The Balanced Scorecard Strategic Management System and the Complementary Role of Total Quality Management (TQM)

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1. Introduction

The purpose of this paper is to provide a explanation of the Balanced Scorecard (BSC) strategic management system and then show how total quality management (TQM) can play an important complementary role in that system. The Balanced Scorecard concept has been around for more than a decade. However, there may still be some who are not familiar with it or who would like to review the concept. This paper will also briefly describe some of the basic ideas associated with TQM and how they can complement the BSC. These ideas will be mostly those of Dr. W. Edwards Deming, perhaps one of the most influential people in the quality movement. Dr. Deming died in 1993 at the age of 93. Almost up to his last day he was active in promoting his ideas on how to manage quality. His four-day seminars became famous and were heavily attended. It is still available on video tapes.[1)]

This paper is organized as follows:

1. Introduction
2. Background
3. The Balanced Scorecard, an overview
4. The Balanced Scorecard as a strategic measurement system
5. The Balanced Scorecard as a strategic management system

1) For a brief biography of Dr. Deming, see Austenfeld (2001b). The set of video tapes can be purchased through the Deming Institute (http://www.deming.org).

6. The Balanced Scorecard, the process for creating one
7. How Deming's approach to TQM complements the Balanced Scorecard
8. Conclusion

2. Background

Background on the Balanced Scorecard. Robert S. Kaplan and David P. Norton undertook a year-long, multi-company study in 1990 to see if there was a better way to measure a company's performance than relying only on financial accounting measures. Norton at the time was the CEO of the Nolan Norton Institute which conducted the study and Kaplan, a professor at the Harvard Business School, was the academic advisor to the study. Out of that study came the idea of a "Balanced Scorecard." As described by Kaplan and Norton (1996b), this scorecard was organized around four perspectives: financial, customer, internal, and innovation. And the "balanced" in the name "reflected the balance provided between short- and long-term objectives, between financial and nonfinancial measures, between lagging and leading indicators, and between external and internal performance perspectives" (p. viii). In effect, the scorecard was a way to capture much more about what was happening (or should be happening) in an organization such as how it was relating to its customers and how well its internal processes were working. The results of this groundbreaking study were reported in Kaplan & Norton (1992) and the Balanced Scorecard was born.

The appeal of the Balanced Scorecard (BSC) caused several senior executive to seek the help of Kaplan and Norton in implementing it in their companies. From this experience came the realization that the BSC might be even more useful if its measures were tied to the company's strategy. The importance of making this connection between the BSC measures and strategy, was described in another article, Kaplan & Norton (1993). As their experience of working with

companies using the BSC continued, the logical connection between the BSC and strategy became even more obvious. It became more and more apparent that the BSC could be used to not only clarify and communicate a company's strategy, but was actually turning into a way to *manage* the strategy. These ideas were set forth in a third Kaplan and Norton article: Using the Balanced Scorecard as a Strategic Management System (1996a). Realizing that an article couldn't begin to provide the information a company might need to begin working on their own BSC, Kaplan and Norton also published their landmark book that same year: *The Balanced Scorecard: Translating Strategy into Action.* A follow-up book was published in 2001 (*The Strategy-Focused Organization*). This latest book is mostly about the experiences of companies that have begun using the BSC and offers refinements on the basics set forth in the 1996 book. This paper will draw primarily on the 1996 book.

To assist those interested in setting up a BSC, Drs. Kaplan and Norton have established a Web site called the Balanced Scorecard Collaborative at http:// www. bscol.com.

Background on TQM/Deming. The ideas of TQM became popular in the late 1970s and early 1980s when it was apparent that Japan was "eating America's lunch" as far as important market shares; e.g., automobiles, and consumer electronics. This is humorously illustrated by one of my favorite quotes:

> At first the American auto manufacturers resisted making small cars for aesthetic reasons: Smaller cars sell for less money. But finally, feeling the pinch from foreign competition, the U.S. auto makers decided that, OK, they would make small cars. But not just *any* small cars: No, they would make *really bad* small cars. The shrewd marketing strategy here was that people would buy these cars, realize how crappy they were, and go back to aircraft carriers. This strategy resulted in cars such as the Ford Pinto, the Chevrolet Vega, and the American Motors Gremlin—cars that were apparently

designed during office Christmas parties by drunken mail-room employees drawing on napkins; cars that frequently disintegrated *while they were still on the assembly line*. (Barry, 1992, pp. 12–13)

At about this same time a number of quality gurus sprang up, but most notable were three: Joseph M. Juran, Philip B. Crosby, and W. Edwards Deming. Of these Deming seems to have had the most influence on the quality movement. Although they gradually evolved as he thought more and more about quality, by the time of his death, his 14 Points were a fair description of his philosophy of quality management; indeed, for management itself. He also made famous the Plan, Do, Study, Act (PDSA) Cycle. Towards the end of his long and productive life (see Austenfeld, 2001b) he was developing an even more sophisticated approach to management called his "System of Profound Knowledge."Appendixes A, B, and C provide, respectively, brief descriptions of Deming's 14 Points, the Plan-Do-Study-Act (PDSA) Cycle, and Deming's System of Profound Knowledge. We shall return to these in section 7 of this paper.

If one were to try and pinpoint when America finally woke up to the quality problem that the above Barry quote so aptly describes, it would probably be on the evening of June 24, 1980. That's when NBC aired its now famous documentary, "If Japan Can, Why Can't We?" Deming had recently been working with the Nashua Corporation, in Nashua, New Hampshire, a maker of, among other things, carbonless paper. The last 15 minutes of the program were about Deming and his work with Nashua. After the CEO of Nashua told how much their productivity had improved and how they were saving millions of dollars, Deming said: "If you get gains in productivity it is only because people work smarter, not harder, that is total profit, and it multiplies several times" (from Walton, 1986, p. 19). Up to that point in time, Deming was a virtual unknown in America but that soon changed. As Walton describes it:

The next day, the telephone rang relentlessly in Dr. Deming's basement of-

fice. "We were bombarded with calls," recalled Cecelia Kilian[2]. "It was a nightmare." Many of the callers sounded desperate. "They have to see him tomorrow, or yesterday, or their whole company will collapse." (pp. 19–20)

And, as they say, the rest is history. Although already 80 years old, Deming went on to become one of America's foremost recognized authorities on quality. Ironically, it was Deming who arguably turned the Japanese around in the early 50s, some thirty years earlier. Prior to that time, the Japanese were still recovering from the war and turning out such poor quality products that they were the butt of jokes. But Deming told them that they could produce quality products and gave them the information they needed to do so.

After next describing the Balanced Scorecard, we will, in section 7, show how Deming's ideas can complement that management system.

3. The Balanced Scorecard, an Overview

In this section we will consider two things:

- Generally, what is a BSC?
- Why is the BSC needed in today's business world?

Generally, what is a BSC? A BSC is both a measurement and, more importantly, a management system. It is based on the simple idea that companies cannot really understand what's happening within their organization without looking at more than aggregated financial measures. Accordingly, Kaplan and Norton devised a system that also includes nonfinancial measures. In its final form, the BSC framework is built around four perspectives: financial, customer, internal business process, and learning and growth. Taken together these four perspectives address not only the company's financial performance, but also all the other things the company does that result in that financial performance. To understand this better, let's look at a very simple example from Kaplan and Norton as shown

2) Deming's secretary.

in Figure 1. At the top of Figure 1 is the financial perspective showing one possible financial measure Return on Capital Employed (ROCE)[3]. Management then asks this question: What will help our ROCE? Well, if we have loyal customers they will spend more and this will help our profits and our ROCE. Therefore, a logical progression is made from a financial measure, ROCE, to a customer measure, customer loyalty. That is, instead of measuring just ROCE (and other financial measures), let's also measure customer loyalty. Why? To help us better understand either why our ROCE is improving or, even more important, why it is *not* improving. If our customer loyalty "index" is dropping, that may be a good indicator of why our ROCE is also dropping.

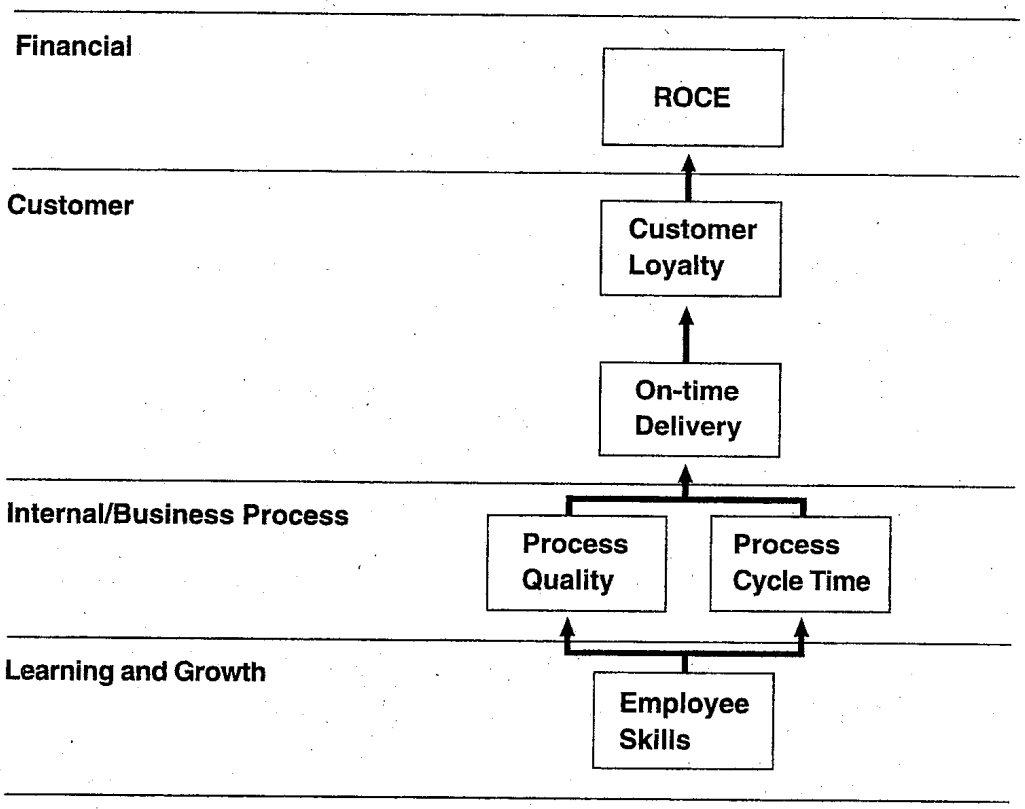

Figure 1. A simple example of the Balanced Scorecard (Kaplan & Norton, 1996b, p. 31).

3) As defined by investorwords.com, ROCE is: A measure of the returns that a company is realizing from its capital. Calculated as profit before interest and tax divided by the difference between total assets and current liabilities. The resulting ratio represents the efficiency with which capital is being utilized to generate revenue.

But why stop there? Let's ask this question: What will help improve customer loyalty? As Figure 1 suggests this might well be on-time delivery (OTD). After all, as customers ourselves, we all know how much we appreciate it when we can depend on a company to deliver on-time (or even sooner!). So, let's measure how we're doing on our on-time delivery performance; i.e., delivering the product or service when or sooner than promised or agreed to. Again, the logic seems flawless: if our OTD performance is excellent, it is probably at least one good indicator of pleasing our customers and generating customer loyalty. These two indicators are closely related to the customer and, therefore, are part of the BSC's customer perspective.

Continuing down the "performance chain" we now ask what will help improve our OTD performance? Now we begin looking at our internal business processes. Very generally, there are two important measures here: quality and cycle-time. The higher the quality of our processes the more likely we will produce a product or service that comes out "right" the first time; "right" meaning in a form that will please the customer. The faster we can produce that product/service, the sooner we can get it to our customer. These two measures, process quality and process cycle-time, fall within the BSC's internal business process perspective.

The final perspective, learning and growth, addresses a final question: What will help us improve the quality and cycle-time of our internal business processes? This question really brings home the statement that is often made but seldom really meant: "Our people are our most important asset." It is only to the extent that a company's employees, managers and workers alike, are well trained and motivated that everything else works. Following our Figure 1 example, one of the important things for high quality and low cycle-times is skilled employees. Accordingly, ways to measure just how "skilled" your workers are will also be an indicator of why your internal processes are either working well or not.

In this simple example we have looked at only a few possible measures and,

according to Kaplan and Norton, typically a company could have up to 25 separate measures spread over the four perspectives (1996b, p. 162). For example, in looking at what affects process quality and cycle-time, a company might also want to measure the "goodness" of its equipment—be it age, maintenance, or whatever—as part of the learning and growth perspective. This is because even the best trained worker cannot deliver good products with lousy equipment. This idea of multiple measures applies to all four perspectives.

We have been describing the BSC in terms of measures. In fact, before the *measures* come *objectives*. And this is where the "strategic" aspect of the BSC comes in. The BSC actually starts with the CEO (or equivalent) and his executive team deciding on the company's strategy. And, even, before this, on the company's mission/vision statement; for example, here is McDonald's:

> McDonald's vision is to be the world's best quick service restaurant experience. Being the best means providing outstanding quality, service, cleanliness and value, so that we make every customer in every restaurant smile.

McDonald's then goes on to say, in general, how it will achieve this vision:

> To achieve our vision, we are focused on three worldwide strategies:
>
> - Be the best employer for our people in each community around the world.
> - Deliver operational excellence to our customers in each of our restaurants.
> - Achieve enduring profitable growth by expanding the brand and leveraging the strengths of the McDonald's system through innovation and technology. (http://www.mcdonalds.com/corporate/index.html)

From this very general strategy statement strategic objectives are then developed that turn the general statement into something measurable. For example, one of McDonald's might be to have an annual ROCE growth of x% in line with its third worldwide strategy of "enduring profitable growth." Note that we have

taken ROCE, a measure as we saw above, and assigned a *target* to it. Now we have a strategy-based objective that can be measured to see if we are meeting the target. Similarly, we would establish targets for the rest of the measures in our ROCE << customer loyalty << on-time delivery << process quality/cycle-time << employee skills chain.

So imagine a set of say five strategic financial objectives/measures at the top and, feeding into these, some 15 to 20 more objectives/measures in the other three perspectives. Also imagine that each objective/measure is related to one (or more) other objective/measure in a cause-and-effect way (as we saw in Figure 1). You now have a Balanced Scorecard!

It is important to understand an important distinction between two types of objectives/measures: those which simply are an indication of an outcome and those which are an indication of performance *that leads to an outcome*. The first are called *lagging* indicators because they tell you what's *happened*. The others are called *leading* indicators because they tell you what's *happening*. In our Figure 1 example, a lagging indicator would be a measure of our ROCE; i.e., as a result of what we've been doing, this is our present ROCE. Improving on-time delivery or reducing process cycle-time are leading indicators because they tell us how well we are performing our current activities which will cause our future outcomes (such as ROCE) to be either better or worse. For this reason, leading indicators are also called performance drivers. The lagging indicators are often the same for most companies while the leading indicators tend to be more company-unique. Because of their universality, lagging indicators are also called core measures. As Kaplan and Norton (1996b) say:

> A good Balanced Scorecard should have an appropriate mix of outcomes (lagging indicators) and performance drivers (leading indicators) that have been customized to the business unit's [company's] strategy. (p. 150)

Here are some more examples of lagging (outcome) measures: return on

investment (ROI), profitability, customer satisfaction, customer acquisition, innovation, postsale service, employee satisfaction, and employee productivity. Here are some more examples of leading (performance driver) measures: new products, new pricing strategy, operating expenses, shopping convenience, responsiveness, product development, the invoicing/billing process, knowledgeable workforce, strategic information availability, and efficacy of suggestion program.

We will have more to say about how this set of 15 to 25 objectives/measures that are related in a logical and cause-and-effect way, can be used to not only explicate your strategy but to monitor and manage it too. For now let's consider why such a system is needed in this day and age.

Why is the BSC needed in today's business world? One could probably come up with many good reasons for why the BSC is needed but here are few:

- The shift from an "industrial age" to an "information age"
- The need to focus improvement initiatives
- The limitations of using only financial objectives/measures
- The need to be sure we implement our strategy

The shift from an "industrial age" to an "information age." According to Kaplan and Norton, up to about 1975, the primary concern of businesses was how to make production more efficient. As Kaplan and Norton (1996b) express it:

> During the industrial age, from 1850 to about 1975, companies succeeded by how well they could capture the benefits from economies of scale and scope. Technology mattered, but, ultimately, success accrued to companies that could embed the new technology into physical assets that offered efficient, mass production of standard products. (p. 2)

With these sort of rote operations, financial measures seemed to suffice as an indication of how well "...operating divisions used financial and physical capital to create value for the shareholder" (p. 3).

With the rise of the information age and global competition all that changed.

Now things like quality and responsiveness became important as well as working closer with your customers and suppliers. Innovation and shorter product develop times became key success factors. And now knowledgeable workers and learning organizations are proving to be important for success. The BSC explicitly recognizes these important "success" factors.

The need to focus improvement initiatives. As companies began trying one thing after another to survive and effectively compete, something still seemed to be missing. For many, programs like just-in-time (JIT), TQM, and reengineering didn't seem to work or, at best, caused only incremental improvements. The problem was usually that these initiatives were fragmented instead of being linked together as part of a unified strategy. This is one of the great strengths of the BSC: ensuring that all actions in a company are logically related to achievement of its strategic objectives. This means any new initiatives can only be undertaken if they will contribute to strategic objective achievement and any ongoing initiatives can only continue as long as they do this.

The limitations of using only financial objectives/measures. The trouble with financial measures is they only tell you how you did; that is, they are "backward looking." And, they don't even tell you *why* you did well or not. The BSC, with both lagging and leading indicators, can tell you not only how you did (the outcome lagging indicators) but why you did well (the performance driver leading indicators). Furthermore, these leading indicators, as the name implies, can give you a good idea of what to expect from future outcome measures such as core financial measures.

The need to be sure we implement our strategy. This last example reason may sound strange but Kaplan and Norton begin their latest book (2001, p. 1) by citing several references that support the sad conclusion that most strategies fail simply because *they never get implemented.* This seems to ring true with the old joke that once the annual strategy is developed into a nice document each year it

is filed away to gather dust until its time to update it again. The BSC, properly used, ensures not only that a strategy exists but that it is being executed and monitored for effectiveness. And, when measures show it is not being achieved as expected, through analysis that leads to learning, it is changed. In fact, as we understand the BSC better we will realize that, in a sense, it *is* the strategy.

These, then, are some of the reasons why we need something like the BSC. Call it what you want (a rose by any other name...) but the framework of the BSC makes eminent sense when conscientiously created and used. That so many companies have had success with this system of measurement/management is proof of its value. At this point let's take a closer look at BSC as a measurement system.

4. The Balanced Scorecard as a Strategic Measurement System

In this section we will consider these aspects of the BSC:

- The financial perspective
- The customer perspective
- The internal business process perspective
- The learning and growth perspective
- Putting all the perspectives together

The financial perspective. This perspective necessarily has preeminence since a company's first duty is to its shareholders to provide a good return on their investment. Accordingly, the other three perspectives will "support" this one. However, within this perspective, as with the others, we can have both outcome (lagging) measures and performance driver (leading) measures. Kaplan and Norton (1996b) use three "strategic themes" to broadly group the possible measures in this perspective; some of which could be outcomes and others drivers: (1) revenue growth and mix, (2) cost reduction and productivity improvement, and (3) asset utilization/investment strategy.

Under *revenue growth and mix* might be such measures as percentage of revenue from new products and services, percentage of revenue from targeted new customers or market segments, or some measure of change resulting from a new pricing strategy[4]. Under *cost reduction and productivity improvement* a typical measure might be one that measures the reduction in administrative expenses or the percentage of business transacted over various channels (to encourage the use of low-cost channels such as electronic data interchange (EDI) or extranets). Under *asset utilization/investment strategy* typical measures would be ROCE, ROI, and economic value added (EVA)[5]. Kaplan and Norton also mention as measures the cash-to-cash cycle[6] and percentage of resources shared.

Kaplan and Norton mention a fourth area in this perspective that companies may wish to measure, and that is the extent to which they are prudently managing risk. For example, an objective to broaden revenue sources could serve not only as a "growth" objective but one that serves to reduce the company's risk should one or more sources turn sour.

The customer perspective. For this perspective Kaplan and Norton identify five "core" outcome objectives/measures: market share, customer retention, customer acquisition, customer satisfaction, and customer profitability. These, for the most part, would be considered lagging measures within this perspective and are com-

4) This pricing strategy could be either lowering the price or raising it. With the use of activity based costing (ABC) it is possible to determine the "true" cost of a product or service. It may turn out that you need to raise your price to make a profit on certain products/services and that this will not significantly effect demand. One possible measure here would be percentage of unprofitable products or customers.

5) As defined by investorwords.com, EVA is: For a company, after-tax earnings minus the opportunity cost of capital. As with any other entity, economic value added essentially measures how much more valuable a company has become during a given time period.

6) The time between when you must pay for a product's labor and material and when you receive payment for the product. Of course you want this to be as short as possible.

mon to most businesses. The performance driver (leading) measures are grouped according to three things: product/service attributes, customer relationship, and image/reputation. These measures should be tailored to the company's targeted customer base. For example, is the customer looking for low-cost, no-frills service or, at the other extreme, full-service and willing to pay a premium price? Once the targeted customer type is identified, a way to measure the extent to which the desired *product/service attributes* are being provided could be devised. As for *customer relationship*, performance drivers could be the knowledge, competence, and "friendliness" of the sales representative. *Image and reputation* is tied closely to product/service attributes and relationship but a company may wish to use separate measures to see how it is doing in this area. For example, using market research the company may want to see if it is perceived as a highly professional firm known for its high quality and integrity.

The internal business process perspective. The objective/measures in this perspective are, for the most part, performance drivers of outcomes or other drivers. For example, by improving the cycle-time of a process you will be improving responsiveness to the customer and customer satisfaction. Kaplan and Norton (1996b) discuss these using a generic value-chain going from "identification of customer need" to "satisfaction of customer need" (see Figure 2).

For the *innovation process* the important thing is to bring a continual flow of

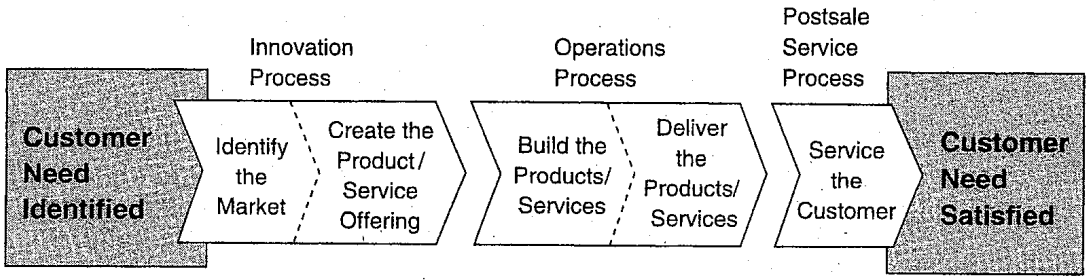

Figure 2. The value chain for the internal business process perspective (Kaplan & Norton, 1996b, p. 96).

new and desired products to market at a reasonable development cost. Effective measures in this area could be very beneficial to a company's bottom-line since R&D is an area that historically has not received that much scrutiny. As Kaplan & Norton (1996b) put it: "Many companies' performance measurement systems remain anchored to operational efficiencies rather than to the effectiveness and efficiency of research and development processes" (p. 100). This is probably due to the fact that until fairly recently a company's success was based on "efficient manufacture of high-volume products," not an active R&D program.

Examples of measures for the product development (innovation) process are: percentage of sales from new products, time to develop the next generation of products, and the ratio of operating profit to development costs. The latter measure, as Kaplan and Norton put it, "...signals to design and development engineers that the goal of R&D is not just technically sophisticated and innovative devices, but devices that have a market potential that will more than repay their development costs" (p. 101). Although Kaplan and Norton discuss under "operations process" measures of the extent to which a product/service create value *for the customer* and measures of features that make the product/service truly distinctive, it seems these are really additional innovative process measures.

The *operations process* measures deal with how well we are producing and delivering the product/service. These measures will almost invariably fall under one of these three categories: quality, time, or price. For example, measures of order-processing time are usually important. Kaplan and Norton give an example of a bank that reduced the time for approval of a mortgage loan application from 26 days to 15 minutes! By measuring this cycle, the bank was forced to ask just how much of the 26 days was spent actually working on the application versus non-value-added waiting times—obviously the vast majority was "waiting" time. Another area of potential improvement that has received considerable attention

over the last twenty years is manufacturing process improvement. This means measuring things like cycle-times and quality, and taking steps to improve these things. These various activities fall under the rubric total quality management (TQM)—already discussed at the beginning of this paper. In fact, TQM, as taught and practiced by Deming, will apply to almost all objectives related to establishing and/or improving a company's internal business processes. We will have more to say about this in section 7 of this paper.

The final process in the Figure 2 value-chain is the *postsale service process.* Here measures for such mundane things as how well the invoicing and collection process functions could be important to the company; both from a satisfied customer and cash flow point of view. Kaplan and Norton (1996b) cite an example of where companies selling high-tech equipment are beginning to embed diagnostic technology in their products that will enable "repair people to show up on-site to perform preventive maintenance and repair, often surprising customers who had yet to notice any degradation in equipment performance" (p. 106). As with the operations process, most of the objectives/measures here are quality/time/price related and, again, TQM can help. It is interesting to note that as the quality of a product is improved, so does the "postsale service" in that *there is less need for it*! As an example, think about how the highly reliable cars Japan started shipping in large quantities to the U.S. in the late 1970s/early 1980s swamped out the poor-quality cars American manufacturers had become infamous for (see Barry quote in section 2 above).

The learning and growth perspective. For employees to carry out the company's internal business processes in a way that delivers value to the customer and profit to the company, they must be motivated, well trained, and have the information they need when they need it. Kaplan and Norton suggest three outcomes we may wish to measure as indicators of employee "well-being": employee satisfaction, employee retention, and employee productivity. If any of

these measures are down, then we would want to look beyond them to whatever situation-specific drivers we decided to measure in this perspective. Basically there are three types of drivers: employee capabilities, information systems capability, and employee motivation, empowerment, and alignment.

For *employee capabilities* we want our employees not only well trained to do their jobs but to think and act beyond their routine tasks. For example, for those workers dealing directly with our customers, we want them trained to also present a "good face" to the customer and, within reasonable boundaries, have the authority and requisite knowledge to take immediate action should problems arise. An example of one measure of this is a company that identified competencies that were strategically important for the job and then began measuring the extent to which incumbents had these competencies.

Closely related to employee capabilities is *information systems capabilities*. Without the right information support systems, the employee cannot hope to do a good job no matter how well trained. For example, those dealing directly with the customer need to have ready access to product/service information. Also, it is often helpful for these employees to be able to get information on the customer such as past purchases and credit information. (This idea of having adequate information support applies equally to employees whose "customers" are *internal* to the company.) As with training, measures can be developed to assess how well the company is closing the gap between its information needs and the capability to meet them (e.g., something called a "strategic information coverage ratio" might be used).

The final type of objectives/measures relate to how well the company's employees are *motivated, empowered, and "aligned."* Actually, it is probably the initiatives taken to satisfy our strategic employee/information system capabilities that will drive these three areas. For example, if our employees are well trained and given what they need to do a good job, they will probably be motivated and

ready for the "empowerment" necessary to do so. A couple of measures suggested by Kaplan and Norton are: the extent to which the suggestion program is used including the quality of the suggestions, and how well continuous improvement initiatives are working. By alignment, we mean to what extent everyone is aligned with the strategic goals of the company. Once the BSC is implemented, anything that measures the extent of employee participation in the BSC will also be a measure of alignment. Of course, measures of the previously mentioned three "outcome" measures of employee satisfaction, retention, and productivity are also excellent indicators of motivation, empowerment, and alignment.

Putting all the perspectives together. Figure 3 shows how the four perspectives are combined into a unified, cause-and-effect system of lagging and leading indicators. This example is for an actual insurance company that used the BSC as a means to turn the company around. Using a "clean slate" approach, the executives first defined their vision for the "new" company and then developed strategic objectives considered necessary to achieve the vision. These are shown in the left-hand column of Figure 3. Then, by asking how they would know if the objectives was achieved, they came up with the lagging measures shown in the center column (strategic outcome measures). Finally, to have both an "early" indicator that the objective was going to be met plus identify the things its people must focus on on a day-by-day basis, leading measures were developed as shown in the right-hand column of Figure 3.

To illustrate this for one part of Figure 3, let's look at the strategic objective of "underwriting profitability (I2)." The executives decided that a good set of indicators for this would be loss ratio, claims frequency, and claims severity. Of course, it would typically take a relatively long time to see a change in these lagging indicators resulting from changes to the underwriting process. Therefore, a leading indicator called "underwriting quality audit" was established. The reasoning here is that by periodically performing audits on the policies of each under-

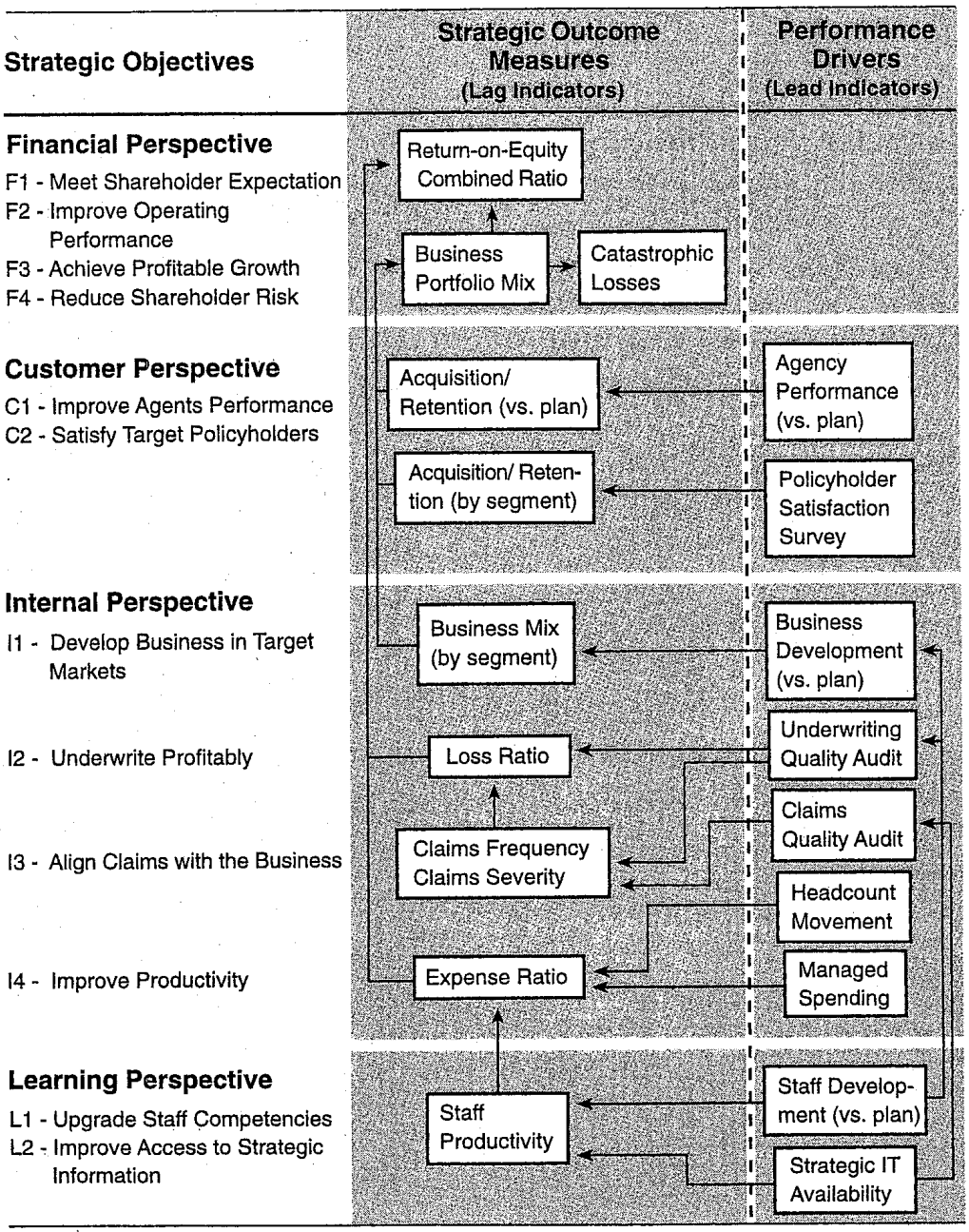

Figure 3. A Balanced Score example for an insurance company (Kaplan & Norton, 1996b, p. 160).

writer against a set of "good underwriting" criteria, the company could determine from the audit scores just how well they were doing underwriting and, consequently, their chances for ultimately improving profitability in this area. Note that the arrows in Figure 3 show this cause-and-effect relationship. However, note that in keeping with a BSC principle that all objectives/measures ultimately

feed into the financial objectives, the arrow from the "loss ratio" measure feeds into the "return-on-equity/combined ratio" objective box.

A couple of important points need to be made here. First, in a BSC you would normally see objectives/measures in the internal business process and learning and growth perspectives supporting those in the customer perspective. This was the case with our simple BSC of Figure 1. It should be noted, however, that Figure 3 does show how the performance drivers in the learning and growth perspective support those in the internal business process perspective. For example, for our underwriting quality audit example, the "staff development" and "IT (information technology) availability" objectives are shown as such drivers.

The other point is how developing a BSC in this way triggers initiatives needed to satisfy the strategy. In this case, there was probably a major overhaul of the company's underwriting process along with parallel training and IT initiatives to bring underwriting competency and IT support in line with the requirements of the new process criteria. In this way, the BSC usually becomes much more than simply a way to measure one's strategy; it becomes a strategy formulation and implementation vehicle. We now examine this idea further by see how the BSC is actually a strategic *management* system.

5. The Balanced Scorecard as a Strategic Management System

In this section we will consider these aspects of the BSC:

- Getting alignment throughout the organization
- Setting targets and allocating resources
- Getting feedback and learning

Getting alignment throughout the organization. Once the strategic measurement system at the "executive-level" is decided, it must be communicated to everyone in such a way that it can be used for the development of objectives and measures at the lower-levels. Kaplan and Norton recommend the strategic busi-

ness unit (SBU)[7] as the best place to develop the BSC. Ideally the SBU is involved with the whole value-chain from innovation through postsale services. Figure 4 shows where an SBU might fit into a typical corporate organization. The communication of the BSC can (and should) take place many ways, including launch announcements, brochures, newsletters, and the intranet (including electronic bulletin boards). The important thing is to be sure the communications plan is a single coordinated effort, carefully crafted to whatever stage the company is in as far as the roll-out and continued implementation of the BSC. As an example, Kaplan and Norton (1996b) point out that electronic bulletin boards could "be established for each scorecard measure, allowing managers and all other employees to comment about the root causes for exceeding or falling short on any particular measure" (p. 206).

The primary purpose of communicating the BSC's strategic objectives and higher-level measures is to initiate a "cascading" of additional objectives/mea-

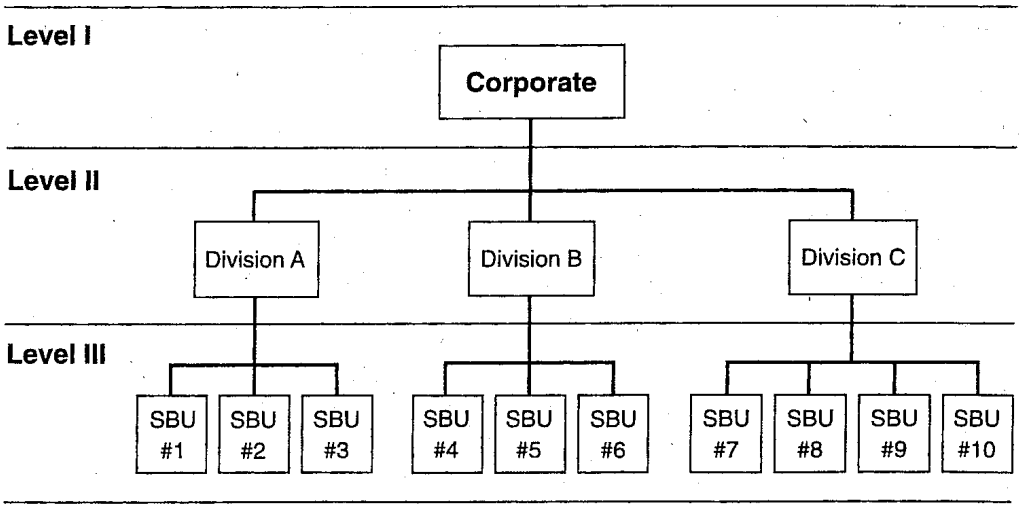

Figure 4. Where an SBU might fit into a typical corporate organization (Kaplan & Norton, 1996b, p. 301).

7) xrefer.com defines strategic business unit (SBU) this way: An autonomous division within a company responsible for planning the marketing of a particular range of products.

sures so that eventually all organizational units, right down to the individual level, can become part of and see where they contribute to the strategy. For example Caldwell (2000) provides an example of BSC objectives/measures to monitor and improve a company's process for the manufacture of insulated wires. These more detailed objectives could well be part of a larger objective to improve the quality of all manufacturing processes which, in turn, supports "customer" and "financial" objectives. So, in effect, the BSC at the SBU level will result in additional supporting BSCs at the lower levels. This way we can be sure everyone is "pulling together" to make the strategy successful.

Although the main BSCs will be at the SBU level, it is likely there will be some sort of BSC at divisional and/or corporate levels. The amount of detail in the BSCs at these levels will be depend on just how much commonality there is among the SBUs—the more commonality, the more detail can be in the higher level BSCs[8]. At a minimum, definite strategic guidance in the form of mission statements and strategic themes/objectives should exist at these higher levels. Furthermore, the corporation's BSC(s) should be used as the basis for keeping the board of directors informed. Traditionally, in most cases these boards merely review financial outcome measures to see how the company and CEO are doing. This, as we know, does little to tell them how the company is *really* doing in terms of growing, learning, and developing competitive advantage—something the BSC *can* do.

A final point with regard to alignment, concerns compensation. In reality, there are two kinds of "compensation": intrinsic and extrinsic. Kaplan and Norton (1996b), in discussing the first, make this statement based on their experience with the BSC:

8) In fact, in some cases, as the SBU BSCs are developed, they may well reveal previously unknown areas of commonality (e.g., common customers or distribution channels) that could then be emphasized in the divisional/corporate BSCs.

> This [BSC] articulation of how individual tasks align with overall business unit objectives has created intrinsic motivation among large numbers of the organizational employees. Their innovation and problem-solving energies have become unleashed, *even without explicit ties to [monetary] compensation incentives*. (p. 220, emphasis added)

In other words, once an employee can see that what he/she is doing is really meaningful, their motivation is likely to increase greatly. (More will be said about this in section 7 under Deming's System of Profound Knowledge.) However, eventually, monetary compensation must be added; especially to reward exceptional performance and with equal emphasis on meeting both financial and nonfinancial objectives. Once the BSC is implemented, Kaplan and Norton recommend a company wait, perhaps a year, before finalizing its monetary compensation plan since there is a danger of rewarding the wrong behavior until one really understands which objectives are the most important. Due to the sensitivity of this subject, anyone considering implementing a BSC should read the additional advice contained in their 1996 book.

Setting targets and allocating resources. Of course an objective/measure is meaningless unless there is a target; i.e., a statement that by such and such a time such and such an amount of improvement will occur. Although Kaplan and Norton recommend stretch targets to be achieved over the next three to five years (and such may be feasible in some cases) I would suggest that just getting a strategy "up and operating" to achieve even moderate targets would be a big step for most companies! Anyway, stretch or otherwise, targets should be set and this includes for all BSCs down to the lowest organizational unit. In some cases, a target may have to be simply a best guess but, as experience grows with operating under the BSC, it should become easier to set sensible and even stretch targets.

Once targets have been established for all the objectives, appropriate initiatives must be undertaken and necessary resources allocated. Kaplan and Norton dis-

cuss three ways to help a company determine where it will need new (or reinvigorated) initiatives: (1) where there are "missing measures," (2) continuous improvement types, and (3) radical improvement types.

"Missing measures" initiatives. Once a BSC is developed, it is typical for a company to find that data for at least 20% of its measures is not available. For example, the insurance company used as an example in section 4 (Figure 3) found it needed data to measure such things as "regulatory compliance, claims effectiveness, policy-holder satisfaction, and competency levels" (p. 230) and had to develop processes to obtain this data. Kaplan and Norton caution that BSC users should not let missing data hold up implementation. Until good processes are in place, managers can make subjective assessments of to what extent a target was met and, besides, by pressing ahead with implementation, the need for the new data gathering process will continue to get attention.

Continuous improvement initiatives. The BSC will no doubt reveal internal business processes that exist but are in need of improvement. This, in essence, is the objective of TQM programs. For example, an initiative to improve the defect rate for some particular manufacturing process might need to be undertaken to achieve some BSC objective. Such initiatives could range all the way from a series of *kaizen* blitz[9] projects for short-term, rapid improvements to major, usually long-term efforts to improve a process—for example, by using Six Sigma[10].

Radical improvement initiatives. This might also be called reengineering. In

9) A *kaizen* blitz effort might, typically, last one to three weeks. It is an intensive effort by a team to work on some important business process. The purpose is to not only remove non-value-added activity but to change the mind-set of the process participants so that the gains made will continue along with continual improvement of the process.

10) Six Sigma is a defect reduction technique that was pioneered by the Motorola company. Using a rather rigorous methodology, Six Sigma seeks to reduce the variation in a production process to the point where the number of defects is only a few in a million! See Austenfeld (2000) for more information about Six Sigma.

these cases the existing process or processes are found completely inadequate. For example the underwriting process of the insurance company cited above (section 4) where a major initiative was undertaken to create a process that would meet the improved underwriting objective of the BSC (as shown in Figure 3).

Of course, as required initiatives are identified, the necessary resources to see them through must be allocated. This would apply not only to projects that are needed to set up new processes but for the on-going operation of all BSC identified initiatives. For example, one initiative might be the improve the company's image by training employees to be courteous and knowledgeable. This initiative would require the continuing allocation of funds.

Just as the BSC serves as a checklist for what initiatives are needed, it equally serves to tell the company what initiatives are *not* needed. That is, once the BSC is implemented, any projects or processes that *do not* contribute to one of its objectives should be terminated. This will also be the key criterion to evaluate any new investments. Thus it is the BSC that ensures all initiatives/resources are contributing to the company's strategy. It also ensures that when the senior management team is reviewing the strategy via the BSC, they know every project and initiative they are looking at is meaningfully linked to the strategy; that is, they are not wasting their time looking at things that are not strategy-related.

A final point with regard to allocation of resources is the budget. Prior to the BSC, budgets concentrated mostly on financial measures such as sales, operating expenses, and gross margins. Although these things remain important, the budget must now become integrated with the BSC and take into consideration all four perspectives and a longer time frame than the traditional one year. As Kaplan and Norton (1996b) put it:

> If the target-setting process of the long-range plan is conducted appropriately, the short-term budgeting process simply involves translating the fist year of a five-year plan into operational budgets for strategic objectives and

measures in the four scorecard perspectives. (p. 248)

Getting feedback and learning. The final, and perhaps most important, aspect of using the BSC as a strategic management system is to get feedback and learn. Once the BSC is up and operating, it is necessary to review how well the strategy is working. This, in effect, is saying how valid is the set of cause-and-effect relationships of the BSC? This assessment can be made both on an ad hoc basis and through periodic review meetings. Kaplan and Norton recommend strategy review meetings take place on a quarterly basis. These reviews should take place at a time and place separate from the usual monthly operating reviews and the two reviews (strategy and operating) should complement each other. That is, as things come up in the operating meeting that bear on the strategy, they should become an item for that review and vice versa. One company with which the authors worked had this very basic approach to its strategy reviews: Is the company achieving it near-term strategic objectives? Will its long-term strategic objectives be met? Are any changes to the strategy needed?

Besides the periodic reviews, a company can also get feedback on its strategy/BSC using such things as correlation analysis, anecdotal reporting, and independent reviews. Although not conclusive, *correlations* such as improved employee morale with improved customer satisfaction, at least provide some support for the validity of the connection[11]. *Anecdotal reports*, especially early on before much statistical data is available, can also be useful for helping to confirm the validity of some theorized cause-and-effect relationship. Also, it is always useful to have someone who is *independent* from those who developed the BSC take a look at

11) Heskett, et al. have come up with the "Service Profit Chain" which is a generic representation of the BSC. It shows how improvements in internal service quality through such things as better employee selection and development and improved workplace design can, going up the four perspectives of the BSC, ultimately result improvements in revenue growth and profitability. According to Kaplan and Norton, the validity of these correlations has been borne out in studies of high-performing companies.

it for validity. In an example company cited by Kaplan and Norton, a business unit's BSC was examined by executives from other business units.

As these various reviews take place invariably problems will be found in terms of not meeting one or more strategic objective targets. This is where the "learning" takes place. Suppose the reason for not meeting the target is obvious; e.g., some driver upon which the objective depends also did not meet its target. Then it is a very straight forward matter of remedying that problem (correct the "driver" problem)— this is an example of *single-loop learning*. However, suppose all the supporting drivers for some failing objective *are* performing as expected and desired. Now the executive team must go back and examine the underlying theories and assumptions upon which those particular cause-and-effect relationships were based. In other words, *they must engage in double-loop learning*[12]. And, I might add, this use of double-loop learning should not be restricted only to when a problem appears but ideally is a continuous activity; especially with the executive team whereby they are constantly questioning their assumptions and theories about the BSC's cause-and-effect relationships.

In conclusion, then, once the set of causally related objectives and measures are established across the four perspectives and the BSC is fully promulgated throughout the organization its real value as an effective strategic management system and a means for the organization to learn and grow can be realized. Because the "devil is in the detail," let's now take a look at the specifics of how

12) The concepts of single- and double-loop learning comes from the work of learning theorists Chris Argyris and Donald Schon. These concepts were first espoused in their 1974 book (see References). With single-loop learning, all the assumptions, norms, values, etc. upon which an individual or organization bases its actions (strategy) remain unquestioned. In this case, efforts are concentrated on trying some different action/strategy within the same operating framework to achieve a better end. With double-loop learning the whole operating framework of assumptions, norms, values, etc. is questioned. It has been shown that double-loop learning can lead to significant breakthroughs in performance.

an organization would go about creating a BSC.

6. The Balanced Scorecard, the Process for Creating One

The main players in the creation of a BSC are the executive team and someone Kaplan and Norton (1996b) call the architect. The architect:

> ...guides the process, oversees the scheduling of meetings and interviews, ensures that adequate documentation, background readings, and market and competitive information are available to the project team, and, in general, serves to keep the process on track and on schedule. (pp. 299–300)

In other words, the architect is sort of a super facilitator and would usually be a senior staff manager such as the vice president of strategic planning or vice president of quality management.

Figure 5 shows the four steps and ten tasks for creating a BSC. This process has been taken from Kaplan and Norton with slight modification of some of the task titles. These are the four steps:

- Define the architecture
- Build consensus around strategic objectives
- Select and design measures
- Build the implementation plan

Step 1: Define the architecture. There are two tasks associated with this step:

- Task 1: Select the appropriate organizational unit
- Task 2: Identify SBU/corporate linkages

Task 1: Select the appropriate organizational unit. The architect, working with the senior management team, decides on the organizational unit for which the BSC will be developed. As discussed in section 5 above, the strategic business unit (SBU) is usually the appropriate unit (see Figure 4). However, other possibilities might be at a functional level if the function is very large or complex or even at the corporate level if there is a lot of commonality among the subordi-

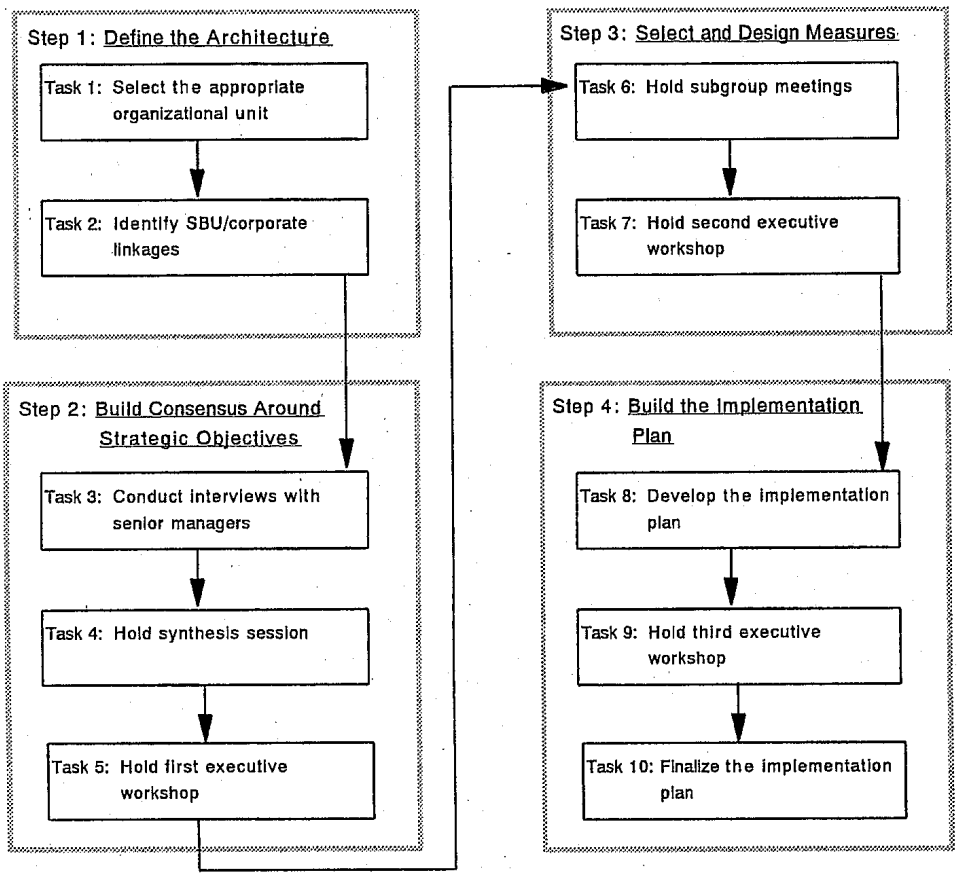

Figure 5. The process for creating a BSC (adapted from Kaplan & Norton, 1996b, pp. 300–308).

nate units of the corporation. In general, if the unit it large enough to have its own strategy, it is probably a good candidate.

Task 2: Identify SBU/corporate linkages. The architect accomplishes this task by interviewing key senior managers to find out (1) the SBU's financial objectives, (2) important corporate objectives (i.e., environment, safety, quality, etc.), and (3) linkages with other SBUs (e.g., due to common customers, competencies, internal support, etc.). This information will help ensure that as the BSC objectives are developed they do not optimize the SBU at the expense of the corporation or other SBUs. Furthermore, it also provides a set of constraints and opportunities to guide the development of the BSC.

Step 2: Build consensus around strategic objectives. At the conclusion of this step, the top objectives within each of the four perspectives will have been iden-

tified and described along with possible measures. As Figure 5 shows, there are three tasks to this step:

- Task 3: Conduct interviews with senior managers
- Task 4: Hold synthesis session
- Task 5: Hold first executive workshop

Task 3: Conduct interviews with senior managers. Although Kaplan and Norton don't say, these senior managers would probably be the head of the SBU and his/her direct reports; typically six to twelve people. Before the interviews the architect puts together and distributes to each manager: information about the BSC; the SBU's vision, mission, and strategy; and industry-related information. This latter information should cover "the industry and competitive environment of the SBU, including significant trends in market size and growth, competitors and competitor offerings, customer preferences, and technological developments" (Kaplan & Norton, 1996b, p. 303). After the senior managers have been given a chance to review this material[13], they are interviewed individually to get their ideas about appropriate strategic objectives across the four perspectives. Besides this primary purpose, the interviews serve to educate the managers on the BSC, get them thinking about translating the strategy into objectives/measures, identify any concerns, and to see if there are any potential conflicts, either about implementation of the BSC or "at a personal or interfunctional level." Although the architect will be conducting the interview, he/she will have one or two assistants to record what the managers are saying, especially about appropriate objectives and possible measures.

Task 4: Hold synthesis session. The purpose of this session by the architect

13) It seems it would be much more effective and efficient to provide the senior managers with a well thought out briefing first that covers these same areas. At the conclusion of this briefing, they could be given a carefully organized package that makes it easy for them to get more details on each area.

and his/her assistants is to take the information gained from the interviews and organize it into a set of ranked tentative objectives (and possible measures) across the four perspectives. While doing this they should also see to what extent each objective supports the SBU's strategy and how the objectives might fit together in a set of cause-and-effect relationships. Anonymous quotes from the interviews should be prepared to support and explain the objectives. During this session any issues that need to be discussed should also be identified such as potential areas of resistance and management changes that the BSC will likely cause.

Task 5: Hold the first executive workshop[14]. Kaplan and Norton don't say, but presumably these are the same people who were interviewed during Task 3. The purpose of this workshop is to:

- Get consensus on the vision/mission/strategy
- Have a thorough discussion of each objective developed during the synthesis session
- Decide on the top three or four objectives for each perspective
- Develop brief descriptions for each objective
- Develop potential measures for each objective
- Create four subgroups, one for each perspective

The subgroups are formed by splitting up these senior executives and adding members from the next levels of management ("to broaden the base of deliberations and consensus"). At the conclusion of this workshop, the architect prepares a document summarizing what was accomplished and distributes it to all concerned. This summary will include who is in each of the four subgroups and who

14) It is important to note that at this point the architect moves more and more into a position of facilitator, letting the executives take on responsibility for development of the BSC. This ensures that the BSC will becomes "owned" by management, *not the architect*. However, it is still the architect's job to be sure all the actions necessary for BSC development are taken.

the subgroup leaders are.

Step 3: Select and design measures. Now that the objectives have been pretty well identified, it is time to begin developing the measures. This is accomplished with Tasks 6 and 7:

- Task 6: Hold subgroup meetings
- Task 7: Hold second executive workshop

Task 6: hold subgroup meetings. The architect now facilitates as many meetings as necessary by the four subgroups to refine and develop appropriate measures for each objective identified during Task 5. Once a measure is decided upon, the source of the measurement data must also be identified along with any actions needed to ensure the data will be available. Finally, the subgroups must identify the cause-and-effect relationships among the measures both within the perspective and external to it. All this information should be displayed in a way to make it easy for discussion and use in the next executive workshop. Towards this end, the architect should probably develop some uniform way to display the information across the four perspectives.

Task 7. Hold second executive workshop. Although not clear from Kaplan and Norton, the members of this workshop are presumably the same as those involved with the four subgroups of Task 6. The purpose of this workshop is to once more discuss the SBU's vision/mission/strategy and have the subgroup leaders present their recommendations for the objectives/measures for each of the four perspectives for comment and finalization. Also, to extent possible, targets should be developed for each measure[15]. A suggested way to collate all the information from this workshop is a *draft* brochure that could be used to com-

15) Kaplan and Norton say "stretch" targets but I have a feeling that it might be better to "walk before running"; especially if the SBU is not that strategically savvy. After all, it seems just successfully absorbing all the changes a BSC entails will be challenge enough in the near-term.

municate the BSC to everyone in the organization.

Step 4: Build the Implementation Plan. This final step involves the following three steps:

- Task 8: Develop the implementation plan
- Task 9: Hold third executive workshop
- Task 10: Finalize the implementation plan

Task 8: Develop the implementation plan. This task is carried out by a special team; usually the four leaders of the subgroups of Task 6. Among other things, the implementation plan should formalize the (stretch?—see footnote 15) targets, include how the measures are to be linked to their data sources, how the BSC will be communicated throughout the organization, and how "second-level" metrics will be developed[16].

Task 9: Hold third executive workshop. The executive team meets for a third time to essentially validate everything: vision, mission, strategy, objectives, measures, and targets. Although not very clear from Kaplan and Norton, I believe the outcome of this workshop will be a refinement of the implementation plan develop during task 8. In particular the executive team should include in the plan: how all current and needed initiatives will be aligned with the objectives of the BSC[17], the final plan for promulgation and implementation of the BSC throughout the organization, and what changes are needed to the management and information systems.

Task 10: Finalize the implementation plan. Actually this task would probably

16) Kaplan and Norton don't say much about these "second-level" metrics but, it seems their systematic development will be a key to having an effective BSC. That is, ensuring that these "top three or four objectives/measures" in each perspective are linked as needed to all lower level objectives/measures right down to the shop floor. As mentioned earlier, an example of a "second-level" metric is found in Caldwell (2000).

17) This part of the implementation plan should also address the termination of any initiatives that obviously do not contribute to BSC objectives.

be better named "implement the implementation plan." Kaplan and Norton recommend this be done within 60 days of completion of the planning phase. In fact, the implementation plan should include a phase-in plan to ensure this happens. In section 5 we talked about not letting missing measures—measures yet to be determined for some objective—hold up implementation of the BSC. This applies also to missing data. Best estimates can be used for such information until the information system catches up with the BSC requirements.

Time frame for creation of a BSC. Figure 6 shows a time frame suggested by Kaplan and Norton for creation of the BSC (Tasks 1–10). This schedule is mostly dependent on the availability of senior executives and, accordingly, could be longer or shorter. It is advisable not to make it much shorter, however, since it is good for the executives to have time between interviews and workshops to think about what they have learned each time.

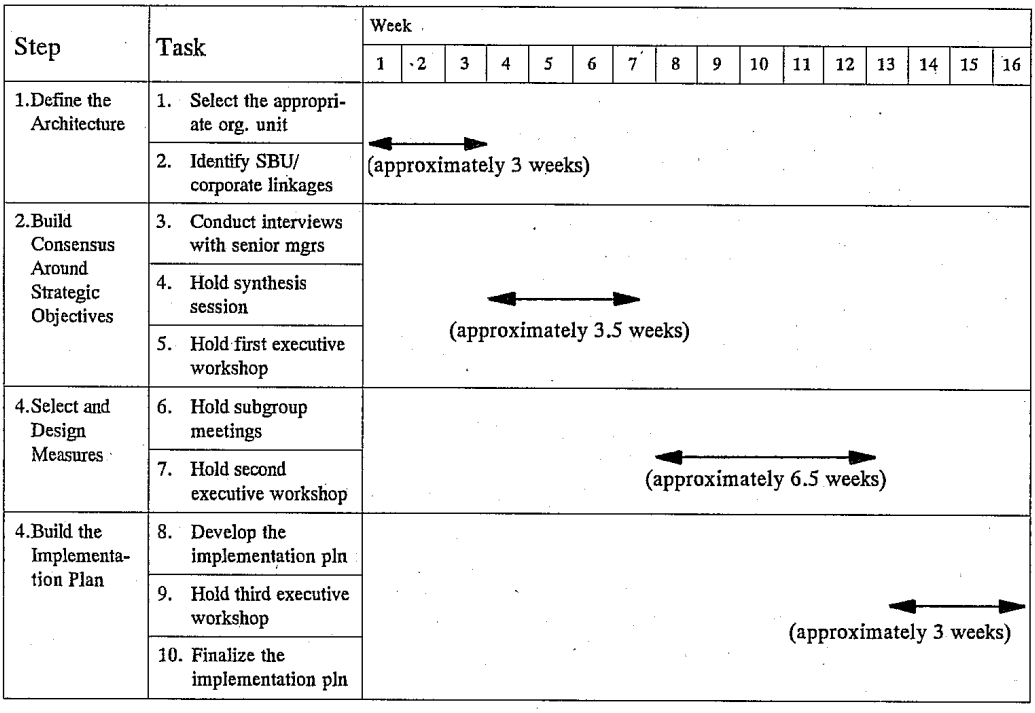

Figure 6. Suggested time frame for creation of a BSC (adapted from Kaplan & Norton, 1996b, p. 309).

7. How Deming's approach to TQM complements the Balanced Scorecard

Now that we have described the Balanced Scorecard in some detail, let's see how Deming's approach to TQM can complement it. We will consider this by looking at the three things that most exemplify Deming's views on quality: his 14 Points, the Plan-Do-Study-Act (PDSA) Cycle, and his System of Profound Knowledge. Appendixes A, B, and C provide, respectively, brief descriptions of these three things.

Deming's 14 Points (see also Appendix A). Some of these points were being advocated by Deming as early as 1950 when he was invited by the Union of Japanese Scientists and Engineers (JUSE) to give a series of lectures to Japanese manufacturers (Gabor, 1990). His main ideas about quality eventually coalesced into this set of 14 Points. For ease of display and showing how they relate to the BSC, the following chart will be used. This version of the Points, perhaps the most official, is taken from Deming's famous book *Out of the Crisis* (1986, pp. 23–24).

Deming's Point	How it complements the Balanced Scorecard
Point 1: Create constancy of purpose towards improvement of product and service, with the aim to become competitive and to stay in business and to, provide j obs.	This could be the "purpose" statement for creating a BSC. There will truly be a "constancy of purpose towards improvement" if a company conscientiously uses its BSC with its set of interlocking objectives, measures, and improvement targets. Furthermore, as implied by "constancy of purpose," one of the main reason for the BSC is to build a company that can compete even better in the future.
Point 2: Adopt the new philosophy. We are in a new economic age. Western management must awaken to the challenge, must learn their responsibilities, and take on leadership for change.	This is more of an admonition than a quality guideline. However, with it, Deming seems to be saying the same thing Kaplan and Norton are saying with regard to why a BSC is needed. That is, we are in a new information age and the old way of doing business will no longer suffice. As Deming puts it: "We can no longer tolerate commonly accepted levels of mistakes, defects, material not suited for the job, people on the job that do not know what the job is and are afraid to ask..." (p. 26).

Point 3: Cease reliance on mass inspection to achieve quality. Eliminate the need for inspection on a mass basis by building quality into the product in the first place.	This idea of producing high-quality products and service is a constant theme throughout the Kaplan and Norton book. In the customer perspective it plays an important role in driving things like customer satisfaction and retention. To get this high quality into our products/service we must look to the internal business process perspective and establish objectives for the creation and maintenance of high-quality processes. Kaplan and Norton tell the story of a company that makes printed-circuit boards but, until motivated by a visit to Japan, did not measure how much of its product made it through the production process without requiring rework. It turned out it was only 16%. Once this company began improving the process it was soon able to boost this to 60% and reduce its work force by 25%. In effect, 25% of the workers were there to inspect, detect, and rework defective product!
Point 4: End the practice of awarding business on the basis of price tag. Instead, minimize total cost. Move toward a single supplier for any one item, on a long-term relationship of loyalty and trust.	Although Kaplan and Norton discuss this under the customer perspective, it is really an extension of having high-quality production processes. After all, your product can only be as good as the material that goes into it. Therefore, part of the internal business process perspective could well be objectives relating to your suppliers. For example, how many long-term relationships have been established? Or, how many suppliers have been qualified to deliver their supplies "just-in-time*"? * Just-in-time means the supplier can be counted on to deliver high-quality supplies at almost the exact time they will be needed by the manufacturer.
Point 5: Improve constantly and forever the system of production and service, to improve quality and productivity, and thus constantly decrease costs.	This rather general point could well be a statement of what we should do with regard to our internal business processes. That is, as we work our way down the four-perspective chain and identify which processes are important to our strategy, we would then bring to bear all available methods for improving those processes so they yield continuously higher quality and productivity at a lower cost.
Point 6: Institute training on the job.	This simply stated point is one of the three major themes of the learning and growth perspective discussed in section 4 of this paper. If there is one failing most responsible for companies not doing better, it is probably the lack of an effective training program. This is often readily evident when you go to a store to buy something. A polite, knowledgeable, and ready-to-help salesperson does not just happen by accident. Furthermore, the use of TQM techniques to continuously improve internal business processes, requires that workers be trained in these techniques. In fact, with the judicious use of focused training, a company an eventually bring about a major cultural change—a culture that, as a

	normal matter, always thinks in terms of the customer and continuous improvement.
Point 7: Institute leadership. The aim of supervision should be to help people and machines and gadgets to do a better job. Supervision of management is in need of overhaul, as well as supervision of production workers.	The BSC represents the essence of "leadership" in that the CEO and his executive team, in developing and using it, are forced to become involved in all the SBU's activities. And involved in such a way that they help the employees (and the "machines and gadgets") to do a better—strategically relevant—job through the set of cause-and-effect related objectives and measures. Furthermore, as can be seen from the way the BSC is created (section 6), all of management is forced to become actively involved in understanding and achieving the SBU's strategic objectives; i.e., there is, in effect, an "overhaul" of management supervision.
Point 8: Drive out fear, so that everyone may work effectively for the company.	One reason there is often "fear" in the work place is the workers simply are not sure if they are doing the right thing. All they know is they are to "produce as much as possible as fast as possible." This often leads to the coverup of problems and actions taken that will be harmful in the future. For example, a production manager might ship a lot of product of dubious quality on the last day of the month to meet some arbitrary quota. The whole idea of the BSC is to fully display all the activities of the company in such a way that everyone knows their role in satisfying the strategy. Furthermore, the whole idea of making the BSC fully transparent is to validate the assumptions underlying its set of cause-and-effect relationships. Therefore, deviations from expected performance are not used for blame but "as opportunities for learning."
Point 9: Break down barriers between departments. People in research, design, sales, and production must work as a team, to foresee problems of production and in use that may be encountered with the product or service.	This point is certainly in-line with the development and use of the BSC. As can be seen from Tasks 5, 7, and 9 of the creation process (section 6), it is (all) the senior managers who come to consensus on the vision, mission, and all the strategic objectives, measures, and targets of the BSC. And, since the BSC cuts across all functions, there must be no "barriers" between departments for the BSC to be effectively created and used. The quarterly strategy reviews will sensure this interdepartmental cooperation continues.
Point 10: Eliminate slogans, exhortations, and targets for the work force asking for zero defects and new levels of productivity. Such exhortations only create adversarial relationships, since the bulk	Managing by "slogans and exhortations" is the old, unthinking way of managing. It implies that the workers can do a better job without any changes to the system* (which was created by management and only management can change). The BSC implicitly recognizes this fallacy with its internal business process and learning and growth perspectives. That is, if we want to improve customer satisfaction we must improve our product/service and if we want to im-

of the causes of low quality and low productivity belong to the system and thus lie beyond the power of the work force.	prove our product/service, we must improve the system. * The "system" is everything that bears on producing a product or service; i.e., the quality of the incoming material, the quality and condition of the equipment, the training and motivation of the workers, etc.
Point 11a: Eliminate work standards (quotas) on the factory floor. Substitute leadership. *Point 11b: Eliminate management by objectives. Eliminate management by the numbers, numerical goals. Substitute leadership.*	Although the BSC calls for targets (otherwise an objective is meaningless), these are not arbitrary but based on what can be reasonably achieved.* Furthermore, as mentioned with Point 8 above, if targets are not met, it is not seen as a reason to castigate a manager or worker but as an opportunity for learning all around. And this is certainly a key part of leadership. * Kaplan and Norton do advocate "stretch" targets but the definition of "stretch" is very subjective and, it would seem, depends a lot on how much progress a company has made in moving from a dysfunctional management environment to a healthy implementation of its BSC.
Point 12a: Remove barriers that rob the hourly workers of their right to pride of workmanship. The responsibility of supervisors must be changed from mere numbers to quality. *Point 12b: Remove barriers that rob people in management and in engineering of their right to pride of workmanship. This means, inter alia, abolishment of the annual review or merit rating and of management by objectives.*	As already discussed at Point 10, the BSC recognizes the vital link between the efficacy of the system and the ability of the worker, be he/she an hourly worker or a salaried professional, to deliver a good product or service. If the employee is not given the training, equipment, and motivation to do a good job, he/she will not do a good job—surely this is not "rocket science."* Deming makes a very persuasive argument regarding the abolishment of the annual review or merit rating and management by objectives (see Appendix A). Instead, Deming says people doing similar work should have their performance plotted on a control chart and, any deviations from a reasonable norm, checked out. This is probably the one area where Deming's ideas do not fully mesh with the BSC. Kaplan and Norton do not really talk that much about a company's performance evaluation system except to say that eventually BSC goals achievement should be linked to the compensation system. I would think a company would want to take Deming's advice here into consideration as they are revamping their compensation system. * Unfortunately, it is a lesson many companies, even today, have not learned.
Point 13: Institute a vigorous program of education and self-improvement.	Again, Kaplan and Norton do not really talk about this in their book. The emphasis is more on "reskilling" in light of specific strategic objectives. However, an underlying theme of the BSC is to continuously develop the employee to become more broadly knowledgeable and creative and thus be able to handle greater empowerment. Therefore,

	this Deming point would seem to fit right in with the BSC idea of continuously upgrading the organization's human capital. In fact, this should be part of any "learning" organization as a BSC organization is suppose to be. Besides the organizational gains from the knowledge/experience improvements, following the advice of this point can do wonders as far as making employees feel the company cares about and believes in them and their potential.
Point 14: Put everybody in the company to work to accomplish the transformation.	Of course this "transformation" is the same one Kaplan and Norton are talking about when they speak of moving from the old industrial age, command and control style of management to the new information age, involve-everyone style. And what better way to "involve everyone" than with a BSC that logically and systematically links all organizational activities, from the top to the bottom, to the achievement of a common set of strategic objectives.

The Plan-Do-Study-Act (PDSA) Cycle (see also Appendix B). The PDSA Cycle made popular by Deming actually originated with Walter A. Shewhart, a friend and mentor of Deming who worked for Bell Laboratories, the research arm of AT&T, America's monopoly telephone company at that time.

For those already familiar with the PDSA Cycle, the BSC should appear to be simply a logical extension of the idea to the whole organization. The "plan" part of the cycle, in this case, is the creation of the BSC described in section 6 of this paper. The "do" part is the actual implementation where the BSC is put into action. The "study" part is the monitoring of the measures to see how well targets are met—primarily via the quarterly strategy review meetings. Finally, the "act" part is the set of actions that results from the monitoring.

As discussed in section 5, these "act" actions could range from a simple fix of some obvious problem to full-scale "double-loop" learning whereby the underlying hypotheses upon which the BSC's cause-and-effect relationships are questioned and, possibly, changed. At this point, the "new and improved" BSC is put into action for another PDSA cycle.

Thinking in terms of the PSDA Cycle also complements the BSC in another

and perhaps more typical way. That is, how the BSC is used to understand and satisfy the customer. Once the organization has decided on its financial objectives (the financial perspective part of the BSC), its "customer" objectives are determined. These are based on something Kaplan and Norton call the customer value proposition: those things our customers most value in the product or service[18]. To develop the customer value proposition, the organization conducts customer research. Once the customer value proposition is determined, objectives for the customer perspective are developed along with those supporting objectives in the internal business process and learning and growth perspectives. This completes the "plan" part of the PDSA Cycle.

The "do" part is, again, the implementation of the BSC and the "study" part is seeing if the planned set of cause-and-effect initiatives (objectives) are, indeed, delivering the customer value proposition. If not, some appropriate action is taken—the "act" part—to remedy the situation.

So the BSC can be seen as simply thinking in terms of the PDSA Cycle, both on the scale of the whole organization and in terms of satisfying the customer.

Deming's System of Profound Knowledge (see also Appendix C and Austenfeld, 2001a). This system was one of Deming's last contribution to the field of quality[19] and is set forth in his book, *The New Economics: For Industry, Government, Education* (2nd ed., 1994). The System consists of these four elements: (1) appreciation for a system, (2) knowledge about variation, (3) theory of knowledge, and (4) psychology. These four elements are meant to work together to form a management philosophy which encapsulates Deming's thinking over his long life. Although seemingly simple concepts, a serious study of these four elements and how they work together will yield important insights for

18) For example, is the customer most interested in a no-frills but dependable product at a low cost or a premium product at a higher cost?

19) Deming passed away in December of 1993 at the age of 93.

good management. As was done with the 14 Points, a chart will be used to show how each element of the System of Profound Knowledge complements the BSC.

Element	How it complements the Balanced Scorecard
Appreciation for a system	The BSC is a system. It is a system with a definite aim—to makethe company successful. To accomplish this aim, a set of cause- and-effect related objectives (the system's components) work together to contribute to this aim. And the active monitoring of these objectives is the means by which the system is effectively managed. Furthermore, by thinking of the company's strategy in terms of this system, management begins concentrating on improving the system instead of blaming the workers for poor results.
Knowledge about variation	Knowledge of variation is very important with respect to the the BSC. It is probably in the internal business process perspective that it most obviously comes into play in that we want our business processes to have as little variation as possible. For example, if we are making a part for a car, we want that part to be the same every time we make it. This, of course, is what revolutionized the manufacturing industry as best exemplified by Henry Ford's assembly line. Another example is something as mundane as a Big Mac. Almost without exception, I know I can get the exact same high-quality Big Mac no matter where I go in the world. Whether it is to satisfy (delight?) the customer with a highly reliable product or to save the company money by having almost no defects, knowledge of variation is important for a successful BSC. See Austenfeld, 2001a, pp. 83–87 for some of the more technical aspects of variation.
Theory of knowledge	This element is best exemplified by recalling the discussion under "Getting feedback and learning" in section 5 above. The BSC is a set of cause-and-effect hypotheses. That is, initially the organization hypothesizes that such and such an effort (say, improving customer loyalty) will effect some objective (say, ROCE). Once the BSC is implemented, its objectives/measures are closely watched and subjected to formal reviews. If this monitoring shows that the organization is not getting the effect expected, then the thinking that led to the original hypothesis is reexamined and, perhaps, a new hypothesis is developed and tested. This is, in effect, the theory of knowledge. And the Deming model for this knowledge building process is the PDSA Cycle (see just above and Appendix B for a discussion of this cycle).

Psychology	Here Deming stresses two points: (1) people are different and (2) management should rely more on intrinsic motivation rather than extrinsic motivation. This element would seem to apply mostly to the learning and growth perspective dealing with employees. For example, in training people or assigning them jobs, management should realize that people learn differently and have different aptitudes. Although Kaplan and Norton don't mention it in their 1996 book, it is often a good idea to test the work force to see just what skills and aptitudes each person does, in fact, have. Then put those skills and aptitudes to the best use through judicious job assignments and appropriate training. As for intrinsic motivation, one of Deming favorite stories was about a boy who would wash the dishes after dinner every evening until, one evening, to show her appreciation, his mother gave him a quarter. He never washed another dish. Once what he had done for the sheer joy of pleasing his mother became just another job and lost its specialness as an act of love. The BSC, with it clear linkage of objectives down to the individual level will let everyone see, usually for the first time, how their efforts fit in to achievement of the strategy. Given this understanding, it is much more likely the individual employee will want to do his or her best to help the company succeed, even without additional compensation. In fact, as with Deming story of the boy, such additional compensation can often have an adverse effect on performance; often sincere praise is a better reward. A final thought about how psychology might play an important role when creating a BSC and that is with respect to your customers. To really understand them it is important to have some understanding of psychology. For example, what are the steps that lead to a buying decision?, why do customers prefer some other product over yours?, how do your customers differ?, etc.

8. Conclusion

This paper has provided a brief overview of the very effective and widely used management system known as the Balanced Scorecard (BSC). It has also shown how total quality management (TQM), as taught and practiced by Dr. W. Edwards Deming, can play an complementary role in building and using a successful BSC. In fact, some of Deming's ideas about such things as appreciation

of a system and knowledge of variation would seem to be very helpful in understanding the essence of the BSC. It would behove anyone contemplating developing and using a BSC to also take the time to study some of Deming's ideas as embodied in his 14 Points, the Plan-Do-Study-Act (PDSA) Cycle, and his System of Profound Knowledge.

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Deming's Fourteen Points

(Deming, 1986, pp. 23–24)

Point 1: *Create constancy of purpose towards improvement of product and service, with the aim to become competitive and to stay in business, and to provide jobs*. Here Deming is stressing the need for management to make a real commitment to quality so that everyone else in the company has confidence *that there will be a future*. Specifically, management must innovate, put resources in research and education, and "constantly improve the design of product and service." Management must be concerned with business far beyond the next quarter's dividends!

Point 2: *Adopt the new philosophy. We are in a new economic age. Western management must awaken to the challenge, must learn their responsibilities, and take on leadership for change*. According to Deming, for the transformation (of Western management) to occur: "We can no longer tolerate commonly accepted levels of mistakes, defects, material not suited for the job, people on the job that do not know what the job is and are afraid to ask..." (p. 26). Citing the precision with which the Japanese train system operates—as opposed to what we often find in America, for example—Deming relates this set of instructions for getting to a company in Japan: "0903 h Board the train. Pay no attention to trains at 0858, 0901. 0957 h Off."

Point 3: *Cease reliance on mass inspection to achieve quality. Eliminate the need for inspection on a mass basis by building quality into the product in the first place*. The main idea here is that it is better to randomly sample the process's output for purposes of maintaining statistical quality control rather than having 100% inspection. Deming mentions a printing company that had prided itself on proofreading everything eleven times yet still needed help due to constant customer complaints. The problem: each of the eleven inspectors relied on

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Deming's Fourteen Points

the other ten! In other words: you can't inspect quality into a product or service. Instead, you should work to constantly improve the process—improved quality will automatically result.

Point 4: *End the practice of awarding business on the basis of price tag. Instead, minimize total cost. Move toward a single supplier for any one item, on a long-term relationship of loyalty and trust.*[1] Deming quotes from an actual government advertisement for professional help: "For delivery and evaluation of a course on management for quality control for supervisors.... An order will be issued *on the basis of price*." Worse yet, such a practice will drive those who would have delivered good products and services out of business. Common sense tells us that you can't make quality products out of poor quality material. The other idea contained in this point is that it is a good idea to establish long-term relationships with your suppliers. This way you can work together to improve the quality of the supplies and, accordingly, that of the product in which they are used. As the product's quality improves and it becomes more successful, the additional profit can be shared with the supplier thus encouraging further improvements!

Point 5: *Improve constantly and forever the system of production and service, to improve quality and productivity, and thus constantly decrease costs*. Some of the things Deming mentions here are continual improvement through a better understand customer requirements, development of better relationships with suppliers, doing a better job of hiring, training, and supporting workers, and considering/experimenting with all ways that a process might be made better (maybe just by changing the temperature or humidity). Toyota takes this point seriously; for example, in 1995 Toyota Motors received 764,402 suggestions and *99% were*

1) Deming discusses this point extensively in *Out of the Crisis* (17 pages).

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Deming's Fourteen Points

adopted (Toyota Motor Corporation, 1997).

Point 6: *Institute training on the job.* Deming cites an example, perhaps all too common, of a worker simply being told to "go to work" without having the job explained to him and, to make matters worse, a foreman who "knows nothing." Managers need to be trained in all aspects of the company operation and given an appreciation of variation. Unfortunately, most American managers have not had experience at the "factory floor" level. Deming also brings up the importance of recognizing that people learn in different ways.

Point 7: *Institute leadership. The aim of supervision should be to help people and machines and gadgets to do a better job. Supervision of management is in need of overhaul, as well as supervision of production workers.* Deming here is saying the job of management is not "passive" supervision but "leadership" supervision. This means knowing enough about the worker's job to be able to give him or her the help needed. It also means not managing by the numbers as in "zero defects" or just meeting or not meeting some specification. The goal of leadership should be to empower (with the training and equipment needed) and encourage the worker to continual improve the process, not meet some relatively arbitrary specification or make some quota number.

Point 8: *Drive out fear, so that everyone may work effectively for the company.* Workers and supervisors will often do what management wants out of fear, even if it has long-term adverse consequences. One example Deming cites is a foreman who knew the production line needed to be shut down for repairs but took a chance in an attempt to meet management's quota for castings. When his worst fears were realized, not only wasn't the quota met, but the line was down for four days for repairs! Fear will lead to such things as an inspector passing poor quality products and fudging figures. A secure environment must be created where

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Deming's Fourteen Points

the worker knows it is OK to report a problem and a spirit of working together to solve problems prevails over blaming.

Point 9: Break down barriers between departments. People in research, design, sales, and production must work as a team, to foresee problems of production and in use that may be encountered with the product or service. Another common problem in companies is the left hand not knowing what the right hand is doing, Deming gives the example of a perennial design problem that the servicemen continued to correct because there was no system for feedback to manufacturing to eliminate the problem in the first place! Departments need to think in terms of who their internal customers are and develop a good working relationship with them.

Point 10: Eliminate slogans, exhortations, and targets for the work force asking for zero defects and new levels of productivity. Such exhortations only create adversarial relationships, since the bulk of the causes of low quality and low productivity belong to the system and thus lie beyond the power of the work force. What good are slogans when nothing is changed to help the worker do a better job. Deming's famous Red Bead experiment dramatically demonstrates the futility of exhorting workers to do better when the system remains the same. As the experiment shows, the (management created) system will never allow the workers to do better until management changes it.

Point 11a: Eliminate work standards (quotas) on the factory floor. Substitute leadership.

Point 11b: Eliminate management by objectives. Eliminate management by the numbers, numerical goals. Substitute leadership. As Deming so eloquently points out, work standards (quotas) are great demoralizers. Take the case of the woman required to handle 25 reservation/information calls an hour for some airline. Due

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Deming's Fourteen Points

to circumstances beyond her control, calls often took longer than the average of 1/25 of an hour (2.4 minutes) the standard called for. The results was a dilemma: either give courteous and helpful service or rush the call, often angering the customer. Instead, as already mentioned, the process must be studied and and systematically improved.

As for management by the numbers, the main problem is saying "we will increase productive (or anything) by, say, 10% next year" *without a plan or method for doing so*. It's as if somehow that increase will occur without any change in the way the company has been doing business—impossible, with a lot of frustration being the only result.

Point 12a: *Remove barriers that rob the hourly workers of their right to pride of workmanship. The responsibility of supervisors must be changed from mere numbers to quality.*

Point 12b: *Remove barriers that rob people in management and in engineering of their right to pride of workmanship. This means,* inter alia, *abolishment of the annual review or merit rating and of management by objectives*. Some of the barriers to pride of workmanship cited by Deming in *Out of the Crisis* are: foremen who are afraid to make decisions or don't know their job well enough to give leadership, equipment not working right, inadequate training, and being required to use poor quality materials. Deming cites many real life examples.

Point 12b, about eliminating the annual review or merit rating, is perhaps the only point that is controversial. However, Deming's basis for this point is similar to that for Point 3, *Cease reliance on mass inspection*. As Deming puts it:

> Basically what is wrong is that the performance appraisal or merit rating focuses on the end product, at the end of the stream, not on leadership to

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Deming's Fourteen Points

help people. *This is the way to avoid the problem of people.*[2] A manager becomes, in effect, manager of defects [emphasis added]. (p. 102)

Besides this, such rating systems tend to foster competition among workers rather than teamwork. They also tend to foster an attitude of "not rocking the boat" and focusing more on how to get a good rating (e.g., tell the boss what he/she wants to hear) rather than using the knowledge possessed to help the company.

Instead, Deming says the performance of all workers doing a similar job should be tracked and plotted on a control chart. Should anyone's performance fall outside reasonable limits, an investigation should be conducted to determine the cause (inadequate training, bad equipment, etc.). It is usually the system, not the individual worker, that is at fault when something goes wrong or there is poor performance. In fact, according to Scholtes, et al. (1996), about 85% of the problems an organization encounters are due to the system. Given that you have been careful to select good people, given them appropriate training and the chance to gain experience, and provided motivation, they will almost invariable do a good job *if the system lets them.*

Point 13: *Institute a vigorous program of education and self-improvement.* As opposed to Point 6, *Institute training on the job*, this one is talking about just making your people better through education and other means such as giving them additional responsibilities. To quote Deming from *Out of the Crisis*: "People require in their careers, more than money, ever-broadening opportunities to add something to society, materially and otherwise" (p. 86).

Point 14: *Put everybody in the company to work to accomplish the transfor-*

2) Probably most of us know from our experience in the work place or even at home how difficult it is for us to deal directly with people, especially about what might be perceived as a deficiency on the part of someone. Simply put, we fear confrontation.

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mation. The transformation is everybody's job. This simply means moving beyond words to action. Management must study, understand, and agree on what the other 13 points mean and then disseminate this information to all the others in the company and develop concrete plans for accomplishing the points with *everyone's* involvement.

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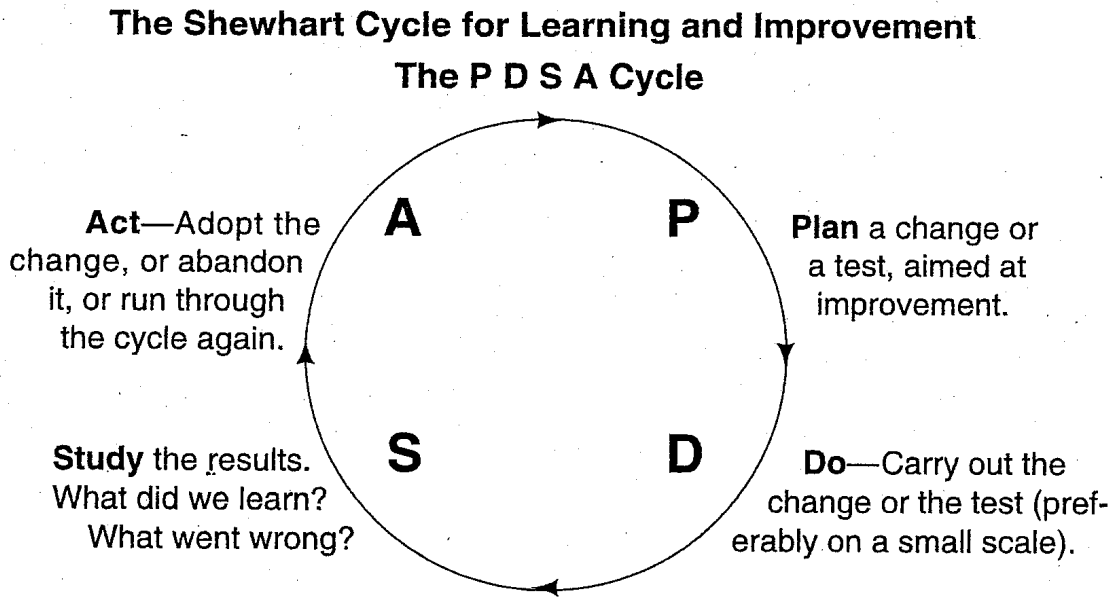
The Plan-Do-Study-Act (PDSA) Cycle

The Plan-Do-Study-Act (PDSA) Cycle is used to systematically develop theories (predictions) and test them. The figure here depicts the PDSA cycle, something originally developed by Walter A. Shewhart, a scientist with Bell labs and Deming mentor, and then enthusiastically adopted by Deming.[1] Although simple in concept, it is a powerful tool for increasing knowledge. Let's assume we want to improve some system. During the "plan" stage we gather data on the current system[2], ensure it is in statistical control, and make some prediction based on a theory about what improvement some change will cause. Finally we devise an experiment to test our theory. Note that unless the system is in statistical control[3] we can't make meaningful predictions about how it might improve once



The PDSA Cycle (Deming, 1994, p. 132).

1) The PDSA Cycle is also known as the Shewhart Cycle or the Deming Cycle.
2) Especially what its desired output should be based on "customer" requirements.
3) By "statistical control" we mean that the system (or process) has been monitored using statistical control techniques such as a control chart to determine its inherent variability. Once this is known, one can predict fairly accurately just how well it will produce whatever it is producing; i.e., the quality of its output.

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The Plan-Do-Study-Act (PDSA) Cycle

some change is made.

During the "do" stage we carry out the experiment—usually on a limited basis. As the name implies, during the "study" stage we study our results and try to determine if, indeed, the change we made did cause the improvement predicted; that is, we validate our theory. And, finally, during the "act" stage we either adopt the change or, if it didn't seem to do any good, reject it and try something else repeating the cycle. Even if the change did work, we repeat the cycle continuously striving for better quality.

The PDSA cycle can be used in many ways. For example, it could also be used to improve customer acceptance of some product/service by doing customer research in the "plan" stage, changing our product/service accordingly (the "do" stage), see how the customer likes the new product/service (the "study" stage), and, in the "act" stage, either permanently adopt the change, modify it, or abandon it altogether. Again, however, the cycle should be continuously repeated. For a further explanation of the PDSA cycle, Scholtes (1999) recommends Neave (1990).

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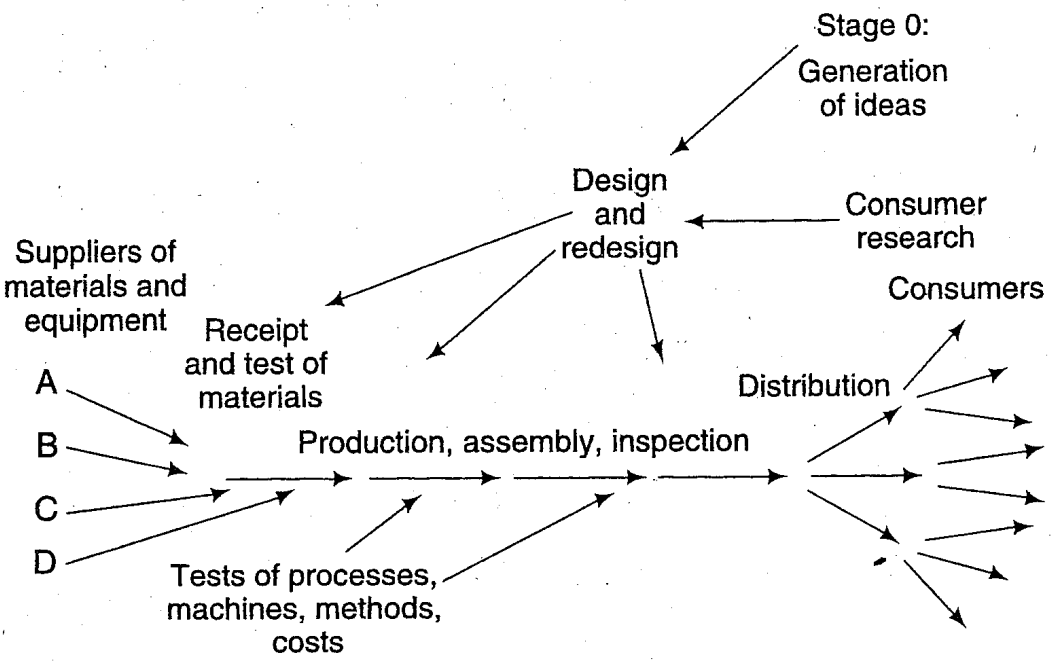
The System of Profound Knowledge

Deming's system of profound knowledge consists of these four elements: (1) appreciation for a system, (2) knowledge about variation, (3) theory of knowledge, and (4) psychology. Deming's fullest explanation of these elements is in Chapter 4 of his book *The New Economics* (2nd ed., 1994). It is important to note that these four elements must be used together to truly affect the transformation they are meant to affect. Let's briefly look at each of the elements. (For a more detailed explanation see Austenfeld, 2001a).

Appreciation for a system. Here is Deming's definition of a system: "A system is a network of interdependent components that work together to try to accomplish the aim of the system" (Deming, 1994, p. 50). This definition does not say anything about the size of the system; it could be something as simple as a system for producing widgets or delivering some service, to the entire organization of a big company to, even, a country. Of course, as the size increases so do the management challenges. Here is an example of a generic production system (Deming, 1994, p. 58):



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The System of Profound Knowledge

These are the most important points for appreciating a system:

- It must have an aim
- The performance of each component must be judged on the basis of its contribution to the aim.
- The system must be actively managed.
- The importance of the system to individual performance must be recognized.

Knowledge about variation. When we talk about variation, we are usually talking about variation in a process or system; for example, a process for making the steel rods with a certain diameter and length. Another example would be system for transporting people by air (airplanes, airports, airline employees who manage and operate the system, etc.). Here one variable might be arrival times. Airlines that pride themselves on having good "on-time" arrival performance will seek to reduce variation in such a system. Some of the important points for this element are:

- Variation is normal.
- There are two kinds of causes of variation.
- The importance of a stable system.
- Why managers should not blame their workers for poor performance.
- Don't tamper with the system.

Theory of knowledge. For this element, Deming stresses the need for managers to both understand how knowledge is advanced and to lead such efforts within their organizations. The important points are:

- Theories need to be developed and tested to advance knowledge.
- The plan-do-study-act (PDSA) cycle should be used to systematically develop theories (predictions) and test them (see Appendix B).
- Learning should be continuous and organization-wide.

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The System of Profound Knowledge

Psychology. To round out the System of Profound Knowledge it is necessary to talk about people; after all, aren't they an organization's "most important asset"? In fact, it is only through people that things are accomplished. We can have the best system, know all about variation and knowledge, and still not have a successful organization if we don't understand people; particularly what motivates them to want to do a good job. These are the important points about this element:

- People are different.
- Rely more on intrinsic motivation rather than extrinsic motivation.

As a final comment it is important to reiterate here that the four elements do form a system themselves and should be used together. As mentioned, for a more detailed explanation of this system see Austenfeld (2001a) and Deming (1994).