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CHAPTER

The Balanced Scorecard: Strategic-Based Control

AFTER STUDYING THIS CHAPTER, YOU SHOULD BE ABLE TO:

1. Compare and contrast activity-based and strategic-based responsibility accounting systems.
2. Discuss the basic features of the Balanced Scorecard.
3. Explain how the Balanced Scorecard links measures to strategy.
4. Describe how an organization can achieve strategic alignment.

Many firms operate in an environment where change is rapid. Products and processes are constantly being redesigned and improved, and stiff national and international competitors are always present. The competitive environment demands that firms offer customized products and services to diverse customer segments. This, in turn, means that firms must find cost efficient ways of producing high-variety, low-volume products. This usually means that more attention is paid to linkages between the firm and its suppliers and customers with the goal of improving cost, quality, and response times for all parties in the value chain. Furthermore, for many industries, product life cycles are shrinking, placing greater demands on the need for innovation. Thus, organizations operating in a dynamic, rapidly changing environment are finding that adaptation and change are essential to survival. In Chapter 4, we learned that activity-based management describes the fundamental economics that drive a firm and thus allows managers to have a better understanding of the causes of cost. In turn, understanding the root causes of costs enables managers to more effectively improve performance by continuously improving processes.

Activity-based management also produced a new form of responsibility accounting, one that better fit environments that demand continuous improvement because of keen competitive conditions and dynamic change. Recall that the responsibility accounting model is defined by four essential elements: (1) assigning responsibility, (2) establishing performance measures or benchmarks, (3) evaluating performance, and (4) assigning rewards. The traditional or financial-based responsibility accounting model emphasizes financial performance of organizational units and evaluates and rewards performance using static financial-oriented standards (e.g., budgets and standard costing). While this model is useful for firms operating in a stable environment that wish to emphasize maintaining the status quo, it is certainly not suitable for firms operating in a dynamic environment that requires continuous improvement. For this reason, activity-based responsibility accounting was developed. (Chapter 12 detailed the differences between the two models.) However, while the activity-based responsibility accounting model was a significant improvement, it soon became apparent that it suffered from some limitations. This then led to the development of *strategic-based responsibility accounting*, the topic of this chapter.

OBJECTIVE 1

Compare and contrast activity-based and strategic-based responsibility accounting systems.

Activity-Based versus Strategic-Based Responsibility Accounting

Activity-based responsibility accounting represents a significant change in how responsibility is assigned, measured, and evaluated. Effectively, the activity-based system added a process perspective to the financial perspective of the functional-based responsibility accounting system. Processes represent how things are done within an organization; therefore, any effort to improve organizational performance had to involve improving processes. It also altered the financial perspective by changing the point of view from that of cost control to maintain the status quo to that of cost reduction by continuous learning and change. Thus, responsibility accounting changed from a one-dimensional system to a two-dimensional system, and from a control system to a *performance management system*. Although these changes were dramatic and in the right direction, it was soon discovered that the new approach also had some limitations. The most significant shortcoming was the fact that the continuous improvement efforts were often fragmented, and they failed to connect with an organization's overall mission and strategy. Lacking was a navigational system, and the result was undirected and rudderless continuous improvement. Consequently, at times, the expected competitive successes did not materialize.

What was needed was *directed continuous improvement*. Providing direction meant that managers needed to carefully specify a mission and strategy for their organization and identify the objectives, performance measures, and initiatives necessary to accomplish this overall mission and strategy. In other words, a *strategic-based responsibility accounting system* was the next step in the evolution of responsibility accounting. A **strategic-based responsibility accounting system (strategic-based performance management system)** translates the strategy of an organization into operational objectives and measures. A strategic performance management system can assume different forms, the most common being that of the Balanced Scorecard. The **Balanced Scorecard** is a strategic-based performance management system that typically identifies objectives and measures for four different perspectives: the financial perspective, the customer perspective, the process perspective, and the learning and growth perspective.¹

1. Robert S. Kaplan and David P. Norton, *The Balanced Scorecard* (Boston: Harvard Business School Press, 1996).

The Balanced Scorecard converts a company's strategy into executable actions that are deployed throughout the organization. The Balanced Scorecard approach has spread rapidly in the United States. One study estimated that about 40 percent of the *Fortune 1000* companies had implemented the Balanced Scorecard by the end of 2000.² Because of its widespread use and popularity, we will focus our discussion of performance management on the Balanced Scorecard. A general overview of the Balanced Scorecard will first be provided by comparing the specific responsibility elements of activity-based responsibility accounting with those of the Balanced Scorecard. In the remainder of the chapter, more specific details of the Balanced Scorecard will be provided.

Assigning Responsibility

Exhibit 13-1 reveals that the strategic-based responsibility accounting system adds direction to improvement efforts by tying responsibility to the firm's strategy. It also maintains the process and financial perspectives of the activity-based approach but adds a customer and a learning and growth (infrastructure) perspective, increasing the number of responsibility dimensions to four. Although more perspectives could be added, these four perspectives are essential for creating a competitive advantage and allowing managers to articulate and communicate the organization's mission and strategy. Only perspectives that serve as a potential source for a competitive advantage should be included (e.g., an environmental perspective). This leaves open the possibility of expanding the number of perspectives. Notice that the two additional perspectives consider the interests of customers and employees, interests that were not fully considered by the activity-based responsibility system. Another difference is that the Balanced Scorecard diffuses responsibility for the perspectives throughout the entire organization. Ideally, all individuals in the organization should understand the organization's strategy and know how their specific responsibilities support achievement of the strategy. The key to this diffusion is proper and careful definition of performance measures.

EXHIBIT 13-1 Responsibility Assignments Compared	
Activity-Based Responsibility	Strategic-Based Responsibility
<ol style="list-style-type: none"> 1. No tie to strategy 2. Systemwide efficiency 3. Team accountability 4. Financial perspective 5. Process perspective 	<ol style="list-style-type: none"> 1. Linked to strategy 2. Systemwide efficiency 3. Team accountability 4. Financial perspective 5. Process perspective 6. Customer perspective 7. Learning and growth perspective

Establishing Performance Measures

Exhibit 13-2 reveals that the strategic-based approach carries over the financial and process-oriented standards of the activity-based system, including the concepts of value-added and dynamic standards. None of the advances developed in an activity approach are thrown out, but the strategic-based approach adds some important refinements. In a strategic-based responsibility accounting system, performance measures must be integrated so that they are mutually consistent and reinforcing. In effect, performance mea-

2. Tom Sullivan, "Scorecard Eases Businesses' Balancing Act," *InfoWorld 2001* (January 8, 2001).

asures should be designed so that they are derived from and communicate an organization's strategy and objectives. By translating the organization's strategy into objectives and measures that can be understood, communicated, and acted upon, it is possible to more completely align individual and organizational goals and initiatives. Thus, the measures must be balanced and linked to the organization's strategy.

EXHIBIT 13-2 Performance Measures Compared	
Activity-Based Measures	Strategic-Based Measures
<ol style="list-style-type: none"> 1. Process-oriented and financial standards 2. Value-added standards 3. Dynamic standards 4. Optimal standards 	<ol style="list-style-type: none"> 1. Standards for all four perspectives 2. Used to communicate strategy 3. Used to help align objectives 4. Linked to strategy and objectives 5. Balanced measures

For a firm to have balanced measures, it means that the measures selected are balanced between *lag measures* and *lead measures*, between *objective measures* and *subjective measures*, between *financial measures* and *nonfinancial measures*, and between *external measures* and *internal measures*. **Lag measures** are outcome measures, measures of results from past efforts (e.g., customer profitability). **Lead measures (performance drivers)** are factors that drive future performance (e.g., hours of employee training). **Objective measures** are those that can be readily quantified and verified (e.g., market share), whereas **subjective measures** are less quantifiable and more judgmental in nature (e.g., employee capabilities). **Financial measures** are those expressed in monetary terms, whereas **nonfinancial measures** use nonmonetary units (e.g., cost per unit and number of dissatisfied customers). **External measures** are those that relate to *customers* versus *shareholders* (e.g., customer satisfaction and return on investment). **Internal measures** are those measures that relate to the *processes* and *capabilities* that create value for customers and shareholders (e.g., process efficiency and employee satisfaction).

A strategic performance management system uses many different kinds of measures because of the need to build a closer link to strategy. In the traditional, financial-based responsibility model, performance measures are almost always financial and, therefore, almost always lag measures. Financial and lag measures are not sufficient to link with strategy. Many strategic objectives are nonfinancial in nature and require the use of nonfinancial measures to promote and measure progress. For example, increasing customer loyalty may be a key strategic objective that will lead to increased revenues and profits. Yet, how is customer loyalty measured? The number of repeat orders is a good possible measure, and it is a nonfinancial measure. And what are some of the drivers of customer loyalty? Increasing product quality? Increasing on-time deliveries? Or both? And how are these critical success factors measured? Percentage of defective units and percentage of on-time deliveries are good possibilities. Clearly, to express the desired linkages among strategic objectives, nonfinancial measures are needed.

The concept of lead measures is also critical. A lead measure, by definition, is one that has a causal linkage with the strategy. For example, if the number of defective units decreases, will customer loyalty actually increase? If the number of repeat orders increases, will revenues and profits actually increase? Assuming a causal relationship exists, when in reality it does not, can be quite costly. For example, **Xerox** assumed that increasing customer satisfaction would lead to increased financial performance. It then spent millions on surveying and measuring customer satisfaction only to discover that increasing customer satisfaction did not increase financial performance. As it turned out,

a customer loyalty measure was the correct lead measure for improving financial performance.³

Finally, it should be noted that to communicate an organization's strategy through the language of measurement requires both scope and flexibility. Scope implies that both internal and external measures are needed. Flexibility requires subjective and objective measurement as well as nonfinancial measures. In effect, a Balanced Scorecard expresses the complete story of a company's strategy through an integrated set of financial and nonfinancial measures that are both predictive and historical and which may be measured subjectively or objectively.

Performance Measurement and Evaluation

In an activity-based responsibility system, performance measures are process oriented. Thus, performance evaluation focuses on improvement of process characteristics, such as time, quality, and efficiency. Financial consequences of improving processes are also measured, usually by cost reductions achieved. Therefore, a financial perspective is included. A strategic performance management system expands these evaluations to include the customer and learning and growth perspectives as well as a more comprehensive financial view. The organization must also deal with performance evaluation of things, such as customer satisfaction, customer retention, employee capabilities, and revenue growth from new customers and new products. However, the difference is more profound than simply expanding the number and type of measures being evaluated. Exhibit 13-3 summarizes the comparison of performance evaluation for the activity- and strategic-based approaches.

EXHIBIT 13-3 Performance Evaluation Compared: ABC versus Strategic-Based	
Activity-Based Performance Evaluation	Strategic-Based Performance Evaluation
<ol style="list-style-type: none"> 1. Time reductions 2. Quality improvements 3. Cost reductions 4. Trend measurements 	<ol style="list-style-type: none"> 1. Time reductions 2. Quality improvements 3. Cost reductions 4. Trend measurements 5. Expanded set of metrics 6. Stretch targets for all four perspectives

Performance evaluation in a Balanced Scorecard framework is deeply concerned with the effectiveness and viability of the organization's strategy. Furthermore, the Balanced Scorecard approach is used to drive organizational change, and much of this change emphasis is expressed through performance evaluation. This is communicated by establishing *stretch* targets for the individual performance measures of the various perspectives. **Stretch targets** are targets that are set at levels that, if achieved, will transform the organization within a period of three to five years. Performance for a given period is evaluated by comparing the actual values of the various measures with the targeted values. Two key features make stretch targets feasible: (1) the measures are linked by causal relationships and (2) because of the linkages, the targets are not set in isola-

3. Christopher Ittner and David Larcker, "Coming Up Short on Nonfinancial Performance Measurement," *Harvard Business Review*, November 2003, 88–95.

tion but rather through a consensus of all those in the organization. Exhibit 13-4 reveals that the reward systems of the two systems are strikingly similar and differ only on the number of dimensions being evaluated.

EXHIBIT 13-4 Rewards Compared	
Activity-Based Rewards	Strategic-Based Rewards
1. Performance evaluated on two or more dimensions	1. Performance evaluated on four or more dimensions
2. Group rewards	2. Group rewards
3. Salary increases	3. Salary increases
4. Promotions	4. Promotions
5. Bonuses, profit sharing, and gainsharing	5. Bonuses, profit sharing, and gainsharing

Assigning Rewards

For any performance management system to be successful, the reward system must be linked to the performance measures. The activity- and strategic-based systems both use the same financial instruments to provide compensation to those who achieve targeted performance goals. A key difference for both systems from the traditional control system is the fact that rewards are based on much more than financial measures. In the case of the Balanced Scorecard, four dimensions of performance must be considered instead of the two in an activity-based performance system. It is very unlikely that an organization can secure the needed support for a Balanced Scorecard of measures unless compensation is tied to the scorecard measures. Both systems must also face the thorny problem of team-based rewards.

OBJECTIVE 2
Discuss the basic features of the Balanced Scorecard.

Basic Concepts of the Balanced Scorecard

The Balanced Scorecard permits an organization to create a strategic focus by *translating* an organization's strategy into operational objectives and performance measures for four different perspectives: the financial perspective, the customer perspective, the internal business process perspective, and the learning and growth (infrastructure) perspective. The Balanced Scorecard is an effective way of implementing and managing a company's strategy. A number of companies attribute their recent financial success to this strategic performance management system.

Strategy Translation

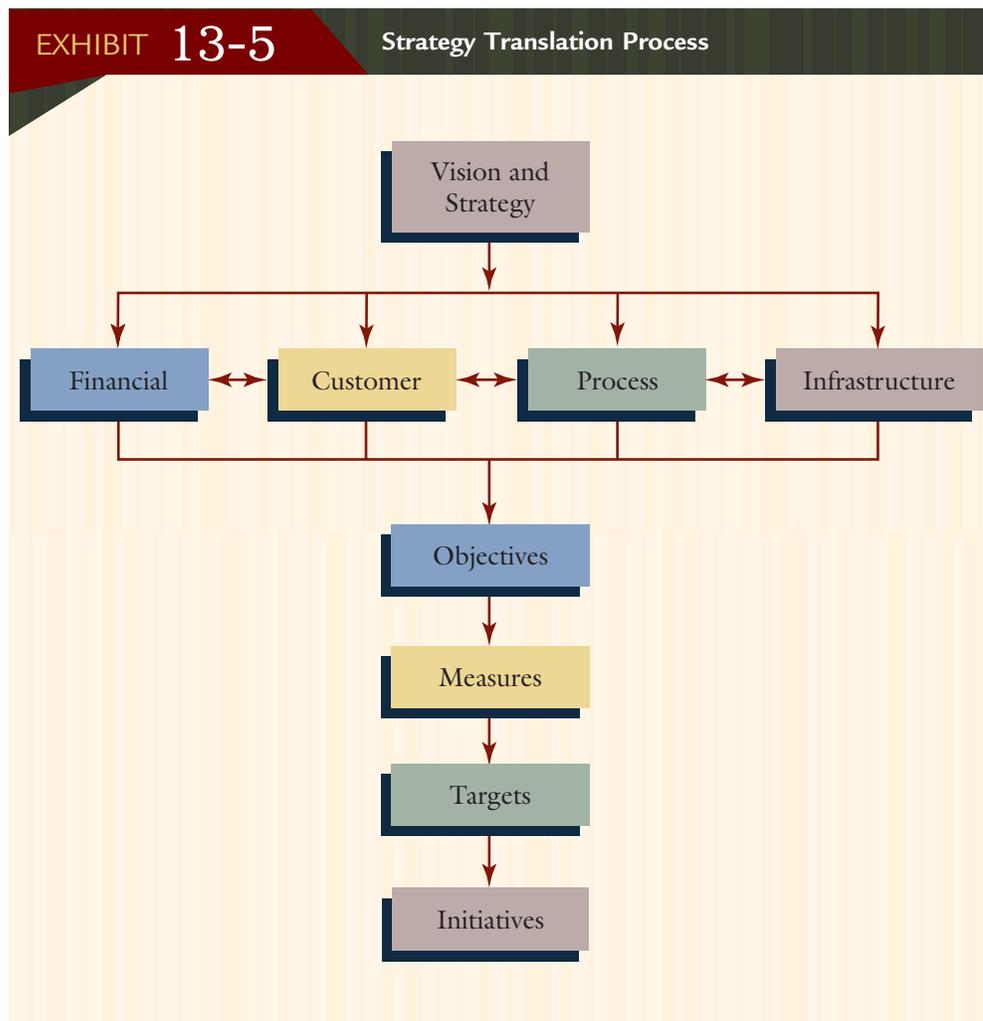
Strategy, according to the creators of the Balanced Scorecard framework, is defined as:⁴

choosing the market and customer segments the business unit intends to serve, identifying the critical internal and business processes that the unit must excel at to deliver the value propositions to customers in the targeted market segments, and selecting the individual and organizational capabilities required for the internal, customer, and financial objectives.

Strategy, then, is identifying and defining management's desired relationships among the four perspectives. *Strategy translation*, on the other hand, means specifying objectives,

4. Kaplan and Norton, *The Balanced Scorecard*, 37.

measures, targets, and initiatives for each perspective. The strategy translation process is illustrated in Exhibit 13-5. Consider, for example, a company that wishes to pursue a revenue growth strategy. For the financial perspective, the company may specify an *objective* of growing revenues by introducing new products. The *performance measure* may be the percentage of revenues from the sale of new products. The *target or standard* for the coming year for the measure may be 20 percent. (That is, twenty percent of the total revenues for the coming year must be from the sale of new products.) The *initiative* describes *how* this is to be accomplished. The “how,” of course, involves the other three perspectives. The customer segments, internal processes, and individual and organizational capabilities that will permit the realization of the revenue growth objective must now be identified. This illustrates the fact that the financial objectives serve as the focus for the objectives, measures, and initiatives of the other three perspectives. It also illustrates the need to carefully define the relationships among the four perspectives so that strategy becomes visible and operational. However, before examining how these causal relationships define and operationalize the strategy, we first need a better understanding of the four perspectives, their objectives, and their measures.



The Financial Perspective, Objectives, and Measures

The **financial perspective** establishes the long- and short-term financial performance objectives expected from the organization’s strategy and simultaneously describes the economic consequences of actions taken in the other three perspectives. This implies that

the objectives and measures of the other perspectives should be chosen so that they cause or bring about the desired financial outcomes. The financial perspective has three strategic themes: revenue growth, cost reduction, and asset utilization. These themes serve as the building blocks for the development of specific operational objectives and measures. Of course, the three themes are constrained by the need for managers to manage risk.

Revenue Growth

Increasing revenues can be achieved in a variety of ways, and the potential strategic objectives reflect these possibilities. Among these possibilities are the following objectives: increase the number of new products, create new applications for existing products, develop new customers and markets, and adopt a new pricing strategy. Once operational objectives are known, performance measures can be designed. Possible measures for the preceding list of objectives (in the order given) are percentage of revenue from new products, percentage of revenue from new applications, percentage of revenues from new customers and market segments, and profitability by product or customer.

Cost Reduction

Reducing the cost per unit of product, per customer, or per distribution channel are examples of cost reduction objectives. The appropriate measures are obvious: the cost per unit of the particular cost object. Trends in these measures will tell whether or not the costs are being reduced. For these objectives, the accuracy of cost assignments is especially important. Activity-based costing can play an essential measurement role, especially for selling and administrative costs—costs not usually assigned to cost objects like customers and distribution channels.

Asset Utilization

Improving asset utilization is the principal objective. Financial measures such as return on investment and economic value added are used. Since return on investment and economic value-added measures were discussed in detail in Chapter 10, they will not be discussed here. The objectives and measures for the financial perspective are summarized in Exhibit 13-6.

Risk Management

Managing the risk associated with the adopted strategy is another critical strategic theme—one that is common to the three strategic financial themes already discussed.

EXHIBIT 13-6

Summary of Objectives and Measures: Financial Perspective

Objectives	Measures
<i>Revenue Growth:</i>	
Increase the number of new products	Percentage of revenues from new products
Create new applications	Percentage of revenues from new applications
Develop new customers and markets	Percentage of revenues from new sources
Adopt a new pricing strategy	Product and customer profitability
<i>Cost Reduction:</i>	
Reduce unit product cost	Unit product cost
Reduce unit customer cost	Unit customer cost
Reduce distribution channel cost	Cost per distribution channel
<i>Asset Utilization:</i>	
Improve asset utilization	Return on investment Economic value added

Diversification of customer types, product lines, and suppliers are common means of lowering risk. Sourcing materials from only one supplier may lower costs, but it may also jeopardize the firm's throughput if something happens to the supplier (e.g., a labor strike). Similarly, revenues may be increased by relying on one very large customer—but what happens if the customer decides to buy elsewhere? Thus, any strategic initiative must be balanced with careful consideration of the risk involved.

Customer Perspective, Objectives, and Measures

The **customer perspective** defines the customer and market segments in which the business unit will compete and describes the way that value is created for customers. The customer perspective is the source of the revenue component for the financial objectives. Failure to deliver the right kinds of products and services to the targeted customers means revenue will not be generated.

Core Objectives and Measures

Once the customers and segments are defined, then *core objectives* and *measures* are developed. **Core objectives and measures** are those that are common across all organizations. There are five key core objectives: increase market share, increase customer retention, increase customer acquisition, increase customer satisfaction, and increase customer profitability. Possible core measures for these objectives, respectively, are market share (percentage of the market), percentage growth of business from existing customers and percentage of repeating customers, number of new customers, ratings from customer satisfaction surveys, and individual and segment profitability. Activity-based costing is a key tool in assessing customer profitability (see Chapter 11). Notice that customer profitability is the only financial measure among the core measures. This measure, however, is critical because it emphasizes the importance of the *right* kind of customers. What good is it to have customers if they are not profitable? The obvious answer spells out the difference between being customer focused and customer obsessed.

Customer Value

In addition to the core measures and objectives, measures are needed that drive the creation of *customer value* and, thus, drive the core outcomes. For example, increasing customer value builds customer loyalty (increases retention) and increases customer satisfaction. **Customer value** is the difference between realization and sacrifice, where realization is what the customer receives and sacrifice is what is given up. Realization includes such attributes as product functionality (features), product quality, reliability of delivery, delivery response time, image, and reputation. Sacrifice includes attributes such as product price, time required to learn to use the product, operating cost, maintenance cost, and disposal cost. The costs incurred by the customer *after* purchase are called **post-purchase costs**.

The attributes associated with realization and sacrifice provide the basis for the objectives and measures that will lead to improving the core outcomes. The objectives for the sacrifice side of the value equation are the simplest: decrease price and decrease post-purchase costs. Selling price and post-purchase costs are important measures of value creation. Decreasing these costs decreases customer sacrifice, and, thus, increases customer value. Increasing customer value should impact favorably on most of the core objectives. Similar favorable effects can be obtained by increasing realization. Realization objectives, for example, would include the following: improve product functionality, improve product quality, increase delivery reliability, and improve product image and reputation. Possible measures for these objectives include, respectively, feature satisfaction ratings, percentage of returns, on-time delivery percentage, and product recognition rating. Of these objectives and measures, delivery reliability will be used to illustrate how measures can affect managerial behavior, indicating the need to be careful in the choice and use of performance measures.

Delivery reliability means that output is delivered on time. On-time delivery is a commonly used operational measure of reliability. To measure on-time delivery, a firm sets delivery dates and then finds on-time delivery performance by dividing the orders delivered on time by the total number of orders delivered. The goal, of course, is to achieve a ratio of 100 percent. However, this measure used by itself may produce undesirable behavioral consequences.⁵ Specifically, plant managers were giving priority to filling orders not yet late over orders that were already late. The performance measure was encouraging managers to have one very late shipment rather than several moderately late shipments! A chart measuring the age of late deliveries could help mitigate this problem. Exhibit 13-7 summarizes the objectives and measures for the customer perspective.

EXHIBIT 13-7 Summary of Objectives and Measures: Customer Perspective	
Objectives	Measures
<i>Core:</i>	
Increase market share	Market share (percentage of market)
Increase customer retention	Percentage growth, existing customers
	Percentage of repeating customers
Increase customer acquisition	Number of new customers
Increase customer satisfaction	Ratings from customer surveys
Increase customer profitability	Customer profitability
<i>Performance Value:</i>	
Decrease price	Price
Decrease post-purchase costs	Post-purchase costs
Improve product functionality	Ratings from customer surveys
Improve product quality	Percentage of returns
Increase delivery reliability	On-time delivery percentage
	Aging schedule
Improve product image and reputation	Ratings from customer surveys

Process Perspective, Objectives, and Measures

The **internal business process perspective** describes the internal processes needed to provide value for customers and owners. Processes are the means by which strategies are executed. Thus, the process perspective entails the identification of the critical processes needed that affect customer and shareholder satisfaction. To provide the framework needed for this perspective, a *process value chain* is defined. The **process value chain** is made up of three processes: the *innovation process*, the *operations process*, and the *postsales process*.⁶ The **innovation process** anticipates the emerging and potential needs of customers and creates new products and services to satisfy those needs. It represents what is called the *long-wave* of value creation. The **operations process** produces and delivers *existing* products and services to customers. It begins with a customer order and ends with the delivery of the product or service. It is the *short-wave* of value creation. The **postsales service process** provides critical and responsive services to customers after the product or service has been delivered.

5. Joseph Fisher, "Nonfinancial Performance Measures," *Journal of Cost Management* (Spring 1992): 31–38.

6. Kaplan and Norton, *The Balanced Scorecard*, 96.

Innovation Process: Objectives and Measures

Objectives for the innovation process include the following: increase the number of new products, increase percentage of revenue from proprietary products, and decrease the time to develop new products. Associated measures are actual new products developed versus planned products, percentage of total revenues from new products, percentage of revenues from proprietary products, and development cycle time (time to market).

Operations Process: Objectives and Measures

Three operations process objectives are almost always mentioned and emphasized: increase process quality, increase process efficiency, and decrease process time. Examples of process quality measures are quality costs, output yields (good output/good input), and percentage of defective units (good output/total output). Quality costing and control are discussed extensively in Chapter 14. Measures of process efficiency are concerned mainly with process cost and process productivity. Measuring and tracking process costs are facilitated by activity-based costing and process value analysis. These issues were explored in depth in the activity-based management chapter (Chapter 12). Productivity measurement is explored in Chapter 15. Common process time measures are cycle time, velocity, and manufacturing cycle effectiveness (MCE).

Cycle Time and Velocity

The time it takes a company to respond to a customer order is referred to as *responsiveness*. *Cycle time* and *velocity* are two operational measures of responsiveness. **Cycle time (manufacturing)** is the length of time it takes to produce a unit of output from the time materials are received (starting point of the cycle) until the good is delivered to finished goods inventory (finishing point of the cycle).⁷ Thus, cycle time is the time required to produce a product (time/units produced). **Velocity** is the number of units of output that can be produced in a given period of time (units produced/time). Although cycle time has been defined for the operations process, it is defined in a similar way for innovation and postsales service processes. For example, how long does it take to create a new product and introduce it to the market? Or, how long does it take to resolve a customer complaint (from start to finish)?

Incentives can be used to encourage operational managers to reduce manufacturing cycle time or to increase velocity, thus improving delivery performance. A natural way to accomplish this objective is to tie product costs to cycle time and reward operational managers for reducing product costs. For example, in a JIT firm, cell conversion costs can be assigned to products on the basis of the time that it takes a product to move through the cell. Using the theoretical productive time available for a period (in minutes), a value-added standard cost per minute can be computed.

$$\text{Standard cost per minute} = \text{Cell conversion costs/Minutes available}$$

To obtain the conversion cost per unit, this standard cost per minute is multiplied by the actual cycle time used to produce the units during the period. By comparing the unit cost computed using the actual cycle time with the unit cost possible using the theoretical or optimal cycle time, a manager can assess the potential for improvement. Note that the more time it takes a product to move through the cell, the greater the unit product cost. With incentives to reduce product cost, this approach to product costing encourages operational managers and cell workers to find ways to decrease cycle time or increase velocity.

7. Other definitions of cycles are possible, e.g., a cycle's starting point could begin when the customer order is received and the finishing point when the goods are delivered to the customer. For a JIT firm, delivery to the customer is a reasonable finishing point. Another possibility for the finishing point is when the customer receives the goods. Cycle time measures the time elapsed from start to finish, regardless of how the starting and finishing points are defined.

An example will illustrate these concepts. Assume that a company has the following data for one of its manufacturing cells:

Theoretical velocity: 40 units per hour
 Productive minutes available (per year): 1,200,000
 Annual conversion costs: \$4,800,000
 Actual velocity: 30 units per hour

The actual and theoretical conversion costs per unit are shown in Exhibit 13-8. Notice from Exhibit 13-8 that the per-unit conversion cost can be reduced from \$8 to \$6 by decreasing cycle time from two minutes per unit to one and one-half minutes per unit (or increasing velocity from 30 units per hour to 40 units per hour). At the same time, the objective of improving delivery performance is achieved.

EXHIBIT 13-8		Conversion Cost Computations	
Actual Conversion Cost per Unit			
Standard cost per minute	=	\$4,800,000/1,200,000	
	=	\$4 per minute	
Actual cycle time	=	60 minutes/30 units	
	=	2.0 minutes per unit	
Actual conversion cost	=	\$4 × 2	
	=	\$8 per unit	
Theoretical Conversion Cost per Unit			
Theoretical cycle time	=	60 minutes/40 units	
	=	1.5 minutes per unit	
Ideal conversion cost	=	\$4 × 1.5	
	=	\$6 per unit	

Manufacturing Cycle Efficiency (MCE)

Another time-based operational measure calculates manufacturing cycle efficiency (MCE) as follows:

$$\text{MCE} = \frac{\text{Processing time}}{(\text{Processing time} + \text{Move time} + \text{Inspection time} + \text{Waiting time} + \text{Other non-value-added time})}$$

where processing time is the time it takes to convert materials into a finished good. The other activities and their times are viewed as wasteful, and the goal is to reduce those times to zero. If this is accomplished, the value of MCE would be 1.0. As MCE improves (moves toward 1.0), cycle time decreases. Furthermore, since the only way MCE can improve is by decreasing waste, cost reduction must also follow.

To illustrate MCE, let's use the data from Exhibit 13-8. The actual cycle time is 2.0 minutes, and the theoretical cycle time is 1.5 minutes. Thus, the time wasted is 0.50 minute (2.0 - 1.5), and MCE is computed as follows:

$$\begin{aligned} \text{MCE} &= 2.0/2.5 \\ &= 0.80 \end{aligned}$$

Actually, this is a fairly efficient process, as measured by MCE. Many manufacturing companies have MCEs less than 0.05.⁸

8. Kaplan and Norton, *The Balanced Scorecard*, 117.

Postsales Service Process: Objectives and Measures

Increasing quality, increasing efficiency, and decreasing process time are also objectives that apply to the postsales service process. Service quality, for example, can be measured by first-pass yields where first-pass yields are defined as the percentage of customer requests resolved with a single service call. Efficiency can be measured by cost trends and productivity measures. Process time can be measured by cycle time where the starting point of the cycle is defined as the receipt of a customer request and the finishing point is when the customer's problem is solved. The objectives and measures for the process perspective are summarized in Exhibit 13-9.

EXHIBIT 13-9		Summary of Objectives and Measures: Process Perspective	
Objectives		Measures	
Innovation:			
Increase the number of new products		Number of new products/total products; R&D expenses	
Increase proprietary products		Percentage revenue from proprietary products Number of patents pending	
Decrease product development cycle time		Time to market (from start to finish)	
Operations:			
Increase process quality		Quality costs Output yields Percentage of defective units	
Increase process efficiency		Unit cost trends Output/input(s)	
Decrease process time		Cycle time and velocity MCE	
Postsales Service:			
Increase service quality		First-pass yields	
Increase service efficiency		Cost trends Output/input(s)	
Decrease service time		Cycle time	

Learning and Growth Perspective

The **learning and growth (infrastructure) perspective** defines the capabilities that an organization needs to create long-term growth and improvement. This last perspective is concerned with three major *enabling factors*: employee capabilities, information systems capabilities, and employee attitudes (motivation, empowerment, and alignment). These factors enable processes to be executed efficiently. The learning and growth perspective is the source of the capabilities that enable the accomplishment of the other three perspectives' objectives. This perspective has three major objectives: increase employee capabilities; increase motivation, empowerment, and alignment; and increase information systems capabilities.

Employee Capabilities

Three core *outcome* measurements for employee capabilities are employee satisfaction ratings, employee turnover percentages, and employee productivity (e.g., revenue per employee). Examples of lead measures or performance drivers for employee capabilities

include hours of training and strategic job coverage ratios (percentage of critical job requirements filled). As new processes are created, new skills are often demanded. Training and hiring are sources of these new skills. Furthermore, the percentage of the employees needed in certain key areas with the requisite skills signals the capability of the organization to meet the objectives of the other three perspectives.

Motivation, Empowerment, and Alignment

Employees must not only have the necessary skills but they must also have the freedom, motivation, and initiative to use those skills effectively. The number of suggestions per employee and the number of suggestions implemented per employee are possible measures of motivation and empowerment. Suggestions per employee provide a measure of the degree of employee involvement, whereas suggestions implemented per employee signal the quality of the employee participation. The second measure also signals to employees whether or not their suggestions are being taken seriously.

COST MANAGEMENT

Tele Danmark (TDC), Denmark's leading telecommunications service provider, implemented the Balanced Scorecard using five perspectives: financial, customer (market), innovation, human resources, and business processes. To provide incentives for managers, it has linked managers' pay to outcomes. The Balanced Scorecard is based on an SAS Data Warehouse, which makes it possible to obtain, organize, and store the company's data relating to the Balanced Scorecard. According to management, the Balanced Scorecard system could not be effectively managed without an information technology (IT) solution. The Balanced Scorecard with IT support has enabled TDC to have an effective management system that supports management's vision and provides the ability to target critical focus areas.

Technology in Action

The IT capability allows the company to analyze deviations by scrutinizing the data to see exactly where the problem is. IT also allows the company to link to a variety of data sources (such as SAP, project management systems, production systems, etc.). Using IT facilitates the implementation and use of the Balanced Scorecard because it integrates, analyzes, and distributes information across the company. (The company is divided into a series of business sectors that are subdivided further into divisions, and each strategic business unit has its own Balanced Scorecard.) Intranet capability is a particularly useful way of communicating and monitoring strategic objectives and associated measures.

Source: Taken from the Web site, <http://www.sas.com/success/tdc.html> as of September 18, 2004.

Information Systems Capabilities

Increasing information system capabilities means providing more accurate and timely information to employees so that they can improve processes and effectively execute new processes. Measures should be concerned with the *strategic information availability*. For example, possible measures include percentage of processes with real-time feedback capabilities and percentage of customer-facing employees with online access to customer and product information. Exhibit 13-10, on the following page, summarizes the objectives and measures for the learning and growth perspective.

OBJECTIVE 3

Explain how the Balanced Scorecard links measures to strategy.

Linking Measures to Strategy

The Balanced Scorecard is a collection of critical performance measures that have some special properties. First, the performance measures are derived from a company's vision, strategy, and objectives. To link measures to a strategy, they must be derived from strategy. Second, performance measures should be chosen so that they are *balanced* between outcome and lead measures. Outcome measures such as profitability, return on investment, and market share tend to be generic and, therefore, common to most strategies and organizations. Performance drivers make things happen; consequently, lead measures

EXHIBIT 13-10

Summary of Objectives and Measures:
Learning and Growth Perspective

Objectives	Measures
Increase employee capabilities	Employee satisfaction ratings Employee turnover percentages Employee productivity (revenue/employee) Hours of training Strategic job coverage ratio (percentage of critical job requirements filled)
Increase motivation and alignment	Suggestions per employee Suggestions implemented per employee
Increase information systems capabilities	Percentage of processes with real-time feedback capabilities Percentage of customer-facing employees with online access to customer and product information

are indicators of how the outcomes are going to be realized. Lead measures usually distinguish one strategy from another. Thus, lead measures are often unique to a strategy and because of this uniqueness support the objective of linking measures to strategy. Third, all scorecard measures should be linked by cause-and-effect relationships.

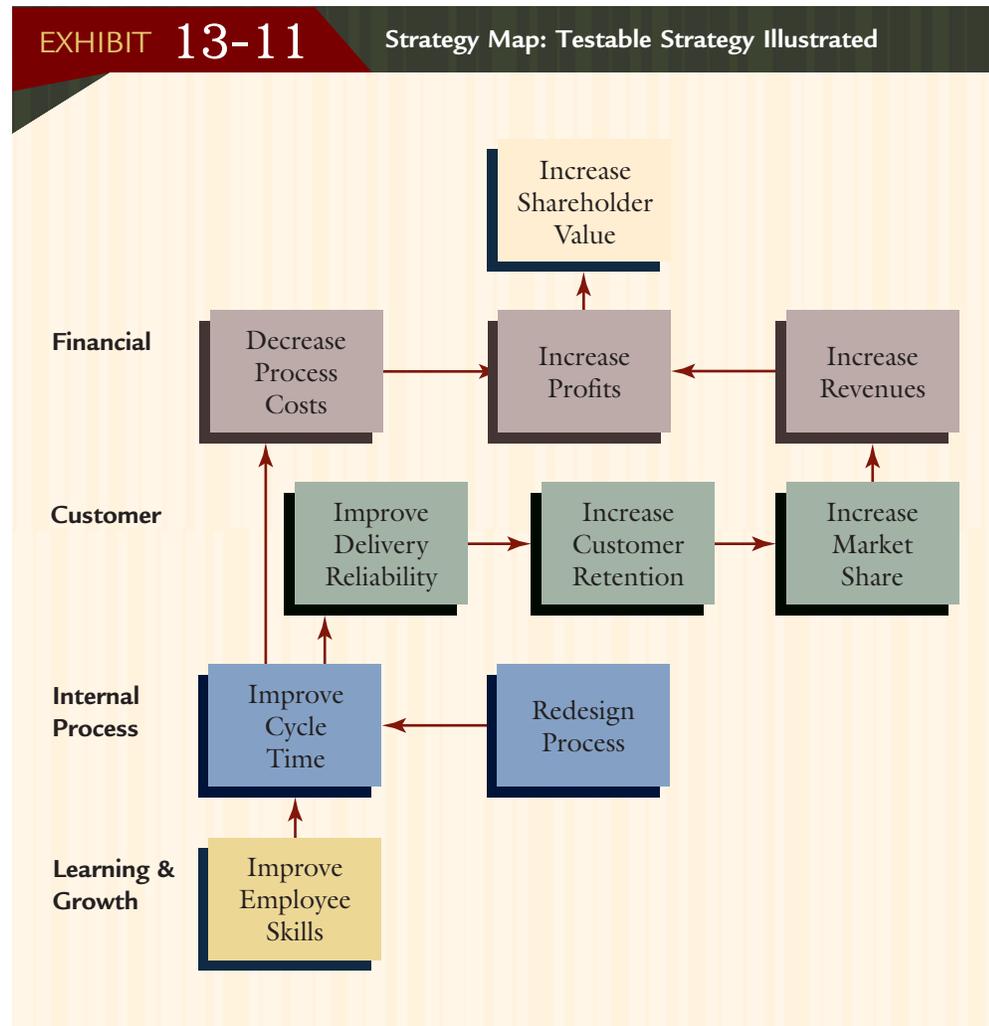
The Concept of a Testable Strategy

This last requirement—that of linking through the use of cause-and-effect relationships—is the most important requirement. Cause-and-effect relationships are the means by which lead and lag measures are integrated and simultaneously serve as the mechanism for expressing and revealing the firm's strategy. Outcome measures are important because they reveal whether the strategy is being implemented successfully with the desired economic consequences. Lead measures supposedly cause the outcome. For example, if the number of defective products is decreased (a lead measure), does this result in a greater market share (an outcome measure)? Does a greater market share (acting now as a lead measure), in turn, result in more revenues and profits (lag measures)? These questions reveal the vital role of cause-and-effect relationships in expressing an operational model of a strategy—a strategy that can be expressed in a testable format. In fact, a **testable strategy** can be defined as a set of linked objectives aimed at an overall goal. The testability of the strategy is achieved by restating the strategy into a set of cause-and-effect hypotheses that are expressed by a sequence of if-then statements.⁹ Consider, for example, the following value-growth strategy expressed as a sequence of if-then statements:

If employee skills are upgraded and if the manufacturing process is redesigned, then manufacturing cycle time will be decreased; if cycle time decreases, then delivery reliability will improve and process costs will decrease; if delivery reliability improves, then customer retention will increase; if customer retention increases, then market share will increase; if market share increases, then sales will increase; if sales increase and costs decrease, then profits will increase; if profits increase, then shareholder value will increase.

9. Kaplan and Norton, *The Balanced Scorecard*, 149. (Kaplan and Norton describe the sequence of if-then statements only as a strategy. Calling it a testable strategy distinguishes it from the earlier, more general definition offered.)

The *strategy map* of Exhibit 13-11 illustrates the value-growth strategy, as described by this sequence of if-then statements. This exhibit reveals at least four interesting features. First, each of the four perspectives is represented by strategic objectives linked through the cause-and-effect relationships hypothesized.



Second, notice that process improvement and employee skills are jointly hypothesized to cause an improvement in process cycle time. This emphasizes the fact that an outcome can be caused by more than one performance driver. Third, it is also possible that a lead indicator can cause more than one outcome. Notice that decreasing cycle time causes both an improvement in delivery reliability (affecting the customer perspective) and a decrease in process costs (affecting the financial perspective). Fourth, a performance measure can serve both as a lag indicator and a lead indicator. For example, under the influence of employee skills and process redesign, cycle time serves as a lag indicator. But changes in cycle time affect process costs and delivery performance, thus serving as a lead indicator.

Strategic Feedback

Perhaps the most important message associated with the cause-and-effect structure is that the viability of the strategy is testable. Strategic feedback is available that allows managers to test the reasonableness of the strategy. For example, the strategic objectives portrayed in Exhibit 13-11 have associated measures: Hours of training, process

redesign (either the process was redesigned or it wasn't), cycle time, percentage of on-time deliveries, number of repeat orders, market share, revenues, cost, profits, and shareholder value are all observable measures. Thus, the claimed relationships can be checked to see if the strategy produces the expected results.

For the value-growth strategy, we would expect to see an increase in shareholder value. If not, it could be due to one of two causes: (1) implementation problems or (2) an invalid strategy. First, it is possible that *key performance indicators* such as training and process design did not achieve their targeted levels. (That is, fewer hours of training were given than planned, and the process was not redesigned.) In this case, the failure to produce the expected *outcomes* for other objectives (e.g., customer retention and shareholder value) could be merely an implementation problem. On the other hand, if the targeted levels of performance drivers were achieved and the expected outcomes did not materialize, then the problem could very well lie with the strategy itself. This is an example of *double-loop feedback*. **Double-loop feedback** occurs whenever managers receive information about both the *effectiveness* of strategy implementation as well as the *validity* of the assumptions underlying the strategy. In a traditional performance management system, typically, only *single-loop feedback* is provided. **Single-loop feedback** emphasizes only effectiveness of implementation. In single-loop feedback, actual results deviating from planned results are a signal to take corrective action so that the plan (strategy) can be executed as intended. The validity of the assumptions underlying the plan is usually not questioned.

Double-loop feedback is the foundation for strategic learning. In the Balanced Scorecard framework, strategic planning is dynamic—not static. Hypothesis testing makes it possible to change and adapt once it becomes clear that some parts of the strategy may not be viable. For example, it may be that improving quality by reducing the number of defects may not increase market share. If all other competitors are also improving quality, then the correct view may be that improving quality is needed to *maintain* market share. Increasing market share may require the company to search for some other value proposition that will be unique and innovative (e.g., offering a new product).

Strategic Alignment

Creating a strategy is one thing. Implementing the strategy successfully is another. For the Balanced Scorecard to be successful, the entire organization must be committed to its achievement. The Balanced Scorecard is designed to bring about organizational change. For this change to take place, employees must be fully informed of the strategy; they must share ownership for the objectives, measures, targets, and initiatives; incentives must be structured to support the strategy; and resources must be allocated to support the strategy.

Communicating the Strategy

The scorecard objectives and measures, once developed, become the means for articulating and communicating the strategy of the organization to its employees and managers. The objectives and measures also serve the purpose of aligning individual objectives and actions with organizational objectives and initiatives. Videos, newsletters, brochures, and the company's computer network are examples of media that can be used to inform employees of the strategy, objectives, and measures associated with the Balanced Scorecard. How much specific detail to communicate is certainly a relevant question. Communicating too much detail may create a potential problem with competitors. The Balanced Scorecard is a very explicit representation of the company's targeted markets and the means required for obtaining gains in these markets. This can be very sensitive information; the more employees who are aware of it, the more likely it may end up in the hands of competitors. Yet, it is important that employees have a sufficient understanding of what is happening so that they will accept and agree to the

OBJECTIVE 4

Describe how an organization can achieve strategic alignment.

strategic efforts of the organization. Articulation of the Balanced Scorecard should be clear enough that individuals can see the linkage between what they do and the organization's long-term objectives. Seeing this linkage increases the likelihood that personal goals and actions are congruent with organizational goals.

Targets and Incentives

Once objectives and measures have been defined and communicated, performance expectations must be established. Performance expectations are communicated by setting targeted values for the measures associated with each objective. Managers are held accountable for the assigned responsibility by comparing the actual values of the measures with the targeted values. Finally, compensation is linked to achievement of the scorecard objectives. It is vital that the reward system be tied to all the scorecard objectives and not just to traditional financial measures. Failure to change the compensation system will encourage managers to continue their focus on short-term financial performance with little reason to pay attention to the strategic objectives of the scorecard.

Exhibit 13-12 provides an example of targets using the objectives and measures for the example illustrated in Exhibit 13-11. The relative importance management has assigned to each perspective and objective is revealed by weights expressed as percentages. Targets are set for both the long-term and the short-term (e.g., a 3- to 5-year horizon and a 1-year horizon) and should be backed up with initiatives that can be undertaken to achieve them. For example, is it really possible to increase share prices by 50 percent over a 3-year span? And how much increase will be targeted for the coming year? The increase is dependent on increasing revenues by 30 percent and decreasing costs by 20 percent. These changes are, in turn, dependent on other events in other perspectives. Can cycle time be reduced to two days (say, from a current level of five days)?

EXHIBIT 13-12

Targets and Weighting Scheme Illustrated

Perspectives	Objectives	Measures	Targets
Financial (25%)	Increase shareholder value (25%)	Share price	50% increase
	Increase profits (25%)	Profits	100%
	Increase revenues (25%)	Revenues	30% increase
	Decrease process costs (25%)	Costs	20% decrease
Customer (25%)	Increase market share (20%)	Market share	25%
	Increase customer retention (30%)	Repeat orders	70%
	Improve delivery reliability (50%)	On-time percentage	100%
Internal Process (25%)	Improve cycle time (60%)	Cycle time	2 days
	Redesign process (40%)	Yes or No	Yes
Learning & Growth (25%)	Improve employee skills (100%)	Hours of training	30 hours per employee

How to structure incentive compensation with multiple dimensions is a challenging task. Typically, weights that reflect the relative importance of the perspectives are used to determine the percentage of the bonus pool that will be assigned to each perspective. Thus, from Exhibit 13-12, we see that for this example each perspective would be assigned 25 percent of the total bonus pool. But within each category, there are usually multiple objectives and multiple measures. For example, within the customer category, there are three performance measures. How much of the 25 percent bonus

pool should be assigned to each measure? Again, weights that reflect the relative importance of each objective within its category are used to make this determination. Exhibit 13-12, for example, reveals that management has decided to assign 50 percent of the customer category bonus to the on-time delivery objective, 30 percent to the customer retention objective, and 20 percent to the market share objective. Thus, of the original bonus pool, 12.5 percent is assigned to the delivery objective (0.50×0.25).

Distributing potential bonus money to the various perspectives and measures is one thing, but payment of incentive compensation is dependent on *performance*. The actual values of the measures are compared to the targeted values for a given time period. Compensation is then paid, based on the percentage achievement of each objective. However, there is one major qualification for the Balanced Scorecard framework. To ensure that proper (balanced) attention is given to all measures, no incentive compensation is paid unless each strategic measure exceeds a prespecified minimum threshold value.¹⁰

Firms adopting the Balanced Scorecard seem to realize the necessity of connecting their reward system to the objectives and measures of the new performance management system. A Mercer study in 1999 found that 88 percent of the responding companies reported that linking the reward system to the Balanced Scorecard was effective.¹¹ **Mobil**, for example, reported that they would not have had the same focus on the scorecard if there was not a link to compensation.¹² The CEO of **Cigna Property and Casualty** observed that linking compensation to the new measurement system was key to gaining acceptance of the new measurement approach.¹³ In another survey by the Hay Group, it was found that 13 of 15 firms studied linked compensation to the Scorecard. Specifically, about 25 to 33 percent of the total compensation is affected by the Balanced Scorecard, with about 40 percent focused on the financial perspective and 20 percent assigned to each of the three remaining perspectives.¹⁴

Resource Allocation

Achieving strategic targets such as those envisioned in Exhibit 13-12 requires that resources be allocated to the corresponding strategic initiatives. This requires two major changes. First, an organization must decide how much of the strategic targets will be achieved for the coming year. Second, the operational budgetary process must be structured to provide the resources necessary for achievement of these short-time advances along the strategic path. If these changes are not incorporated, then it is difficult to imagine that the strategy will truly become actionable.

10. Ibid., 219–220.

11. Mercer, William and Company, 1999. Rewarding Employees: Balanced Scorecard Fax-Back Survey Results, May 20. London U.K.

12. Robert S. Kaplan and David P. Norton, “Transforming the Balanced Scorecard from Performance Measurement to Strategic Management: Part II,” *Accounting Horizons*, June 2001, 147–160.

13. Ibid.

14. Todd Manas, “Making the Balanced Scorecard Approach Payoff,” *ACA Journal*, Second Quarter, 1999, Volume 8, Number 2.

SUMMARY

Activity-based responsibility accounting focuses on processes, uses both operational and financial measures, employs dynamic standards, and emphasizes and supports continuous improvement. Strategic-based responsibility accounting expands the number of responsibility dimensions from two to four. Customer and learning and growth perspectives are added. Furthermore, the performance measures become an integrated set of measures, linked to an organization’s mission and strategy. Functional-based re-

sponsibility accounting works best for organizations operating in stable environments, and activity- and strategic-based responsibility accounting systems work best for firms operating in dynamic environments.

The Balanced Scorecard is a strategic performance management system that translates the vision and strategy of an organization into operational objectives and measures. Objectives and measures are developed for each of four perspectives: the financial perspective, the customer perspective, the process perspective, and the learning and growth perspective. The objectives and measures of the four perspectives are linked by a series of cause-and-effect hypotheses. This produces a testable strategy that provides strategic feedback to managers. The Balanced Scorecard is compatible with activity-based responsibility accounting because it focuses on processes and requires the use of activity-based information to implement many of its objectives and measures. Alignment with the strategy expressed by the Balanced Scorecard is achieved by communication, incentives, and allocation of resources to support the strategic initiatives.

REVIEW PROBLEMS AND SOLUTIONS

1 PERSPECTIVES, MEASURES, AND STRATEGIC OBJECTIVES

The following measures belong to one of four perspectives: financial, customer, process, or learning and growth.

- a. Revenues from new products
- b. On-time delivery percentage
- c. Economic value added
- d. Employee satisfaction
- e. Cycle time
- f. First-pass yields
- g. Strategic job coverage ratio
- h. Number of new customers
- i. Unit product cost
- j. Customer profitability

Required:

Classify each measure by perspective, and suggest a possible strategic objective that might be associated with the measure.

SOLUTION

<i>Perspective</i>	<i>Objective</i>
a. Financial	Increase number of new products
b. Customer	Increase delivery reliability
c. Financial	Improve asset utilization
d. Learning & Growth	Increase motivation and alignment
e. Process	Decrease process time
f. Process	Increase service quality
g. Learning & Growth	Increase employee capabilities
h. Customer	Increase customer acquisition
i. Financial	Decrease product cost
j. Customer	Increase customer profitability

2 CYCLE TIME AND VELOCITY, MCE

Currently, a company can produce 60 units per hour of a particular product. During this hour, move time and wait time take 30 minutes, while actual processing time is 30 minutes.

Required:

1. Calculate the current MCE.
2. Calculate the current cycle time.
3. Suppose that move time and wait time are reduced by 50 percent. What is the new velocity? The new cycle time? The new MCE?

SOLUTION

1. $MCE = \text{Process time} / (\text{Process time} + \text{Move time} + \text{Wait time})$
 $= 30 \text{ minutes} / 60 \text{ minutes}$
 $= 0.50$
2. $\text{Cycle time} = 1 / \text{Velocity} = 1 / 60 \text{ hr.}, \text{ or } 1 \text{ minute}$
3. The time now required to produce 60 units is 45 minutes (30 minutes process time + move and wait time of 15 minutes). Thus, $\text{velocity} = 60 / (3/4 \text{ hr.}) = 80 \text{ units per hour}$; $\text{cycle time} = 1 / 80 \text{ hr.}, \text{ or } 0.75 \text{ minute}$. Finally, $MCE = 30 / (30 + 15) = 0.67$.

KEY TERMS

Balanced Scorecard 591	Nonfinancial measures 593
Core objectives and measures 598	Objective measures 593
Customer perspective 598	Operations process 599
Customer value 598	Post-purchase costs 598
Cycle time (manufacturing) 600	Postsales service process 599
Double-loop feedback 606	Process value chain 599
External measures 593	Single-loop feedback 606
Financial measures 593	Strategic-based responsibility accounting system (strategic-based performance management system) 591
Financial perspective 596	Strategy 595
Innovation process 599	Stretch targets 594
Internal business process perspective 599	Subjective measures 593
Internal measures 593	Testable strategy 604
Lag measures 593	Velocity 600
Lead measures (performance drivers) 593	
Learning and growth (infrastructure) perspective 602	

QUESTIONS FOR WRITING AND DISCUSSION

1. Describe a strategic-based responsibility accounting system. How does it differ from activity-based responsibility accounting?
2. What is a Balanced Scorecard?
3. What is meant by balanced measures?
4. What is a lag measure? A lead measure?
5. What is the difference between an objective measure and a subjective measure?
6. What are stretch targets? What is their strategic purpose?
7. How does the reward system for a strategic-based system differ from the traditional approach?
8. What are the three strategic themes of the financial perspective?
9. Identify the five core objectives of the customer perspective.
10. Explain what is meant by the long-wave and the short-wave of value creation.

11. Define the three processes of the process value chain.
12. Identify three objectives of the learning and growth perspective.
13. What is a testable strategy?
14. What is meant by double-loop feedback?
15. Identify and explain three methods for achieving strategic alignment.

EXERCISES

13-1 ACTIVITY-BASED RESPONSIBILITY ACCOUNTING VERSUS STRATEGIC-BASED RESPONSIBILITY ACCOUNTING

- LO1** The following comment was made by the CEO of a company that recently implemented the Balanced Scorecard: “Responsibility in a strategic-based performance management system differs on the three D’s: Direction, Dimension, and Diffusion.”

Required:

Explain how this comment describes differences in responsibility between an activity-based and a strategic-based performance management system.

13-2 ACTIVITY-BASED RESPONSIBILITY ACCOUNTING VERSUS STRATEGIC-BASED RESPONSIBILITY ACCOUNTING

- LO1** “A Balanced Scorecard expresses the complete story of a company’s strategy through an integrated set of financial and nonfinancial measures that are both predictive and historical and which may be measured subjectively or objectively.”

Required:

1. Using the above statement about scorecard measures, explain how scorecard measurement differs from that of an activity-based management system.
2. Explain what is meant by historical and predictive measures. Why are both types important for describing a company’s strategy?

13-3 ACTIVITY-BASED RESPONSIBILITY ACCOUNTING VERSUS STRATEGIC-BASED RESPONSIBILITY ACCOUNTING

- LO1, LO3** The Balanced Scorecard is an approach that has the objective of driving change. Performance evaluation is an integral part of this effort. Performance evaluation within the Balanced Scorecard framework is also concerned with the effectiveness and viability of the organization’s strategy.

Required:

1. Describe how the Balanced Scorecard is used to drive organizational change.
2. Explain how performance evaluation is used to assess the effectiveness and viability of an organization’s strategy.

13-4 BALANCED SCORECARD, PERSPECTIVES, CLASSIFICATION OF PERFORMANCE MEASURES

- LO1, LO2** Consider the following list of scorecard measures:

- a. Ratings from customer surveys
- b. Cycle time to resolve customer complaints

- c. Unit customer cost
- d. Return on investment
- e. Employee satisfaction ratings
- f. Percentage of defective units
- g. Post-purchase costs
- h. Time to market (from start to finish)
- i. Suggestions implemented per employee
- j. Customer profitability
- k. Percentage of revenues from new products
- l. MCE

Required:

Classify each measure according to the following: perspective, financial or nonfinancial, subjective or objective, and external or internal. When the perspective is process, identify which type of process: innovation, operations, or postsales service.

13-5 CYCLE TIME AND CONVERSION COST PER UNIT

- LO2** The theoretical cycle time for a product is 48 minutes per unit. The budgeted conversion costs for the manufacturing cell dedicated to the product are \$4,320,000 per year. The total labor minutes available are 960,000. During the year, the cell was able to produce 0.60 unit of the product per hour. Suppose also that production incentives exist to minimize unit product costs.

Required:

1. Compute the theoretical conversion cost per unit.
2. Compute the applied conversion cost per minute (the amount of conversion cost actually assigned to the product).
3. Discuss how this approach to assigning conversion cost can improve delivery time performance. Explain how conversion cost acts as a performance driver for on-time deliveries.

13-6 CYCLE TIME AND VELOCITY, MCE

- LO2** A manufacturing plant has the theoretical capability to produce 54,000 printers per quarter but currently produces 20,250 units. The conversion cost per quarter is \$2,430,000. There are 13,500 production hours available within the plant per quarter. In addition to the processing minutes per unit used, the production of printers uses nine minutes of move time, six minutes of wait time, and 10 minutes of rework time. (All work is done by cell workers.)

**Required:**

1. Compute the theoretical and actual velocities (per hour) and the theoretical and actual cycle times (minutes per unit produced).
2. Compute the ideal and actual amounts of conversion cost assigned per printer.
3. Calculate MCE. How does MCE relate to the conversion cost per printer?

13-7 MCE, EXPRESSION OF A TESTABLE STRATEGY, DOUBLE-LOOP FEEDBACK

- LO2, LO3** Refer to **Exercise 13-6**. Assume that the company identifies poor plant layout as the root cause of wait time and move time.

Required:

1. Express an improvement strategy as a series of if-then statements that will reduce the conversion cost per printer.
2. Assume that you set an MCE target of 60 percent, based on the improvement strategy described in Requirement 1. What is the expected conversion cost per unit? Explain how you can use these targets to test the viability of your quality improvement strategy.

13-8 BALANCED SCORECARD, LEAD AND LAG VARIABLES, DOUBLE-LOOP FEEDBACK

LO1, LO2,
LO3

The following if-then statements were taken from a Balanced Scorecard:

- a. If employee productivity increases, then process efficiency will increase.
- b. If process efficiency increases, then product price can be decreased.

Required:

1. Identify the lead and lag variables, and explain your reasoning.
2. Discuss the implications of Requirement 1 for the financial and learning and growth perspectives.
3. Using the first if-then statement, explain the concept of double-loop feedback.

13-9 TESTABLE STRATEGY, STRATEGY MAP

LO3

Consider the following quality improvement strategy as expressed by a series of if-then statements:

- If design engineers receive quality training, then they can redesign products to reduce the number of defective units.
- If the number of defective units is reduced, then customer satisfaction will increase.
- If customer satisfaction increases, then market share will increase.
- If market share increases, then sales will increase.
- If sales increase, then profits will increase.

Required:

1. Prepare a strategy map that shows the cause-and-effect relationships of the quality improvement strategy (see Exhibit 13-11 for an illustrative example).
2. Explain how the quality improvement strategy can be tested.

13-10 BALANCED SCORECARD, STRATEGY TRANSLATION, STRATEGY MAP, DOUBLE-LOOP FEEDBACK

LO2, LO3

Bannister Company, an electronics firm, buys circuit boards and manually inserts various electronic devices into the printed circuit board. Bannister sells its products to original equipment manufacturers. Profits for the last two years have been less than expected. Mandy Confer, owner of Bannister, was convinced that her firm needed to adopt a revenue growth and cost reduction strategy to increase overall profits.

After a careful review of her firm's condition, Mandy realized that the main obstacle for increasing revenues and reducing costs was the high defect rate of her products (a 6 percent reject rate). She was certain that revenues would grow if the defect rate was reduced dramatically. Costs would also decline as there would be fewer rejects and less rework. By decreasing the defect rate, customer satisfaction would increase, causing, in turn, an increase in market share. Mandy also felt that the following

actions were needed to help ensure the success of the revenue growth and cost reduction strategy:

- Improve the soldering capabilities by sending employees to an outside course.
- Redesign the insertion process to eliminate some of the common mistakes.
- Improve the procurement process by selecting suppliers that provide higher-quality circuit boards.

Required:

- State the revenue growth and cost reduction strategy using a series of cause-and-effect relationships expressed as if-then statements.
- Illustrate the strategy using a strategy map.
- Explain how the revenue growth strategy can be tested. In your explanation, discuss the role of lead and lag measures, targets, and double-loop feedback.

13-11 BALANCED SCORECARD, STRATEGIC ALIGNMENT

LO4 Refer to **Exercise 13-10**. Suppose that Mandy communicates the following weights to her CEO:

Perspective: Financial, 40%; Customer, 20%; Process, 20%; Learning & growth, 20%

Financial objectives: Profits, 50%; Revenues, 25%; Costs, 25%

Customer objectives: Customer satisfaction, 60%; Market share, 40%

Process objectives: Defects decrease, 40%; Supplier selection, 30%; Redesign process, 30%

Learning & growth objective: Training, 100%

Mandy next sets up a bonus pool of \$100,000 and indicates that the weighting scheme just described will be used to determine the amount of potential bonus for each perspective and each objective.

Required:

- Calculate the potential bonus for each perspective and objective.
- Describe how Mandy might award actual bonuses so that her managers will be encouraged to implement the Balanced Scorecard.
- What are some other ways that Mandy can use to encourage alignment with the company's strategic objectives (other than incentive compensation)?

PROBLEMS

13-12 ACTIVITY-BASED RESPONSIBILITY ACCOUNTING VERSUS STRATEGIC-BASED RESPONSIBILITY ACCOUNTING

LO1 Carson Wellington, president of Mallory Plastics, was considering a report sent to him by Emily Sorensen, vice president of operations. The report was a summary of the progress made by an activity-based management system that was implemented three years ago. Significant progress had indeed been realized. At the conclusion of the report, Emily urged Carson to consider the adoption of the Balanced Scorecard as a logical next step in the company's efforts to establish itself as a leader in its industry. Emily clearly was impressed by the Balanced Scorecard and intrigued by the possibility that the change would enhance the overall competitiveness of Mallory. She requested a meeting of the executive committee to explain the similarities and differences between the two approaches. Carson agreed to schedule the meeting but asked Emily to prepare a memo in advance, listing the most important similarities and differences between the two approaches to responsibility accounting.

Required:

Prepare the memo requested by Carson.

13-13 SCORECARD MEASURES, STRATEGY TRANSLATION

LO2, LO3



At the end of 2005, Activo Company implemented a low-cost strategy to improve its competitive position. Its objective was to become the low-cost producer in its industry. A Balanced Scorecard was developed to guide the company toward this objective. To lower costs, Activo undertook a number of improvement activities such as JIT production, total quality management, and activity-based management. Now, after two years of operation, the president of Activo wants some assessment of the achievements. To help provide this assessment, the following information on one product has been gathered:

	2005	2007
Theoretical annual capacity*	124,800	124,800
Actual production**	104,000	117,000
Market size (in units sold)	650,000	650,000
Production hours available (20 workers)	52,000	52,000
Very satisfied customers	41,600	70,200
Actual cost per unit	\$162.50	\$130
Days of inventory	7.8	3.9
Number of defective units	6,500	2,600
Total worker suggestions	52	156
Hours of training	130	520
Selling price per unit	\$195	\$195
Number of new customers	2,600	13,000

*Amount that could be produced given the available production hours; everything produced is sold.

**Amount that was produced given the available production hours.

Required:

- Compute the following measures for 2005 and 2007:
 - Actual velocity and cycle time
 - Percentage of total revenue from new customers (assume one unit per customer)
 - Percentage of very satisfied customers (assume each customer purchases one unit)
 - Market share
 - Percentage change in actual product cost (for 2007 only)
 - Percentage change in days of inventory (for 2007 only)
 - Defective units as a percentage of total units produced
 - Total hours of training
 - Suggestions per production worker
 - Total revenue
 - Number of new customers
- For the measures listed in Requirement 1, list likely strategic objectives, classified according to the four Balance Scorecard perspectives. Assume there is one measure per objective.

13-14 IF-THEN STATEMENTS, STRATEGY MAP

LO2, LO3

Refer to the data in **Problem 13-13**.

- Express Activo's strategy as a series of if-then statements. What does this tell you about Balanced Scorecard measures?

2. Prepare a strategy map that illustrates the relationships among the likely strategic objectives.

13-15 STRATEGIC OBJECTIVES, SCORECARD MEASURES, STRATEGY MAP

LO2, LO3 The following strategic objectives have been derived from a strategy that seeks to improve asset utilization by more careful development and use of its human assets and internal processes:

1. Increase revenue from new products.
2. Increase implementation of employee suggestions.
3. Decrease operating expenses.
4. Decrease cycle time for the development of new products.
5. Decrease rework.
6. Increase employee morale.
7. Increase customer satisfaction.
8. Increase access of key employees to customer and product information.
9. Increase customer acquisition.
10. Increase return on investment (ROI).
11. Increase employee productivity.
12. Decrease the collection period for accounts receivable.
13. Increase employee skills.

The heart of the strategy is developing the company's human resources. Management is convinced that empowering employees will lead to an increase in economic returns. Studies have shown that there is a positive relationship between employee morale and customer satisfaction. Furthermore, the more satisfied customers pay their bills more quickly. It was hypothesized that as employees became more involved and more productive their morale would improve. Thus, the strategy incorporated key objectives that would lead to an increase in productivity and involvement.

Required:

1. Classify the objectives by perspective, and suggest a measure for each objective.
2. Prepare a strategy map that illustrates the likely causal relationships among the strategic objectives.

13-16 CYCLE TIME, CONVERSION COST PER UNIT, MCE

LO2 A manufacturing cell has the theoretical capability to produce 150,000 subassemblies per quarter. The conversion cost per quarter is \$1,500,000. There are 50,000 production hours available within the cell per quarter.



Required:

1. Compute the theoretical velocity (per hour) and the theoretical cycle time (minutes per unit produced).
2. Compute the ideal amount of conversion cost that will be assigned per subassembly.
3. Suppose the actual time required to produce a subassembly is 30 minutes. Compute the amount of conversion cost actually assigned to each unit produced. What happens to product cost if the time to produce a unit is decreased to 25 minutes? How can a firm encourage managers to reduce cycle time? Finally, discuss how this approach to assigning conversion cost can improve delivery time.

4. Calculate MCE. How much non-value-added time is being used? How much is it costing per unit?
5. Cycle time, velocity, MCE, conversion cost per unit (theoretical conversion rate \times actual conversion time), and non-value-added costs are all measures of performance for the cell process. Discuss the incentives provided by these measures.

13-17 MCE, TESTABLE STRATEGY, STRATEGY MAP

LO2, LO3

Auflegger, Inc., manufactures a product that experiences the following activities (and times):

	<i>Hours</i>
Processing (two departments)	42.0
Inspecting	2.8
Rework	7.0
Moving (three moves)	11.2
Waiting (for the second process)	33.6
Storage (before delivery to customer)	43.4

Required:

1. Compute the MCE for this product.
2. A study lists the following root causes of the inefficiencies: poor quality components from suppliers, lack of skilled workers, and plant layout. Suggest a possible cost reduction strategy, expressed as a series of if-then statements, that will reduce MCE and lower costs. Finally, prepare a strategy map that illustrates the causal paths. In preparing the map, use only three perspectives: learning and growth, process, and financial.
3. Is MCE a lag or a lead measure? If and when MCE acts as a lag measure, what lead measures would affect it?

13-18 CYCLE TIME, VELOCITY, PRODUCT COSTING

LO2 Wilton Company has a JIT system in place. Each manufacturing cell is dedicated to the production of a single product or major subassembly. One cell, dedicated to the production of snowmobiles, has four operations: machining, finishing, assembly, and qualifying (testing). The machining process is automated, using computers. In this process, the model's frame and engine are constructed. In finishing, the frame is sandblasted, buffed, and painted. In assembly, the frame and engine are assembled. Finally, each model is tested to ensure operational capability.

For the coming year, the snowmobile cell has the following budgeted costs and cell time (both at theoretical capacity):

Budgeted conversion costs	\$7,750,000
Budgeted materials	\$9,300,000
Cell time	12,400 hours
Theoretical output	9,300 models

During the year, the following actual results were obtained:

Actual conversion costs	\$7,750,000
Actual materials	\$8,060,000
Actual cell time	12,400 hours
Actual output	7,750 models

Required:

1. Compute the velocity (number of models per hour) that the cell can theoretically achieve. Now, compute the theoretical cycle time (number of hours or minutes per model) that it takes to produce one model.
2. Compute the actual velocity and the actual cycle time.
3. Compute MCE. Comment on the efficiency of the operation.
4. Compute the budgeted conversion cost per minute. Using this rate, compute the conversion cost per model if theoretical output is achieved. Using this measure, compute the conversion cost per model for actual output. Does this product costing approach provide an incentive for the cell manager to reduce cycle time? Explain.

13-19 BALANCED SCORECARD, NON-VALUE-ADDED ACTIVITIES, STRATEGY TRANSLATION, KAIZEN COSTING

LO1, LO2,
LO3, LO4

At the beginning of the last quarter of 2005, Youngston, Inc., a consumer products firm, hired Maria Carrillo to take over one of its divisions. The division manufactured small home appliances and was struggling to survive in a very competitive market. Maria immediately requested a projected income statement for 2005. In response, the controller provided the following statement:

Sales	\$25,000,000
Variable expenses	<u>20,000,000</u>
Contribution margin	\$ 5,000,000
Fixed expenses	<u>6,000,000</u>
Projected loss	<u><u>\$(1,000,000)</u></u>

After some investigation, Maria soon realized that the products being produced had a serious problem with quality. She once again requested a special study by the controller's office to supply a report on the level of quality costs. By the middle of November, Maria received the following report from the controller:

Inspection costs, finished product	\$ 400,000
Rework costs	2,000,000
Scrapped units	600,000
Warranty costs	3,000,000
Sales returns (quality-related)	1,000,000
Customer complaint department	<u>500,000</u>
Total estimated quality costs	<u><u>\$7,500,000</u></u>

Maria was surprised at the level of quality costs. They represented 30 percent of sales, certainly excessive. She knew that the division had to produce high-quality products to survive. The number of defective units produced needed to be reduced dramatically. Thus, Maria decided to pursue a quality-driven turnaround strategy. Revenue growth and cost reduction could both be achieved if quality could be improved. By growing revenues and decreasing costs, profitability could be increased.

After meeting with the managers of production, marketing, purchasing, and human resources, Maria made the following decisions, effective immediately (end of November 2005):

- a. More will be invested in employee training. Workers will be trained to detect quality problems and empowered to make improvements. Workers will be allowed a bonus of 10 percent of any cost savings produced by their suggested improvements.

- b. Two design engineers will be hired immediately, with expectations of hiring one or two more within a year. These engineers will be in charge of redesigning processes and products with the objective of improving quality. They will also be given the responsibility of working with selected suppliers to help improve the quality of their products and processes. Design engineers were considered a strategic necessity.
- c. Implement a new process: evaluation and selection of suppliers. This new process has the objective of selecting a group of suppliers that are willing and capable of providing nondefective components.
- d. Effective immediately, the division will begin inspecting purchased components. According to production, many of the quality problems are caused by defective components purchased from outside suppliers. Incoming inspection is viewed as a transitional activity. Once the division has developed a group of suppliers capable of delivering nondefective components, this activity will be eliminated.
- e. Within three years, the goal is to produce products with a defect rate less than 0.10 percent. By reducing the defect rate to this level, marketing is confident that market share will increase by at least 50 percent (as a consequence of increased customer satisfaction). Products with better quality will help establish an improved product image and reputation, allowing the division to capture new customers and increase market share.
- f. Accounting will be given the charge to install a quality information reporting system. Daily reports on operational quality data (e.g., percentage of defective units), weekly updates of trend graphs (posted throughout the division), and quarterly cost reports are the types of information required.
- g. To help direct the improvements in quality activities, kaizen costing is to be implemented. For example, for the year 2005, a kaizen standard of 6 percent of the selling price per unit was set for rework costs, a 25 percent reduction from the current actual cost.

To ensure that the quality improvements were directed and translated into concrete financial outcomes, Maria also began to implement a Balanced Scorecard for the division. By the end of 2006, progress was being made. Sales had increased to \$26,000,000, and the kaizen improvements were meeting or beating expectations. For example, rework costs had dropped to \$1,500,000.

At the end of 2007, two years after the turnaround quality strategy was implemented, Maria received the following quality cost report:

Quality training	\$ 500,000
Supplier evaluation	230,000
Incoming inspection costs	400,000
Inspection costs, finished product	300,000
Rework costs	1,000,000
Scrapped units	200,000
Warranty costs	750,000
Sales returns (quality-related)	435,000
Customer complaint department	<u>325,000</u>
Total estimated quality costs	<u>\$4,140,000</u>

Maria also received an income statement for 2007:

Sales	\$30,000,000
Variable expenses	<u>22,000,000</u>
Contribution margin	\$ 8,000,000
Fixed expenses	<u>5,800,000</u>
Income from operations	<u>\$ 2,200,000</u>

Maria was pleased with the outcomes. Revenues had grown, and costs had been reduced by at least as much as she had projected for the 2-year period. Growth next year should be even greater as she was beginning to observe a favorable effect from the higher-quality products. Also, further quality cost reductions should materialize as incoming inspections were showing much higher-quality purchased components.

Required:

1. Identify the strategic objectives, classified by Balanced Scorecard perspective. Next, suggest measures for each objective.
2. Using the results from Requirement 1, describe Maria's strategy using a series of if-then statements. Next, prepare a strategy map.
3. Explain how you would evaluate the success of the quality-driven turnaround strategy. What additional information would you like to have for this evaluation?
4. Explain why Maria felt that the Balanced Scorecard would increase the likelihood that the turnaround strategy would actually produce good financial outcomes.
5. Advise Maria on how to encourage her employees to align their actions and behavior with the turnaround strategy.

13-20 COLLABORATIVE LEARNING EXERCISE

LO1, LO2,
LO3, LO4

Form groups of three to five. Divide the groups into four sets: A, B, C, and D.

Required:

Use Chapters 12 and 13 to do the following:

1. Group A will compare responsibility under a traditional financial responsibility structure with responsibility under a strategic performance management system.
2. Group B will analyze the differences in performance measures under traditional financial responsibility structures and those under strategic responsibility accounting systems.
3. Group C will compare and contrast performance evaluation of a traditional financial responsibility accounting system with that of a strategic responsibility accounting system.
4. Group D will compare and contrast the reward systems of the traditional responsibility system with that of a strategic responsibility accounting system.
5. One group of each type will report the results of their analyses to the class as a whole.

13-21 CYBER RESEARCH CASE

LO1, LO2,
LO3, LO4

Search the Internet to find a complete description of a company that has implemented the Balanced Scorecard. Possible sources include the following: The Balanced Scorecard Collaborative (<http://www.bscol.com>), SAP (<http://www.sap.com/sem>), and <http://www.bettermanagement.com>. Once you have a company located, answer the following questions:

1. What is/are the strategy or strategies of the company?
2. What perspectives were used?
3. What are the strategic objectives?
4. What are the measures?
5. Did the company present a strategy map?
6. Were there any problems identified in implementation? If so, what were the problems?
7. What were the results? Did the Balanced Scorecard make a difference?