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# ISSUES IN SUPPLY CHAIN COSTING<sup>1</sup>

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## **Introduction**

There is ample evidence in the literature and in business practice, that the competitive playing field is changing very rapidly. Firms are using the term “Supply Chain” to describe a business process which is focused on relationship outside the enterprise, and in bringing maximum value to the end consumer. This shift from a “zero-sum” mentality with vendors and middlemen does not present an easy transition. Embedded infrastructure, rapidly changing technology, deeply rooted culture, and uncertain return all converge to make a dramatically different “go-to-market” strategy a high risk proposition.

However, the tidal wave of competition is forcing many companies to consider heroic measures to stay competitive in the marketplace. Some of the very factors that create risk in the transition to a relational supply chain are those factors which are enabling the change. For example, technology has created the possibility of a low cost, efficient, electronic web between buyers, sellers, and third parties in the channel. This process, currently dubbed “Electronic Commerce,” has allowed new competitors to rapidly enter the arena and left old competitors struggling to defend their market position.

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Technology, as well as merchandising innovation, have caused some massive shifts in power from the manufacturer to the retailer as well. The Wal-Marts, Targets, and Home Depots have in a few short years, created retail juggernauts that force manufacturers to respond in a way that retailers dictate. The net result of this shift in power is the rearrangement of players and powercenters.

With the rapid change in the competitive playing field, the tools of analysis have not kept pace. There have been industry-wide efforts such as the “Efficient Consumer Response” initiative, undertaken by the U.S. food industry, and a series of papers dealing with best practice and technology have been published out of this effort. Other associations of wholesalers, distributors, manufacturers and retailers have focused a growing part of their agenda on this issue of supply chain, value chain, or supplier relationships by the mid 1990s. However, the tools to implement effective supply chain management are sparse. Power of one of the partners frequently rises to the fore as the driving force in a set of supply chain relationships. The ability to assess costing or cost difference in supply chain expectations is clearly lacking by the partners to the supply chain process. The traditional general ledger manufacturing cost oriented systems will not yield precise enough cost results for effective decision making. Without a refined cost metric, decision making becomes an exercise in power and/or politics in the channel performance structure.

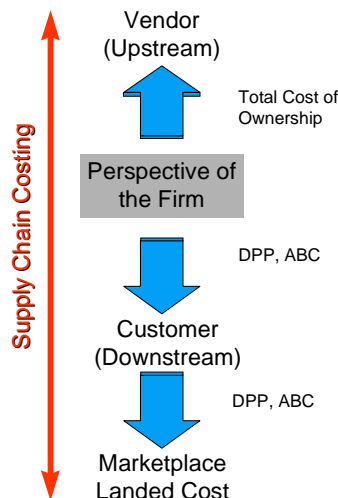
The purpose of this paper is to respond to the following key questions.

- What are the tools available for effectively costing an extended supply chain?
- What is the most effective costing method to improve competitiveness and profitability?

- How do these cost measures apply to profitability and performance over time?
- How should benefits and burdens be shared within the supply chain?

### Available Tools and Their Shortcomings

The problem of determining supply chain costs has been recognized since the 1930s [1]. Firms even then faced the problem of selecting the combination of distribution channels and supply chain partners which would yield the most profitable mix over the long run. As a result, logistics managers have repeatedly required the capability to isolate logistics costs by function, territory, commodity, channel, method of sale, class of trade, order size, operating or product divisions, delivery method, terms of sale, etc. However, no methodology has proven entirely satisfactory in providing the required information. Newer costing techniques such as direct product profitability, total cost of ownership, and activity-based costing have provided useful information but have not satisfactorily addressed the entire supply chain.



**Figure 1 Supply Chain Costing Compared to Other Costing Techniques**

The analysis of distribution costs appears to have paralleled the evolution of the integrated logistics management concept. Distribution costs remained largely a “dark continent” through the early 1960s [2]. Distribution managers had visibility over the costs of individual functions such as warehousing or transportation; however, they had practically no cost visibility over all the activities encompassed by distribution. The fragmentation of distribution activities made it impossible to isolate costs or fix responsibility. This situation led to the decision in some firms to bring together all distribution activities under a single individual with responsibility for the identification, control, and reduction of distribution costs [3]. Industry-based analyses of further cost reduction opportunities within the distribution channel quickly followed [4]. Creation of physical distribution organizations in the 1950s and 1960s and rising distribution costs emphasized the need for more detailed cost information to support contribution analyses and to make accurate cost trade-offs [5] [6] [7] [8] [9] [10] [11] [12] [13].

Since the 1960s, accurate logistics costs and contribution analysis by customer, product, or supply chain have increased in importance to the firm. “Tailored” logistics services and shifting power within the supply chain have renewed an interest in the accurate assignment of logistics costs. Efforts undertaken to increase the visibility of logistics costs within the supply chain include direct product profitability, activity-based costing, total cost of ownership, and efficient consumer response.

Direct product profitability (DPP) represented the first significant effort to determine the costs of moving products through an entire supply chain. The grocery trade initiated DPP as a pricing technique during the 1960s and 1970s [14] [15] [16]. DPP provided a technique for identifying the profit contribution of individual products by

taking into account the specific handling and space costs incurred by an item [14].

Proponents of DPP suggested the approach would provide a better understanding of the profit implications of various merchandising and product-handling decisions [17].

DPP provided a significant advantage over traditional accounting practice for food retailers [14] [15]. Retailers had traditionally relied on gross profit and gross margin for measuring performance. However, these measures ignored how handling and storage costs can vary among items and ". . .how this shortcoming can produce misleading indications of profitability" [14]. DPP improved profitability measurements by taking into account those costs directly affected by a product decision. Studies performed in the mid-1960s by McKinsey and Company found several instances where products that seemed profitable on a gross profit basis turned out to be marginal producers or losers on a direct product profit basis. The handling and storage costs attributable to the products had virtually wiped out all of the higher gross profits [14].

DPP more accurately depicts product profitability by subtracting from gross margin those costs directly attributable to the product. DPP would include the cost of activities such as handling, freight, discounts, allowances, storage, and direct labor. However, DPP excludes "fixed" overhead costs such as supervision, facilities, management, detention, demurrage, purchasing, and inventory carrying costs [14].

The major problem with DPP stems from its focus on direct costs. DPP excludes overhead and non-volume based costs [14]. "...it fails to recognize overhead and administrative expenses and therefore cannot be used for total company costing purposes." [16] DPP also has received only limited use within the grocery industry ". . .because it has never been fully integrated into distributor's business systems" [15]. A

major factor contributing to the limited use of DPP stemmed from the requirement to maintain an extensive database of physical characteristics and to continually update the database [15].

Activity-based costing (ABC) emerged during the 1980s as a means to more accurately assign costs within an organization [18]. ABC is a technique for assigning the direct and indirect costs of an organization to the activities consuming the organization's resources and then subsequently tracing the costs of performing these activities to the products, customers, or distribution channels consuming the activities [19]. ABC overcomes the problems encountered with DPP by assigning indirect as well as direct costs [16]. It also differs from traditional cost accounting by using multiple drivers to assign costs [19]. Traditional cost accounting typically relies on a very limited number of allocation bases or drivers to assign costs such as direct labor [20]. All costs are assumed to vary in direct proportion to the allocation basis. However, indirect costs frequently do not vary in direct proportion with labor hours, machine time, or material consumption. ABC recognizes the different relationships and uses multiple drivers to trace the consumption of indirect resources to the activities consuming them. ABC goes one step further by tracing the activity costs to objects consuming the activity costs. Firms using ABC can obtain more accurate information of how specific products, customers, or supply chains affect costs and contribute to overall profitability [16] [21] [22].

ABC has gained considerable attention as a potential tool for evaluating supply chain performance. The fragmentation or tailoring of logistics services offers an opportunity to obtain a competitive advantage [23]; however, it greatly complicates determining how providing these tailored services impacts logistics costs. ABC provides

a mechanism to trace the costs of performing these services or activities to the customers consuming them. Firms can also use ABC to evaluate how the performance of other supply chain members drive their logistics costs and affect overall profitability [24]. Costs may vary based on factors such as cycle time, on-time delivery, promotional versus regular sales, type of customer, or order accuracy [25].

Despite the advantages provided by ABC, the methodology does not provide a satisfactory solution to supply chain management. ABC applications have concentrated on determining how other supply chain partners affects the firm's costs and profitability [21] [22] [23] [24] [25]. The applications have not attempted to determine how the behavior of the individual firms have affected the total supply chain cost or landed marketplace cost seen by the ultimate consumer. These internal applications provide valuable information; however, they do not enable the supply chain participants to determine where non-value-added activities may exist in the supply chain, what high cost activities or processes to target for continuous improvement or reengineering, what are the key factors driving supply chain costs, or how to incorporate the notion of functional shiftability—to strategically position logistics activities in the channel where the function can be best performed in terms of cost, time, or quality.

Total Cost of Ownership (TCO) represents a more recent attempt to cost a specific portion of the supply chain. “Total cost of ownership is a structured approach for determining the total costs associated with the acquisition and subsequent use of a given item or service from a given supplier.” [26] The approach recognizes that the purchase price represents only a portion of the total cost of acquiring an item. Vendor performance also affects the costs of ordering, expediting, receiving, and inspecting. Many firms

obscure these costs by burying them in overhead or general expenses [27]. TCO attempts to identify the total acquisition price by including the costs of purchasing, holding, poor quality, and delivery failure.

Companies have already begun to use TCO as a means for measuring and evaluating their suppliers [26] [27]. Assigning costs to activities affected by the buyer decision provides another tool in the supplier decision. Buyers can evaluate alternate vendors based on the costs associated with the number of product returns, undershipments, nonconformance, or late shipments. Companies incorporating these factors into their ownership analysis can better determine which suppliers offer the best overall value to them.

TCO provides the capability to assess how inter-firm relationships affect costs within the purchasing firm. It links supplier performance to specific activities performed throughout the purchasing firm and translates the activities into costs. When coupled with activity-based costing, TCO can provide an even more accurate depiction of the activities and resources consumed in dealing with specific vendors [28]. Companies employing TCO can use the information to negotiate with or select upstream channel members based on total acquisition costs and other performance criteria. Although TCO does provide more accurate information on how the performance of one firm in the supply chain affects the costs of another, it does not provide the total supply chain cost.

The costs captured in a TCO analysis only include the costs of one member of the supply chain. TCO does not capture the upstream firm's costs. By not capturing these costs, TCO may miss opportunities for making inter-firm cost trade-offs. One of the firms may more efficiently perform some activities than the other such as transportation,



packaging, warehousing, or inventory management. TCO also does not demonstrate how the buyer's behavior may affect the suppliers' costs. The lack of an integrated costing approach may preclude the supply chain from achieving a cost competitive position.

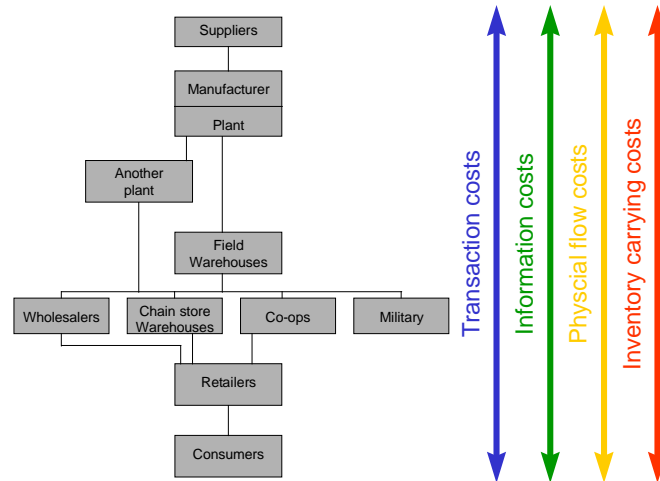
Efficient Consumer Response (ECR) provides the most comprehensive technique currently available for costing a supply chain. Although not a costing model, "ECR focuses on shortening time and eliminating costs in the core value-adding processes of the grocery chain." [29] ECR attempts to link the individual components of the supply chain into a unified, replenishment loop. Cost savings will occur in the form of lower administrative costs from automation the automation of ordering activities, labor savings by cross-docking instead of putting away and selecting inventory, and more efficient utilization of manufacturing or store space.

ECR's Efficient Replenishment strategy includes two phases for reducing supply chain costs. Phase I, Best Practices Efficient Replenishment, automates many of the linkages occurring within the supply chain. Cost savings result from the elimination of manual handling of orders and invoices, paper work errors, and inventory. Phase II, Efficient Replenishment, builds on Phase I automation by attempting to integrate the distributor and supplier replenishment cycles into a single unified replenishment cycle. Integration of the replenishment cycles can generate additional costs savings through more accurate sales forecasts, dynamic allocation, and cross-docking. Activity-based costing provides the vehicle for determining the cost savings, evaluating cost performance on a continuing basis, and identifying further improvements [29].

The methodology employed by ECR for costing and evaluating performance supply chain performance suffers from many of the same problems encountered with

ABC. The costing continues to have primarily an internal focus. Firms have visibility only over their internal costs. They do not have visibility over how their performance or reengineering effects costs elsewhere in the supply chain or total process costs within the supply chain. As a result, the firms may continue to independently pursue efforts to suboptimize their costs while inadvertently increasing overall supply chain costs. The reluctance to share cost information may also prove a significant barrier for determining supply chain costs. The sharing of cost information may give away a hard-earned competitive advantage or provide negotiating leverage to their supply chain partners. However, ECR must possess visibility over the costs across the entire supply chain to effectively reengineer key processes, determine landed marketplace cost, measure performance, or allocate the benefits and burdens between individual firms.

Previous efforts to cost supply chain performance have focused on the effects of internal activities or those spanning neighboring firms. These efforts have provided useful information and have spurred significant improvements. However, they have not produced a measurement system capable of tracing how management decisions within the supply chain effect landed marketplace costs. Current techniques cannot measure costs across the entire supply chain, identify activity or process costs outside the firm, or simulate the effect of proposed changes on overall supply chain costs. Visibility and a reluctance to share cost information represent significant hurdles for evaluating supply chain performance. Despite these drawbacks and obstacles, the techniques used in these earlier efforts can be combined into a methodology for evaluating supply chain costs and performance.



**Figure 2 Process and Activity Costs Spanning the Supply Chain**

## Supply Chain Costing

Supply chain costing provides a mechanism for developing cost-based performance measures for the activities comprising the key processes within the supply chain. The capabilities provided by supply chain include the ability to: determine the overall effectiveness of the supply chain, identify opportunities for further improvement or reengineering, measure performance of individual activities or processes, evaluate alternative supply chain structures or select supply chain partners, evaluate effects of technology improvements. Supply chain costing employs many of the techniques embedded in DPP, ABC, TCO, and ECR; however, it differs by costing activities across the entire supply chain. The approach overcomes the obstacles regarding the availability of cost information by making use of standard or engineered times and existing rate information. Supply chain costing also differs by including transaction, information, physical flow, and inventory carrying costs. The costing makes use of standard or engineered times to determine resource requirements.

Supply chain costing does not replace traditional cost accounting or general ledger accounts. Instead, it translates existing ledger accounts into a diagnostic tool that managers can use to evaluate performance and resource consumption. Supply chain costing essentially creates another set of “books” that can be used to trace the effect of management decision making to corporate profitability or to supply chain costs and performance.

The methodology employs six steps: analyzing supply chain processes, breaking processes down into activities, identifying the resources required to perform an activity, costing the activities, tracing activity costs to supply chain outputs, and analysis and simulation.

*Analyzing Supply Chain Processes.* The methodology begins with the identification of the key processes within the supply chain. The process analysis begins with the design and manufacture of the product and extends through delivery and sale to the ultimate customer. The analysis identifies the major functions performed within each process by each member of the supply chain. This step is completed when the supply chain participants and their major functions have been identified and placed in a flow diagram.

*Breaking Processes Down Into Activities.* The major tasks identified in the previous step do not provide sufficient detail for costing or reengineering. The tasks must be broken down into the specific activities performed by each component of the supply chain. Activities are “a unit of work performed within an organization. A description of the work that goes on in the organization and consumes resources.” [30] Receiving or order picking could represent activities. The decomposition of activities occurs until the

activities represent relatively homogenous functions or low cost centers. For example, receiving may represent a major task. It could be further broken down into the type of goods received (apparel, hardware, etc.) or by type of shipment (TL, LTL, UPS, etc.). A “top-down” decomposition should have stopping rules based on homogenous functions, relative cost, or management interest to prevent too much detail in the activity analysis. For example, decomposing the receipt of apparel into receipt of men’s, women’s, and children’s apparel should only occur if major differences occur in the receipt of these goods, represent major differences in the consumption of personnel or equipment, and have a significant management interest. Breaking down receiving by type of commodity (apparel, hardware, consumer goods, etc.) will probably provide sufficient detail to capture the major diversity in resource consumption driven by product type, customer, or supply chain.

The processes decomposed in this step should include all of those affected by supply chain performance. The analysis should consider processes affecting the level of inventory carried, physical flow, information processed, and transactions performed. The capture of these activities will facilitate cost trade-off analyses between information and inventory or other logistical relationships when the supply chain costing is completed.

The final product of this step is a flowchart illustrating the sequence of activities performed in moving products from the initial source to the ultimate customer. The flowchart should reflect alternate paths the movement may follow due to different customer requirements or channel structure. The flowchart should also include the activities required for exchanging information, processing transactions, and holding inventory within the supply chain.

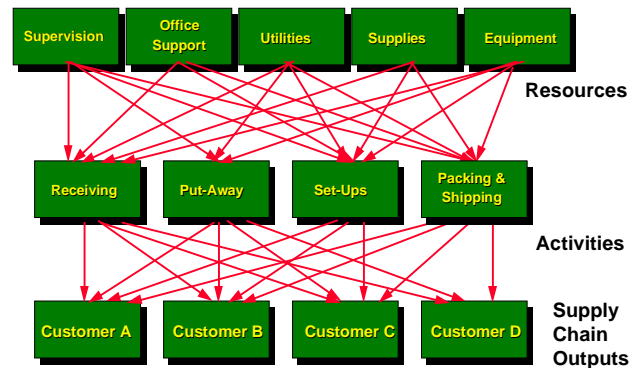
*Identifying the Resources Required to Perform an Activity.* Performance of the activities will result in the consumption of supply chain resources. Resources include the labor, facilities, utilities, material, etc. required to perform an activity. The general ledger or budget contains the costs of these resources; however, these costs are frequently aggregated at too high a level for management purposes. The accounts or resources must be split to capture important differences in the way they are actually consumed by activities [31]. The proportion of a resource consumed in performing an activity determines the amount of the resource cost traced to a specific activity [32]. This approach employs the same techniques used by activity-based costing in assigning resource costs to activities. The process is replicated for each resource until all traceable costs are assigned to the activities. A major difference between supply chain costing and ABC occurs when activities span firms or when costing other firms' activities.

Inter-firm relationships complicate the tracing of resource costs to supply chain activities. Firms may be unwilling to share their cost information which may preclude the accurate costing of activities outside the firm. Many firms may not possess the capability to trace resource costs to specific activities. Most firms have not implemented ABC and cannot provide logistics or supply chain related costs at the activity level. Some activities may also span several firms' boundaries, and the activities may consume resources from several firms. Accurate costing would require tracing resources from each of the affected firms to the boundary-spanning activity.

The use of expert knowledge, work standards, and cost estimates can overcome many of the problems associated with costing activities across inter-firm boundaries. Expert knowledge can assist in the process by identifying the activities likely performed

by other firms. The expert can identify the resources required to perform each of the activities. The expertise required can be drawn from internal sources within the firm, consultants, or individuals with experience in the activities. Published work standards can also provide an indication of the resources required to perform the activities. The standards frequently identify the sub-tasks, resources, and labor times required to perform an activity. The amount of time required to perform an activity will play a major role in determining the amount of each resource traced to an activity. Cost estimates provide a means to validate the resource costs obtained through expert knowledge and work standards. The costs developed through expert knowledge and engineered work standards can be compared against the prices quoted from competing or similar firms performing the same activities in the same region.

*Costing the Activities.* The activity cost represents the total cost of performing a specific unit of work. An activity's cost is the sum of the resource costs traced to the activity. An activity cost would include the cost of the labor, material, administration, supervision, facilities, or other resources consumed in performing the activity. The activity cost differs from the cost obtained through direct product profit or direct product costing since it includes the direct as well as the indirect resources consumed by the activity. As a result, activity costs provide a more complete picture of how resources are consumed within an organization and the costs of providing specific logistics services within the supply chain. Activity costs can answer questions such as what work is performed in the supply chain, what activities consume the most resources, where should management focus to eliminate supply chain costs, and what how does the cost to perform an activity compare with value-added received by the customer [30].



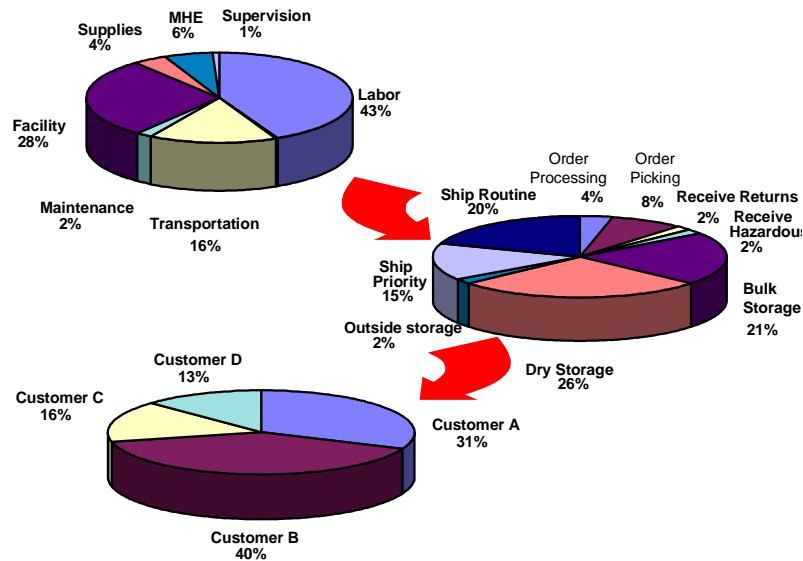
**Figure 3 Assignment of Resource Costs to Activities and Supply Chain Outputs**

*Tracing Activity Costs to Supply Chain Outputs.* Supply chain costing uses the activity costs to determine the total costs of serving specific products, customers, or distribution channels. The approach uses the activity cost and volume to calculate a cost per activity output. Consumption of the outputs determines the proportion of the activity cost traced to different products, customers, or distribution channels. The assignment of activity provides a complete picture how different products, customers or distribution channels affect activity and resource costs across the entire supply chain. Tracing costs to outputs provides several important insights:

- Profitability by customer, product, or supply chain;
- The value-added versus the cost incurred by the final customer;
- Non-value-added activities which can be targeted for elimination;
- Potential for more cost effective trade-offs within the supply chain



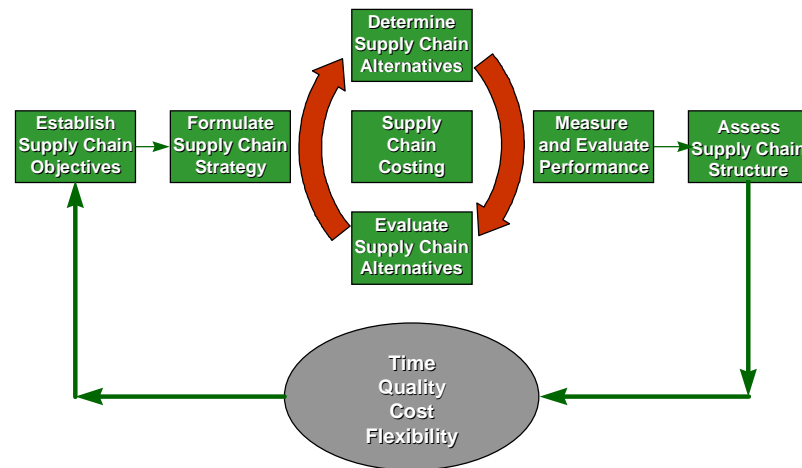
- Opportunities to employ restructuring or “functional shiftability” to align activities with the firms which can most effectively perform them within the supply chain.



**Figure 4 Supply Chain Costing Demonstrates How Resources and Activities are Actually Consumed**

*Analysis and Simulation.* Supply chain costing provides a tool for analyzing the cost drivers for specific activities and how variations in product flow or customer demand will affect costs throughout the supply chain. The information obtained from supply chain costing can support a contribution analysis by product, customer, or distribution channel. Analyses can be performed to determine the causal effect between the customer demand for specific logistics services and activity costs spanning the entire supply chain. The analysis will also enable individual firms to evaluate how different channel structures drive costs and contribute to overall profitability [33]. The firms could use the analysis to determine the most cost competitive channel to serve their customers. Carriers and third-

parties could use the analysis to demonstrate how their services add value or reduce overall supply chain costs.



**Figure 5 Using Supply Chain Costing to Simulate Change.** Adapted from Lambert Douglas M. and James R. Stock, “Steps in the Design Proces,” *Strategic Logistics Management*, 3rd ed., Richard R. Irwin, Inc., 1993, page 88.

The ability to simulate changes represents one of the most significant capabilities offered by supply chain costing. The activities can be altered to reflect potential business process reengineering results, elimination of non-value-added activities, alternate channel structures, or changing the location of functions performed within the supply chain. Activity costs may increase or decrease based on the trade-offs being made within the supply chain and who performs the activity. After revising the activity costs, the supply chain can be simulated by predicting the frequency of occurrence at each activity. The resulting changes in activity costs can then be traced to specific customer, product, or distribution channel to determine the effect on profitability. The simulation capability can also support activity-based budgeting. Firms can use sales predictions to determine

the volume by activity and subsequently the resources required to support each of the activities. The projected resource requirements can be used to support negotiations with carriers, third party providers, or other supply chain partners.

### **Management Implications:**

Increased cost visibility has far reaching implications for supply chain management. Profit contribution will drive strategic decisions regarding the composition and structure of the supply chain. The linking of activity costs to non-financial measures will change the company's evaluation of carriers, vendors, and channel performance while providing a greater degree of influence over changes occurring in the supply chain. Restructuring the supply chain to exploit efficiencies or seize competitive advantages will also emphasize the requirement for a mechanism capable of equitably allocating cost benefits and burdens between supply chain partners.

Firms can use supply chain costing as a strategic tool for restructuring relationships within their distribution channels. Traditional cost accounting buries many "tailored" logistics costs in indirect or "overhead" accounts such as sales, general, and administration (SG&A). These costs are allocated based on sales or volume shipped rather than how they are actually consumed. Supply chain costing enhances strategic management by breaking out these costs and tracing them to the products, customers, or channels driving their consumption. Construction of product-, customer-, or channel-specific profit and loss statements can demonstrate their direct contribution to corporate profitability. Companies can target supply chain relationships yielding the greatest

contributions for strategic alliances or partnerships while taking action to reduce or eliminate high cost/low value-added relationships.

Supply chain costing can leverage reengineering efforts by demonstrating how the integration of boundary-spanning processes can reduce landed marketplace costs. Supply chain partners can target high cost logistics processes for action—elimination, reengineering, or functional shiftability. Logistics costs can be reduced by eliminating non-value-added activities such as inspection of incoming receipts, claims processing, or quality control of outbound shipments. A firm could demonstrate how adoption of electronic data interchange (EDI) could decrease costs for upstream partners by eliminating order processing, data entry, and billing, while downstream partners could benefit by obtaining advanced ship notice, electronic funds transfer, and streamlined order placement. Supply chain partners may also employ functional shiftability to reduce costs or improve performance. Functional shiftability attempts to align tasks with the position in the supply chain where total costs can be minimized with respect to a desired level of performance. Third party intermediaries may acquire the function because they can perform the functions at lower costs, or the function may transfer to a different supply chain partner. [34] [35]. For example, barcoding cartons at the original manufacturer enables the downstream channel members to use the technology to track product flow and precludes manual entry of the information at multiple points in the distribution channel. Economies of scale at the manufacturing plant may allow barcoding to occur at this point with the least total cost to the supply chain.

Linking non-financial performance measures to activity costs across the supply chain can focus attention on improving the value received by customers while increasing

profits by providing this value [36]. Non-financial performance measures such as cycle time, on-time deliveries, number of customer returns provide key indicators regarding the level of service provided to the customer; however, they do not indicate whether the firm or the supply chain has obtained an adequate return on investment. Supply chain costing can provide the linkage by identifying activity costs associated with each of the performance measures. It can identify the activities, resources consumed, and time required to achieve specific levels of customer service--order processing, order picking, delivery, inventory, sales, etc. Nonfinancial performance measures can then be translated into costs affecting the "bottom line."

Supply chain management has a particularly critical need to link performance measurement with cost. Companies often do not have direct control over the activities performed by their supply chain partners. For example, whether a supplier uses wave or batch ordering picking can significantly affect the cycle time and costs experienced in the supply chain. In most cases, supply chain members do not have visibility into how much it costs to perform those services. However, the performance and costs of these activities directly impact the competitive posture of the firm and the entire supply chain. Studying these activities and their costs can reveal opportunities to increase competitiveness and profitability. The drivers behind non-value-added activities can be targeted for elimination resulting in reduced costs and cycle time for the the supply chain. The supply chain can target those activities having the greatest impact on customer service or supply chain costs for continuous improvement to further strengthen their competitive advantage or increase profitability.

The linkage between non-financial performance measures and cost information provides a powerful tool for leveraging change within the supply chain. Companies can use the linkage to evaluate or select partnerships or strategic alliances based on their ability to improve the competitive position of the supply chain. The performance capabilities of potential or existing partners can be translated into costs affecting the company, the supply chain, and the service provided. The supply chain partners can also use this information to tap the competencies of individual members. Functions, relationships, and responsibilities may be shifted from one partner to another based on their individual capabilities and contribution to supply chain competitiveness [37].

Leveraging change within the supply chain to improve service and profitability will require a mechanism to equitably allocate benefits and burdens between affected firms. The costs and benefits of implementing change will not occur evenly throughout the supply chain. For example, upstream investments in packaging, barcoding, or EDIs will increase the costs for these firms, but downstream channel intermediaries will experience the majority of the benefits in the forms of improved information management, streamlined handling, or lower inventory levels. Total supply chain costs may drop due to implementation, but no clear incentive exists to encourage implementation. Many firms also lack the capability to determine how implementing change will affect their internal costs much less the impact on supply chain costs.

Supply chain costing can play an integral role in allocating benefits and burdens within the channel. It lays the foundation for an allocation mechanism by accurately tracing costs to the specific resources contributed and the gains each partner will receive. Firms can then use this information to identify discrepancies and negotiate mechanisms to

overcome perceived inequities [37]. The information can also be used to determine how best to share any resulting savings across the supply chain. Savings could be evenly split between partners [38] or distributed based on the proportion of resources contributed by each supply chain partner. A transaction cost or fee-for-service approach could be established to charge other channel members based on the actual costs of performing services. The fee charged would be based on the resource costs required to perform the activity and a fair rate of return [37]. Allocation mechanism which fairly distribute the savings according to contribution will increase the commitment to change within the supply chain and towards the building of a sustainable competitive advantage.

## **Conclusion**

The move toward supply chain management has offered the firm an opportunity to create significant productivity gains at the interface between the vendor and the customer. Productivity is no longer limited to the transaction boundaries of the firm itself, but can be driven upstream to the vendor and downstream to the ultimate user or consumer. This opportunity has been recognized in the ECR movement, and elsewhere. There is enormous potential gain from improving productivity at the interface between partners, rather than simply focusing within the four walls of the firm itself. However, recognizing this fact, and moving from a traditional channel and a traditional costing system to a point where the firm's costing system is congruent with the supply chain relationships require a new costing capability. Downsizing, rightsizing, and reengineering may cut cost out of the system, but it appears that the name of the game in the last analysis, is bringing value to the customer. Focusing on the consumer is not something new, but balancing customer

value with cost reduction across an entire supply chain represents an important new frontier in the management process.



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