The Cost-to-Serve Method

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Integrating business processes across functions is at the heart of logistics and supply chain management. The fundamentals of compressing time across the chain are well understood. There is a common expectation among logistics professionals that cost will fall out of the supply chain from such programs. The theme of supply chain management is that many businesses are not in the trade-off zone where cost must be balanced against service, but are in the area where good supply chain practice can drive service up and cost down simultaneously.

The central issue for any business is how to meet or exceed customers' expectations in terms of service, at an affordable cost in relation to prices customers are prepared to pay. If expectations are achieved, customers are more likely to stay and are willing to pay more for the service because they value it. Markets are so competitive that there is generally a market rate, which reflects the norm of customers' utility and expectations. Competitive advantage, realizing a premium over the market, is about customers' perceptions and expectations or prior experience of getting extra value. Those perceptions of customer value can be overtaken by competitive innovation in terms of both product and service. In general, product and market half-lives are getting shorter as markets become more global through communications. Competitive advantage can ebb and flow with extraordinary speed. Kanter [1] has observed that global companies are no longer able to introduce products progressively around the world; markets will reject those strategies and resort to grey market trading.

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Companies should no longer choose between being a low cost producer and a market leader in terms of product and service [2]. Supply chain thinking says that they can and should be both. As a result, the role of capabilities becomes more critical. Businesses cannot afford to ignore the central role that high quality and low cost operations will play. When the business is growing, they reinforce profitability; when the business is relatively down, capabilities mean survival. As a result, no company can afford to dismiss organizationally the importance of its operational capability. In essence, companies compete on capabilities [3].

More and more it is focus that counts - a view supported by the work of Hamel and Prahalad [4], who argue that strategic intent is about focus on homogeneous product and market segments. The world of the full-range, full-service vendor is dwindling and reflects an attempt to balance cost and service for the business as a whole. Being competitive in world markets is not about riding a trade-off curve; it is about changing the shape of the curve.

Supply chain principles tell us that:

- If a company can compress its lead-times and raise quality and accuracy at every stage, service will improve and cost will fall out of the business [5].
- Organizations should take a process view rather than a functional view of the operation.
- Working across functional boundaries to integrate business processes is the future. The days of working in functional silos are numbered and organizations must learn how to integrate themselves.

Any organization that can achieve this will have competitive advantage within its grasp, at least for the period of time until the competitive paradigm is changed. The business will get easier and cheaper to run.

The process of supply chain change can be focused on one or both of the following:

- Improving the characteristics of supply in the context of the goals that have been set for service.
- Changing the service objectives.

Such a process is the starting point for a virtuous circle of securing competitive advantage. But there is a paradox; adopting cross-functional supply chain thinking does not eliminate the need for functional excellence. Both are needed and neither can be totally dominant in the new paradigm.

How organizations grasp the supply chain opportunity is a critical success factor in their entire business strategy. A literal interpretation of the process view of business would imply that connections between individual processes, such as order fulfilment and supplier development, are unimportant. But this is not the case. The organization needs to be an integrated whole, based on both the principles of competitiveness and the economic realities of how the business adds value.

The idea of Economic Value Added (EVA) has been widely recognized as a new way to relate financial and stock market performance to the business model and the way the company adds value [6]. There is much that is both valuable and supply-chain-related in this work, but it is essentially historic in nature. The analogy is one of driving forward while looking out of the back window when the road ahead is increasingly hazardous.

The business issue is how to provide information to the functions, which will surface the reality of the competitive environment and the opportunities that the supply chain can offer. Integration requires information, but the functionally-based cost information, with which companies have traditionally worked is limiting and restricting in the vision it provides of how things might be. It is this dilemma that the Cost-to-Serve method has been designed to address. Unlike many new techniques, it does not try to supersede old ways of working; rather it attempts to overlay new insights while enabling the established organization to integrate. Experience has shown that this is a faster route to major change; indeed it is a driver for change.

Drivers for Change

Organizations express their supply chain issues in ways that reflect the key internal perceptions of the hot topics for decision-making. Our experience is that these issues tend to be related. The following terms represent core themes that we regularly encounter: cost of variety; customer channel management; customer service objectives; supply chain routing and network structure; commercial and pricing policy; and, functional cost emphasis and personal rewards.

Cost of Variety

This implies that individual products within a portfolio do not contribute equally to business profitability. Methods of standard costing do not reflect the true burden of variation in the range in terms of: rate of sale; consequential inventory levels; holding costs and obsolescence; changeover times in manufacturing; and, the cost of ordering and administration.

A straightforward gross margin calculation across a range will not isolate these issues, reflecting as it does the direct material and labor costs and the overhead recovery through manufacturing derived from average rates of throughput. The classic Pareto curve shown in Figure 1 is one with which many companies are familiar; but the implication of this curve in terms of rates of sale and volatility on the cost base of the business may be lost.

The natural inclination of the functions in the supply chain is to ignore these differences and continue to schedule the operation to maximize their own functional efficiencies. Examples from our experience include:

- A pharmaceutical manufacturer packaging a year's supply of a drug for Greece in a single run.
- A consumer goods manufacturer shipping to its depots in full pallet quantities when the actual consumption represented by a pallet is 6 months.

Actions like these are counter to time compression principles, and no one in the organization knew the true supply chain cost implications or if there was a better way.

The marketing preference for product variety is dominant and generally prevails. If the costs of this are not well known, the debate on value and the commercial implications of the range is one that can only be conducted on gut feeling. Meanwhile manufacturing and physical logistics will operate in ways that maximize the measures of performance, which the accounting system creates, such as overhead recovery.

Managers in leading companies are

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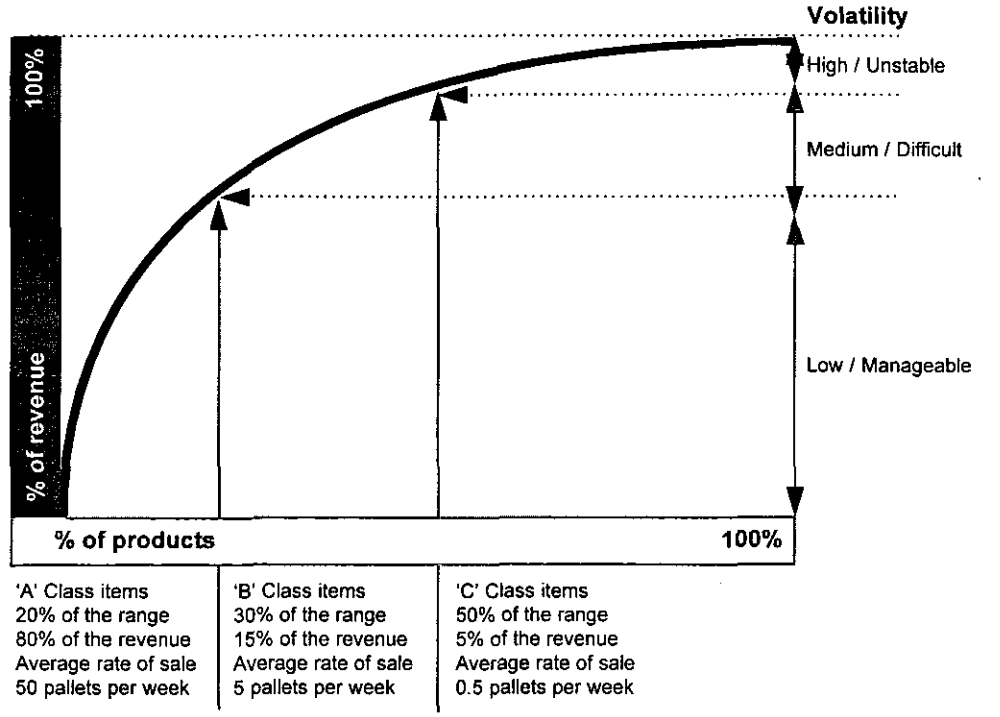
Figure 1
Typical Pareto Curve With Rates of Movement



working to implement postponement or localization strategies and apply de-coupling point principles to inventory management. They are often able to justify these based on high level cost reduction derived from structural changes: for example, taking out local distribution capacity and reducing inventories. Such practices will compress the band width of the cost of variety, but the differences will generally remain and be significant.

The scale of the differences in the Cost-to-Serve of customer groups or channels that emerge from a full analysis can be quite remarkable.

Customer Channel Management

This is another dimension of business variety through which Pareto's law is evident. Every business has both large and small customers; mostly the commercial terms for the larger customers recognize the scale of the business they place through lower prices. The concept of channel management is now well established and has been introduced to band customer groups together to reflect sets of homogeneous behavior. For example, the use of distributors by manufacturers in the computer industry is commonplace. This group manages customer demand quite differently from local dealers and is intrinsically cheaper to do business with. The distributor channel also accesses a wider market.

If we look at a simple table of the cost impacts of dealing with large and small customers (or bulk and high service channels) they are generally more far reaching than is anticipated. This is shown in Table 1.

The scale of the differences in the Cost-to-Serve of customer groups or channels that emerge from a full analysis can be quite remarkable. The strategic message is that it is difficult for a business to serve many channels simultaneously, all at the lowest cost and consistent with the market requirement. As a result, the role of the distributor in the chain is being reinvented, as larger companies are externalizing the capability to handle smaller accounts. This is creating a dilemma for pricing as the full costs of the smaller business supply chain become better understood and the margin and pricing implications are opened up. There may be no easy answers to such problems. An era of commercial policy is being put under the microscope and changes in the commercial arena are accompanied by competitive risk. However, there is no

alternative to knowing the cost-to-serve as a starting point for change.

Customer Service Objectives

The nature of the service commitment that a company makes to its customers is a key part of its market place positioning and a fundamental starting point for its supply chain strategy and structure. In line with the cost differences between large and small customers, there is generally a service expectation difference. The time-to-serve different customer groups may vary. Also within customer groups the true service requirement may not be the same from one order to the next.

Over recent years there has been immense management attention given to customer service achievement through the use of information technology to calculate and report on measures like OTIF (On Time, In Full), supplier performance rating and softer perception surveys. Generally, the trend has been to shorter service lead-times to secure competitive advantage and with a one size fits all philosophy. This has been driven by marketing, often with costs being absorbed through functional improvements in efficiency. The freight community has served industry well by reducing the real costs of freight and providing much greater flexibility and shorter lead times. As a result, decisions to raise service as expressed in lead time have so far been quite easy.

The impact of downward pressure on inventory levels and increasing volatility in the supply chain is now being felt in declining performance attainment, or sudden short-term failures. Leaving customers short of product is damaging for revenue, customer retention, goodwill, and future price negotiations. In some cases it leads to fines or liquidated damages. The moment they occur, such difficulties overwhelm any advantages from cost reduction in the supply chain. As a result, many companies are investing in planning and scheduling systems to overcome shortfalls in customer service attainment at the OTIF level.

The big idea that emerges from this situation is a customer service covenant. The principle is to segment the service objectives of the different channels, (and sometimes also within the channels), and to place those requirements into a written framework against

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Table 1
Customer-driven Characteristics and Costs

Large Customers	Small Customers
Characteristics of demand	
Large quantities and ordered in bulk	Small orders, frequently with many items
Forward forecast often available	Capable of occasional large orders
Subject to erractic requirement changes	No forecasts
Reliability valued above short lead-times as tend to hold inventory	Rarely hold inventory. Require short lead-times
Still likely to place many small orders alongside large ones	Not usually well organized so still require reliability and predictability
Often impose logistics contraints around documentation and delivery times	More likely to accept standard logistics arrangements for delivery
Very demanding on returns for credit and clean documentation and will only pay on time if this is right	Higher risk with credit control and collection
Cost impact areas	
Low physical logistics costs for the bulk of the volume, as full pallets and truck load distribution with plannable lead-times	High costs of order processing as few items and low value
Low order-processing costs due to high value order line	High costs of picking and packing
High costs associated with specials and singles usually supplied at bulk prices	Higher costs of delivery in relation to order value
High administration costs of covering mistakes to secure payment	High costs of credit control and debt collection with risk of bad debt

which the supplier-customer relationship can be measured and costed. The word covenant is used to imply a greater degree of flexibility and mutual trust than is interpreted by using the word contract.

The consequence of such an approach is that customers start to understand the tolerance of suppliers' chains to deliver what is required under the various conditions in which their requirements are placed. In the same covenant, suppliers know they are allowed to moderate the expectations of their customers when difficult requirements are placed; and that a measure of on-cost will be accepted by customers. This is exciting new ground with some major implications:

- Companies will no longer have a single goal for the standards of service for a customer or channel.
- Companies may need more than one supply chain design to address the different requirements and the 'tolerance' that is set.
- The basis for a discussion of customer requirements with associated costs is a way of institutionalizing supplier-customer relationships.

But first a company must understand its full supply chain costs and its key drivers.

Supply Chain Routing and Network Structure

This is invariably a key issue for management. It represents the operational footprint through which the supply chain is executed. It is seen as being strategic. Management devote much effort to attempts to rationalize their networks. The trend of the past few years has been towards:

- Fewer market-based inventory locations.
- Inventory held at a generic level as far back up the chain as possible and preferably at the plant that made it.
- All sites engaging more flexible transport networks using Truck Load (TL), Less than Truck Load (LTL) and Express modes.
- Outsourcing of not just transportation, but warehousing and some final assembly or localization.

Actions to date have usually been of a macro nature implying downsizing and rationalization. But the implications of a variable service covenant on the network design can be immense. In this context, the future will be about another level of reduction and rationalization, but more finely tuned to the dynamics of the supply chain. The supply chain routing will be dynamically adjusted to the characteristics of the order, the real service commitment that the customer requires and the availability of product in the supply chain. This means that a number of routes will be open for use to serve a particular customer and is illustrated in Figure 2.

The implication of this approach is that local inventories will fall yet further and that the true cost of doing business with some channels or order types will be fully understood. A consequence of this will be the development of new types of shared use facilities, a theme we will touch on again later.

Commercial and Pricing Policy

Price and the terms of trade determined by the organization usually reflect the corporate view of market opportunities, as well as, the company's competitive positioning. It is clear from the discussion so far that the rate of erosion of the planned gross margin by different products and customers can differ remarkably. Our experience is that the combination of products, customers, logistics routings and pricing policy can obliterate the planned margin completely for a significant part of the business. For distributors this may be an easy problem to solve once the information is at hand: discontinue the lines/customers, adjust prices, reduce costs, or some of each. For manufacturers or full range service providers, the information must be tempered with commercial caution as there are the tricky questions of product-market interaction and overhead recovery to consider.

These arguments can be persuasive barriers to change as they introduce questions of risk, total economics and overall market place strategy to the decision-making process. Indeed the implications of a true profitability analysis are strategic. In order to consider such implications with any balance, quality information is first required on the relationship between prices and costs; then the debate is enabled.

Hamel and Prahalad [4] provide a chilling warning that a lack of focus creates cost, economies of scale across products and channels can be a myth. Businesses must have integrity of purpose in their market positioning and a supply chain focus, which

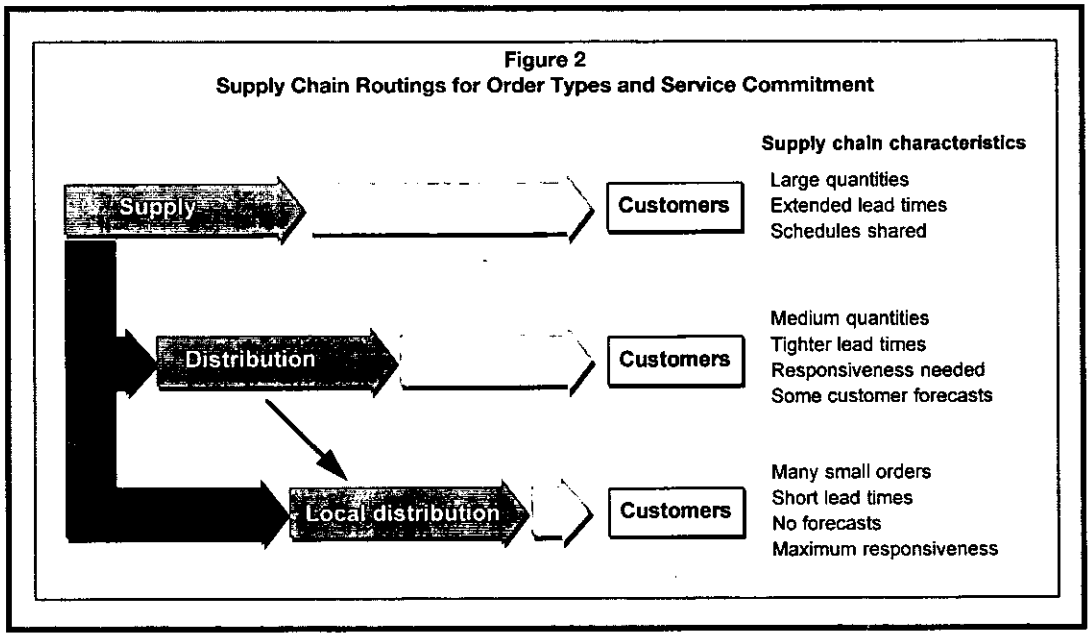

Figure 2
Supply Chain Routings for Order Types and Service Commitment

serves that positioning. Attempting to be all things to all people is a recipe for decline.

Functional Cost Emphasis and Personal Rewards

The grip of the general ledger on the control processes of most large corporations is vice-like. The financial architecture of a typical corporation reflects its organization, history, culture and priorities. This is both inevitable and necessary. It is through such structures that our colleagues in finance exercise their obligations of fiduciary care. Over the long-term companies have evolved these systems as a response to their business environment, but the rate of evolution will need to accelerate as competitive pressures mount.

The functional emphasis that the general ledger brings, reinforces the organizational architecture and is a powerful barrier to supply chain change. In contrast, supply chain thinking is truly radical for most corporations and asks that a new balance is struck between functions, and that new types of cost and performance targets are set for the people in the business. This is a major change for the majority of middle managers. For example, we may suddenly be telling them that they can spend more on freight to get the product to the customer when it becomes available, rather than waiting to fill a truck on the next scheduled route; or that they should increase their manufacturing costs to save money on inventory and reduce damage to service downstream.

If these messages are not carried through to the personal goals, reward and recognition programs and to a realignment of their budgets, managers would probably not believe or trust their directors. And they would be right! How many times have we experienced the sudden edicts two months before year-end ordering only full truckload shipping, building inventory way above plan to maximize recovery of fixed costs, and loading the channel with stock it did not need, which will almost certainly come back?

In much the same way as we have advocated a customer service covenant with customers, a business also needs a covenant with its management. New ways of working will be stabilized and institutionalized in the organization and playing the new game will secure the rewards and recognition that drives achieve.

Finance needs new tools to do this. However, we do not believe that it is practical to think of replacing the conventional general ledger systems. They will remain a crucial anchor to the whole control of a corporation and its legal responsibilities. Neither does the idea of elaborate activity-based techniques appeal. The cost of maintaining these is high. The tendency is to work to levels of detail that do not enhance policy making. Time is a factor. Elaborate systems and process changes take years to set up and make secure. Time is a competitive factor and extends to the finance function, even though they might find this idea new.

Five Keys to Organizing for Supply Chain Thinking

Out of these issues emerge five keys for internalizing supply chain thinking for a corporation: (1) the importance of knowing costs; (2) organizational re-balancing; (3) outsourcing and shared cost structures; (4) avoidable and fixed costs; and, (5) risk and timing.

The Importance of Knowing Costs

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An understanding of how cost accumulates through the supply chain in an holistic way, based on the combinations of products and customers, is essential to handling the business issues associated with the supply chain. It is a cornerstone of deciding what to change, and how to prioritize such changes. If the theme of cross-functional organization based on processes is to be realized, then the business needs a view of the true process costs and the factors that drive those costs.

The conventional ways of recording and managing cost through general ledger and functional budgeting controls are not adequately focused on the process of integration. The role of finance as the treasury function with its emphasis on accuracy and caution is not well aligned to the adoption of new methods of looking at the business. Attempts to apply elaborate activity-based costing techniques have not often proved successful, as they have tried to capture excessive detail, reflecting the precise culture of the finance function.

What is needed is a simpler method of looking at process-based costs, which does not descend to excessive detail (which in any event is inapplicable in the relatively coarse art of determining strategic direction). The method must be capable of being tied back to the cost base of the business. It must be capable of throwing up benchmarks for the business and directing attention to the strategic issues in both customer and product variety, supply chain design and commercial and service terms.

Organizational Re-balancing

When the business knows its costs to a sufficient degree of accuracy, then it has a platform from which to work towards the new paradigm. This is a business process in its own right and will be a new skill for most companies. In the same way that companies have internalized processes like planning, forecasting and financial budgeting, the process of balancing the organization is one that must be learned and internalized. Figure 3 illustrates the way in which the issues raised by a Cost-to-Serve Analysis can be used to reach a new balance in the business. Re-balancing can be made at either or both:

- A tactical level: the channels that will be favored; commercial terms that will be adjusted; and, functions that will have expenditure constraints relaxed to reduce costs elsewhere in the business.
- A strategic level: the conditions of customer service; the nature of the investments in supply; capacity and network design.

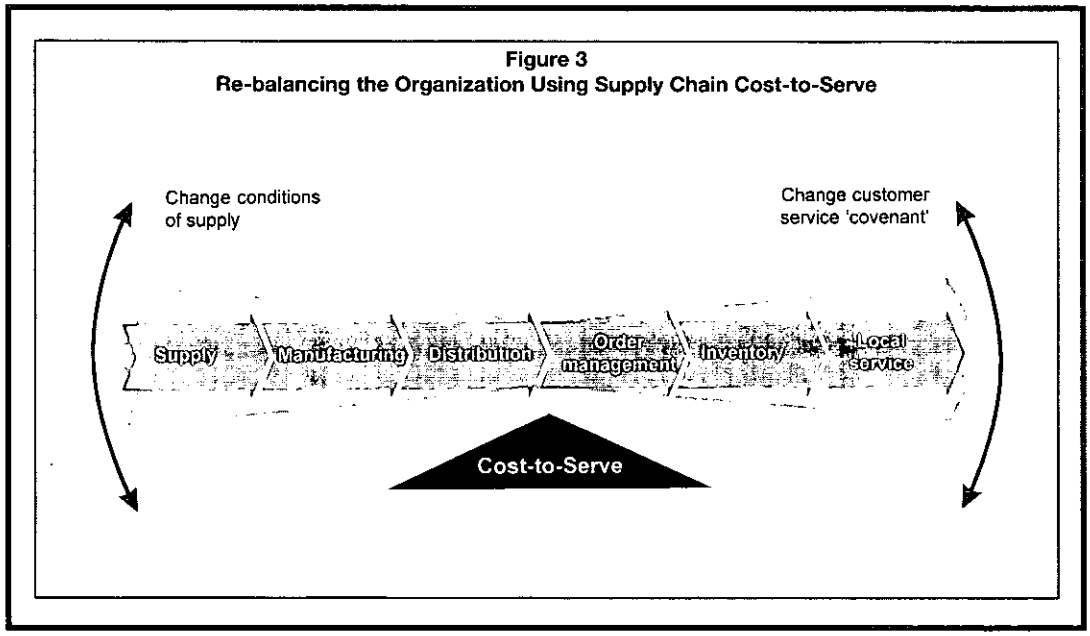
Even with a clear picture of the true costs, the balancing process is not easy. It takes time for people in a business to understand the implications of the new cost picture. This may not sit easily with the established power balance in the business.

The implication of this is that securing organizational re-balancing is not a one-step process. It is a journey upon which an organization should set out with openness, integrity, and a commitment to resolve the conflicts that will arise with determination and care.

Outsourcing and Shared Cost Structures

The use of outsourcing is widespread in supply chain management. It ranges from contracting out manufacturing, through to physical logistics, order management and call center operations. Some service providers are now handling the planning and execution processes around inventory management and giving full systems support. There is the whole area of information systems outsourcing, which has been one of the growth businesses of the 90's.

The argument for outsourcing is often couched in terms of externalizing aspects of the operation that are not core competencies. This is usually interpreted as the idea that there are things that the business does not do well; that are not of strategic significance to its market positioning; and, therefore be let go. This seems to us to be a limiting view, which constrains the whole concept of outsourcing. The real arguments go somewhat deeper:



- Letting go of a function or operation for an expected one-off step change in cost performance does not recognize the Cost-to-Serve segmentation that may exist in the business; and, may inhibit that view being taken later.
- It is an implicit abdication by management of its duty to understand and manage its cost base; and, can prevent organizational re-balancing.
- Cost performance may improve (although there is an abundant case-load of disappointment with outsourcing), but the areas of leverage in the five levels of supply chain improvement shown in Figure 4 often do not extend beyond the first two.
- The real quantum comes from engaging capacity and capability in third parties, which enables increasing focus on the individual supply chains of the business.

The choices for management making outsourcing decisions rest on either the supply chain function providing a unique capability conferring competitive advantage, or alternatively, logistics costs can benefit from shared leverage to such a degree that they are taken out of the competitive arena.

In the light of our earlier observations on the perishability of competitive advantage, this is not a stationery target. The obligation is on the contracting company to stay in conceptual control, which seems to be the point that is often missed. It is a true act of abdication to let an outsourcing contract without establishing a process to stay on top of the Cost-to-Serve and to continue to work on how the relationship may be able to add value in the future.

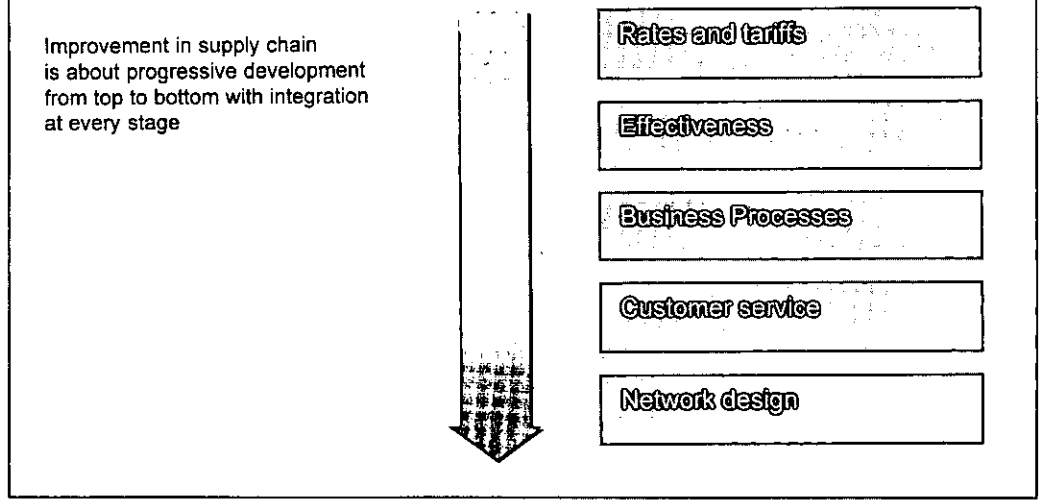
Avoidable and Fixed Costs

One of the dilemmas for most large businesses is the ratio of fixed to variable cost.

One of the dilemmas for most large businesses is the ratio of fixed to variable cost. Typically the fixed costs of an establishment are in excess of 50% and may reach 85% of the total supply chain costs. In many companies the true activity-related costs of logistics are as low as 10%, with the balance being fixed, establishment-related or semi-variable. The implications of this in a Cost-to-Serve and organizational re-balancing process can be profound, for example:

- Costs have different time horizons over which they can be avoided - some can be cut quickly, while others are actionable only in the long-term.
- Any realignment of the supply chain, which changes activity levels, will have an impact on the perceived effectiveness of the residual activity as establishment costs are back-flushed on to the remaining activities.
- It is easy to reject such an approach as tending to make everything uneconomic and so reduce the process to absurdity. That is where management judgement must be brought to bear. Such judgements are enabled by the process. The process does not force the decision.
- Exceptional changes may be needed- relating to the corporation 'investing' to adjust its fixed cost base and bring the

Figure 4
The Five Levels of Supply Chain Improvement



performance up to world-class. Procter and Gamble is a classic example of such an approach. They made a $1.4 billion exceptional charge to reorganize manufacturing in line with smoother demand created by supply chain management.

- There may be value in keeping the cost structure more variable and accepting a cost premium to reduce the exposure of the business to future change.

In any event, it will be easier to face such complex choices if the corporation has a view of its Cost-to-Serve.

Risk and Timing

Business people are conditioned to avoid or minimize risk. An unwritten rule of corporate governance is that you don't bet the business, or at least, not unless you have to, or you think you have all the angles covered.

Our experience is that quantum change is often blocked within the organization. This may come from inaccurate perceptions of risk based on the functional cost emphasis and an incomplete picture of the exposure that a particular decision may create. It is easy to spend time worrying about things that ultimately prove not to be a problem. The ability through Cost-to-Serve analysis and modeling to create a prioritized and time-phased plan of change is a powerful means to segment risk, and handle the issues it creates in a controlled way.

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The Cost-to-Serve Method

In this section we present an example of how we have applied the Cost-to-Serve method. The method is not a rigid documented procedure; rather it is an approach that can be applied at varying levels of sophistication from simple spreadsheets to advanced relational databases. The analytical tools are built to reflect the particular circumstances of the company in terms of both the complexity of the business and the issues that need to be addressed. In this example, the analysis is quite high level, looking at only product family and major customer channel detail. This is sufficient to illustrate the key dimensions and the differentials that exist.

The case is based on experience, but the data does not relate to a specific business. The company, HiTech, is a $1.3 billion business in Europe in the consumer electronics sector. It has a Far East parent and much of the product is sourced from the Far East. There are also U.S. and Eastern European plants and the company makes use of outsourced manufacturing. HiTech sells four main product families to the marketplace - monitors, processors, peripherals and accessories. It sells through four main channels - distributors, large accounts, retail and original equipment manufacturers (OEMs). The reader should understand that there may be significant variations within these categories, which

would have to be addressed in real life.

To understand the costs and drivers in HiTech, it is necessary to collect data in some detail and carry out analysis to understand quantitatively the major supply chain characteristics. The results of this analysis feeds the Cost-to-Serve model. Typically this analysis will include: total flows of products by product group/channel down the supply chain; the logistical variety of products within product groups/channels; order and inventory profiles; seasonality/cyclicality; sourcing; delivery performance; warehousing performance; and, transportation performance.

The general nature of these analyses is shown in the example although the actual conditions for a business may require that a particular dimension is addressed in more or less detail. The complexity of the model will depend on the number of channel-product group combinations, and it is crucial to design the model at the right level of detail. That is recognizing variety within product groups and channels while keeping a sufficiently simple strategic viewpoint.

It is our experience that more detailed models do not enable more sophisticated conclusions; simpler is better and faster is a good general rule. This is not a fine tuning approach; it goes straight to the heart of a company's issues. Nevertheless it is a detailed process that brings together company data in a new way. A list of the data areas that may need to be accessed is shown in Table 2.

Once obtained, the data can be analyzed for key cost driving criteria through a relational database, and then re-compiled at the summary level into a spreadsheet. Tables 3 and 4 illustrate part of this summary level. The physical characteristics and revenue of HiTech by product group are summarized in Table 3.

It is immediately obvious that the products that drive revenue are not the same as those driving tonnage and cube. This is illustrated graphically in Figure 5. It is our experience that any analysis that generates such a picture is the prelude to disturbing insights into the relative costs of both products and channels.

Customers are categorized at the high level into four channels - distributors, large accounts, retailers and OEMs. The mix of flows by channel and product group is reproduced in Table 4. This shows that the mix of product by family-channel combination is variable. Channels do not contribute evenly to the business mix. Each family-customer channel set is different. Table 4 allows us to develop the idea of logistical channels as groups of customers/geographies/products in which products exhibit similar characteristics, such as handling, rate of sale, routing and so on. It is clear that products do not all follow the same route or consume the same resources down the various market channels. Also the source of supply impacts on the inbound physical logistics costs.

In this example, while the range is generally delivered ex-stock from a central European warehouse, products bound for OEMs are delivered direct from the plants. This is illustrated in Figure 6 with the Cost-to-Serve attached.

Costs are linked to activities using a key driver for each activity. The activities and drivers used in this example are described in Table 5. Each activity is defined on the basis of a fixed and variable cost. The variable cost being equal to the cost driver extended by the throughput for that activity for its logistical channel. This approach is accurate within a band of capacity tolerance of the existing infrastructure. If the expectation is that this will change, then the model will need some redesign to accommodate projected future costs and capacity.

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Table 6 shows the cost drivers used in the simple model for HiTech.

Table 7 shows the costs by activity and by channel for HiTech derived from Tables 3, 4 and 6.

An important part of the Cost-to-Serve process is tying back the results to the total cost by function in the business. This ensures that the fixed variable ratios have been correctly interpreted, and the model is capturing and linking the various cost drivers correctly.

The final piece of analysis in this example is the relative costs of the product families and the rate at which the planned margin is eroded by channel. This is shown in Table 8.

The implications of this simple example of Cost-to-Serve would be highly significant for HiTech management. To assist the reader we have pulled together this analysis into a simple pictorial representation to show the

Table 2
Typical Areas of Data Enquiry for Cost-to Serve Analysis

Area of data	Comments
Product master file	including product groups, standard manufacturing costs and physical characteristics (units/pallet, units/case, kg/unit, units/m3...)
Customer master file	including customer reference, customer group and geography
Suppliers and manufacturing master file	including geography and lead-time by product
Hub master file	including geography and list of products held/cross-docked in each hub (hubs can be located at manufacturing sites)
Sales data at transaction level (typically for a period of 3 - 6 months)	including order number, shipment number, product code, quantity ordered and delivered, hub reference, customer reference
Sales data, aggregated weekly for a period of 1 year	to understand seasonality and capacity requirements for hubs and outbound freight
Inbound data at transaction level (typically for a period of 3- 6 months	including order number, product code, quantity, supplier/manufacturing reference, hub reference
Sales data, aggregated weekly for a period of 1 year	to understand seasonality and capacity requirements for inbound freight and hubs
Inventory data (for a representative date)	including product code, number of units in stock, hub reference
Operating costs, including Head Office (derived from General Ledger)	
Fixed costs	including rent, rates (e.g. electricity, gas, local taxes, maintenance, water...), indirect salaries fully loaded (including NIS, pensions, company cars), overheads for each facility (e.g. post, telephone)
Financial costs	including building depreciation, computer depreciation, capital cost of holding the inventory, product obsolescence
Variable costs	including direct salaries fully loaded, equipment running costs and depreciation
Distribution costs (derived from General Ledger)	
Fixed costs	including indirect salaries fully loaded and overheads for each facility
Financial costs	including truck depreciation
Variable costs	including drivers' salaries fully loaded, fuel
Outsourcing costs (derived from contractual agreement with 3rd party	
Warehousing rates	including RH&D, cost/pallet/week, administration
Transportation rates	including cost/pallet/week
Capacity constraints	maximum capacity for manufacturing/warehousing/distribution

relative costs by route. This is shown in Figure 6. The key points can be summarized as follows:

- The Cost-to-Serve for the business averages 4.8%, but disguises a range from 3.8% to 7.6% - double the cost from lowest cost channel (distributors) to highest cost (retailers).
- The range of Cost-to-Serve for the product families is even greater from 1.5% of revenue for processors to 15.6% for monitors - a difference factor of ten times.
- The erosion of gross margin down the various channels ranges from 18% to 27% (for the sake of brevity we have not illustrated the relative margin by channel, simply the erosion rate).
- Monitors are the low point of HiTech's

Table 3
Business by Product Sector with Physical Characteristics

	Total ($m)	$4/Kg	Kgs/m²	$s/m3	Tons	m³
Accessories	151	90	190	17,100	1,673	8,807
Peripherals	439	110	121	13,310	3,993	33,002
Monitors	226	22	120	2,640	10,268	85,568
Processors	439	160	175	28,000	2,745	15,688
Total	**1,255**	**67**	**131**	**8,772**	**18,680**	**143,064**

Figure 5
Balance of Revenue, Cube and Tons by Product Family

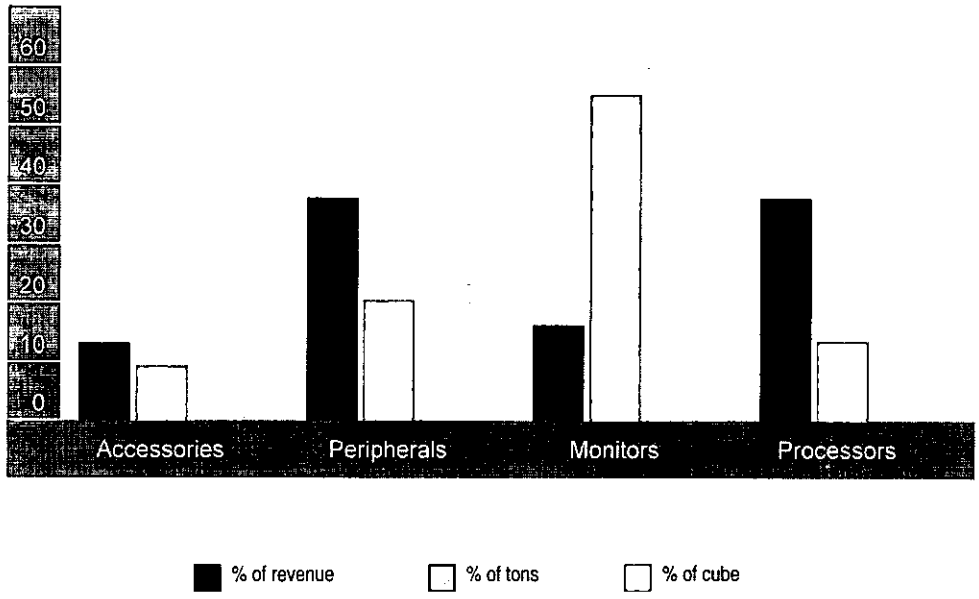

Table 4
Channel and Product Family Segmentation

	Total ($m)	Distributors	Large Accounts	Retailers	OEMs
% of revenue	100%	48%	15%	18%	19%
$m	**1,255**	**602**	**188**	**226**	**238**
Product families by channel %					
Accessories	9%	46%	12%	13%	29%
Peripherals	32%	58%	19%	10%	13%
Monitors	21%	24%	11%	35%	30%
Processors	38%	51%	14%	19%	16%
Product families by channel $ms					
Accessories	151	69	18	20	44
Peripherals	439	255	83	44	57
Monitors	226	54	25	79	68
Processors	439	224	61	83	70

range where sales through distributors make an attributable loss.

The implications of this analysis are that the supply chain contains huge cost differentials. As a result, companies would be well advised to make investment, marketing, sourcing and commercial decisions based on having a Cost-to-Serve framework to hand. In this example the directors of HiTech would be unwise to develop business in the monitor range or with the retail channel if they wish to avoid the risk of disappointing their investors.

The Bottom Line Impact of Cost-to-Serve Analysis

The results that can be secured from applying the toolkit are dependent on the particular circumstances of the company. However, it is often the case that the work leads to priorities that are unexpected. A description of the business issues and the Cost-to-Serve tool kit would not be complete without some examples of typical conclusions and benefits that arise from the process. The depth of impact that the approach can have is seen in the following: short-term improvements; support for strategy developments and investment decisions; framework for sourcing decisions; and, commercial change.

Short-Term Improvements

In one case analysis exposed the fact

Table 5
Typical Cost Drivers by Activity

Activity	Cost drivers
Order management and administration	Orders or order lines
Primary transportation	Cube, routing and frequency
Warehousing	Handling unit and pick detail
Inventory financing costs	Stock cover and IRR
Obsolescence	Stock cover and product life cycle
Direct delivery	Cube and frequency
Local delivery	Drop density and order size

Table 6
Cost Drivers for HiTech

	Units	Total units	$Cost/unit	Distributors	Large accounts	Retailers	OEMs
Channel related							
Order management and administration	Orders	135,000	14.81	35,000	10,000	78,000	12,000
Warehousing	Pallets	158,960	96.88	57,477	21,040	41,527	38,916
	Cases	1,350,000	4.89	337,500	540,000	472,500	—
Inventory financing costs	ex stock	weeks	15%	4	3	6	0
Direct delivery	loads	3,395	980	1,216	283	399	1,497
Local delivery	drops	47,497	120	12,932	3,419	31,145	—

	Units	Total units	$Cost/unit	Accessories	Peripherals	Monitors	Processors
Product family related							
Primary transportation to the Netherlands from:							
Malaysia	Truck equivalent unit	273	4,000	—	795,588	295,063	—
Korea	Truck equivalent unit	515	3,500	239,156	995,735	—	567,996
Czechoslovakia	Truck load	738	2,100	—	—	1,549,079	—
USA	Truck equivalent unit	153	2,500	—	213,372	—	169,046
Outsource Europe	Truck load	788	950	79,339	—	630,697	38,543
Obsolescence	% of revenue			2%	1%	1%	2%
	Cost per year $m			3.0	4.4	2.3	8.8

Table 7
Costs by Activity, Channel and Family

Cost area	Total ($m)	Distributors	Large accounts	Retailers	OEMs
Order management & admin.	2.0	518,519	148,148	1,155,556	177,778
Primary transport	5.6	2,299,320	800,115	1,255,528.3	1,219,649
Warehousing	22.0	7,218,325	4,678,333	6,333,145	3,770,196
Inventory financial costs	3.0	1,455,491	414,765	1,092,400	—
Obsolescence	18.4	8,955,680	2,674,405	3,290,610	3,527,805
Direct delivery	3.3	1,191,538	277,564	391,315	1,466,846
Local delivery	5.7	1,551,873	410,277	3,737,455	—
Total	**60**	**23,190,745**	**9,403,609**	**17,256,009**	**10,162,274**
% of revenue	4.8%	3.8%	5.0%	7.6%	4.3%

that the company had been overpaying for a particular service, and in another that the unit costs of two warehouse sites were a long way apart. The changes that are driven by such conclusions equate to responding to an audit of performance. Improvements can be quickly won and drop straight to the bottom line. The method is, in effect, a means to secure benchmarks that are actionable.

Support for Strategy Development and Investment Decisions

Analysis can provide an assessment of the relative capacity usage of different product groups through the supply chain. This insight is important when investments in capacity are imminent. It is not uncommon to find that a particular product is driving the requirement for capacity, but has a marginal contribution that is well below the requirement for the business. In one case this discovery led to a decision to both relocate and outsource a new warehousing and distribution development. The alternative of developing near the existing manufacturing site was shown to have unacceptable returns. At the same time the existence of some lines in the range was challenged and the whole product line strategy of the business was revisited. The subsequent reduction in investment was worth many millions of dollars.

Framework for Sourcing Decisions

A company in the garment industry was accustomed to buying the majority of its products from the Far East on long lead-times. A detailed Cost-to-Serve model showed that the differential on the total supply chain cost between high value and

Table 8
Costs by Product Family and Erosion of Gross Margin by Channel-Family Combination

Estimated profitability by product and channel	Total ($m)	Distributors	Large accounts	Retailers	OEMs
Cost-to-serve (approximation based on m³)					
Accessories	3,610,697	1,816,212	524,831	528,611	741,043
Peripherals	14,463,392	8,581,073	3,113,841	1,523,695	1,244,783
Monitors	35,156,676	9,206,688	4,674,273	13,827,534	7,448,181
Processors	6,781,871	3,586,772	1,090,664	1,376,169	728,267
Total	**60,012,637**	**23,190,745**	**9,403,609**	**17,256,009**	**10,162,274**
Cost % to revenue					
Accessories	2.4%	2.6%	2.9%	2.7%	1.7%
Peripherals	3.3%	3.4%	3.7%	3.5%	2.2%
Monitors	15.6%	17.0%	18.8%	17.5%	11.0%
Processors	1.5%	1.6%	1.8%	1.6%	1.0%
% margin erosion					
Accessories	9.1%	9.4%	9.1%	7.7%	9.4%
Peripherals	13.3%	14.0%	13.3%	11.6%	10.9%
Monitors	88.5%	106.1%	99.0%	76.0%	91.6%
Processors	7.6%	8.9%	7.4%	6.3%	6.1%
Overall % margin eroded	**22%**	**18%**	**20%**	**27%**	**25%**

bulky items and fast-moving budget lines was much greater than previously understood. The model showed the breakpoints and cost trade-offs and indicated the potential for sourcing more in the UK and Eastern Europe, or changing the basis of purchasing and shipping from the Far East.

Commercial Change

A company with many channels of distribution for its products, with different customer size and service requirements, found that it was at risk of losing market share. A Cost-to-Serve model quickly demonstrated the relative profitability of the channels, and drove fundamental commercial decisions around their profit expectations and marketing emphasis in the future - a true re-balancing exercise.

Conclusions

It seems strange that companies will know, in the finest detail, exactly what a product costs to make and yet they have little idea what it costs to serve a customer.

It seems strange that companies will know, in the finest detail, exactly what a product costs to make and yet they have little idea what it costs to serve a customer. It can be argued that it is the customer that makes the profit not the product and hence it is critical to know what the Cost-to-Serve is. Once the Pareto distribution by customer profitability can be identified then the door is opened for transforming the overall profitability of the company.

The direction of the sales effort can be given much sharper focus once the characteristics of higher profit customers are known. Even more importantly where the Cost-to-Serve is high, alternative means of serving those customers, entailing less cost, can be sought. While only if no other option existed would unprofitable customers be dropped, at least management attention would be drawn to such accounts.

While putting the requisite systems in place to capture the necessary cost data may be difficult, it is an effort that will pay back dramatically in terms of enhanced profitability.

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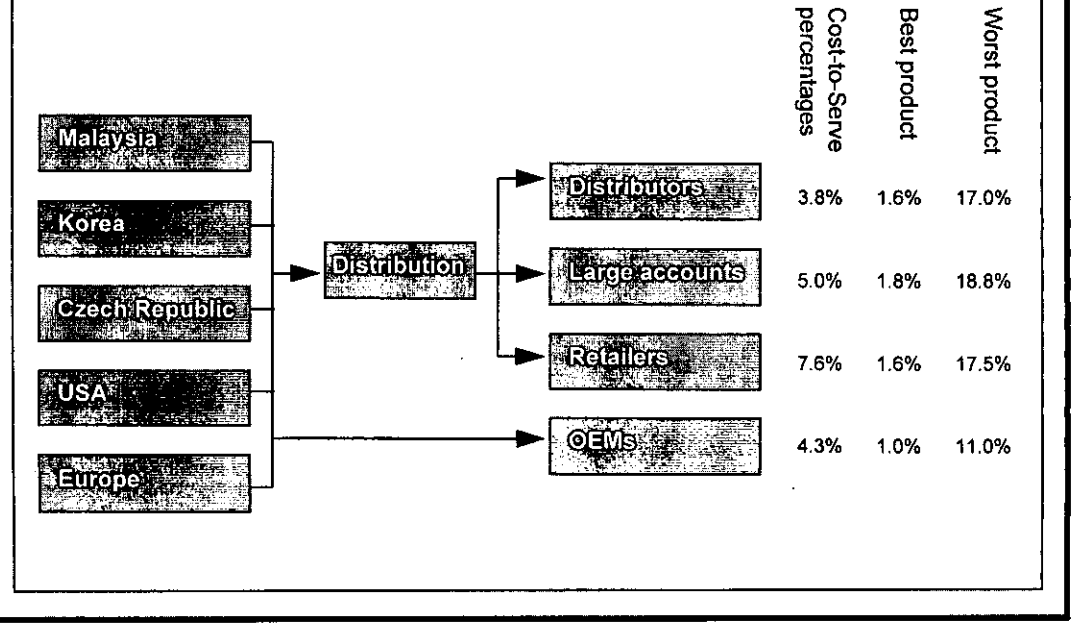
Figure 6
The Supply Chain with Relative Costs



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