: Discounts and Allowances				
Market Development Funds				
Slotting Allowances				
Co-op Advertising	_____	_____	_____	_____
Net Margin	_____	_____	_____	_____
Variable Marketing & Logistics Costs:				
Transportation				
Receiving				
Order Processing				
Other Costs				
(will depend on situation)	_____	_____	_____	_____
Contribution Margin	_____	_____	_____	_____
Assignable Nonvariable Costs:				
Salaries				
Advertising				
Inventory Carrying Costs Less:				
Charge for Accounts Payable				
Other Costs				
(will depend on situation)	_____	_____	_____	_____
Controllable Margin	_____	_____	_____	_____

segments such as customers, class of trade, geographic area, sales territory and product.

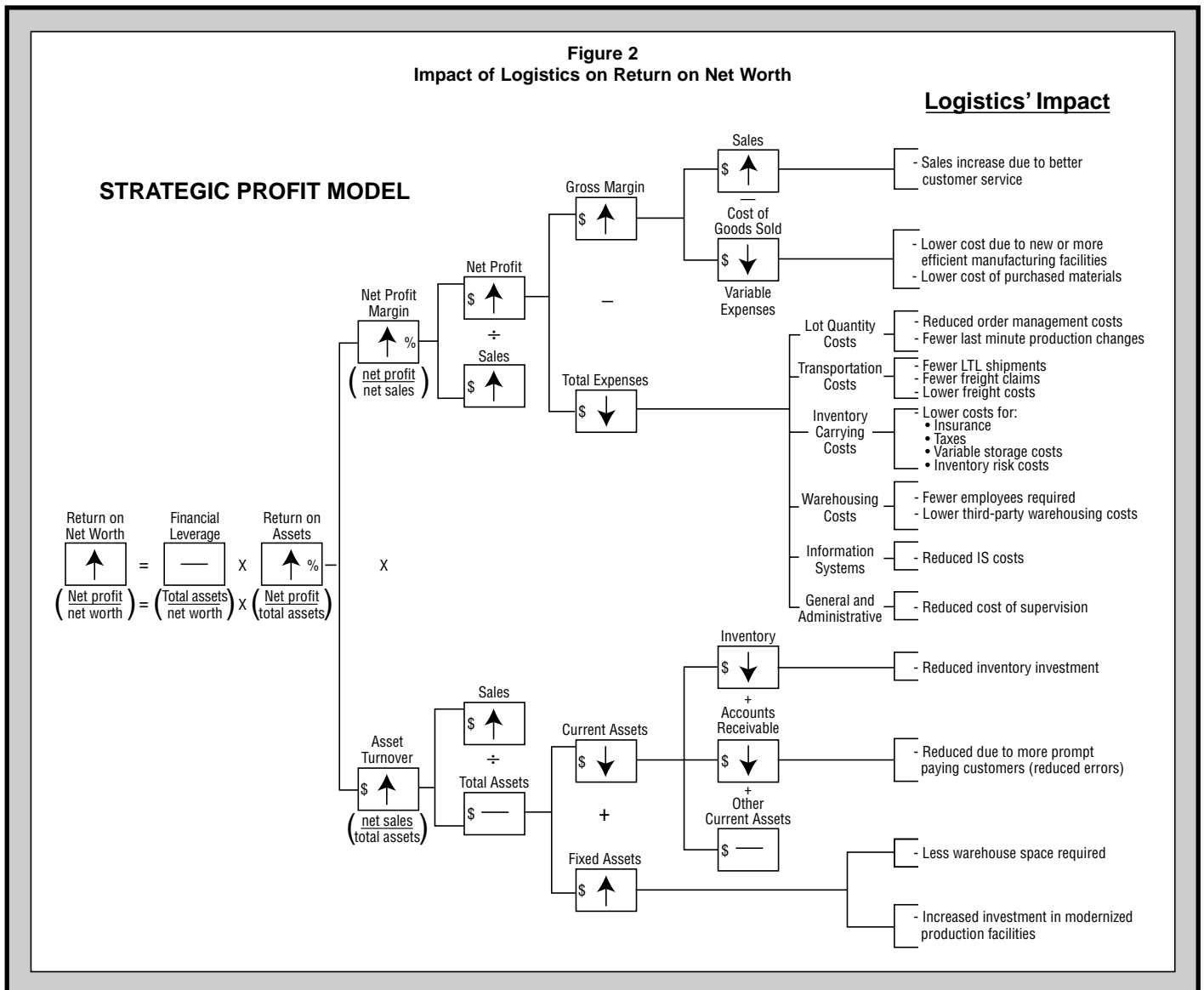
Strategic Profit Model

A potential limitation of total cost analysis and segment profitability analysis is that they do not measure the cost of assets other than inventory and accounts receivable. The strategic profit model demonstrates how asset management and margin management will influence return on assets, and return on net worth, which is the return on shareholders' investment plus retained earnings (see Figure 2). The most common practices of asset and cash flow management are to reduce accounts receivable and inventory. However, both of these practices, when used without any changes in logistics

systems' efficiency or effectiveness, can lead to disastrous results on corporate profit performance. Indeed, large reductions in inventory levels, without considering the impact on other logistics costs, may increase the total cost of logistics. Likewise, reducing accounts receivable can affect the customers negatively, resulting in lower sales revenue. The strategic profit model assists managers to determine the overall impact of decisions with regards to cash flows and asset utilization.

Figure 2 illustrates the many ways that logistics contributes to return on net worth. First, better management of logistics (as measured by length of lead-time, in-stock availability and fill rates, for example) can result in higher sales as a result of higher

The strategic profit model demonstrates how asset management and margin management will influence return on assets, and return on net worth...



prices, higher volume or more rapid time-to-market for new product introductions. Cost of goods sold can be reduced as a result of taking cash from an inventory reduction and/or accounts receivable and investing it in new manufacturing equipment that will enable quick production changeover and be more efficient (lower labor costs, less material waste and more energy efficient). Cost of goods sold also can be reduced through purchasing cost reductions as a result of logistics. Total expenses can be reduced by improved logistics in a number of expense categories (see Figure 2 for details). These actions will result in much higher profitability. In terms of the Balance Sheet, excellence in logistics can result in a reduction in both current and fixed assets, which leads to increased asset turnover. The higher profitability and higher asset turnover provide two upward pressures on return on assets. This combined with a reduction in financial leverage as a result of debt repayment leads to higher return on net worth, but not as large an increase as would be possible by reinvesting the cash in the business. Generally, companies that are flush with cash are not those with high price earnings ratios.

Reinvestment of the cash in the business is the option used most frequently by companies and is illustrated in Figure 2. The cash from asset reductions related to logistics is invested more productively in plant modernization, new products or other investments that meet the firm's minimum acceptable rate of return on new investments. In this case, all of the impact on return on net worth would be due to changes on the profit and loss statement. Asset turnover would remain the same since the cash made available from reductions in inventories and accounts receivable is reinvested in other more productive assets. Consequently, financial leverage remains the same. However, the impact on sales and the size of the cost reductions would be much greater with this option and the increase in return on net worth would be larger than in the previous example (debt repayment). It should be noted that if fixed costs increase, then operating leverage increases, which may result in higher risk and lower value.

The strategic profit model can be used to measure and sell the value of logistics to

customers. It is equally useful in showing top management the role that logistics is playing in corporate success. However, it is not without problems. First, it is necessary to estimate the impact of logistics in generating revenue. Customer satisfaction surveys can be very useful in this regard. Cost measurement systems can provide the cost data and information on inventory levels and other assets can come from the logistics information system.

Although the strategic profit model has many strengths over the methods of measuring value described thus far, recent literature on corporate finance has shown a strong consensus among researchers that shareholder value is a better performance metric of the financial consequences of strategies than traditional accounting measurements.

Shareholder Value

Shareholder value has become popular as a reliable and consistent way to look at the value of many businesses and to measure how alternative strategies and investments will affect the company's total value [13]. According to shareholder value theory, a business creates value when it meets or exceeds a cost of capital that correctly reflects its investment risk [14]. It is built on the key assumption that a business is worth the net present value of its future cash flows, discounted at the appropriate cost of capital. By focusing on cash flow, shareholder value overcomes the inadequacies of the traditional financial measurements. Also, by using a present value approach, the model recognizes the time preference for money and the risk of an investment. For many years traditional accounting measures have been criticized because they are backward looking and short sighted, whereas decision making is forward looking and concerned with the long-term outcomes.

The ability to create wealth for shareholders is crucial to the survival of companies. Two of the most accepted schools of thought on how management should link corporate performance to the creation of shareholder value are: shareholder value analysis (SVA), established by Rappaport [15], and economic value-added (EVA), established by Joel Stern [16].

According to shareholder value theory, a business creates value when it meets or exceeds a cost of capital that correctly reflects its investment risk.

Showing customers how the company's logistics operations affect the shareholder value of their firms would be the ultimate measure of the financial impact of logistics.

Copeland, Koller and Murrin gave the following explanation for why shareholder value should be the measurement of choice:

Empirical evidence indicates that increasing shareholder value does not conflict with the long-run interest of other stakeholders. Winning companies seem to create relatively greater value for all stakeholders: customers, labor, the government (via taxes paid), and suppliers of capital. Yet, there are additional reasons—more conceptual in nature, but equally compelling—to adopt a system that emphasizes shareholder value. First, value is the best metric for performance that we know. Second, shareholders are the only stakeholders of a corporation who simultaneously maximize everyone's claim in seeking to maximize their own. And finally, companies that do not perform will find that capital flows toward their competitors [17].

They provide the additional argument for why value is the best metric:

Value (discounted cash flows) is best because it is the only measure that requires complete information. To understand value creation one must use a long-term point of view, manage all cash flows on both the income statement and the balance sheet, and understand how to compare cash flows from different time periods on a risk-adjusted basis [18].

Every decision that managers make is reflected in the valuation of the company. No other single metric is this comprehensive. According to Copeland, Koller and Murrin, value cannot be short-term if properly implemented, but the other measures can be short-term:

Earnings per share or return on equity are usually used in a myopic way—requiring information about only the next few years at best. Furthermore, earnings tend to focus mainly on managing the income statement and places low weight on the actual

amount and timing of cash flows. Even the spread between the return on invested capital (ROIC) and the cost of capital can be a bad metric if used only for the short term and because it encourages underinvestment (harvesting the business to increase ROIC). If the value manager does the job well, the results are reflected in MVA (market value-added). Other performance measures, such as the growth in earnings, return on equity, and the spread between the return on capital and the cost of capital are less comprehensive than value creation and less well correlated with the actual market value of companies [19].

Rappaport expressed the fundamental assumption of SVA as, "a business is worth the net present value of its cash flows discounted at the appropriate cost of capital", and identified seven key generic value drivers that are expected to drive the value of any business: sales growth rate, operating profit margin, cash tax rate, fixed capital needs, working capital needs, cost of capital, and planning period [20]. The aim is to think the strategic alternatives through in value terms, so that value can be maximized. The approach recognizes the importance of better reporting of historic cash flows and asserts that a better relationship exists between shareholder returns and cash flow measurements than traditional accounting measurements. SVA derives the total shareholder value by discounting free cash flows at the cost of capital for the period over which a particular strategy is expected to be in use. In order to calculate the cash flows beyond the planning period, a perpetuity model is used where the last year's forecasted operating profit is divided by the company's weighted cost of capital. The calculation considers the opportunity cost of capital and value is only increased if returns exceed that cost of capital. This approach has the advantage of recognizing the value beyond the pre-set planning period of a strategy and leads to a better judgment among alternative investments from the company's perspective. However, it may fail to show the real value beyond the planning period since the returns are assumed as to be equal to the company's

Every decision that managers make is reflected in the valuation of the company. No other single metric is this comprehensive.

cost of capital, ignoring the fact that additional sales beyond the planning period may generate value returns higher than the cost of capital.

EVA is an alternative approach to SVA, which derives the total shareholder value by determining a performance spread, that is the excess of the return on invested capital above the cost of capital, which when multiplied by the invested capital produces the EVA for each period in the forecast. These individual EVAs are then discounted and summed to produce a premium which is added to invested capital to determine the common equity value. The detailed steps in EVA calculation are very well documented by Stewart [21], Mills and Print [22], and Ehrbarg [23]. The EVA approach theorizes that shareholders measure value creation, not value preservation. It deducts out all capital expenditures designed to maintain plant and equipment, as well as dividends since the shareholder has invested the funds for superior investment returns [24].

Copeland, Koller and Murrin, after working on a research project in their corporate finance practice at McKinsey & Company Inc., developed several approaches to valuation [25]. In fact, they presented two discounted cash flow (DCF) based frameworks for valuing a business, including the entity DCF model and the economic profit model. The entity DCF model values the equity of a company as the discounted value of a company's operations (which equals the discounted value of expected future cash flow) less the discounted value of debt and other investor claims that are superior to common equity. In the economic profit model, the value of a company is the amount of capital invested plus a premium or discount equal to the present value of the cash flows created each year going forward. In other words, economic profit is equal to the spread between the return on invested capital and the cost of capital, times the amount of invested capital. Economic profit model is especially useful for understanding a company's performance in a single year, while the entity model is not.

Although expressed in somewhat different forms and different names, these models are almost identical to SVA and EVA, respectively. Copeland, Koller and Murrin

identified three levels of value drivers: generic, business-unit specific, and operating. While the generic drivers are consistent with the key value drivers that are mentioned in Rappaport's work, these authors go one step further in specifying the other levels of drivers and linking all of them to strategies and operational decisions. If logistics is viewed as a business-unit specific measure for example, generic value drivers may consist of sales growth rate, cash tax rate, operating profit margin, fixed and working capital needs, cost of capital, and planning horizon. Business-unit specific value drivers for logistics may contain logistics service quality, total cost of logistics, and order-to-delivery cycle time. Operating value drivers may include items like ability to mix products in a truckload, order fill rate, order cycle consistency, inventory carrying costs, transportation costs, and warehousing costs.

Arzac developed a formula to evaluate the potential for value creation or destruction at the level of business units, rather than the whole corporation [26]. The value creation is expressed in terms of the expected return on equity (ROE), the cost of equity capital, the expected growth of the company, and the period during which the company is expected to maintain a positive spread between its ROE and its cost of equity. However, in order to translate this method to the business unit level, the spread between ROE and a unit's weighted-average cost of equity and debt capital (WACC) is calculated. Furthermore, to estimate the unit's contribution to the value of shareholder equity, return on equity is added to the spread between ROI and the after tax cost of debt, multiplied by the debt-equity ratio.

Value can be measured from the supplier's or the customer's perspective. It is necessary to measure how logistics programs and the customer service that results affects the value of the customer's business. It is also necessary to measure how these programs affect the value of the supplier's company. When this occurs logistics executives will achieve the recognition within the organization that they have been denied thus far.

How Logistics Affects EVA

The EVA approach theorizes that shareholders measure value creation, not value preservation.

Logistics can affect EVA in four areas: revenue, operating costs, working capital, and fixed assets [27]. Figure 3 shows how logistics affects EVA.

Revenue

The customer service provided by logistics can have a major impact on sales volume and customer retention. While it is not generally possible to calculate the exact correlation between service and sales, there have been many studies, that have indicated a positive relationship [28]. Superior customer service (in terms of reliability and responsiveness) can strengthen the likelihood that customers will remain loyal to a supplier. Evidence suggests that higher levels of customer retention lead to greater sales. Customers are more likely to place a greater proportion of their purchases with a supplier that provides excellent service over time. Also, if the value of the higher level of service is measured and sold to the customer, there will be less pressure on margins resulting in higher revenue.

Operating Costs

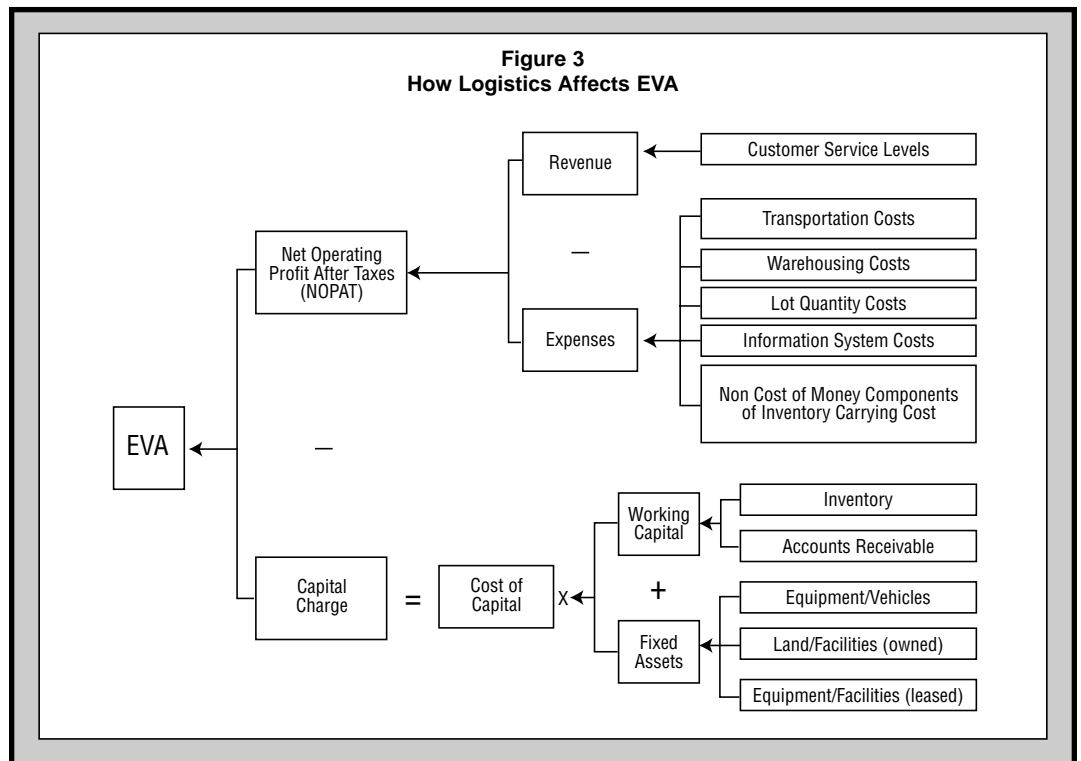
The potential for operating cost reduction through logistics is considerable. A large proportion of costs in a typical business

is driven by logistics practices. Savings in transportation costs, warehousing costs, lot quantity costs (the costs associated with purchasing and producing in different lot sizes), information systems costs and the non-cost-of-money components of inventory carrying costs (as a result of inventory reductions) all represent opportunities for increased net operating profit after taxes. Logistics innovations that reduce costs, such as time compression in the supply chain, must be documented for top management and customers must be shown how these savings are affecting their EVA measures.

Working Capital

Logistics can have a significant influence on working capital requirements. Long supply chains by definition generate more inventory. Order fill and invoice accuracy directly affect the ability to collect accounts receivable in a timely manner. Faster collection of receivables and lower inventories free up cash for other investments. Working capital requirements can be reduced through time compression in the supply chain and the associated improvement in cash-to-cash cycle times (the time from the payment for purchased materials until the sale of the finished product and collection of cash). The

The customer service provided by logistics can have a major impact on sales volume and customer retention.



cash-to-cash cycle time can be six months or longer in many manufacturing industries [29]. By focusing on eliminating the time in the supply chain that does not add value, reductions in working capital can be achieved.

Fixed Assets

Logistics is asset intensive and in many companies the potential for asset reductions is substantial. Investments in trucks and materials handling equipment can be significant as can be the investment in company-owned as well as leased warehousing facilities.

When it is possible to reduce a customer's investment in fixed assets the impact on the customer's EVA should be measured. Similarly, if the logistics function implements programs that reduce the corporation's investment in logistics related fixed assets, the impact on EVA should be measured and sold within the firm.

Selling the Value Advantage

It is critical to measure value from the customer's perspective. Once value has been measured, it must be sold to the customer. It is important at this stage to identify who in the customer organization is the appropriate level executive to receive this information.

For planning purposes, it is important to remember that value is a moving target. Customers can be expected to pay a premium only for service that is incrementally better than that of competitors. As competitors improve, so must the company. What represents value-added this year will not represent it next year if competitors can match the level of service provided.

In addition, the role of the sales force is changing. Increasingly, salespeople must be consultants for the customer. In terms of the products and services that they are selling, they must know the customer's business better than the customer. And, they must be constantly searching for new ways to add value for the customer. For these reasons, knowledge of how to measure and sell the value of logistics should be a necessary part of the training of the sales force.

It is also critical to sell the value provided by logistics inside the firm. Customer satisfaction surveys should be used

to estimate the impact of logistics on revenue. Logistics performance metrics should be designed to capture the impact that logistics is making on operating expenses, working capital and fixed assets. Failure to do so will put the logistics organization and its programs at risk. Everyone on the top management team should know how logistics is contributing to the performance of the company's share price.

Conclusions

The advantages and disadvantages of the various methods of measuring value are summarized in Table 6. The most common measures of value used in corporations are customer satisfaction measures [30]. However, these are the least financially oriented metrics and only in rare cases will they result in customers paying premium prices or rewarding the supplier with sufficiently large increases in volume. In some cases total cost analysis is used, but we would argue that if customers are expected to pay for value-added services that influence revenue then total cost analysis is not an acceptable measure of the value of the supplier's performance. Total cost analysis when used within the organization to show the value of logistics reinforces the view that logistics is simply a cost center.

In cases where there are revenue implications associated with logistics performance, total cost analysis falls short. For example, if the firm is selling a consumer product through retailers, the measure of value should be profit contribution. Increasingly, anything that a firm can do to help its customers better serve their customers and/or the consumer adds value. But, every attempt should be made to show the financial impact of these value creation efforts. If the buyer is being judged only on margin and inventory turns, then it will be necessary to sell at a higher level in the organization. There will be an education process that must take place. Buyers are going to buy the way they are rewarded for buying. If they are judged on gross margin and not on profitability, that is how they will buy. However, increasingly firms will have the capability to generate contribution reports by stock keeping unit and measure the costs and revenues associated with different suppliers.

...knowledge of how to measure and sell the value of logistics should be a necessary part of the training of the sales force.

Once that happens, buyers are going to be more willing to consider all the cost and revenue implications of supplier alternatives. They are going to look at transportation costs, warehousing costs, and the other costs that show up in their reports as well as attempt to estimate the impact that suppliers have on revenue.

We believe that shareholder value is the most comprehensive measure. Research is necessary to determine cost effective ways to measure the impact of logistics on shareholder value. What are the time and

cost implications of attempting to specify the impact of logistics operations on the value of the customer's firm as well as on the value of supplier's own stock price? Is it possible to segment the market based on value? Another important point is that value is a moving target and customers can be expected to only pay for incremental value received. What represents incremental value this year may not represent incremental value next year if competitors improve. Customers can be expected to reward suppliers only for incremental value creation. It is constantly

...value is a moving target and customers can be expected to only pay for incremental value received.

**Table 6
Comparative Advantages and Disadvantages of Various Value Metrics**

Value Metric	Advantages	Disadvantages
Customer Satisfaction	<ul style="list-style-type: none"> • Has a direct impact on the bottom line through revenues and total logistics costs • Improves market share • Enables alignment of services with customer needs • Relatively easy to obtain these measures • Customer does the work by filling out the survey 	<ul style="list-style-type: none"> • Relies on the customer to determine if the level of satisfaction justifies paying a premium price or purchasing more from the supplier • Relies on management outside of logistics to identify the impact on revenues which typically does not happen
Customer Value-Added	<ul style="list-style-type: none"> • Based on the notion that value beyond price leads to higher sales figures, higher profit margins and higher shareholder value • Relatively easy to obtain these measures • Customer does the work by filling out the survey 	<ul style="list-style-type: none"> • Relies on the customer to determine if the level of customer value-added justifies paying a premium price or purchasing more from the supplier • Fails to measure the financial impact of providing higher levels of customer value-added
Total Cost Analysis	<ul style="list-style-type: none"> • Price and related costs are considered • Managers can improve profits by reducing total cost of logistics 	<ul style="list-style-type: none"> • Does not consider revenue implications of logistics related service • More time consuming since it has to be done on an individual customer basis • Requires access to cost information • Perpetuates the myth that logistics is simply a cost that must be reduced
Segment Profitability Analysis	<ul style="list-style-type: none"> • Revenue and out-of-pocket costs are considered 	<ul style="list-style-type: none"> • Does not measure the cost of assets employed with the exception of inventory and accounts receivable • Need revenue and cost data by supplier. Customer may not have these data or be willing to share supplier data • Requires sophisticated accounting system
Strategic Profit Model	<ul style="list-style-type: none"> • Measures net profit, ROA, return on net worth • Assists managers in the evaluation of cash flows and asset utilization decisions 	<ul style="list-style-type: none"> • Fails to consider the timing of cash flows • Subject to manipulation in the short run • In addition to revenues and costs, assets dedicated to the relationship must be known
Shareholder Value	<ul style="list-style-type: none"> • Recognizes the time value of money and the risk of an investment • Focus on cash flow overcomes the inadequacies of traditional financial measures 	<ul style="list-style-type: none"> • Implementation related concerns in the areas of discount rates, planning period, and projected cash flows (missing linkage between the business strategy and shareholder value). • Most data intensive method • Most time consuming and expensive to implement

necessary for management to innovate and look for new ways to add value for customers. Once this has been accomplished, customers must be shown in financial terms how they are benefiting. Finally, executives from functional areas other than logistics must be shown how this value proposition for customers translates to value creation for the company's own shareholders. Only then, will situations such as the one described at the beginning of this article be avoided.

References

- [1] Lambert, Douglas M. and M. Christine Lewis, "Managing Customer Service to Build Market Share and Increase Profit," *Business Quarterly*, Vol. 48, No. 3 (Autumn 1983), p. 50.
- [2] Heskett, James L., W. Earl Sasser, Jr. and Leonard A. Schlesinger, *The Service Profit Chain*, New York, NY: The Free Press, 1997, pp. 57-79.
- [3] For more information on how to conduct a customer service audit, see Chapter 4 of: Douglas M. Lambert and James R. Stock, *Strategic Logistics Management*, 3rd Edition, Homewood, IL: Richard D. Irwin, Inc., 1993, pp. 127-143.
- [4] Gale, Bradley, *Managing Customer Value*, New York, NY: The Free Press, 1994.
- [5] Naumann, Earl, *Creating Customer Value: The Path to Competitive Advantage*, Cincinnati, OH: Thompson Executive Press, 1995.
- [6] Naumann, Earl, *Creating Customer Value: The Path to Competitive Advantage*, Cincinnati, OH: Thompson Executive Press, 1995, p. 101.
- [7] Gale, Bradley, *Managing Customer Value*, New York, NY: The Free Press, 1994.
- [8] Gale, Bradley, *Managing Customer Value*, New York, NY: Free Press, 1994, p. 29.
- [9] For an explanation of the PIMS database see: Robert D. Buzzell, Bradley T. Gale and Ralph G.M. Sultan, "Market Share-A Key to Profitability," *Harvard Business Review*, Vol. 55, No. 1 (January-February 1975), p. 105.
- [10] Lambert, Douglas M. and James R. Stock, *Strategic Logistics Management*, 3rd Edition, Homewood, IL: Richard D. Irwin, 1993.
- [11] Ellram, Lisa M., "Framework for Total Cost of Ownership," *The International Journal of Logistics Management*, Vol. 4, No. 2 (1993), pp. 49-60; and, Lisa M. Ellram and Arnold B. Maltz, "The Use of Total Cost of Ownership Concepts to Model the Outsourcing Decision," *The International Journal of Logistics Management*, Vol. 6, No. 2 (1995), pp. 55-66.
- [12] Lambert, Douglas M., "Logistics Cost, Productivity, and Performance Analysis," in James F. Robeson and William C. Copacino, Eds., *The Logistics Handbook*, New York, NY: The Free Press, 1994, pp. 260-302.
- [13] Christopher, Martin and Lynette Ryals, "Supply Chain Strategy: Its Impact on Shareholder Value," *The International Journal of Logistics Management*, Vol. 1, No. 1 (1999), pp. 1-10.
- [14] McCrory, Francis V. and Peter G. Gerstberger, "The New Math of Performance Measurement," *The Journal of Business Strategy*, Vol. 13, No. 2 (March-April 1992), pp. 33-38.
- [15] Rappaport, Alfred, *Creating Shareholder Value: The New Standard for Business Performance*, New York, NY: The Free Press, 1986.
- [16] Stern, Joel M., "One Way to Build Value in Your Firm, a la Executive Compensation," *Financial Executive*, November-December 1990, pp. 51-54.
- [17] Copeland, Tom, Tim Koller and Jack Murrin, *Valuation: Measuring and Managing the Value of Companies*, New York, NY: John Wiley and Sons, Inc. 1994, p. 22.
- [18] Copeland, Tom, Tim Koller and Jack Murrin, *Valuation: Measuring and Managing the Value of Companies*, New York, NY: John Wiley and Sons, Inc. 1994, p. 23.
- [19] Copeland, Tom, Tim Koller and Jack Murrin, *Valuation: Measuring and Managing the Value of Companies*, New York, NY: John Wiley and Sons, Inc. 1994, p. 23.
- [20] Rappaport, Alfred, *Creating Shareholder Value: The New Standard for Business Performance*, New York, NY: The Free Press, 1986.
- [21] Stewart, G. Bennett, III, *The Quest for Value: A Guide for Senior Managers*, 2nd Edition, New York, NY: Harper Collins, 1999.
- [22] Mills, Roger and C. Print, "Strategic Value Analysis," *Management Accounting*, Vol. 73, No. 2 (February 1995), pp. 35-36.
- [23] Ehrbarg, Al, *EVA: The Real Key to Creating Wealth*, New York, NY: John Wiley

and Sons, 1998.

[24] Kanter, Jeffrey M. and Matthew P. Ward, "Long-Term Incentives for Management, Part 4: Performance Plans," *Compensation and Benefits Review*, Vol. 22, No. 1 (January-February 1990), pp. 36-49.

[25] Copeland, Tom, Tim Koller and Jack Murrin, *Valuation: Measuring and Managing the Value of Companies*, 2nd Edition, New York, NY: John Wiley & Sons, Inc., 1995.

[26] Arzac, Enrique R., "Do Your Business Units Create Shareholder Value?" *Harvard Business Review*, Vol. 64, No. 1 (January-February 1986), pp. 121-126.

[27] Christopher, Martin and Lynette Ryals, "Supply Chain Strategy: Its Impact on Shareholder Value," *The International Journal of Logistics Management*, Vol. 10, No. 1 (1999), p. 3.

[28] Anderson, Eugene W., Claes Fornell

and Donald R. Lehmann, "Customer Satisfaction, Market Share and Profitability: Findings from Sweden," *Journal of Marketing*, Vol. 58, No. 3 (1994), pp. 53-64; and, Coca-Cola Retailing Research Council and Andersen Consulting, *The Retail Problem of Out-of-Stock Merchandise*, 1996.

[29] Christopher, Martin and Lynette Ryals, "Supply Chain Strategy: Its Impact on Shareholder Value," *The International Journal of Logistics Management*, Vol. 10, No. 1 (1999), p. 4.

[30] Keebler, James S., Karl B. Manrodt, David A. Durtsche and D. Michael Ledyard, *Keeping Score: Measuring the Business Value of Logistics in the Supply Chain*, Oak Brook, IL: Council of Logistics Management, 1999, p. 61.

Douglas M. Lambert is the Raymond E. Mason Professor of Transportation and Logistics and Director of The Global Supply Chain Forum, Fisher College of Business, The Ohio State University; and the Prime F. Osborn III Eminent Scholar Chair in Transportation and Logistics, Professor of Marketing and Logistics and Director, The International Center for Competitive Excellence at the University of North Florida. Dr. Lambert has served as a faculty member for over 500 executive development programs in North and South America, Europe, Asia, Australia and New Zealand. He is the author of *The Development of an Inventory Costing Methodology*, *The Distribution Channels Decision*, *The Product Abandonment Decision* and co-author of *Management in Marketing Channels*, *Strategic Logistics Management* and *Fundamentals of Logistics Management*. His publications include more than 100 articles. In 1986 Dr. Lambert received the CLM Distinguished Service Award for his contributions to logistics management. He holds an honors BA and MBA from the Ivey School of Business at the University of Western Ontario and a Ph.D. from The Ohio State University. He can be reached at The Ohio State University, 506 Fisher Hall, 2100 Neil Avenue, Columbus, OH 43210-1399. Phone: 614/292-0331. Fax: 614/292-0440. Email: lambert.119@osu.edu. He also can be reached at the University of North Florida, 4567 St. Johns Bluff Road South, Jacksonville, FL 32224. Phone: 904/620-2585. Fax: 904/620-2586. E-mail: dlambert@unf.edu

Renan Burduroglu is Director of Retail Measurement Services, AC Nielsen ZET, Istanbul, Turkey and a Ph.D. candidate at Bosphorus University. She holds an MBA with a concentration in Logistics from the University of North Florida in Jacksonville. In 1999, she received the Chairman's Award for Excellence for her contributions to revenue and employee satisfaction. She can be reached at the AC Nielsen ZET, Kar Plaza Kayisdagi Caddesi, Karamnli Ciftlik Sk. E Blok, No. 45, K.14, 81120, Icerenkoy, Istanbul, Turkey. Phone: 011-90-216-469-1500 (extension 1650). Fax: 0216-469-1369. E-mail: renanb@acnielsenzet.com.tr