JOURNAL OF MANAGEMENT ACCOUNTING RESEARCH
Volume Eighteen
2006
pp. 127–135

The Competitive Advantage of Management Accounting

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I am thrilled to receive this recognition from my management accounting colleagues. My excitement is tempered only by an image I have of the most familiar lifetime achievement award, made by the Academy of Arts and Sciences at its annual Oscar award ceremony. This award introduces 20 minutes of boring speeches into the telecast, and generally features a tottering octogenarian suffering from advanced osteoporosis, barely visible behind the podium. I prefer to take my inspiration from Edward Deming and Peter Drucker who were highly active and productive into their 90s, allowing me to feel that I am just in the early stages of the second half of my career.

In reflecting on my good fortune in receiving this award, I thought about a question I occasionally get asked about which individual, teacher, or management thinker had the largest influence on me. While most people have a ready answer to this question, I struggle with this question. My inspiration has come not from a single teacher or thinker but from the many colleagues and doctoral students I have been fortunate to work with at Carnegie Mellon and Harvard. I went back and counted (a natural response by an accountant to any question) and learned that I have had more than 40 coauthors for my papers, cases, and books. While the list below leaves out many, some of my most significant collaborator-teachers include:

- Yuji Ijiri, my first coauthor of accounting research papers, and a major influence for my shift in research and teaching from operations research to accounting;
- Dick Roll, who taught me how to do empirical research on financial databases;
- Bob Elliott of KPMG Peat Marwick, who showed me how statistical and analytic tools can improve auditing;
- Tom Johnson, who helped me understand the powerful influence of historical forces on contemporary management practices;
- Robin Cooper, my collaborator in developing activity-based costing, who exemplified how to conceptualize theory from innovative practices, captured in case studies, and the value of learning from doing, by implementing our ideas with actual companies;
- Chris Argyris, with whom I wrote only one paper but who taught me about the origins of personal and organizational barriers to implementing new ideas in practice as well as practical strategies for overcoming them; and
- Dave Norton, a management visionary and practitioner, with whom I have collaborated for 16 years to coauthor four books, seven Harvard Business Review articles (with many more still to come), and many, many conference presentations together.

In addition to these profound influences on my work, my engineering training at MIT and Cornell has helped me recognize two physical laws as foundational for my work. First

is Moore's Law. Gordon Moore, an Intel founder, postulated more than three decades ago that computing power would double every 18 months, a prediction that has been amply validated during the next 36 years (corresponding to 24 cycles of doubling computing power). In the late 1960s when I embarked on my accounting research career, information economics was just being transferred from the economics and decision sciences literature into accounting. This paradigm correctly pointed out that the relentless pursuit of accuracy in accounting numbers, particularly in cost measurement, would be counter-productive since the incremental benefits from decisions with more accurate data would likely be far less than the incremental cost of collecting and analyzing detailed cost data. Fortunately, as computing technology followed Moore's Law during the next four decades, computing power expanded by more than a factor of 16 million (2^{24}). Detailed data are now inexpensively available even for companies with thousands of products, tens of thousands of customers, and hundreds of thousands of transactions each month. A recent time-driven activity-based costing (ABC) application calculated individual SKU cost and profitability information for a retail home improvement chain with more than 1,200 stores, each stocking more than 40,000 SKUs (250,000 in aggregate), and handling more than 100,000 customer transactions per store each month. Constructing an accurate cost and profitability model for such an enterprise would have been virtually impossible 40 years ago. But today, with the tremendous advances in computing software and hardware, such a project, while ambitious, is now economical and almost routine.

The second physical law I wish to highlight is the second law of thermodynamics (hereafter, 2nd Law), which helps to explain the widespread adoption of both ABC and the Balanced Scorecard (BSC). For those without an engineering or science background, the second law states that entropy—a technical term representing disorder or chaos—continually increases. The application of the 2nd Law from physical systems to organizations reflects the natural tendency of enterprises with multiple business and support units, employing hundreds and thousands of employees, to drift into incoherence. Business units continually introduce new products, varieties, channels, customers, and segments, usually with poor guidance from their cost and profitability measurement systems. Business leaders introduce new strategies with little guidance of their impact on other units and the corporation, and employees pursue local continuous improvement initiatives with little sense of priorities and cumulative impact.

I had first-hand experience with the natural tendency of organizations to drift into incoherence when I served for five and a half years as a business school dean, an experience that one observer correctly described as similar to taking 60 puppy dogs for a walk without a leash. Each employee is innovative and creative and often has terrific ideas about what he or she should be doing to advance the mission of the enterprise. But these ideas get pursued without a clear understanding of how the sum total of local, entrepreneurial efforts cumulates to higher-level value creation. Often the efforts are orthogonal and occasionally even subtractive, rather than additive and reinforcing.

All organizational leaders face the challenge of energizing and aligning local efforts so that they reinforce each other and produce value exceeding what would be achieved by decentralized employees or local business units acting autonomously. The management accounting innovations of activity-based costing and the Balanced Scorecard provide leaders with analytic tools to offset individual and organizational tendencies toward chaos and disorder. These two management tools are costly to implement—tying back to the information economics discussion—but have demonstrated their ability to create value far in excess of their costs through the creation and communication of valid information that guides decisions made by thousands of employees and dozens of business units about

products, processes, customers, and transactions. The new information is the equivalent of adding energy into a thermodynamic system, counteracting the 2nd Law effects, to align the disparate molecules into a more coherent structure.

Activity-based costing and Balanced Scorecard are two new management accounting systems that extend business history, industrial organizations, and strategy literatures on aligning strategy and structure for competitive advantage (Chandler 1977, 1990; Porter 1980, 1985). These economic-based literatures rarely feature management accounting systems, except for their roles in contracting and incentives. But systems play roles well beyond their use for creating extrinsic motivation. I have used airplane examples numerous times in my writings, and I will revert back to this metaphor to illustrate the point. The incentives for pilots and their passengers are already naturally aligned; both groups want a safe flight to an intended destination that arrives on time. Passengers do not have to contract extensively with pilots to achieve this goal congruence. But even with this high degree of goal alignment, airplane cockpits still contain dozens of different instruments. Why is all this information needed if the primary purpose of information is to align incentives? Clearly, the task of piloting a vehicle, such as a jumbo jet, through crowded airspace, amidst occasionally hostile weather conditions, is a complex task. Even skilled pilots need extensive instrumentation to guide the journey to the objective desired both by pilots and passengers, as well as the executives and shareholders of the airline.

One economist has criticized the Balanced Scorecard, stating that having more than one objective means having no objective. When I first read this observation, I made a mental note never to fly in a plane that this economist piloted; I imagined his cockpit with only a single instrument, showing a picture of the intended landing field next to a digital printout of the desired arrival time.

Leading complex enterprises amidst changing consumer tastes, continual technological innovation, and highly competitive, global markets is far more challenging than flying a jumbo jet. And, unlike pilots, who rarely solicit advice and assistance from their passengers, company leaders need the assistance and efforts of their employees if the enterprise is to be successful. Management accounting instrumentation is not just for pilots; it should inform the decisions taken by all the other passengers on the enterprise's journey. We should not expect that leaders can perform their complex tasks, especially with the 2nd Law driving fragmented and diffuse local efforts, without extensive instrumentation to guide the journey. Beyond the value of information to plan and guide the journey, communicating and sharing information creates intrinsic motivation for the employees, as they learn about the enterprise's objectives and how they can contribute to organizational success.

Another criticism is that empirical management accounting research does insufficient testing of theory, especially theory derived from economics (Zimmerman 2001). Some have already responded to this critique, but I would like to use this occasion to add my own thoughts on this allegation. I would not have worked on either activity-based costing or Balanced Scorecard if I did not believe both to be firmly grounded in and highly motivated by economics. And both extend the economist's model of the firm in important ways. While it is self-serving for me to make this claim, we should be celebrating innovations that arise within the management accounting literature, especially those that extend economic models, not criticizing these innovations because they were not derived from large sample empirical testing of theory derived from standard economic models.

Normal science testing of steady-state management accounting practice, based on standard economic theory, is certainly worthwhile. But this methodology should hardly be the only paradigm to guide our research. The relationship of management accounting to social sciences, such as economics, psychology, sociology, and anthropology, should be like the

relationship of engineering to the physical sciences. Accounting systems, like engineering designs, are constructed, not natural phenomena. Management accountants create, design and build systems, and then imbed these systems in organizational processes and routines. Management accounting is as economics Nobel-laureate Herbert Simon described, a "science of the artificial" (Simon 1996). Simon observed, "design ... is the core of all professional training; it is the principal mark that distinguishes the professions from the sciences." Business school professors are employed in a professional school, not a graduate school. Management accounting research and teaching, if it is not to become sterile, should be intimately anchored in the systems designed and operated by management professionals in actual organizations. Such an agenda exploits a natural competitive positioning for the management accounting community for distinctive scholarship. And for at least a portion of our research, we should strive to create new designs that can be successfully applied in practice. Chris Argyris helped me understand that changing practice is a more powerful and difficult test than explanation or prediction: "if social scientists truly wish to understand certain phenomena, they should try to change them. *Creating, not predicting, is the most robust test of validity-actionability* (emphasis added) (Argyris 1997, 811)."

Both activity-based costing and Balanced Scorecard have solid economic roots; they extend the foundational supply and demand curves in the "theory of the firm," taught in every microeconomics course. The microeconomist's supply, or cost, curve traces the increase in costs associated with increasing production of the firm's single product. Of course, few companies produce only a single product; economists use this simple curve merely for illustrative purposes, not to represent any company's actual cost function. The simple standard cost model of materials, labor, and allocated overhead, however, used for nearly a century, is at its heart like the economist's cost curve, based on a single product cost model. The standard cost model, developed 100 years ago, was probably the right engineering design at the time, given the low percentage of overhead, relative to direct labor and materials, the limited diversity in most firms, and the high cost of information collection and processing. By the end of the 20th century, however, this same model represented a bad engineering tradeoff. Information collection and processing costs were much lower (thanks to Moore's Law) and the simple standard cost model no longer represented well contemporary companies' cost structure in the presence of high product variety, process complexity, and customer proliferation. The venerable standard cost model failed to predict how increasing the scale of production through increased scope (i.e., variety) would lead to much higher costs in the firm.

The ABC innovation revealed more clearly the underlying economics of the multiproduct, multicustomer firm, and provided the language and analytics for explaining the considerable diseconomies of scope experienced by firms as they grew through proliferation of products, services, and customers. Until ABC came along to deconstruct so-called fixed overhead costs into the specific resources demanded by individual orders, products, services, customers, and channels, we could not explain why companies' supposedly fixed costs were not only not staying fixed but, in many cases, were increasing faster than unit volumes. Thus, the ABC model provides the valid extension of the economist's cost curve to capture the economics of multiproduct and multicustomer companies, a significant advance in our understanding of the cost economics of complex enterprises. And it leverages the management accountant's competitive advantage over economists; our familiarity with the systems, structures, and management processes of actual enterprises.

ABC not only generalizes the economist's cost curve, it also corrects a defect in the economist's hypothesized cost function. Economists often propose nonlinear production functions that feature capital and labor substitutions. The linearity of activity-based costing

seems simplistic compared to these complex nonlinear formulations. But ABC's distinction between measuring the cost of resource spending and the cost of resource usage corrects an error or misspecification in the economists' production and cost function. While the cost of acquiring resources, particularly capital resources, may be nonlinear with scale, the cost of using resources is linear—at least within the deterministic models that have proved adequate to date for modeling cost behavior in actual companies (the introduction of cost nonlinearities due to stochastic variation was described by Banker et al. [1988]).

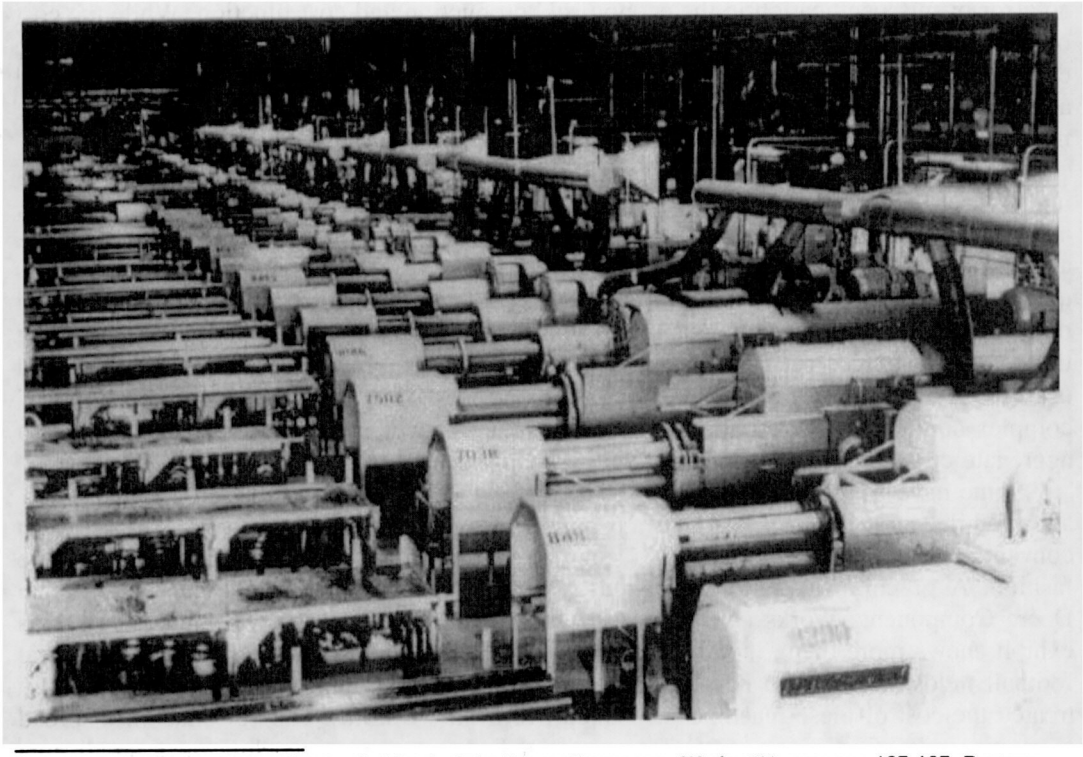
The linearity of resource usage provided the basis for time-driven activity-based costing, a recent reformulation of ABC (Kaplan and Anderson 2004). With time-driven ABC, analysts need only calculate two quantities: the cost of supplying capacity, usually time, and the quantity of capacity used each time a transaction or activity is performed. This quantity, of course, is piecewise linear (modeled by time equations) with the volume and mix of different types of activities performed. I believe that this formulation of measuring the cost of resources used by products, services, and customers is far more accurate and useful for representing and managing the economics of organizations than economists' complex nonlinear cost functions, which are used primarily, perhaps exclusively, to explain aggregate cross-sectional or longitudinal company-level data.

Some have been concerned with the apparent ABC assumption that all costs are variable. While that is not an accurate attribution of ABC, far more costs are variable than conventional thinking had previously recognized. But the variability occurs in a more subtle fashion. A graphic illustration appeared as an exhibit (reproduced as Figure 1) in John Deere Components Works (A), an early ABC case I wrote in 1986 (Kaplan 1986). This exhibit shows more than a hundred similar machines housed in an area the size of several football fields. Those who have taught this case know that John Deere's existing system treated the cost of these machines as "fixed overhead." But how can 130 machines spread over hundreds of square meters of space be a fixed cost? One machine in a small area might be a fixed cost. But 130 machines housed in an enormous space has to be a variable cost—there is a demand for machining work that cannot be handled by one machine or even 50 machines. The company sensibly scales its equipment resources and space to meet the demand for work. This picture—worth more than 1,000 words—screams out that capacity is granular (one machine at a time) and scalable.

A similar picture would show the multitude of employees working in a call center, an accounts receivable department, or an IT or human resources department. The only plausible, and economic, explanation for the quantity of resources acquired for these departments is that they have been acquired to handle the quantity of demands made on them. A time-driven ABC model identifies the capacity of each department or process and assigns the cost of this capacity to the volume and mix of work performed. If, through continuous improvement or rationalization of product lines, orders, and customers, the company reduces the demand for work in these various departments and processes, the ABC model estimates the quantity of resources no longer needed so that managers can take steps to redeploy these resources or manage them out of the company. The costs become variable through information and management action, not automatically or through some vague hand-waving that "in the long run, all costs are variable." This insight from ABC is fundamental to understanding and managing a company's economics.

The other curve in the microeconomist's toolkit is the downward sloping demand curve, which represents the decreased quantity of goods that consumers purchase as price increases. Price is certainly important in the purchase decision. But except for highly commoditized products with little opportunity for differentiation, it is not the only factor. Even companies, such as Toyota, McDonald's, or Wal-Mart, which compete on offering their

FIGURE 1



Source: Robert S. Kaplan and Artemis March, John Deere Component Works (A), case no. 187-107. Boston: Harvard Business School, 1987.

customers a low cost buying experience, still emphasize quality and short purchase times to attract and retain their customers. And many other companies find customers willing to pay significantly higher prices, even for standard products and services, if the purchase is easy and fast. As I drive home each evening, I pass a Mobil station selling gasoline, among the most commoditized of all products, at a price premium of at least $0.10 a gallon more than a discount gasoline station immediately adjacent to it. Many people, including myself, purchase at the Mobil station despite its much higher prices, because it offers multiple pumps, so I never have to wait, a speedy purchase (using my Speedpass™), and clean, safe restrooms. If I purchased at the discount station, I save some money but also have to wait in line, pay cash, and use inferior ancillary services.

A demand curve that represents customers' actual purchase decisions must include many more variables than just price. The Balanced Scorecard measures customer objectives and the value proposition being offered to attract, retain, and deepen relationships with targeted customers. It is the management accountants' generalization of the economists' demand curve. It explicitly models the important factors, including price, that trigger a customer's purchase decision.

The Balanced Scorecard is also grounded in the financial economist's shareholder value maximization principle but not, of course, from a simple one-period maximization model under certainty. In a one-period model, there would be little need to invest in people, systems, quality, and customer relationships for the future. My doctoral thesis in operations research at Cornell featured dynamic stochastic programming models (Kaplan 1970). Dynamic programming's fundamental insight is that an optimal *one-period* decision is not the optimal *first-period* decision for a multiperiod journey. The measures you wish to maximize in a one-period problem, or in the final period of a multiperiod decision problem under uncertainty, are quite different from those you optimize in the first period of a ten year or 40 quarter period decision horizon. Dave Norton and I developed the Balanced Scorecard since we believed that companies' multiperiod maximization of shareholder value could not be based on financial metrics alone. These metrics do not measure the change in period to period shareholder value from decisions taken during that period. We felt that companies would benefit from using a broader set of instruments to guide their extended maximizing journey through competitive space. This need became especially important during the past 25 years as the role for intangible assets—customer relationships, people, systems, culture, innovation, quality, and regulatory and societal performance—became the basis for differentiation and competitive advantage. Previously, many firms could gain competitive advantage through the financial and physical assets—cash, inventory, and property, plant and equipment—that accountants felt comfortable valuing on companies' balance sheets. But intangible assets create value in more complex ways and their value to the firm can not be reduced to the balance sheet's simple linear additive valuation model.

Dave Norton and I worked from the adage that if you do not measure a variable, you cannot manage and improve it. So while we could not assign financial value to a company's most important value-creating assets, we knew that we could use other metrics to quantify the state of intangible assets (Kaplan and Norton 2004a). The metrics, derived from and linked to the strategy, improved communication, resource allocation, management, and feedback so that intangible assets could be aligned better for shareholder value creation. Thus, the origin of the Balanced Scorecard came from recognizing the limitation of purely financial metrics to guide multiperiod economic optimization, and to suggest how to solve this problem in a relatively simple way. We were not attempting to be soft and fuzzy by introducing the Balanced Scorecard into the theory and practice of management accounting. We were grounded in how to improve the measurement and reporting of the economics of real enterprises, competing with increasingly complex, multiperiod strategies, and requiring the mobilization and alignment of their intangible assets. The BSC articulates an economic and testable theory (Campbell et al 2005) of the company's strategy to align its processes, people, systems, and culture to creating sustainable value for customers and shareholders. Of course, some companies may deliberately choose to balance shareholder objectives with those of other stakeholders, such as employees and communities. They also can productively use the Balanced Scorecard as the mechanism for articulating and implementing their objectives for these diverse stakeholders, as was done by the Amanco company when it developed a strategy map and Balanced Scorecard for its triple bottom line objectives of improving economic, environmental, and social performance (Kaplan and Norton, 2004b: 191–195).

ABC and BSC now seem well embedded in the routines of many enterprises in many industries and regions of the world. In thinking about future research opportunities, my sense is that we have passed the point of asking "whether" and should focus on "how." The challenge ahead is to gain greater insight into how to make these tools more accessible,

effective, and easier to use; what are the design and organizational principles that create success or lead to failures?

My bet for a promising research agenda in this area would include the role of leadership in adoption and successful implementation of management accounting innovations. Many studies of adoption, success, and failure rates of management accounting innovations use models that include company and industry characteristics, probably because data for these variables are simple to collect. But we should not be using measures in our models only because the data are inexpensively available. As we say in Balanced Scorecard implementations, you should measure what you want, not want what you can (easily) measure.

Based on my 20 years of observations of successful and unsuccessful ABC and BSC implementations, leadership quality emerges as the most important explanatory variable. For example, take the comparative study of the adoption of ABC by General Motors and Chrysler (Anderson and Young 2001). Chrysler's implementation was more successful than GM's because its effort was led and championed by CEO Robert Eaton, and President Robert Lutz. General Motors, in contrast, introduced ABC much earlier than Chrysler but the GM project never got outside the finance office; it became adopted as the "official" costing methodology at General Motors, a not inconsiderable achievement in that company, but it never became the central focus for the company's design, engineering, and production efforts as at Chrysler. The different leadership for ABC at the two companies goes a long way toward explaining its differential impact.

Similarly the client for Balanced Scorecard is the senior line executive, not a financial or IT officer. The role of the CEO is so important that it may be both necessary and sufficient for successful BSC implementation. Dave Norton and I, each year, identify up to two dozen enterprises around the world that have implemented the Balanced Scorecard well and used it to dramatically improve their performance. In each case, the enterprise CEO introduced and championed the Balanced Scorecard project. We have never seen a highly successful BSC implementation without the active and continued leadership of the unit's CEO. And we have seen few if any failures when such CEO leadership existed. So any attempt to explain variation in the adoption and success of management accounting and control system innovations, such as ABC or BSC, should include leadership quality in the analysis; otherwise the study has a serious omitted variables problem. To accomplish this expanded research agenda, management accountants will partner more with their organizational behavior colleagues than with their economist or finance colleagues, not (as Seinfeld might say) that there is anything wrong with that.

Thank you again for this honor. I hope that my lifetime of work stimulates others to extend the pathways I have trod upon.

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