

A former management accountant reflects on his journey through the world of cost management

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Abstract

As an accountant and economist I once believed it is natural to guide business operations with management accounting information. I held to that belief until about ten years ago when I began to doubt the efficacy of using targets, scorecards, and other forms of quantitative data to guide, assess, and control operating activities. In this paper I describe briefly the journey that led me to doubt that it is possible to achieve stable and satisfactory financial results in the long run by driving business operations with quantitative targets, financial or otherwise. I now believe that "managing by means" with a "pattern language" is an alternative approach to managing operations that generates more stable and more satisfactory long-term financial performance than companies have ever achieved with traditional management accounting tools.

Keywords: *activity-based cost management; accounting history; quality management; production system design; natural living systems.*

Acknowledgements: For encouragement and help at many stages of his journey the author particularly wants to thank David Cochran (MIT), Robert Hall (AME), Elaine Johnson (MBM Associates), Makoto Kawada (Meijo University), Art Kleiner (Dia*Logos), Jinichiro Nakane (Waseda), John Oh (PSU), Hiroshi Okano (OCU), Richard Schonberger (Schonberger Associates) and Peter Senge (MIT and SoL).

This paper is based on the author's keynote presentation at The second *Accounting History* International Conference hosted by Osaka City University, Osaka, on 8 August 2001.

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Introduction

During the 1970s I established my credentials as an accounting historian by writing a series of widely-acclaimed journal articles about the evolution of management accounting in large-scale American manufacturing enterprises in the century that ended in the 1920s. In those articles I viewed management accounting from the perspective of a former accountant who equated good management with using accounting information to guide and control business operations and from the perspective of an academic economist who connected good business decision making with microeconomic theory of the firm. Following leads suggested to me by the historian Alfred D. Chandler, Jr (1962, 1977) and the economist Oliver Williamson (1970) I traced the origins of management accounting to a need that entrepreneurs have for information that is lost when they form hierarchies to guide economic activity with the “visible hand” of management instead of leaving it to the “invisible hand” of the market. The series of articles I published in the 1970s traced the appearance of virtually all modern management accounting practices to various stages in the evolution of managed enterprise in the nineteenth and early-twentieth centuries. I concluded that emerging managed enterprises in the American economy strengthened their position and improved their financial capability by designing new management accounting tools to assess costs, to evaluate profitability, to create incentives, to monitor managers, and to make capital acquisition decisions.

Around 1982 a call from Robert S. Kaplan, then Dean of the management school at Carnegie Mellon University, prompted me to shift attention away from studying management accounting’s role in the growth of American business before 1930. Kaplan asked me to join him in studying the changes in management accounting after 1930 that caused it to be implicated in the decline of American manufacturing – a matter of great national concern by the late 1970s. He and I became engaged in research that led eventually to our writing the book *Relevance Lost* (Johnson & Kaplan, 1987). The book traced both the positive contribution that management accounting made to the growth of American business before 1925 and its debilitating influence on American manufacturing enterprises following World War II. Most notably, one chapter of the book briefly described a new approach to product cost accounting that we believed could reverse the particularly damaging influence of traditional cost accounting information on production and marketing decisions in manufacturing organisations around the world. That new approach to product costing, labeled soon after the book appeared as “activity-based costing”, or ABC, seemed to offer a new form of cost management. Interest in ABC generated numerous invitations to speak to audiences and to write papers.

Thus, I enjoyed two spectacular successes as a management accountant by 1987: first, to write a series of award-winning articles that documented the history

of management accounting from the onset of the Industrial Revolution to the early twentieth century; secondly, to co-author a book that many experts later would say ushered in one of the most significant management accounting innovations in the twentieth century. However, speaking engagements that followed upon the publication of *Relevance Lost* would lead me away from management accounting, toward fields of inquiry that I never could have imagined in my wildest dreams in early 1987.

The change began with questions that certain manufacturing engineers and quality professionals asked following my presentations on activity-based costing and the new cost management. The manufacturing engineers all agreed that ABC, by tracing overhead costs to the “activities” responsible for the resource consumption that actually causes overhead costs, enables accountants to cost products more discerningly than previous methods of cost allocation. However, many, especially Richard Schonberger (1982), a professor at University of Nebraska, and Robert Hall (1983), a professor at Indiana University, asked if I had considered the possibility that changing the way work is done might cause those costs to disappear, thus making cost accounting and ABC unnecessary. When I asked how “changing” work might cause overhead costs to disappear they replied “study Toyota”. Quality professionals, including W. Edwards Deming (1982), also told me that ABC failed to pay explicit attention to the customer, whose satisfaction was presumably the purpose of an organisation’s work in the first place. Dr Deming asked if I had considered viewing a business as a system, a concept that he too said would take on greater meaning as I learned more about Toyota.

Responding to these questions, I began in the late 1980s to learn rapidly about operations management, Toyota’s practices, systems thinking, and quality management – subjects I had scarcely encountered in my training or experience in accounting and economics. I attended conferences and seminars, read voraciously, and visited countless companies in North America. The first result of my efforts was to articulate by 1988 what I called “customer-focused activity management”, a concept that encompassed both the quality managers’ focus on customer satisfaction and the operational managers’ focus on flexible activities. I purposely used the term “activity” to catch the attention of management accountants who were increasingly drawn to activity-based cost management practices. I hoped that I could persuade them to shift attention from costing activities, an exercise that I believed increasingly was of no value, and, instead, to pay attention to eliminating overhead activities by organising work in more expeditious ways, following Toyota’s example. My 1992 book *Relevance Regained* discusses the idea of managing activities from a customer perspective, but it had slight impact on the marketplace. Alas, the operational-management concept that I called “activity management” was transformed by cost management consultants, and others, into a

cost-accounting-oriented concept that became known as “activity-based management”, or ABM.

The issue as I saw it by 1992 was to change the thinking underlying mass production approaches to work that gave rise to overhead activities (i.e. approaches to work that gave rise to the “hidden factory” or the “information factory”). The problem, I believed, was not to reduce overhead costs by doing faster or with fewer resources what should not be done in the first place, which I felt was the thrust of “improvement initiatives” such as ABM, process reengineering, “best practice” benchmarking, outsourcing, and other schemes to reduce “non-value” overhead activities. Such initiatives, in my opinion, did nothing to change the main problem, which was to change the thinking that had dominated manufacturing practices since World War II. Reinforcing that thinking, furthermore, was the management accounting approach to cost management that ABC, ABM etc. did nothing to change.

Following *Relevance Regained* I focused my attention increasingly on clarifying the differences between the thinking that shapes traditional modes of organising work and the thinking that shapes and sustains Toyota’s production system. Aiding my efforts was an invitation in early 1992 to visit and study Toyota’s facility in Georgetown, Kentucky, a site that I have had the good fortune to visit scores of times since that first trip. I also regularly visited plants of companies struggling to emulate Toyota’s practices. Equally important was my encounter with systems thinkers and scientists in the early and mid-1990s, when I began to develop the idea that Toyota’s remarkable production system succeeds by emulating principles like those that shape and guide living systems in nature. That idea is the central theme of my latest book, *Profit Beyond Measure*, published in 2000. In that book I argue that the key to stable and satisfactory long-term performance is to regard a business as a natural living system and to manage its affairs accordingly.

In the remainder of this paper I want to focus on one key feature of what I think it means to manage a business according to the principles that guide natural living systems. That feature is at the heart of what “systemic thinking” means to me. It is captured in a stanza of poetry by the English poet William Blake:

He who would do good ... must do it in Minute Particulars. General Good is the plea of the scoundrel, hypocrite, and flatterer (*Jerusalem*, plate 55, lines 60 and 61).

To put it boldly, management accounting leads people to manage a business according to principles that are the *antithesis* of those that guide natural systems. The keystone of management accounting is the idea that the parts of a business can be defined by absolute quantitative (financial) measurements and the whole is simply the sum of those parts. In other words, the whole is seen as a “General Good” that is to be managed by manipulating the parts – the “Minute Particulars”.

This strategy might work in running a machine, but it invariably fails, in the long run, in running a natural system. Indeed, applying this strategy to a business creates what I call the “big lie” (Johnson, 2001).

The big lie is this: One can change the total cost or total profit of an organisation by a certain amount by changing the costs or profits of the company’s *parts* by the *same* amount. In other words, because the total cost or profit of an organisation presumably equals the sum of the costs or profits in *all* its parts, the total can be changed in any amount simply by changing any of its parts in the same amount.

The idea that you can change the magnitude of the whole simply by changing parts in the same magnitude is found everywhere. Open any management accounting, finance, or economics textbook currently used in MBA programs, and you’ll see this assumption implicit in any discussion about cost management. People actually believe that if a company wants to show an increase in profits of \$1 billion, then all it has to do is add margin or cut costs in the amount of \$1 billion somewhere in the firm. Perhaps it should acquire another product line with potential profits of \$1 billion, outsource a function that currently consumes \$1 billion in costs, or just “downsize” employment (that is, lay people off) to the tune of \$1 billion. Whichever path is chosen, the idea is that one can influence an organisation’s overall performance in absolutely predictable ways simply by treating the company as a collection of parts that can be moved in or out of the system like game pieces.

To be sure, we can do that with most machines. But with living systems – and human organisations *are* living systems – trying to optimise the whole by optimising the parts only leads to *declining* performance. An analogy would be an excellent basketball team whose owner ordered each player to optimise his individual performance by scoring as many baskets as possible during a game. What would such an order do to the team’s ability to function as a smoothly coordinated unit? The team would become a chaotic mess easily bested by the opposing team. In other words, the assumption about optimising parts of a natural system is dangerous.

The key to managing a business as a natural system is to attend to *relationships* among particulars. Beginning at the lowest level in an organisation, pay disciplined attention to the basic relationship between supplier (a person who is competent to satisfy the customers’ needs) and customer (a person whose satisfaction will provide the company with revenue). View every person in the organisation as both a supplier to someone in the next downstream process and a customer to someone in the next upstream process. See each person’s desired goal to be completing the steps required to move one order one step further (to the next internal customer) in the prescribed time and with the least consumption of resources possible, including consumption of equipment and capital.

By behaving in this way, Toyota is able to produce in the shortest time in its industry the highest quality output in the greatest variety of models at the lowest cost. It isn't easy, of course. The secret is in the details (Spear & Bowen, 1999; Won *et al.*, 2001). Each person's work is self-standardised as to content, timing, sequence, and outcomes. Each person communicates directly and unambiguously with his or her internal supplier and customer. All material follows the shortest path from step to step. All work is visible at every point so that abnormalities, when they occur, are seen and corrected at the moment they happen. And each person engages in continuous self-improvement of the work they perform. The point is that disciplined attention to details insures predictable and stable outcomes time after time after time. By nurturing patterns in the relationships among the minute particulars, achieving a good result is virtually inevitable.

To operate in this way emulates how a natural system functions. A tree's quality of life and its survival reside, for example, in each and every cell. The metabolic process flows through every cell in the entire system at a common rate – a common “beat” that resembles the takt time² of work stations on a perfectly balanced production line. Abnormalities are detected and corrected by immunological processes at the cell level. No central control system passes instructions down and receives performance reports from below. Information concerning operations exists in each and every cell in the DNA that standardises the content, timing, sequence, and outcomes of chemical processes necessary for the tree's ongoing existence.

Compare the balanced and continuous flow in a tree with the situation that one sees in a factory where overhead cost variances in a daily management accounting report are used to assess performance against a target – a General Good. In such settings a discontinuous and disjointed flow of material exists because abstract targets force people to optimise unit cost in the whole by optimising unit costs in each and every part of the plant. Unstable and uncontrollable outcomes ensue as predictably as the cacophony an orchestra conductor might achieve by assembling a collection of outstanding musicians and asking each to play their respective parts of a score as if they were solos.

In *Profit Beyond Measure* I refer to focusing on targets as “managing by results” (MBR). Focusing on minute particulars is referred to as “managing by means” (MBM). The difference between MBR and MBM can be described on several levels. On one level MBR describes the practices that we associate with traditional management accounting. These practices dominate the attention of top managers in large corporations around the world where it is more or less taken for granted that a spreadsheet containing quantitative relationships can unambiguously connect the parts and whole of a business. On another level MBR and MBM reflect two quite different views of reality that correspond to distinct scientific interpretations of how the universe operates. MBR reflects the worldview of

seventeenth-century science embodied in the works of Isaac Newton and Rene Descartes, whereas MBM reflects the worldview inspired by the twentieth-century writings of Albert Einstein. In the MBR world reality consists of collections of objects defined by absolute measures such that any whole is simply a sum of its parts and no more. In that world quantitative measures define all that matters and something does not exist if it cannot be measured. In the MBM world, by contrast, reality reflects relationships among a communion of subjects – not the quantitative sum of a collection of independent objects. Features of any system in the MBM world can be measured quantitatively, but what is measured is an emergent property of systemic relationships, not an absolute condition in its own right.

Thus, absolute cost, quality, or leadtime do not exist in an MBM context. In other words, those measures are emergent properties of relationships among people and resources that have no meaning outside the context of those relationships. To say that one plant or one process has lower or higher costs than another plant or process is meaningless in an MBM world. Meaning resides in knowledge of differences in relationships between the two cases. Consider, for example, two different companies' plants that produce identical-looking bumpers to attach to similar types of automobiles (Linck *et al.*, 2001). Both plants use the same injection molding machines, the same resins to mold plastic bumper forms, the same paint processes and paint to finish bumpers, and they rely on workers from the same labor force to get the work done. However, one plant's bumpers are more costly to produce than the bumpers of the other plant, they fit onto autos with less precision, and they are not delivered to the auto assembly customers as promptly or as reliably as the other plant's bumpers.

Years of effort by the company with the less capable plant – an MBR company – have not enabled it to match the other plant's performance. Predictably, that effort reflects a belief that quantitative data about resources and manpower can reveal the relevant differences and can indicate the steps to take to close the gap. Leaders of the MBR company presume that one gains understanding of relevant differences by "drilling down" into quantitative data about costs, defects, and processing times. Excessive costs, they believe, are addressed by taking out measured quantities of resources (for example, laying off workers) or by driving workers to produce more output per shift. Deficient quality is dealt with by reducing defects in individual processes. Delays in filling orders are handled by reducing the "nonvalue-added" time in processes, while leaving run rates and lot sizes unchanged. Never has the MBR company paid attention to the relationships that connect resources and people in their bumper-making plant. Consequently they pay no attention to the fact that takt times in their plant range from 105 seconds in molding to 7 seconds in painting to 50 seconds in final preparation for delivery to an auto final assembly plant that operates on a 55 second takt time. Not surprisingly, the MBR company's bumper plant houses an enormous inventory of

bumpers between processes that does not exist in the MBM company's plant where material flows smoothly through every process at virtually the same takt time, ideally the pace of final demand. Equally unsurprising, perhaps, is that the MBR company addressed this inventory "problem" several years ago by investing enormous sums of capital in an automated and computerised storage and retrieval system. In other words, they attempted to "save" inventory and storage costs by doing faster what should not be done in the first place.

The MBM company's bumper plant, by contrast, reflects sustained attention to designing the relationships – the means – by which people and resources are combined in the respective molding, painting, and finishing steps required to deliver a bumper to an auto assembler. To discuss in detail what that entails is not possible in this short contribution. But I did indicate earlier that relationship building begins by balancing and stabilising the flow of material and information between each internal customer and supplier and by standardising the steps for doing work in each work station. Such disciplined attention to how material flows and how work is done *in each minute particular* is the key to emulating the patterns one observes in natural systems. The final result of disciplined relationship building can be likened to the results achieved by an experienced fire builder. Thus, building a fire that is capable of sustaining a strong, bright flame for hours requires logs, of course. But just as important as the logs – perhaps more important – is the attention that the skilled fire builder pays to the spaces between logs. Pack the logs too tightly and the flame dies out. Pack the logs too loosely and the flame never gets started. Build spaces between the logs just right and you get a long-lasting and bright flame.³ The analogy to the bumper plants should be obvious. Adding and removing resources and people – logs – isn't enough to achieve the costs and other performance traits you desire. The secret to good performance is in the relationships – the spaces between the logs.

To put "management by means" in the context of my long journey in the world of cost management I would say MBM returns me to the place where I started around 1987 but, to paraphrase T.S. Eliot, it shows me that place for the first time. After writing *Relevance Lost* I began to doubt the idea that companies can improve their cost performance by compiling better cost information. When I came to understand what it meant to eliminate overhead costs by organising work in new ways, I realised that better cost accounting information, including ABC and ABM information, would not lead to better understanding of what causes costs. Now I am firmly convinced that costs are emergent features of the system of relationships that we design into our work places. Hence, cost management is not an accounting exercise and management accounting information has no meaning for understanding or controlling costs. Cost accounting should always be viewed as an aspect of financial accounting, reporting, and planning – never a tool for managing operations. Even product and process costing fall outside the domain of cost

accounting. Properly considered they are accomplished through target costing, an engineering exercise that requires detailed knowledge of minute particulars and that begins by preparing what Toyota refers to as “material and information flow” maps. But target cost information is not an appropriate tool for managing costs of operations. The idea that business operations can be understood and controlled with quantitative targets, even target costs, rests on flawed logic and erroneous science.

Indeed, my journey has brought me to the realisation that cost management must be viewed as an aspect of enterprise system design, not an accounting exercise. Enterprise system design links an organisation’s objectives with the precise means required to achieve those objectives (Cochran, 2001). Enterprise system design is a new field of study just beginning to take shape, but the evidence in so far suggests that it leads more reliably to the goals that management accountants strive to achieve than do exhortations to drive work mindlessly with quantitative targets. The superiority of enterprise system design over management accounting emanates from its closer correspondence to the principles that shape and guide the operation of natural living systems. Anchored as it is in mechanical system principles, contemporary cost management will stay mired in the adolescent phase it reached with ABC and ABM until business leaders recognise that the work humans do in business organisations is a primeval, generative phenomenon that is linked to the evolutionary process giving rise to everything we observe in the universe, from atoms and galaxies to forests and human beings themselves. Because businesses are natural systems that have evolved from the system of all natural systems in the universe, their operations cannot be reduced to quantitative measures. They can be understood as much as humanly possible only with words – language.

Specifically, explaining a successful business system such as Toyota’s requires language to describe and map the patterns that shape relationships. In *Profit Beyond Measure* I suggest using a robust language resembling the “pattern language” proposed by architect Christopher Alexander (1977) to articulate the means that a business must cultivate in its minute particulars if it is to function in the spirit of a natural living system. I now believe this goal can be reached. The outlines of a pattern language that reflects principles evident in natural systems is emerging in the words that David Cochran (2001) uses to describe the means for achieving a system’s objectives in his enterprise system design framework. Moreover, the quantitative measures of the objectives spelled out in that enterprise system design framework provide an excellent example of what W. Edwards Deming (1982) meant by a business system’s “capability”. Deming admonished managers not to impose targets on people without knowing first the capability of the system in which the people work. The name of the game for Deming was to create a stable system with a known capability that you work continually to improve. From that perspective, a numerical target is never a guide for action.

Quantitative measures reveal capability, but they do not point the way to what must be done to improve capability. For that one needs knowledge of the pattern language – the means. Only by nurturing the means can one improve the system’s capability. The enterprise system design framework is the best way I know at the moment to implement this message in concrete business practice.

Conclusion

For nearly a decade I have exhorted managers to put aside the tools of management accounting and financial management and turn attention to the systems they use to organise work and people. Experience tells me this is not a popular message. But history is showing us, I am convinced, that business organisations that strive above all else to achieve relentless growth in revenue and profitability targets are inevitably self-destructive, destructive of humane societies, and destructive of the ecosystem needed to sustain decent human life. To reverse those outcomes I have urged business leaders to stop managing ends and, instead, to manage means. To not get this point is to fail to understand aberrations to nature’s principles such as human slavery or the confinement of wild creatures in theme parks. As Dr Deming was known to say, the business world we created in the past century incarcerates us in a prison of our own making. Our goal must be to liberate ourselves from this self-imposed prison that we create by sacrificing means to ends. Only fear of “not having enough” stops us from breaking out. However, the understanding science now gives us of the past 15 billion miraculous years of evolution in this self-organising universe should do much to allay that fear (Berry & Swimme, 1992; Chaisson, 2001). In the long run, the ends in a well-functioning natural system exceed any results humans can achieve by driving people to achieve targets without regard for the means. I now believe that the tools of enterprise system design and pattern language finally provide business leaders with the means to “manage the means”. With those tools, business leaders can reject confidently the false belief that achieving the ends spelled out in spreadsheets and scorecards justifies any means. Finally they can begin, and not a moment too soon, to focus in a disciplined manner on nurturing natural systemic patterns in the minute particulars of a business, to regard the means as “ends in the making”, and to stop justifying the dehumanisation and ecological destruction that they inevitably create in the name of mindless growth and accumulation.

Notes

1. A collection of these articles is found in Johnson (1986). Those articles form the basis of the historical material elaborated in chapters 1 through 6 of Johnson and Kaplan (1987). Subsequent interpretations and revisions of those articles are found in Johnson (1991) and Johnson (1997).
2. Takt time refers to the pace at which work proceeds on a production line. It is calculated by dividing the average time available in a shift by the average demand in units for final output. A goal of balanced, continuously-flowing production systems is to synchronise the pace of work in every step to the average takt time, thus resulting in a balanced flow that resembles the metabolic flow through a living system such as a tree.
3. The metaphor of logs, spaces, and flames comes from the poem "Fire" by Judy Sorum Brown in her collection of poems *The Sea Accepts All Rivers*, Alexandria, VA: Miles River Press, 2000, pp.27-8.

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