DEVELOPING CUSTOMER-CENTERED PERFORMANCE MEASURES †

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This paper discusses the role that performance measures have in evaluating organizational effectiveness/efficiency, and the recent shift away from the traditional "manager-centered," cost accounting approach to a "customer-centered," performance- based perspective. The dysfunctional aspects of the former approach are discussed and contrasted with the advantages of the latter, more recent one. Then, a conceptual model for developing customer-based performance measures is developed. The paper concludes with a brief summary of the arguments presented, some limitations and caveats, and directions for future research.

The measurement of organizational performance is a key component of organizational effectiveness (Hall, Johnson, Thomas and Turney, 1991). Without performance measurement information, the organization has no way of knowing whether it is achieving its mission, whether its strategies are appropriate to the situation, or whether implementation of the strategies is being successfully accomplished. The focus of this paper is on profit oriented, private sector organizations involved in some form of manufacturing and/or service activities, and, as such, the ultimate external measure of success is typically defined in terms of financial performance. However, it is argued here that performance measures internal to the firm can

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take on a variety of contexts and forms. The role of performance measures, in the context of organizational mission, strategies, and actions, is indicated in Figure 1 (adapted from Dixon, Nanni and Vollman, 1990).

The mission of the organization -- the definition of the organization's purpose, business areas, and "value-added" -- drives the development of strategies and plans. The strategies and plans, in turn, guide and determine the actions to be taken by organizational members. Actions include establishing and maintaining effective work processes, designing the organizational structure, emphasizing quality. These actions drive the development of performance measures. Performance measures provide a framework for the systematic collection and analysis of data summarizing performance within the organization. Once collected, these data provide feedback regarding achievement of the mission, successful implementation of strategies and plans, and success of the organization's actions. Effective performance measures provide feedback on both internal processes and on the level of satisfaction of customers and stakeholders. The result, when the mission, strategies, actions, and performance measures are operating, is an increasingly effective organization.

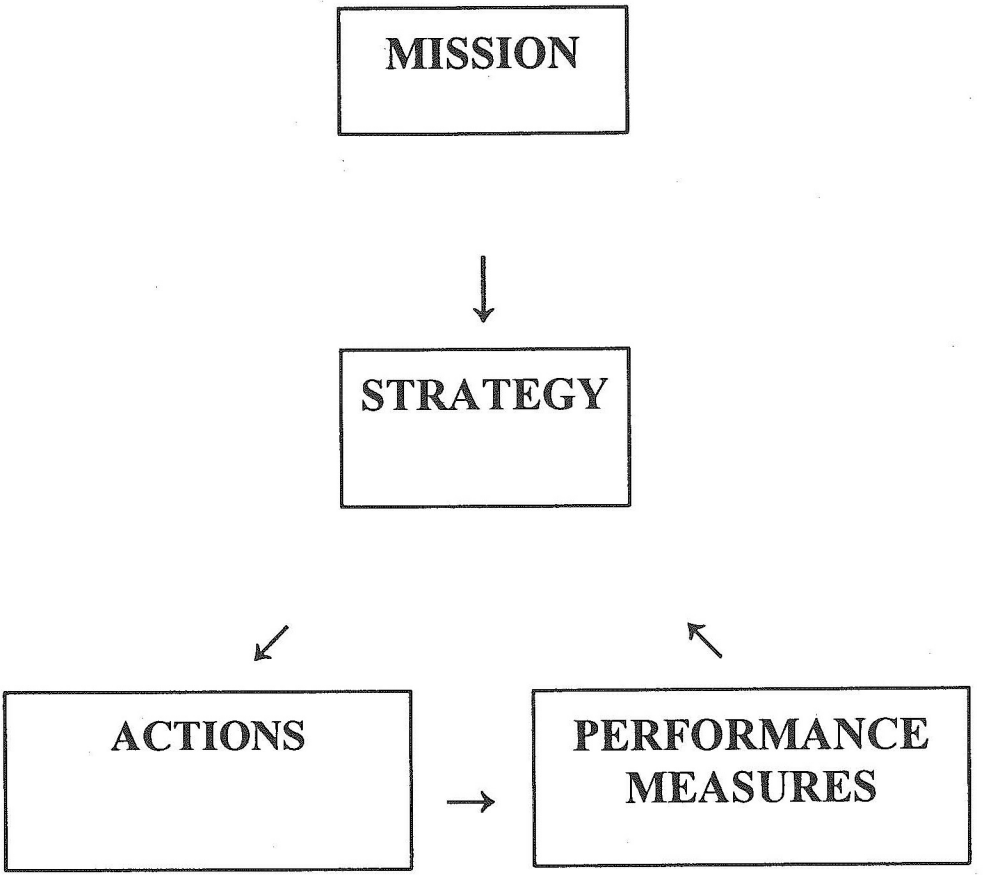
A NEW MODEL OF PERFORMANCE MEASUREMENT

Performance measures have traditionally been developed from a cost-accounting orientation, which has been labeled a "manager-centered approach" (Hall et al., 1991). From a historical perspective, cost accounting was developed in the late 1800s to help managers evaluate the total costs of operating textile mills, railroads, steel mills, retail stores, and similar businesses (Johnson and Kaplan, 1987). Attention was focused on variable costs (such as labor and materials) versus fixed costs (maintenance, facilities, and support functions). At that time, variable costs formed a considerable portion of total costs, typically 80% or more. Consequently, breaking the production process into components and assigning overhead charges to each component on some roughly rational basis was a sensible way of tracking costs. Standard financial indicators resulting from the cost-accounting approach include machinery utilization, labor utilization, net profit, return on investment, unit cost, and inventory turnover.

Production methods have changed dramatically however, particularly in the past two decades, and the assumptions upon which cost accounting were built are no longer applicable for most organizations. For example, variable costs have dropped from 80% to only 10-15% of total costs (Kaplan, 1984). As a result, not only do cost-accounting-based measures fail to provide useful feedback, but (as will be demonstrated shortly) they motivate patterns of counterproductive behavior (Drucker, 1990). The difference in orientation and actions of

Figure 1

Role Performance Measures in Organizational Effectiveness



organizations that are manager-centered versus customer-centered is so great that they have been labeled as separate operational paradigms (Hall et al., 1991). A variety of familiar programs fall into the customer-centered paradigm, including Total Quality Management (TQM), Just-in-Time (JIT) manufacturing, Total Productive Maintenance (TPM), continuous improvement, total employee involvement, and quality function deployment.

Performance measures used by world-class organizations tend to be customer-centered rather than management-centered (Hall et al., 1991). Customer-centered performance measures are linked with product quality, dependability of service, waste reduction, timeliness, flexibility, innovation, and other indicators that are closely linked with actual work processes. Development and implementation of these measures has often resulted in dramatic improvements in internal work efficiency and effectiveness, thus driving the performance of products and services in the marketplace (Young, 1992). Manager-centered performance measures, on the other hand, tend to be based on financial measures and used for control purposes.

Key differences in assumptions between the manager-centered and customer-centered paradigms are summarized in Table 1 below (adapted from Hall et al., 1991). As can be seen, the manager-centered paradigm describes the traditional American organization.

Table 1

Differences Between Manager-and Customer-Centered Organizations

MANAGER-CENTERED ORGANIZATIONS	CUSTOMER-CENTERED ORGANIZATIONS
A company is its assets; the company is a possession	A company is its people; assets are people and people are assets
Economies of scale dominate; bigger is always better	Economies of scope dominate; faster response is better
Managers manage; workers work; management initiates all improvement	Workers are thinkers; everyone in the organization works for improvement
Vertical organization; functional silos separate groups	Horizontal organization, multi-directional communication; internal customer chain; focus on external customer needs
Profit is always first; costs are thought of in terms of tradeoffs	Quality is first; there is no compromise with quality and customer service
Company-centered operations; transaction driven management	Manufacturing-centered operations; improvement driven, problem solving/teamwork orientation
Performance measurement for control purposes; traditional cost accounting measures dominate	Performance measurement for work improvement; internal and external customer satisfaction and other non-cost operating measures dominate; measures of work processes for continuous improvement lead to high financial performance

Numerous writers (e.g., Schonberger, 1990; Suzaki, 1987) have presented detailed arguments as to why customer-centered organizations outperform manager-centered organizations. Manager-centered organizations simply cannot compete with customer-oriented organizations in such areas as innovation, quality, timeliness, cost, and customer satisfaction. As will be seen in the next section, cost-accounting-based performance measures make it very difficult for members of manager-oriented organizations to keep the overall mission in mind and to avoid succumbing to strong pressures, thus behaving in ways that hurt overall organizational performance.

Finally, as Cooper (1995) emphasizes, the shift in manufacturing from mass to lean production techniques must be accompanied by corresponding changes in assumptions about how to compete in the global market. Cooper has developed a conceptual tool labeled the "Survival Triplet," based on three critical dimensions of product effectiveness:

1) cost-price,

2) quality, and

3) functionality.

Each of these components has a minimum and a maximum value for any given product to be competitive. The result can be thought of as a three-dimensional solid figure which defines a "survival zone" for each product. Thus the product will become non-competitive if it exceeds a certain price, drops below a certain level of quality, or fails to achieve a minimum level of functionality. The product will also become non-competitive, in a positive sense, if the producer can simultaneously drop below a certain price and exceed a certain level of quality and functionality-- other products simply will not compete with such a product. The traditional manager-centered model focuses attention on the area of cost-price, while the customer-centered model drives the manufacturer to optimize performance on all three dimensions. As a result, products coming from a manager-centered producer tend to drop out of the "survival zone" and cannot compete successfully with those coming from the customer-centered model.

DYSFUNCTIONAL IMPACTS OF COST-ACCOUNTING PERFORMANCE MEASURES

Once developed and implemented, performance measures tend to take on a life of their own, motivating a pattern of specific behaviors within the organization (Dixon, Nanni and Vollmann, 1990). As the saying goes, "you get what you measure." Cost-accounting measures begin to drive both organizational actions and strategies because they 1) provide information to

organization members as to what is important, and 2) indicate how their performance will be evaluated. Consequently, these performance measures become extremely powerful motivators of behavior throughout the organization (Johnson and Kaplan, 1987).

For example, once cost accounting measures are in place, management is highly motivated to show "good" performance on these measures. Consequently, they will work hard at maximizing output, minimizing unit cost figures, and maximizing performance on other measures such as machine- and labor-utilization. A side effect of these efforts, unfortunately, is excessive amounts of work-in-process (WIP) and inventory. Further, the goal of maximizing machinery and direct-labor utilization leads to tactics such as long production runs and sustained use of the workers. Unintended consequences of these tactics include additional WIP and inventory problems as well as inadequate attention to equipment maintenance and training of personnel. Thus, the drive to perform well on the performance indicators also contributes to breakdowns and operator errors.

Additional production problems will emerge as reductions in the training budgets (which reduce overhead expenditures) contribute to workers falling behind technically. Quality will also become an increasing problem because of the expanded production volume and the corresponding inability to adequately check for and correct defects. Consequently, resources devoted to rework increase and scrap rates will rise. Storage, transportation within the production area, and work scheduling become increasingly difficult. The overall result is a production process characterized by waste, inefficiency and low levels of effectiveness.

We want to stress that at department manager level, the actions and tactics used to perform well on the performance indicators appear very sensible. As a whole, however, they devastate the production system. The resulting production strategies are *exactly* the opposite of those recommended by world-class manufacturing experts (e.g., Black, 1991; Schonberger, 1990; Suzaki, 1987).

ENHANCEMENT OF ORGANIZATIONAL EFFICIENCY AND EFFECTIVENESS WITH CUSTOMER-CENTERED MEASURES

In sharp contrast, when customer-oriented performance measures are used, Figure 1 continues to hold true. This is because customer-oriented measures build upon the concepts of both external customers outside the organization and a "chain of customers" within the organization (Schonberger, 1990). The identification of external customers should be a relatively simple, straightforward process. However, our experience confirms what others have noted (e.g., Tenner and DeToro, 1992), namely, that most managers do not think in very specific terms of who their customer really is. For example, when dealing with a large company which has thousands of employees, the important task is to identify which of those people are really

the customers. That is, the customers (buyers) of our product may not be, and usually are not, the ultimate users. Thus, the problem of identifying specific customer requirements can become very complex since the supplier has to identify who is the customer (i.e., the purchaser, the end user, or someone else), and what are the expectations of the customer(s) regarding the attributes of the product.

There is an equally complex identification problem within the organization for "internal customer chain." This concept takes the notion of the supplier-customer chain and extends it to input/output relationships within the firm. For example, if a production process involves a series of steps by different work groups then, in effect, a series of supplier-customer relationships results and, ideally, the initial "supplier" will provide the materials needed by the "customer" only in the quantity needed and only at the time they are needed. Customer identification in this process is aided by notions of output. "Outputs" are defined by Tenner and DeToro (1992, p. 54) as "the specific products or services that you produce, as part of your work process, and that you pass to others, who, in turn, use them in their work process." They go on to state the obvious but important point that if one can identify who receives your output(s), one can simply ask that person about such things as requirements and expectations which can then be translated into performance criteria (e.g., timeliness, quality and, defect rate).

As the internal customer becomes, in turn, the internal supplier for the next link in the chain, exactly the same process of performance measurement and feedback of data applies (see Figure 2). The end result of the chain of customers is essentially a "horizontal organization" (Ostroff and Smith, 1992). In the horizontal organization the products flow smoothly through the organization, unimpeded by departmental boundaries, quite unlike the deep departmental silos typically found in manager-centered organizations. While traditional organizations focus on vertical information flows, it is the lateral or horizontal flows of information created by performance measures that are critical to effective performance (Drucker, 1990).

In addition to the information flows, it is also important that the different roles that individuals or work groups perform within such organizations is understood. The internal chain of customers focuses on the notion that any one individual in the internal customer chain is simultaneously a customer (receiving output from another supplier) and a supplier (providing input to another customer farther down the chain). But, we can deduce from the literature that there is a third role, that of producer. That is, each individual or work group transforms and adds value to what eventually emerges as the final product. In fact, much of what has been written recently focuses on the value added function, eliminating those activities which contribute to costs but fail to add value (Porter, 1985), and focusing only on immediate results (e.g., Myers, and Ashkenas, 1993; Schaffer and Thomson, 1992). While this is certainly important, the other two roles, those of customer and supplier, seem to have been overlooked, or at least down played. Granted, much has been written about the importance of customer orientation as it relates to external customers, but very little attention has been given to the

concept of internal customers (Mohr-Jackson, 1991: Schonberger, 1992). If the requirements of the external customer are the ultimate driving force in this process, firms must also recognize that that the internal customer chain is composed of producers who are also, simultaneously, customers and suppliers.

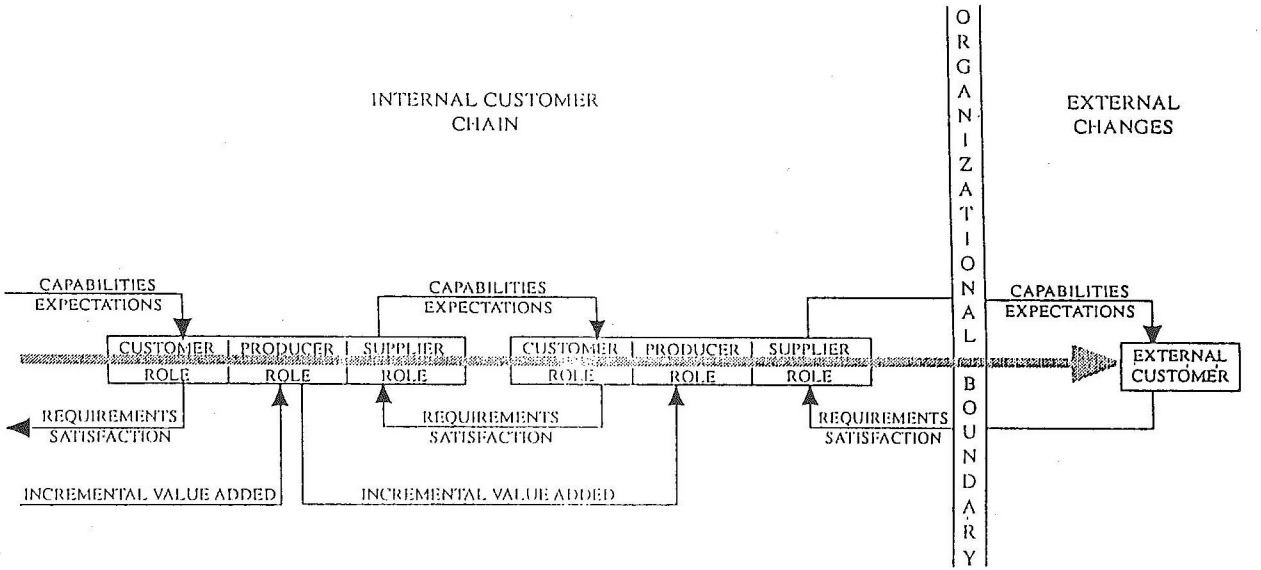
One final point needs to be made with regard to supplier-customer relations, both internal and external. As the customer provides two types of information to the supplier (the product/service requirements and the customer's satisfaction with them), the supplier provides two other types of information to the customer (capabilities as they relate to what the supplier can reasonably deliver and expectations about the product/service quality). This set of exchanges is also depicted in Figure 2, where the interchange of information is continuous with all parties making continual and progressive adjustments. In any firm, resources are limited, and it is not reasonable to expect that a supplier can completely meet every customer requirement within some cost constraints. This holds true for the relationship between the external customer and the supplier firm, and within the internal customer chain as well. As the customer specifies a variety of requirements and the supplier responds with a realistic estimate of what can be delivered given a variety of constraints, the overall process becomes one of negotiation and optimization. That is, the customer has an idea of basic requirements, but is constrained by how much can be paid for a product or service. Likewise, the supplier evaluates what level of product quality/service can be supplied given cost constraints. The point is, customer requirements and supplier constraints are in a constant state of flux, and what constitutes "customer satisfaction" changes over time, as does the customer's expectations of what the supplier can deliver.

A CONCEPTUAL MODEL FOR DEVELOPING CUSTOMER-BASED PERFORMANCE MEASURES

The literature provides little guidance regarding the process of actually developing customer based performance measures. The model shown in Figure 3 provides a framework for performance-measure development. The first four steps are accomplished by the process owner leading a cross-functional team composed of members who represent all the departments or groups that are involved in the production process. If there is no process owner (as is often true in functionally structure organizations), then someone -- perhaps a member of senior management -- will need to be named to this position. The performance measure development process must be led by staff who are able to rise above functional stovepipes and boundaries and work with the entire production process.

Figure 2

Customer - Supplier Information Flows



Note: This figure depicts only the final work steps of a work process flow that could involve a large number of upstream work steps.

The first steps in the model are the identification, by the process owner and the cross-functional team, of specific external customers and the initial determination of their needs as related to the products and/or services provided by the supplier. As noted above, the outcome of this stage should be a completed analysis of who will be receiving the final outputs and how they will be using them. It is crucial that these ultimate customers be asked to identify their requirements and standards for what is the minimum acceptable and what would be desirable. Customer requirements go beyond traditional notions such as product attributes, features, and warranties. In this age of global competition, customer requirements now include other things such as product quality, reliability, timely delivery, lot size, and after purchase services. It must be noted here that once the customer and supplier go through the process depicted in Figure 2, the supplier must then deliver what was agreed upon *in this cycle* if the customer is to be minimally satisfied.

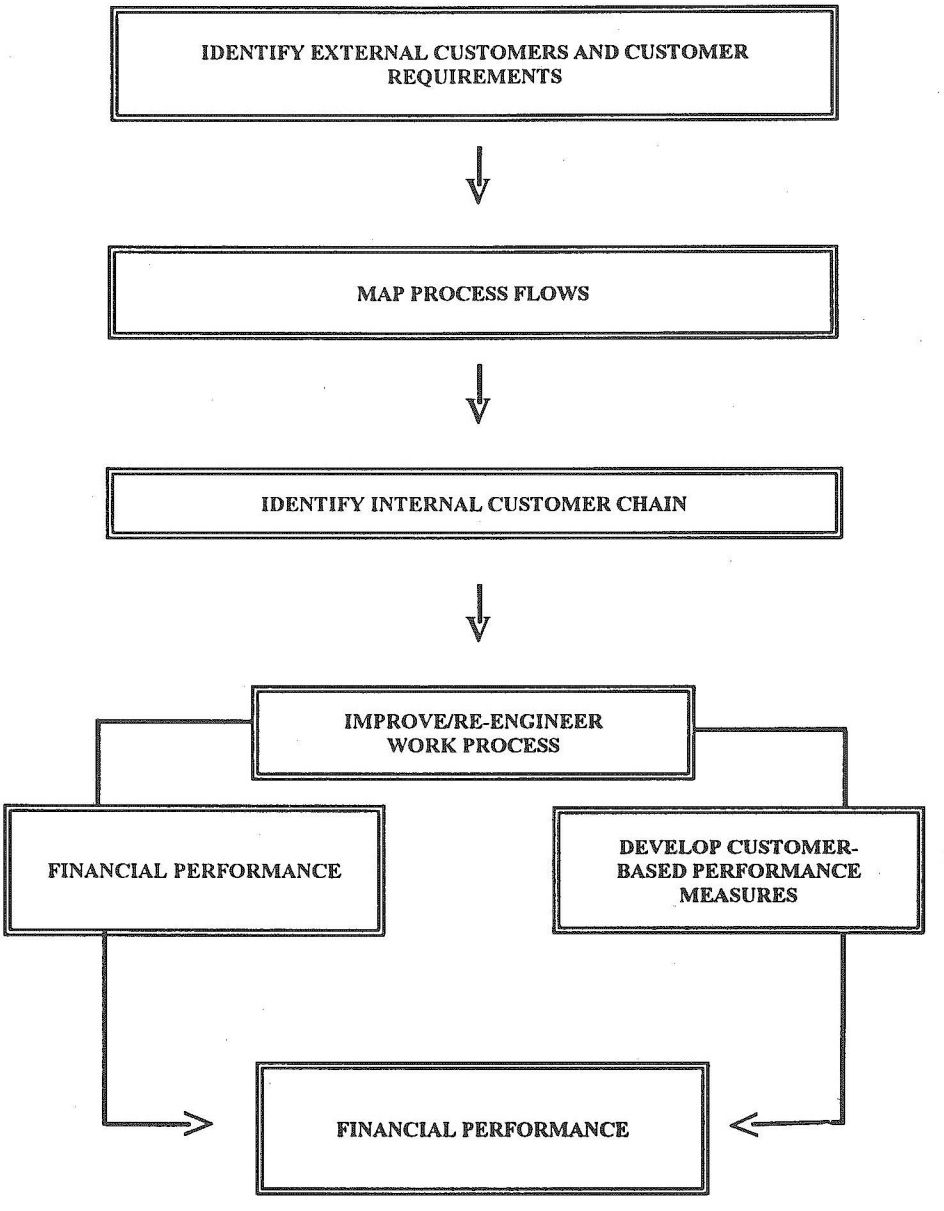
The next step in the process is to mapping out the existing process flows. It is vital to thoroughly understand the entire existing process before attempting any improvements or creating any performance measures. It is likely the certain aspects of the existing plant layout, production flows and the organization of staff make it impossible to meet customer requirements. The completed process map should portray in a simple fashion each step in the production process, including what is accomplished and by whom and depicting how the materials and/or information flows through the process. The map may, for example, be laid out on a chart of the production workspace. Consideration of process flows overcomes the restrictions of functional boundaries, portrays the overall transformation process from inputs to outputs, and helps pinpoint critical links, bottlenecks and potential trouble spots.

Once the steps in the process have been identified, it is a simple step to identify the internal chain of customers. The process owner and his/her team simply identify all of the handoff points in the process. Those handing off materials or information are suppliers; those receiving materials or information are customers. As mentioned earlier, the identification of an internal chain of customers must be grounded in the concept of outputs. This step builds on Schonberger's (1992, p. 83) notion of organizing "...resources into chains of customers, each chain mostly self-contained and focused on a product or customer 'family.' "

What is not such a simple step is to educate the individuals or groups at each handoff point as to their roles as suppliers or customers. As Gunn (1992) points out, organization members must understand that their "customer" may well be in the next office. Firms must identify an internal "chain of customers" based on one person's output becoming another's input, be that on a product assembly line or in a billing process in the accounting department. Organization members need to understand that customer satisfaction and concern for quality and timeliness are just as important to those within the firm as to those who receive the final product outside the firm.

Figure 3

A Model for Developing Customer-Based Performance Measures



In the next step in the model, labeled "Improve/Reengineer Work Processes," the process owner and the supporting team use the information from the previous steps to redesign the work processes so that external customer requirements can be met as effectively and efficiently as possible. Blaxill and Hout (1991, p. 94) contend, "Everything flows from robust processes: higher quality, better cycle time and much lower overhead." It may be that only minor adjustments to the work process are necessary, or it may be that major improvements and radical redesign of how the work is accomplished is required. At any rate, it makes no sense to perform work which does not contribute to meeting customer requirements or to develop and implement performance measures for flawed processes. While it is beyond the scope of this paper to summarize reengineering techniques, there are a variety of tools that can be used to implement this stage of the model (e.g., Hammer and Champy, 1993; Montgomery and Levine, 1996). Specific improvements may include reducing transport distance, flow time and space along the customer chain, cutting setup and changeover times, and using the customer's rate of usage for production scheduling as ways to streamline operations. Regardless of the techniques employed, it is critical that the improvements be initiated and driven by the organizational members and work teams (i.e., internal suppliers and customers) most closely involved with the work processes.

A final step in the reengineering process is for each supplier-customer pair (which may have changed from the original analysis) to negotiate exactly how the internal customer requirements are to be met. This discussion is truly a negotiation process, with the goal being a win-win agreement on how the supplier and customer are to work together. If resources are limited, it may be that not all demands of internal customers can reasonably be met. For example, it would be unreasonable for one internal customer to demand three day delivery on a component from an internal supplier simply to build in slack time for this stage of processing, when a two day delivery would suffice. The internal negotiation process must be driven by external customer requirements which cannot be compromised. In fact, each time there is a comprise on external customer requirements internally, the sum of all those compromises will be manifested many times over in that final product (Tenner and De Toro, 1992).

The next two steps in this process should be conducted simultaneously, by different teams working in direct communications with each other. First, a team composed of financial experts uses activity-based cost accounting (ABC) techniques to allocate costs across the process flows. While ABC is not a universal panacea, when used in concert with a process analysis and improvement efforts, it can be a very effective tool in helping to obtain an accurate estimate of the costs associated with each supplier-customer step in the production process. The reason we advocate implementing ABC at this stage in the model is best summarized by Johnson (1992, p. 154): "If your goal is competitive operations, don't waste time gathering data and compiling information in order to cost work you shouldn't be doing anyway." Thus, ABC information is not created until the production process has been thoroughly improved in the previous step.

While ABC is being used to allocate costs, the parallel step in the model is for the process owner and the team to the facilitate the development of customer-centered performance measures for each supplier-customer linkage. That is, performance measures are developed for each supplier-customer link by the supplier staff working in conjunction with their customers. The exact nature of the measures will, of course, depend on customer needs, as discussed earlier. Measures might include quality, dependability, waste, timeliness, and customer satisfaction. Finally, when the ABC financial analysis is completed, the cost attributed to each step of the process will simply be included as a performance measure for the corresponding step in the process. Consequently, not only will such measures as cycle time and queue time be tracked, but the cost of performing the step will be a measure of performance as well.

When the measures for each internal supplier have been completed, the process owner/team then can create a set of "rollup measures", such as total cycle time, total waste, total amount of rework, etc.. As a result, a small set of measures that reflect overall process performance will be available.

Finally, the model shows that the net result of the entire performance measure development process will be reflected in the firm's financial performance. If the firm truly adopts a customer orientation and if the customer requirements drive revising or reengineering the internal processes so that the final product meets or exceeds customer expectations, then bottom-line financial performance must necessarily be affected. We believe that this financial performance is optimized by following the process we have outlined.

CONCLUSION

The customer-centered orientation provides an approach to the measurement of organizational performance that, unlike the manager-centered one, should improve organizational efficiency and effectiveness. The cost-accounting measures used in the manager-centered approach drive both workers and managers to short-term efforts to maximize these measures, resulting in overall inefficiency, low effectiveness and possibly some dysfunction. Customer-centered measures provide motivation to organizational members to improve quality, reduce cycle time, develop innovations, and thus improve the value-added. When performance measures are developed for each link in the internal customer chain, the organization effectively becomes horizontal rather than vertical. The deep vertical silos typically found in traditional organizations are circumvented.

Customer-centered measures provide the information that top management needs to make operational decisions. Experts in the area of production and productivity strongly advise managers not to make operational decisions based solely on cost accounting data (Dixon, et al., 1990; Hall et al., 1991; Johnson and Kaplan, 1987; Peters, 1988). This is not to say that there

is no role for cost accounting measures. Cost accounting measures may well be required for external reporting purposes, perhaps to regulatory agencies, or to fulfill legal requirements. Activity-based accounting provides all the data (and more) of traditional cost accounting measures except that it reflects reality better because of more accurate and appropriate overhead allocations. We argue strongly against using only accounting measures to guide the actual operation of an organization. The cost in terms of dysfunctional behaviors and loss of mission orientation is simply too great. Rather, these tools should be used as part of a larger process guided by external customer requirements and evaluated using customer-centered performance measures. Hopefully, such measures can be developed using the conceptual model presented here.

REFERENCES

Black, J. T. (1991). ***The Design of the Factory with a Future.*** New York: McGraw-Hill.

Blaxill, M. F. & Hout, T. M. (1991). "The Fallacy of the Overhead Quick Fix." ***Harvard Business Review***, 69(4), 93-101.

Dixon, J. R., Nanni, A. J., & Vollmann, T. E. (1990). ***The New Performance Challenge: Measuring Operations for World-Class Competition.*** Homewood, IL: Richard D. Irwin

Drucker, P. F. (1990). "The Emerging Theory of Manufacturing." ***Harvard Business Review***, 68(3), 94-102.

Gunn, T. G. (1992). ***Twenty-First Century Manufacturing.*** New York: Harper Business.

Hall, R. W., Johnson, H. T., Thomas, P., & Turney, B. B. (1991). ***Measuring Up: Charting Pathways to Manufacturing Excellence.*** Homewood, IL: Richard D. Irwin.

Hammer, M. & Champy, J. (1993). ***Reengineering the Corporation.*** New York: Harper-Collins.

Johnson, H. T. & Kaplan, R. S. (1987). ***Relevance Lost: The Rise and Fall of Cost Accounting.*** Boston, MA: Harvard Business School Press.

Johnson, H. T. (1992). ***Relevance Regained.*** New York: The Free Press.

Kaplan, R. S. (1984). "Yesterday's Accounting Undermines Production." ***Harvard Business Review***, 4(4), 95-101.

Mohr-Jackson, I. (1991). "Broadening the Market Orientation: An Added Focus on Internal Customers." ***Human Resource Management,*** 30(4), 455-467.

Montgomery, J.C. & Levine, L.O. ***The Transition to Agile Manufacturing***, Milwaukee, WI: Quality Press.

Myers, K., & Ashkenas, R. (1993). "Results-Driven Quality..Now!" ***Management Review***, March, 40-44.

Ostroff, F. & Smith, D. (1992). "The Horizontal Organization." ***The McKinsey Quarterly***, 1, 148-168.

Peters, T. (1988). ***Thriving on Chaos.*** New York: Alfred Knopf.

Porter, M. E. (1985). ***Competitive Advantage: Creating and Sustaining Superior Performance.*** New York: The Free Press.

Schaffer, R. H. & Thomson, H. A. (1992). "Successful Change Programs Begin with Results." ***Harvard Business Review***, 70(1), 80-89.

Schonberger, R. J. (1990). ***Building a Chain of Customers.*** New York: The Free Press.

Schonberger, R. J. (1992). "Is Strategy Strategic? Impact of Total Quality Management on Strategy." ***Academy of Management Executive***, 6(3), 80-87.

Suzaki, K. (1987). ***The New Manufacturing Challenge: Techniques for Continuous Improvement.*** New York: The Free Press.

Tenner, A. R. & DeToro, I. J. (1992). ***Total Quality Management: Three Steps to Continuous Improvement.*** Reading, MA: Addison-Wesley Publishing Co.

Young, S. M. (1992). "A Framework for Successful Adoption and Performance of Japanese Manufacturing Practices in the United States." *Academy of Management Review*, 17(4), 677-700.