HOW ZYSCO USES THE BALANCED SCORECARD

By Yuanhong Chen; Zengbiao Yu, CPA; and Thomas W. Lin, CMA

During the past two decades, the balanced scorecard (BSC) has emerged as a useful managerial tool in Western companies. This hasn't been the case in China. In this article, we explain how Zhongyuan Special Steel Co., Ltd (ZYSCO), a typical Chinese state-owned company, applied this powerful tool to help it overcome challenges and achieve new success. The results show that other companies can also adopt BSC principles to make positive changes and improve their management and performance.

Recent Challenges and Operations Reform

ZYSCO is a manufacturer of machinery components and special steel products. Founded in 1970, it has been listed on the Shenzhen Stock Exchange since 2010. ZYSCO is the only company in China that has a complete production line of melting, forging, machining, heat treatment, and chrome plating. Its main products include petroleum drilling tools, retained mandrel, cast pipe mold for industrial equipment, and large, special fine forging such as metallurgy rollers, die steel, and customized forgings. ZYSCO also is the main drill collar supplier of CNPC (China National Petroleum Corporation) and Sinopec Group (China Petrochemical Corporation). The largest manufacturer of nonmagnetic drill collars in China with an 80% domestic market share, it's also the largest manufacturer of retained mandrel in Asia.

Like many other state-owned enterprises in China, ZYSCO focused its operations and management mainly on the volume of production and sales. Because of its advantage in equipment, products, and markets, and because the economy was booming, the company achieved great success: Both sales and net income quadrupled from 2003 to 2008.

Then the global financial crisis struck in 2008. Since then, ZYSCO has encountered increasing challenges, both externally and internally. For instance, the price of raw material (scrap steel) kept increasing. More and more private enterprises started to produce similar products, which led to price wars and the shrinking of ZYSCO's market share. Cost disadvantages were also serious problems in the production process because the average yield was less than 95%, and scrap waste and product defects exceeded 20 million RMB (Chinese yuan) per year. Additionally, ZYSCO consumed much more energy than its competitors did. Therefore, the company's financial per-

BSC SUCCESS FACTORS

What does it take to achieve success with a balanced scorecard?

1. Make sure there are high levels of integration and teamwork among organizational units and processes, and promote cooperation among departments.

2. Improve communication both inside and outside the organization. Communicate with people, and align people and strategy before implementing a scorecard. Get their feedback throughout the entire process as well as after implementation of the new system.

3. Balanced scorecards should be built on the organization's strategy and strategy map, and they should be decomposed by the organizational structure until everyone receives his or her own balanced scorecard.

4. Make sure all employees understand the strategy and the relationship between their individual behaviors and the organization's strategic objectives.

5. Linking employee performance to pay should always be stressed to provide enough incentives.

6. Continuously revise and modify the strategy map and balanced scorecard to incorporate and reflect implementation results, feedback, environmental changes, and similar information.

formance declined significantly. In two years—from 2008 to 2010—ZYSCO's earnings per share (EPS) and return on equity (ROE) decreased by 33% and 60%, respectively. Top management began to realize the importance of cost reduction and value creation.

In 2010, in order to improve its financial performance and meet the requirements of SASAC (State-owned Assets Supervision and Administration Commission), ZYSCO came up with a value-oriented management system that was focused on value creation for shareholders using economic value added (EVA®) instead of production and sales volume. Under this system, the main strategic objectives became generating higher net income and reducing the cost of capital.

To deal with its cost disadvantages, ZYSCO's CEO and its chief dispatcher (production manager) decided to institute lean production in all production processes. They asked the production departments to recycle leftover materials, to reduce processing time, and to produce at night to take advantage of the lower time-of-use electricity price. Also, they invested more in technical reform (technology) and purchased a new SXP-65 1400t rotary forging machine from Austria.

Yet these actions didn't help much in light of the deepening of the global financial crisis. Although the value-added time increased to 30% of the throughput time, scrap waste and product defects still exceeded 13 million RMB per year. According to ZYSCO's financial reports, the company's sales increased by 7% from 2008 to 2011, even though its net income decreased from 128.82 million RMB to 90.74 million RMB. ZYSCO's EPS, ROE, and gross margin decreased by 42%, 70%, and 27%, respectively. Furthermore, the large investments in technical reform had brought no benefit. What could the company do?

Management Needed a Strategic Management System

In early 2012, ZYSCO top management believed that there was still great potential for cost reduction. They also thought there was room for improvement in its R&D-production-sales process as well as in its accounting and information system. With improvements in these areas, ZYSCO would be able to achieve better financial performance and succeed in creating value for its shareholders.

ZYSCO's management invited an outside consulting team to help. It consisted of coauthors Yuanhong Chen and Zengbiao Yu as well as Tsinghua University management accounting students. After in-depth discussions between top management and the consulting team, both groups agreed that ZYSCO needed a new strategic management system. This system should be able to integrate the entire company from top to bottom, transform the value creation strategy into everyone's day-to-day job, promote cooperation among departments, and ensure strategy execution (value creation). A strategy map and a balanced scorecard would be the core of this new system.

After in-depth interviews and extensive data collection, the BSC task force and consulting team identified five major existing operational problems.

1. Equipment Didn't Match the Production Mode

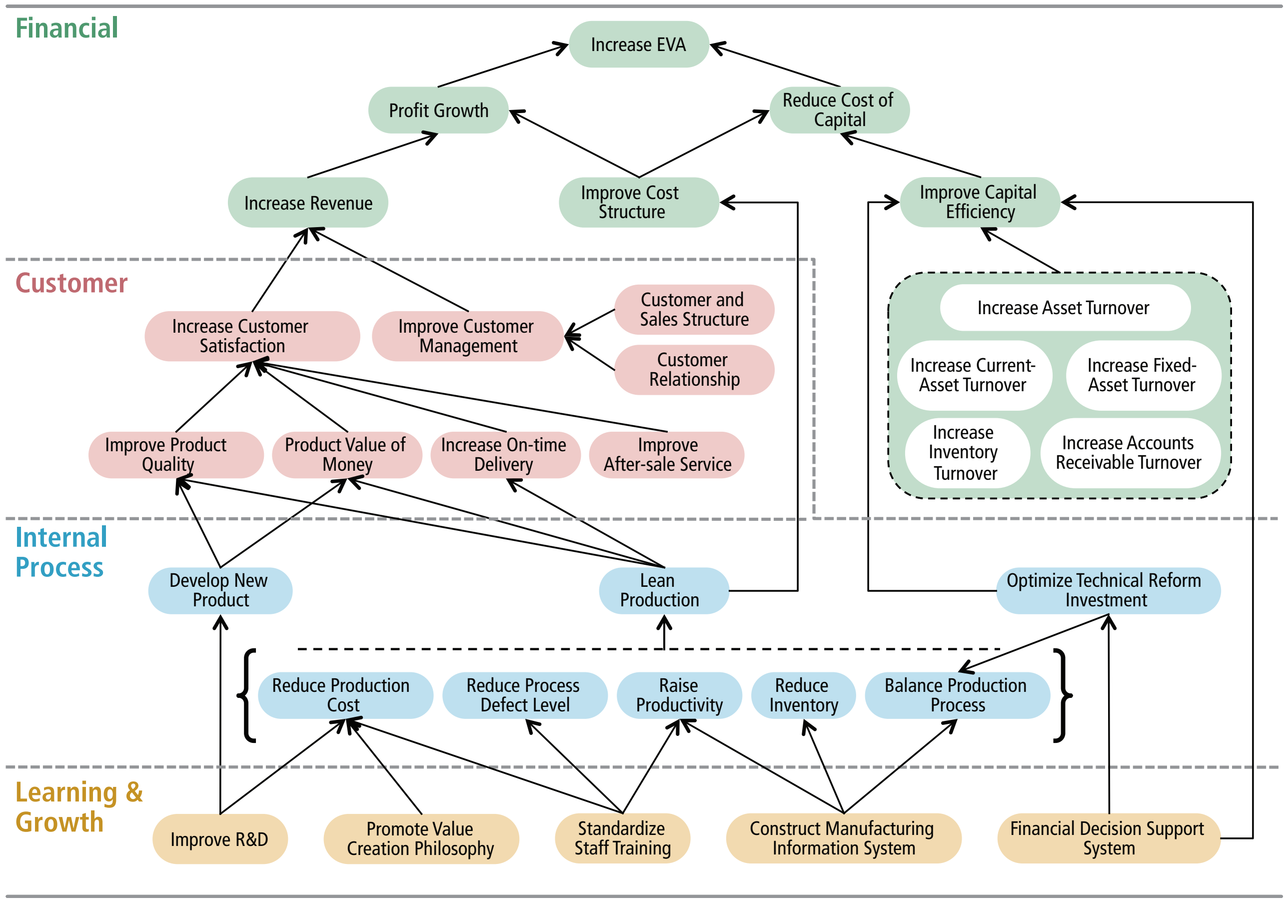
Most of the company's fine forgings and some of its drill collars are highly customized, and they vary in size and properties. Furthermore, many customer orders are small. Therefore, in the past, the company adopted the combination of MTO (make to order) and MTS (make to stock, which is based on sales forecast) in its production. But consultants and BSC task force members noticed that the company spent 300 million RMB to buy an SXP-65 1400t rotary forging machine and an annular furnace, both of which are suitable for continuous and mass production rather than small orders. As a result, both machines were frequently idle, which was a grievous waste of money.

The primary cause of this problem was that managers were blindly pursuing production capacity and volume. Also, there wasn't enough supporting information from the production, sales, and financial departments, which led to the misdirected investment. Therefore, top management wanted to have the accounting system provide more relevant information for managers to use to make better decisions and to make effective performance evaluations rather than focusing only on bookkeeping and financial reporting.

2. Significant Bottleneck at the Melt Shop

ZYSCO has a complete production line of melting, forging, machining, heat treatment, and chrome plating. But the longer the production line, the more problems would occur because of bottlenecking. For example, the capacities of the heating furnaces and annealing furnaces (which are in the melt shop) were only half the capacity of the forging and pressing machines. Therefore, the forging machines always had to stop and wait for the steel from the melt shop. Yet the company made no effort to improve the melt shop's productivity. In fact, the new SXP-65 1400t rotary forging machine exacerbated the bottleneck problem.

Figure 1: ZYSCO Strategy Map



3. Difficulty in Scheduling and Monitoring

ZYSCO also had no production information system, so production scheduling and real-time monitoring were difficult. The chief dispatcher said, "I feel that I'm always busy putting fires out instead of making things better. Troubles may occur anywhere since we have so many kinds of products and customers. Sometimes the product requirements changed, sometimes the date of delivery changed, and sometimes the equipment failed….Whenever these troubles happen, I have to call the manufacturing managers together to adjust or reschedule the production. It's really time-consuming."

4. Variation in Workers' Skills and Product Quality

In ZYSCO, some of the production processes are standardized, and work is done by automated machines. Other processes, however, are completed by production employees, who must exercise personal judgment in their work. The company had adopted a mentor system for its production employees, but there were only a few operations manuals available, and training wasn't standardized. As a result, the employees' skill levels varied, and so did the product quality.

5. Lack of Communication and Cooperation between Sales and Production

The sales department manager complained that the production department couldn't always ensure on-time delivery, which made it difficult to retain key customers. He said, "I always need to bring our customers to the production shops asking supervisors to push the production on time. It's ridiculous! It's the production dispatchers' responsibility to finish on time."

On the other hand, the chief dispatcher retorted that the sales department couldn't provide accurate forecasts, and sales orders were always random and urgent. Since the company's production cycle is long, it's impossible to complete all orders. He noted, "At the peak time, we need to work overtime and hardly complete the orders. But in the off-season, there were not enough orders to maintain

Table 1: ZYSCO Balanced Scorecard

KEY STRATEGIC OBJECTIVES	MEASURES	WEIGHT	TARGET
FINANCIAL PERSPECTIVE			
Increase Revenue	Net Income	18%	Budget
	Gross Profit Margin	10%	Budget
Improve Cost Structure	Costs and Expenses	15%	Budget
Improve Capital Efficiency	Assets Turnover	10%	Budget
CUSTOMER PERSPECTIVE			
Increase Customer Satisfaction	Customer Satisfaction Rate (based on customer survey)	6%	95%
Improve Customer Management	Customer Retention Rate	6%	100%
	Percentage of Sales from High-profit Products	5%	Budget
INTERNAL PROCESS PERSPECTIVE			
Develop New Product	Number of New Products	2%	As Planned
Lean Production	Implementation of Lean Production (evaluated by Board)	5%	95%
	Manufacturing Cost Reduction	5%	Budget
	Capacity Balance	5%	As Planned
Optimize Technical Reform Investment	Return on Technical Reform Investment	5%	Budget
LEARNING & GROWTH PERSPECTIVE			
Improve R&D	Number of New Patents	1%	As Planned
Promote Value Creation Philosophy	Promotion of Value Creation (evaluated by Board)	1%	95%
Standardize Staff Training	Training Evaluation (evaluated by Board)	2%	95%
Manufacture Information Integration System	System Coverage (evaluated by Board)	2%	80%
Financial Decision Support System	Financial Decision Support (evaluated by Board)	2%	90%

continuous production. Keep manufacturing continuously and it will lead to excessive inventory, but if we don't keep continuity, there would be a large waste of energy. This puts us in a dilemma."

All these problems affected ZYSCO's production efficiency and customer satisfaction negatively, which then affected its financial performance negatively.

The Existing Performance Evaluation System

The consulting team and BSC task force also interviewed employees and investigated the existing performance evaluation system. They found three major problems.

First, performance measures in the existing performance evaluation system hadn't changed to tie to the new company strategic objective of value creation. The measures of profit and capital efficiency appeared only in the company's and top management's key performance measures, and most of the departments were still focused on the volume of production and sales. For example, in the sales department, key measures were sales and collections, so the department wasn't concerned about the price, profit, and customer relationship. As a result, the strategic objective had little effect on the actual operation of the company. Without effective management tools, value creation was a bad slogan for ZYSCO's shareholders.

Second, some of the measures didn't provide enough incentives or the right incentives. There were too many subjective measures in the evaluation system, and most of them were vague. Since there was no clear standard or manual, operability and controllability of these subjective measures were weak. Also, some of the measures were unrelated to or uncontrollable by the department being evaluated. And the existing evaluation system didn't take the complexity of work into consideration, which made the employees prefer easy work to complex and time-consuming jobs. In some cases, the person who made the most effort and did most of the difficult work ended up with the lowest score and bonus because he or she had a greater chance of making mistakes.

Third, most targets were set higher than the previous year, regardless of the actual economic environment and challenges the company had been facing. Therefore, the budgeted targets were sometimes unreasonably high and not reachable, which frustrated the employees.

Implementing the Balanced Scorecard

Now it was time to implement the new strategic management system. There were three main goals of the new system.

First, the new system should be able to translate ZYSCO's value creation strategy into performance measures, and it should be able to systematically integrate every hierarchy and every department as a whole. The performance measures in this new system should be SMART (specific, measurable, agreed to by all parties involved, realistic, and time-based).

Second, the new system should show the relationship between individual behaviors and the company's strategic objectives, and it should make sure all employees understand this relationship and the value creation strategy. Also, there should be enough incentive for employees to do the right things.

Third, the new system should focus not only on financial performance but also on the drivers of financial performance. For example, ZYSCO should pay attention to its customer relationships, quality control in the production process, training of the production workers, establishing an information system, and more.

Drawing the Strategy Map

The foundation of implementing a BSC in the strategic management system was ZYSCO's strategy and strategy map. Therefore, based on the company's goals and with the consulting team's help, the BSC task force first drew the strategy map for ZYSCO. As shown in Figure 1, the value creation strategy (increase EVA) was decomposed into multiple strategic objectives based on their causal relationships. These strategic objectives were divided into four perspectives: financial, customer, internal process, and learning and growth.

From the financial perspective, the value creation strategy is decomposed into the objectives of profit growth and reduction of the cost of capital. This is further decomposed into increasing revenue, improving the cost structure, and improving capital efficiency.

The customer perspective objectives are to increase customer satisfaction and improve customer management, which would promote a sales increase. Improve product quality, product value of money, increase on-time delivery, and improve after-sale service are all drivers

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of high customer satisfaction.

The internal process perspective objectives include developing new products and implementing lean production, which could improve customer satisfaction. Lean production and optimizing technical reform investments would also improve cost structure and capital efficiency. The map also shows the five components of lean production: reduce production costs, reduce process defect levels, raise productivity, reduce inventory, and balance production processes.

The learning and growth perspective objectives are to improve R&D, promote a value creation philosophy, improve staff training, and construct a manufacturing information system and financial decision support system. They support the success of strategic objectives in the internal process perspective, and they are the foundation of strategy execution.

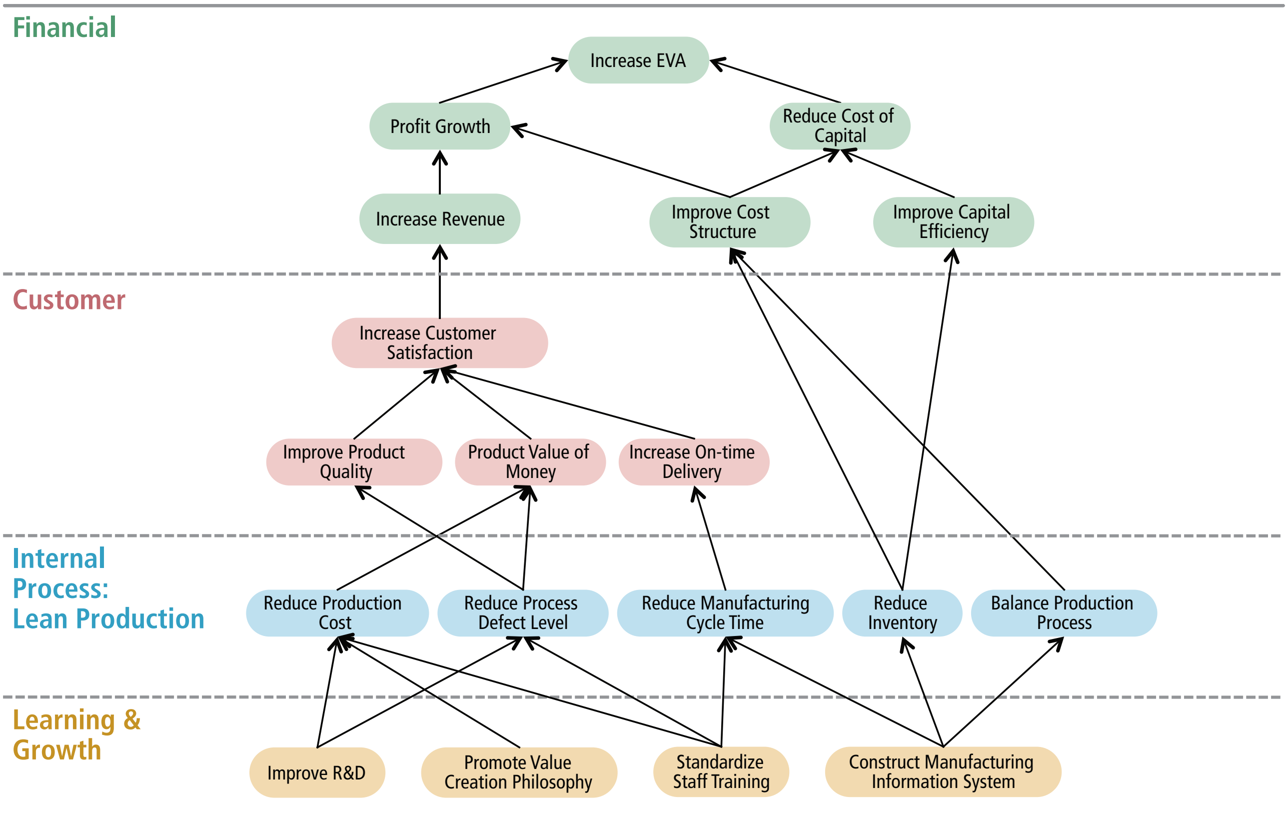
Designing the Balanced Scorecard

Next, the consulting team and BSC task force worked out the balanced scorecard according to ZYSCO's strategy map. Table 1 shows how the strategic objectives are translated into performance measures.

According to the consulting team's information, at the company-level BSC, weights of the four perspectives are usually about 50%, 20%, 20%, and 10%, respectively. The company uses this as a guideline in deciding the weights in ZYSCO's balanced scorecard.

Since the steel industry in China has large overcapacity problems, the company was advised to downplay revenue growth and production capacity as financial measures

Figure 2: Strategy Map of Melt Shop—"Lean Production" Strategic Theme



and to focus on increasing net income by controlling costs and expenses with 15% weight, improving asset turnover with 10% weight, and increasing gross profit margin with 10% weight.

For the customer perspective, customer satisfaction rate is based on a customer survey, which includes evaluation of product quality, on-time delivery, after-sale service, and so on. The target is 95%. Since ZYSCO relies heavily on its key customers such as CNPC and Sinopec, customer retention rate also accounts for 6% in its BSC, and the target is 100%. In order to increase net income, percentage sales from high-profit products (petroleum drilling tools and retained mandrel) is measured with a 5% weight.

For the internal process perspective, implementation of lean production, manufacturing cost reduction, and capacity balance measures account for 5% each. These three measures for lean production account for 15% weight in total so the production department would pay more attention to cutting costs. And the return on technical reform investment with 5% weight is used to reduce useless capacity growth.

For the learning and growth perspective, number of new patents has a 1% weight to motivate innovation. The other four measures in the learning and growth perspective have a total weight of 7%. They are subjective and are evaluated by the board of directors. The targets for manufacturing system coverage and financial decision support system are relatively low because system construction had just begun.

Each department's strategy map and BSC can use the company's strategy map and BSC as a guide. The melt shop is representative of the production departments. Since it consumes nearly 40% of the energy of the entire company and is the company's bottleneck, it deserves the most attention. The melt shop's strategy map is shown in Figure 2. Derived from ZYSCO's strategy map, its strategic theme is lean production (at the internal process perspective).

Table 2 shows the melt shop's BSC in which the mea-

Table 2: Melt Shop Balanced Scorecard

KEY STRATEGIC OBJECTIVES	MEASURES	WEIGHT	TARGET
FINANCIAL PERSPECTIVE			
Increase Revenue	Net Income (based on internal transfer price)	5%	Budget
	Production Plan Completion	10%	As Planned
Improve Cost Structure	Manufacturing Costs per Unit of Output	10%	Budget
	Costs and Expenses	10%	Budget
Improve Capital Efficiency	Inventory Turnover	5%	Budget
CUSTOMER PERSPECTIVE			
Increase Customer Satisfaction	Internal Customer Satisfaction Rate (evaluated by other departments)	3%	95%
	External Customer Satisfaction Rate (evaluated by outside customers)	3%	95%
Improve Product Quality	Outgoing Defect Level, Product Return Rate	5%	As Planned
Increase On-time Delivery	On-time Delivery Rate	5%	98%
INTERNAL PROCESS PERSPECTIVE (LEAN PRODUCTION)			
Reduce Production Cost	Raw Material Utilization	5%	As Planned
	Energy Consumption	5%	As Planned
Reduce Process Defect Level	Process Defect Level	3%	As Planned
	First-pass Yield	3%	As Planned
	Scrap/Re-work Rate	3%	As Planned
Reduce Manufacturing Cycle Time	Manufacturing Cycle Time	4%	As Planned
	Implementation of JIT (evaluated by CEO)	2%	95%
Reduce Inventory	WIP Inventory	2%	As Planned
	Finished Goods Inventory	2%	As Planned
Balance Production Process	Capacity Balance	5%	As Planned
	Coordination Among Every Section (evaluated by section chiefs)	3%	95%
LEARNING & GROWTH PERSPECTIVE			
Improve R&D	Number of New Patents	Awarded Separately	
Promote Value Creation Philosophy	Promotion of Value Creation (evaluated by CEO)	1%	95%
Standardize Staff Training	Hours of Training	2%	As Planned
	Attendance	2%	100%
Manufacture Information Integration System	System Coverage	2%	80%

sures are more detailed and more specific than in the company's BSC. The financial measures hold less weight since the melt shop isn't a revenue center. The customer satisfaction rate is divided into two parts because the melt shop should be responsible to both its internal customers (other downstream departments) and external customers. In order to motivate lean production and cost reduction, the related measures in the internal process perspective are weighted much more (37% weight) than in the company's BSC (15% weight). Product quality is also reinforced.

Tables 3 and 4 show the balanced scorecard for the sales department and the financial department, respectively. For the sales department, the measures mainly focus on financial (44% weight) and customer (41% weight) perspectives. The sales department's coordination with the production departments on implementing lean production is also considered and is evaluated by the production departments and the CEO. Other important measures are sales forecast and market analysis, which account for 5% weight.

The financial department is primarily a service department. It has three BSC perspectives: financial measure to improve cost structure (20% weight); improving internal

Table 3: Sales Department Balanced Scorecard

KEY STRATEGIC OBJECTIVES	MEASURES	WEIGHT	TARGET
FINANCIAL PERSPECTIVE			
Increase Revenue	Sales	20%	Budget
	Contract Completion	10%	As Planned
Improve Cost Structure	Costs and Expenses	7%	Budget
Improve Capital Efficiency	Accounts Receivable Turnover	7%	Budget
CUSTOMER PERSPECTIVE			
Increase Customer Satisfaction	Customer Satisfaction Rate	6%	95%
	Customer Complaints	4%	0
Increase On-time Delivery	On-time Delivery Rate	5%	98%
Improve After-sales Service	After-sales Service Coverage	5%	90%
	Response Time	5%	As Planned
Improve Customer Management	Customer Retention Rate	6%	100%
	Percentage of Sales from High-profit Products	6%	Budget
	New Customer Sales	4%	Budget
INTERNAL PROCESS PERSPECTIVE			
Lean Production	Coordination with Production Departments (evaluated by production departments and CEO)	5%	95%
LEARNING & GROWTH PERSPECTIVE			
Promote Value Creation Philosophy	Promotion of Value Creation (evaluated by CEO)	1%	95%
Standardize Staff Training	Hours of Training	1%	As Planned
	Attendance	1%	100%
Manufacture Information Integration System	CRM System Construction (evaluated by CEO)	2%	95%
Financial Decision Support System	Sales Forecast and Market Analysis (evaluated by CEO)	5%	95%

Table 4: Financial Department Balanced Scorecard

KEY STRATEGIC OBJECTIVES	MEASURES	WEIGHT	TARGET
FINANCIAL PERSPECTIVE			
Improve Cost Structure	Costs and Expenses	20%	Budget
INTERNAL PROCESS PERSPECTIVE			
Lean Production	Coordination with Production and Sales Departments (evaluated by other departments and CEO)	5%	95%
Optimize Technical Reform Investment	Investment Project Feasibility Study (evaluated by CEO)	5%	95%
	Return on Technical Reform Investment	5%	Budget
	Coordination with Development Department and Project Management Office (evaluated by other departments and CEO)	5%	95%
LEARNING & GROWTH PERSPECTIVE			
Improve R&D	Coordination with Technical Center (evaluated by technical center and CEO)	5%	95%
Promote Value Creation Philosophy	Promotion of Value Creation (evaluated by CEO)	3%	95%
Standardize Staff Training	Hours of Training	1%	As Planned
	Attendance	1%	100%
Manufacture Information Integration System	Production Cost Accounting System (evaluated by production departments and CEO)	10%	95%
Financial Decision Support System	Sensitivity and Breakeven Analysis (evaluated by CEO)	10%	95%
	Budgeting Accuracy	10%	90%
	Restatements of Financial Reports and Qualified Audit Opinion	10%	0
	System Accuracy	10%	99%

process measures (20% weight), which are primarily related to coordination with other departments; and some learning and growth perspective measures (60% weight).

Other departments create their BSCs according to their specific responsibilities and goals, which are derived from ZYSCO's strategy. Finally, the balanced scorecard should be decomposed according to the organizational structure until everyone gets his or her own balanced scorecard.

Also, ZYSCO's compensation system should be linked to the new system and new measures, and employee/manager bonuses should be paid according to their performance evaluation results.

How the New BSC Can Benefit ZYSCO

This new BSC strategic management system can help ZYSCO by altering the behavior of the management team and employees to overcome operational problems, and this will eventually benefit the financial performance.

By using a manufacturing information system and a financial decision support system, investments in equipment that doesn't match the production mode would be discontinued or reduced, and the management team could use the funds for other valuable technology. The manufacturing information system also would be beneficial to production scheduling and monitoring activities.

By implementing and assessing lean production, as well as by implementing technical reform, the bottleneck problem at the melt shop should be less serious. Lean production and technical reform also play vital roles in reducing production costs and improving product quality. Standardization of the staff training process is designed to supplement the mentoring system so that product quality is more stable and easier to control.

To promote communication and cooperation between the sales and production departments, the two would evaluate each other. For example, the sales department would rate its satisfaction with the production department, and the production department would evaluate the sales department on its coordination in lean production. Furthermore, some measures would be used in both departments' evaluation, such as on-time delivery rate and customer satisfaction rate, so managers and employees in both departments will pay more attention to those measures. The manufacturing information system and the financial decision support system would also improve the cooperation between departments.

Finally, although it would consist of only 1% of the measures, promotion of a value creation philosophy would encourage every employee to understand the new system. Then everyone would know what he or she is responsible for and what objectives to work on. As a result, everyone would work toward a common goal—ZYSCO's value creation strategy.

Making Progress

ZYSCO adopted this new system in the middle of 2012. Since then, all the processes and procedures we described here have been put into place, and the company continues to make progress. For example, both stock market and financial performance have improved. From June 30, 2012, to September 30, 2014, ZYSCO's stock performance improved dramatically. Its cumulative return was 93.53%, while the market return was only 6.22% and the average return of the machinery industry was 27.92%. Meanwhile, as a result of the continuous emphasis on cost reduction and sales growth of high-profit products, ZYSCO's gross margin rose from 9.32% to 12.65%. The company's ROE for 2013 was 0.13%, low but still outperforming most of its competitors. As for capital efficiency, ZYSCO's asset turnover, inventory turnover, and accounts receivable turnover were 0.45, 3.04, and 4.55, respectively, which compared favorably with the industry average of 0.46, 2.03, and 2.33, according to the Wind Financial Terminal.

We hope the new BSC strategic management system will continuously help ZYSCO achieve its strategic objectives. **SF**

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Zengbiao Yu was an independent director of ZYSCO from 2008 to 2013. He and Yuanhong Chen conducted BSC continuing education training sessions for the company's managers, and Tom Lin provided some BSC concepts and structure for them to use in these sessions.