

Full Length Research Paper

Is the balanced scorecard really helpful for improving performance? Evidence from software companies in China and Taiwan

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In the past twenty years, Balanced Scorecard (BSC) has been regarded as a possible effective performance measurement system. In recent decade, BSC is gradually connected with strategic goal management and performance control. However, scholars are still uncertain about the causal relationship between BSC and enhancement of strategic goal accomplishment and performance. Based on previous researches, this study adopted quasi-experimental and longitudinal design to gain a better control over the internal validity of research, and conducted experiments on the popular software industry in Taiwan. Different from past researches that are focused on western companies, the results of this study showed a higher degree of generalization of BSC management. The findings demonstrated that in comparison to control group which did not implement BSC, the experimental companies that had implemented BSC tended to accomplish the goals or have better performance. The results confirmed that implementation of BSC management could effectively enhance accomplishment of strategic goals and performance.

Key words: Balanced scorecard (BSC), software industry, quasi-experimental design.

INTRODUCTION

Due to the rapidly changing business environment, a corporation encounters intense competition today. In order to survive and continue to grow, it has to prepare strategies for responding via operation management. However, whether a strategy can gain support and actualization from the organization members must rely on systematic performance management method used in its promotion. The balanced scorecard (BSC), in combination with corporate policy, is a performance management system for assisting a corporation in actualizing its strategy. In the last decade, BSC developed from an index to measure non-short term financial performance, such as intangible assets, to a tool that can effectively guide strategic thoughts and fulfill it in overall organizational activities. Eventually, it became a strategic performance

management system centered on strategies for organizational performance measurement (Bible et al., 2006).

In early 1990s, Kaplan and Norton, in their series of articles, suggested developing BSC as a corporate performance measurement system tool (Kaplan and Norton, 1992; Kaplan and Norton, 1993, Kaplan and Norton, 1996a; Kaplan and Norton, 1996b). In the books and journal articles published in 2001, Kaplan and Norton emphasized the connection between BSC and business strategy. Thus, BSC became one of the important tools of strategy management and control system (Kaplan and Norton, 2001a; Kaplan and Norton, 2001b). According to Kaplan and Norton (2001b), BSC is the bridge between strategic planning and budget. BSC defines strategic goals, and reasonably evaluates and sets the budget. Setting budget is the key to resource investment in corporate activities and results in performance through the said activities. By evaluation of BSC, the accomplishment of strategic goals can be measured. Therefore, application of BSC on measurement of business strategy and performance is based on the five principles:

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(1) Translate the Strategy to Operational Terms; (2) Align the Organization to the Strategy; (3) Make Strategy Everyone's Everyday Job; (4) Make Strategy A Continual Process; (5) Mobilize Leadership for Change.

Strategy map is a tool to define strategic goal. Development of strategy map can combine strategic goal with four constructs of BSC, namely the financial perspective, customer perspective, internal business process perspective, and learning and growth perspective. In the financial perspective, the strategy should be based on balanced long-term and short-term goals. In the customer perspective, strategy is based on differential value provision. According to the internal business process perspective, value creation must be based on internal business process. Finally, the learning and growth perspective indicates that intangible business assets, such as manpower capital, information capital, and organization capital, should undergo strategy alignment upon strategic goals (Kaplan and Norton, 2004).

The measurement indicator structured by the BSC, covers the substantial indicators in both financial and non-financial aspects, which not only helps employees to understand the corporate vision, but also facilitates management follow up to achieve the strategic objectives more easily. The control of modern corporate value creation mechanism, besides reflecting a short-term and past financial indicator, more importantly, can control the value motivating factor to drive future economic performance, such as operation with clients/customers and suppliers relationship, innovation of internal business processes including product development, manufacturing, and distribution, as well as such learning growth perspectives as: employee skills, employee satisfaction, employee morale, and information system competence. This is the measurement approach emphasized by the BSC. This kind of management system will combine measurement indicators with strategy, and will be able to concurrently consider the past results and future value driving motivating factors, as well as to balance the demand between corporate internal (employee and internal process) and external (shareholders and clients/customers) key factors; to promote future economic performance (that is, to construct client/customer relationship, innovate internal business processes, and gain employee learning growth), to supplement the insufficiency of the lagging indicators (financial performance indicators), that are closely related to corporate value creation. Therefore, more and more corporations have introduced the BSC performance management system. The total production value of Taiwan software industry has risen from US\$1,250 million at the end of 1995 to about US\$5,000 million at the end of 2005, and about US\$5,500 million at the end of 2006. During ten years, the growth has quadrupled, posting a rapid growth. Although the contribution of the software industry to the economic development of Taiwan is not as prominent as the hardware industry with total production value ranked

among the top three in the world, yet in light of future development trends, its position seems to be ever more important, and that it is extremely possible that they could keep pace with the hardware industry, and become a star in the world of tomorrow.

This study focuses on three firms, designated as A, B and C among the top ten major corporations in the software industry in Taiwan, in the application of a quasi-experimental design, to explore the results of implementing the balanced scorecard on operation performance. Company A has implemented the BSC as the experimental group, while Companies B and C, which have not implemented the balanced scorecard, are the control groups. A comparison of the performance of these three firms from 2003 to 2006 is conducted. This study adopted the quasi-experimental field-based research proposed by Cook and Campbell (1979) and Yin (1994) to validate the causal relationship between strategic goal and performance control. The experiment compared corporate performance, including financial performance and non-financial performance, with and without implementation of BSC, in order to validate the effectiveness of BSC management. Cook and Campbell (1979) define a quasi-experiment in field settings as "experiments that have treatments, outcome measures, and experimental units, but do not use random assignment to create the comparisons from which treatment-caused change is inferred". Some scholars suggested that when studying BSC management by quasi-experimental design, due to a high degree of intention to validate the causal relationship between the constructs of BSC and business performance, external validity was limited (De Geuser et al., 2009). However, according to Whetten's (1989) definition on external validity of a theory, the adoption of different "who, when, where" is the important step to validate generalization of the theory. Thus, this study treated technology companies in Taiwan, which were important but rarely explored in past researches, as subjects to validate the causal relationship between corporate strategic goal setting and performance control of BSC management by different objective data with longer observation time (2003 - 2006). This study also enhanced the inference of external validity of BSC in previous researches.

LITERATURE REVIEW

On the subject of this study, the definition of BSC and related empirical studies of the BSC are described as follows:

Balanced scorecard

Kaplan and Norton developed the Balanced Scorecard (BSC) with masters in management accounting, to provide four perspectives in management and evaluation of

corporate performance or value to managers (Kaplan and Norton, 1996a, 1996b).

1. Financial perspective: The measurement indicators related to profitability, such as: sales growth rate, return on investment (ROI), return on assets (ROA), return on equity (ROE), earnings per share (EPS), and economic value added (EVA).
2. Customer perspective: The measurement indicators related to customer and market, such as: customer satisfaction, number of customer complaints, customer retention, market growth rate, and market share.
3. Internal business process perspective: The measurement indicators related to major impact on organization objectives achievement, such as: flow improvement and innovation, after-sales service flow improvement and innovation, work achievement rate, reduction of delivery delay rate, and product quality improvement.
4. Learning and growth perspective: The measurement indicators related to the creation of long-term growth and improvement of an organization through manpower, system and organization programs, such as: strengthening of employee potential, strengthening of information system competency, strengthening of authority/responsibility and incentives, strengthening of objective achievement competency, reduction of employee resignations, and employee satisfaction.

Kaplan and Norton (1996a, 1996b) also point out that the implementation of the BSC is to attain the following goals:

- (1) Clarify and translate vision and strategy; (2) communicate and link objectives and measures; (3) plan, set targets, and align strategic initiatives; and (4) enhance strategic feedback and learning.

According to the studies of many authors, the balanced scorecard (BSC) provides the following functions and characteristics:

1. First, the BSC is a performance management tool, used to improve the organization value creation flow with a more integrated viewpoint (Fletcher and Smith, 2004).
2. Second, the BSC can clarify mission and long-term strategy, and to translate vision in terms of all the structures in an organization (Bontis et al., 1999).
3. Third, the BSC can provide concurrent consideration of both the leading and lagging factors of performance evaluation, both financial and non-financial, internal and external business, qualitative and quantitative measurement, as units of a performance measurement track to successfully attain corporate strategy, objectives and missions (Barsky and Bermser, 1999; Huefner, 2002; Fletcher and Smith, 2004) that is, to clarify strategy and translate it into action.
4. Fourth, the BSC can help a corporation to manage its changes, and help managers to develop the entire evaluation mode of influencing corporate value (Barsky

and Bermser, 1999; Norreklit, 2003; Davis and Albright, 2004).

5. Fifth, the BSC can help managers to be able to achieve the organization objectives in making decisions or provide incentives to employees through such financial indicators as net income, ROI, ROE, and ROA (Johnson, 1998; Abran and Buglione, 2003).
6. Finally, the BSC can help to provide reasonable allocation of rewards and compensation (Banker et al., 2004; Dilla and Steinbart, 2005).

According to the type of BSC suggest by Speckbacher et al. (2003), BSC have three basic types.

(1) Type I BSC: a specific multidimensional framework for strategic performance measurement that combines financial and non-financial strategic measures; (2) Type II BSC: a Type I BSC that additionally describes strategy by using cause-and-effect relationships; (3) Type III BSC: a Type II BSC that also implements strategy by defining objectives, action plans, results and connecting incentives with BSC.

In this study, experimental companies used the strategy map as the guide for organizational goal, activity, and other related decisions, and further conducted "if-then" analysis to clarify the relationship between implementation and goals. Finally, it performed control and performance measurement by financial and non-financial performance measures to match organizational implementation result with strategic goal, which is the third type of usage of BSC.

Empirical studies of the balanced scorecard

Kaplan (1994) takes Rockwater Co. for example to explain the development process of the BSC, to ensure the realization of company promise and serve as a management tool. Kaplan and Norton (1996a, 1996b) use more cases, including many different industries such as banking and insurance industries, to explain the management structure of linking the strategy of business units to the entire strategy of a company. Martinsons et al. (1999) also applied the case study method to explore the result of a corporate information system operation department in implementing the BSC, by adopting four perspectives: corporate value, user orientation, internal process, and future preparation to measure and evaluate the performance of the information system. The result shows that BSC can serve as a measurement system for a strategic information system.

Chia and Hoon (2000) studied the procedures for promoting the BSC, and the BSC item and the criteria establishment process of two large merchandise circulation firms in Singapore. The study result shows that the promotion of the BSC system contributes to clarification of company vision and preparation for the intended

strategy in practice. Hoque and James (2000) studied 66 Australian manufacturing companies that implemented the BSC, and the resulting corporate performance. Organizational performance was a self-reported measure relative to peers within the same industry. The authors measured performance as a composite score on self-reported assessments of ROI, sales margin, capacity utilization, customer satisfaction and quality relative to industry peers. The result reveals that both show a highly positive relationship. The authors noted, however, that while their study relates the use of non-financial measures to performance, their survey fails to capture actual reliance on the BSC or the strength of the causal relationships that are so important to BSC implementation. Ahn (2001) focused on a case study of a strategic business unit (SBU) of a large automation product supplier in Switzerland, in a world-leading position in implementing the BSC. The study result points out that implementing the BSC does not only contribute substantial aid to the realization of performance goals, but can also further achieve advantages in management, for example: planning and budgeting of strategy-oriented action plans, integrating the BSC into the process of company control, contributing to strategy communication, etc. The study also points to the BSC as a comprehensive management tool. Olson and Slater (2002), via a questionnaire investigation of more than 200 senior managers in service and manufacturing firms, surveyed their recognition of corporate implementing of the BSC. The result shows that the performances in such perspectives as financial, customer, internal business process, and learning and growth, all improved, particular in the perspective of customer satisfaction. Braam and Nijssen (2004) engaged in the BSC implementation performance investigation of 41 B to B (business-to-business) companies in the Netherlands, by using objective performance standard – ROI and subjective performance standard – questionnaire investigation; the research result shows that both objective and subjective performance measurement indicators show positive rises.

Davis and Albright (2004) applied a quasi-experiment design for two different American banking organizations, to study the relationship of each branch bank implementing (experimental group), and without implementing (control group) the BSC, as well as financial performance, and found the performance of the banking organizations implementing the BSC far exceeded that of the banking organizations without implementing the BSC. However, the author were not able to obtain the detailed data for any of the non-financial measures appearing on BSC, thereby making causal inferences between financial and specific non-financial measures at the study is impossible. Papalexandris et al. (2004) studied one Greek software firm implementing the BSC and found that the said firm, after implementing the BSC for one year, showed considerable progress in performance in four perspectives: 1. Financial; 2. Customer; 3. internal

business process, and; 4. learning and growth. The application of BSC fields included e-business environment (Bremser and Chung, 2005), airport management (Fernandes and Pacheco, 2007), small and medium size manufacturing organization (Fernandes et al., 2006), integration management system (Bobrek and Sokovic, 2006) and information technology (IT) performance management (Stewart, 2007). Also, Assiri et al. (2006) presented a roadmap for BSC implementation and identified a series of critical factors that must be carefully considered to ensure successful implementation of BSC. Moreover, Wong-On-Wing et al. (2007) applied BSC to reduce the conflict between top management and divisional managers because of the failure of the former to evaluate and consider strategy effectiveness in performance evaluation. The theoretical comments of the above authors and empirical studies provide considerable support for this study in theoretical foundation, research method and the entire research framework.

METHODOLOGY

Research framework

This study focuses on Companies A, B and C among the top ten major corporations in the software industry (in annual revenues ranking, 2005, 2006) to perform a multiple case comparative study. The study design applies a rather rigid “quasi-experimental design” in social science research method, in which Company A, implementing the balanced scorecard system is an experimental group, while Companies B and C do not implement the balanced scorecard, and are control groups, to study the impact on its performance of a corporation either implementing or not implementing the balanced scorecard system. The adopted and obtained data in the study come from the years 2003 to 2006, including the indicators of such perspectives as financial, customer, internal business process, and learning and growth. Figure 1 shows the conceptual research framework of the study.

This study referred to the quasi-experimental field-based research method adopted by Davis and Albright (2004) for experimental design. The experiment was conducted on three companies with similar scale and background. By longitudinal approach, differences of performance and accomplishment of strategic goal with and without BSC implementation were observed. The subject companies had implemented BSC since 2004. Since the effect of implementation could be extended to the following one to two years, data collection would start one year before the implementation (2003), and the observation would last to the third year after the implementation (2006). The efficacy could be recognized through long-term panel data. Regarding the control group, a four-year observation was conducted on two companies without implementation of BSC management. The significance of control group was to be compared with the companies in the experimental group that had implemented BSC regarding performance and accomplishment of strategic goal. In a series of comparison of performance, it was expected the experimental companies implementing BSC should reveal a higher degree of financial or non-financial performance and accomplishment of strategic goal. By the quasi-experimental design, the causal relationship between the strategy management and performance control of BSC would be confirmed and validated. Additionally, different regions, industries, and observation periods could enhance generalization of external validity of BSC.

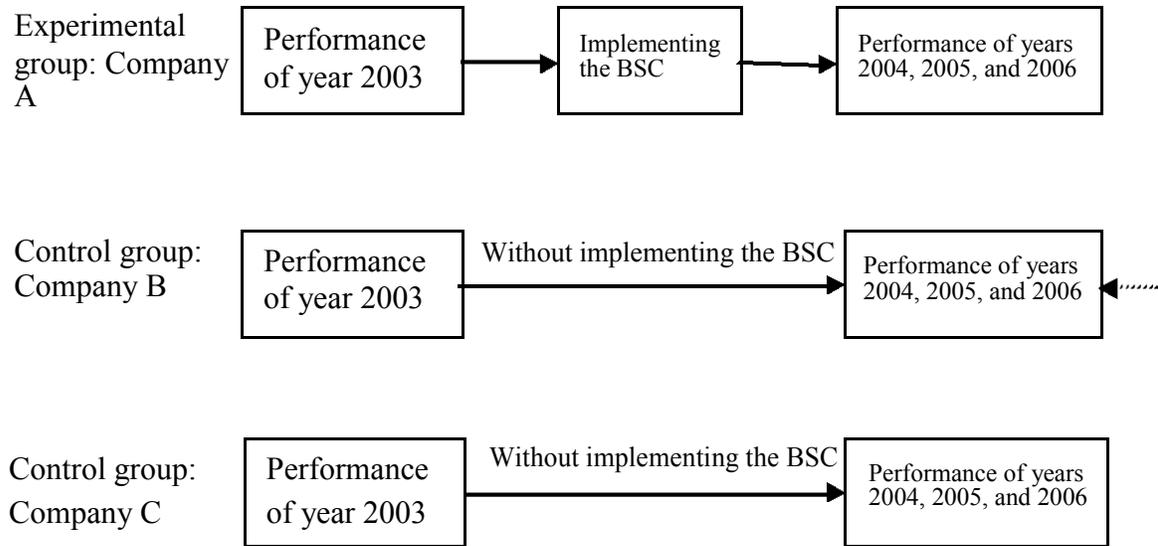


Figure 1. Conceptual research framework.

Brief introduction of the case company

Company A of the experimental group was founded in 1982, with its major business items including: software development, process improvement, Enterprise Resources Planning (ERP), system application, e-training, information safety, and technical R&D. The company locations have developed from Taipei, Taiwan to Hsinchu and Taichung, including 6 branches and 18 branches in Beijing, Shanghai and Kuangjou of China. Up to December 2006, the employees included 900 people (only in Taiwan), and 1900 people (including China), with capital amounting to US\$30 million (only in Taiwan) and about US\$100 million (including China), with annual revenues of about US\$160 million (only in Taiwan) and about US\$500 million (including China). Deputy General Manager Y is the person responsible for promoting the BSC of the company, and the newly established Training Department will lead in promoting the BSC.

Company B, one of the control groups, was founded in 1980. Its main business items include: software design and R and D, enterprise process reengineering, system application, e-training, and information safety protection. Its headquarters is in Taipei, plus 10 branches in Hsinchu, Taichung, and 15 branches in Beijing, Shanghai, and Kuangjou of China. The employees include 850 people (only in Taiwan), and 1800 people (including China), with a capital amount of about US\$35 million (only in Taiwan) and about US\$120 million (including China), with annual revenues of about US\$150 million (only in Taiwan) and about US\$470 million (including China).

Company C, the other control group, was founded in 1985. Its main business items include: software R and D, enterprise resource planning, enterprise process reengineering, information system development and application, supply chain management, e-training, and information safety protection. Its headquarters is in Hsinchu, Taiwan, plus 5 branches in Taipei, Taichung, and 12 branches in Beijing, Shanghai, and Kuangjou of China. The employees include 700 people (only in Taiwan), and 1600 people (including China), with a capital amount of about US\$32 million (only in Taiwan) and about US\$100 million (including China), with annual revenues of about US\$120 million (only in Taiwan) and about US\$360 million (including China).

Implementation of the balanced scorecard of Case Company A

Company A, in order to promote the BSC system, assigns Deputy General Manager Y of Company A to be the responsible person, and an independent Training Department is established for promotion with full effort. The process of Company A in implementing the BSC is as follows:

Establishment of strategy

In accordance with the vision of Company A: To become the top one in Taiwan, to stand in the international community, and be a globally renowned brand in the software industry. Deputy General Manager Y in charge of promoting the BSC has convened many supervisor meetings, in considering the internal/external environment situation of company (SWOT analysis) and the industrial situation of the company, to construct the strategy for the company (Table 1). In order to substantially translate strategy into the objectives/goals of each department in the company, Company A assigns Deputy General Manager Y to be the responsible person of the SBC to convene the company consultants and department managers to jointly discuss and analyze (Figures 2 and 3) information to form a strategic map (Figure 4).

In the strategic map, the strategic issues of learning and growth perspective are: "increasing employee satisfaction", "improving team R&D competency" and "strengthening professional knowledge and skill". Under the leadership of the continuously innovative corporate culture of the company, the followings will help achieve the strategic objectives: strengthening the new concept, knowledge and technology induction, encouraging employees to pursue advanced studies, and strengthening employee training. The strategic issues in the perspective of internal business processes are "improving product quality" and "improving work performance". The substantiated strategic objectives are: comprehensive and humanized product functions, improving product stability, reducing production costs, and work completion on time. The strategic issues in the perspective of customers are: "increasing customer satisfaction" and "expanding market share," while the strategic objectives are: reducing the number of customer complaints to zero

Table 1. SWOT analysis and response strategies of Company A.

Analysis	Response strategies
Strength	<p>The functions of the package software developed by Company A are comprehensive and considerably humanized, along with rather attractive prices.</p> <p>The software and network facility installed by Company A for its clients/customers provides reasonable prices and high stability.</p> <p>The R&D competence of the R&D Department of Company A is extremely strong, hard to duplicate by fellow competitors.</p> <p>The corporate culture of Company A is very active and innovative.</p> <p>The market share of Company A is high (about 10%).</p>
Weakness	<p>The selling and administrative expenses ratio (about 38%) is slightly higher than 32% of the other main competitors.</p> <p>The academic record of employees above graduate school (about 9%) is slightly lower than 11%, the average level of other main competitors.</p>
Opportunity	<p>The strengthening of e commerce of corporations incurs drastic increases of demand in both software and hardware.</p> <p>Active development of the market in China and the market demand in China is large.</p> <p>Considerable rise in added value for products.</p>
Threat	<p>Increase of the imported foreign package software causes market competition to be intense.</p> <p>Many new domestic suppliers participate in market competition.</p> <p>Many existing domestic customers have migrated to China that they may turn to the products of other competitors in the China market.</p>
Strategy	<p>Continuous strengthening of the corporate R&D competence and product quality, and fulfilling delivery on schedule.</p> <p>Continuous expanding of market share and increasing the satisfaction and loyalty of existing customers.</p> <p>Maintain an innovative corporate culture.</p> <p>Reduce selling and administrative expenses ratio.</p> <p>Increase the ratio of employees with educational record above graduate school.</p> <p>More active launchings in China and other international markets.</p> <p>Increase the product added value to increase profitability and product competency.</p>

complaints to zero, and increasing good product referrals. The effort of the former three perspectives all deal with the strategic issues of the financial perspective: "achieving revenue growth target" and "creating reasonable profit" as the main objectives, as well as successfully achieving the corporate vision. The strategic objectives of this perspective are: incremental sales growth rate, reduction of selling and administrative expenses ratio, and incremental increases of product profitability. Concerning the perspectives of the balanced scorecard, with the basis of the measurement indicators by Kaplan and Norton (1996a), in accordance with strategic issues, strategic objectives, with reference to recommendations from specialists and consultants and practical experience, the study and preparation of performance measurement indicators are as shown in Table 2.

Strengthen publicity and training for employees

General Manager X and Deputy General Manager Y convened the department managers and employees in separate batches to describe the vision, strategy of the company and communicate the objectives and performance criteria of each department, with great concern for employees' opinions. The department managers must

at least participate in more than 16 hours of the related BSC program held by the company, and each week hold discussions for at least 2 hours with department employees on the target achievement level and performance indicators with the basis of the BSC. In case of any difficulty or problem in implementation, the company requires that a report be made for Deputy General Manager Y, the responsible person of the BSC and discussions held for responsive measures.

The department employees shall take turns to participate in the BSC program held by the company for at least 4 hours and participate in exams for qualified performance records; otherwise employees need to take another 2-hour training program and must pass the exam.

Execution and feedback

The company, besides requiring each department to discuss the performance system of the BSC for at least 2 hours weekly, desires the reporting of any execution difficulties or problems to the superior levels at all times, and will also discuss the status of each department in implementing the BSC in the weekly meeting of the top management and department managers. No matter which

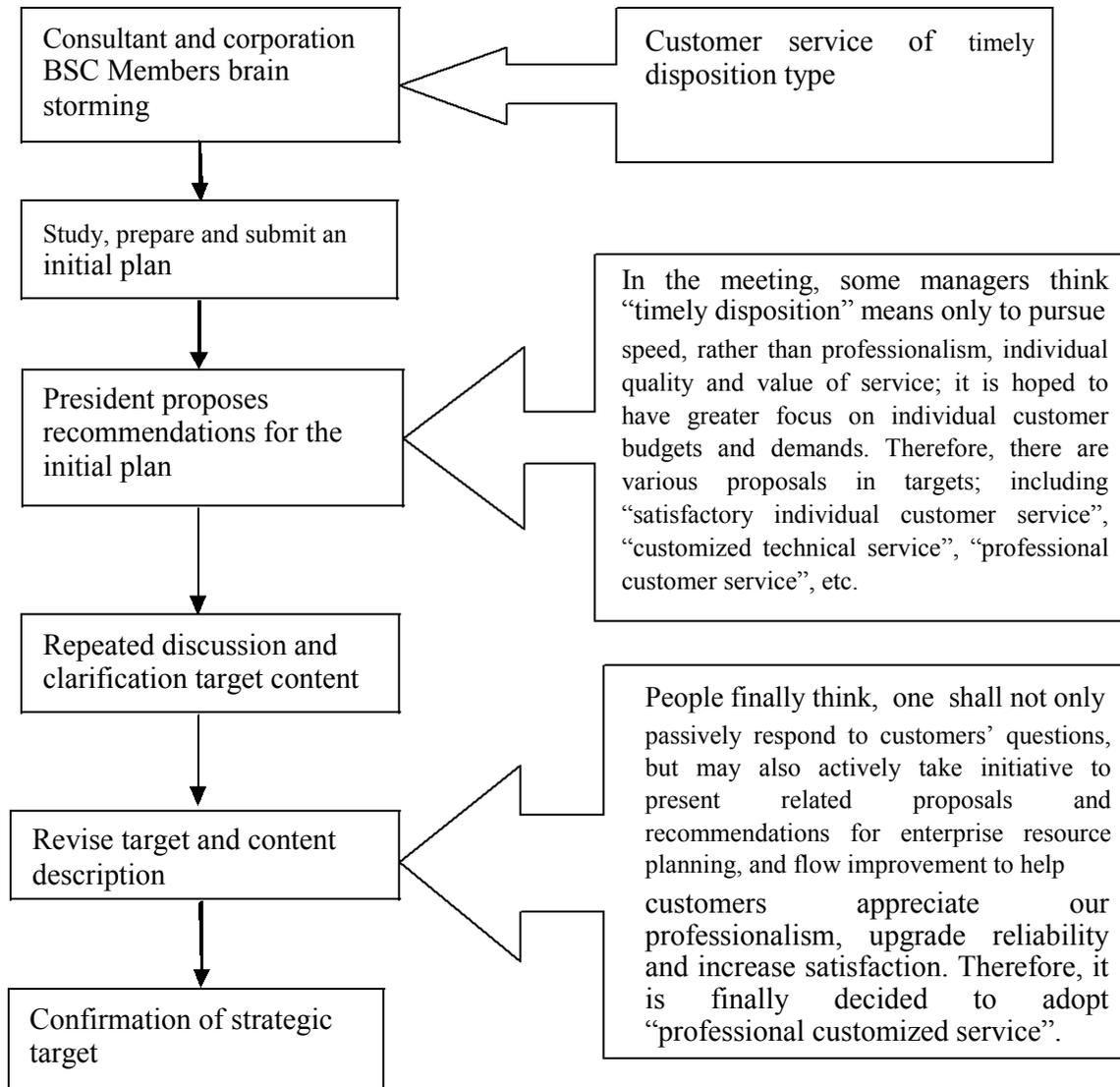


Figure 2. Development of strategic map. Taking the “customized service” of customer perspective for example.

department presents any problem, the supervisors will have a full discussion to determine if it is completely feasible, or to see the necessity to revise the goals or performance indicators.

RESULTS AND ANALYSIS

Financial perspective

As Table 2 shows, the financial perspective measurement indicators of Company A in the BSC are: sales growth rate, selling and administrative expenses ratio, product profitability. Table 3 shows the performance results in comparison with Companies B and C of the control groups. It's apparent from Table 3 that since Company A of the experimental group has experimented with the BSC system at the beginning of 2004, the measurement

indicators in financial perspective: sales growth rate, selling and administrative expenses ratio, and product profitability, all indicate an obviously prominent performance, better than those of Company B and Company C of the control groups. However, the product profitability of Company A still fails to reach the anticipated target, and it's imperative to make further review and improvement for saving other costs or expenses.

Customer perspective

The measurement indicators of the BSC customer perspective for Company A are (Table 2): number of customer complaints, customer satisfaction, and market share. The performance comparison results with Companies B and C

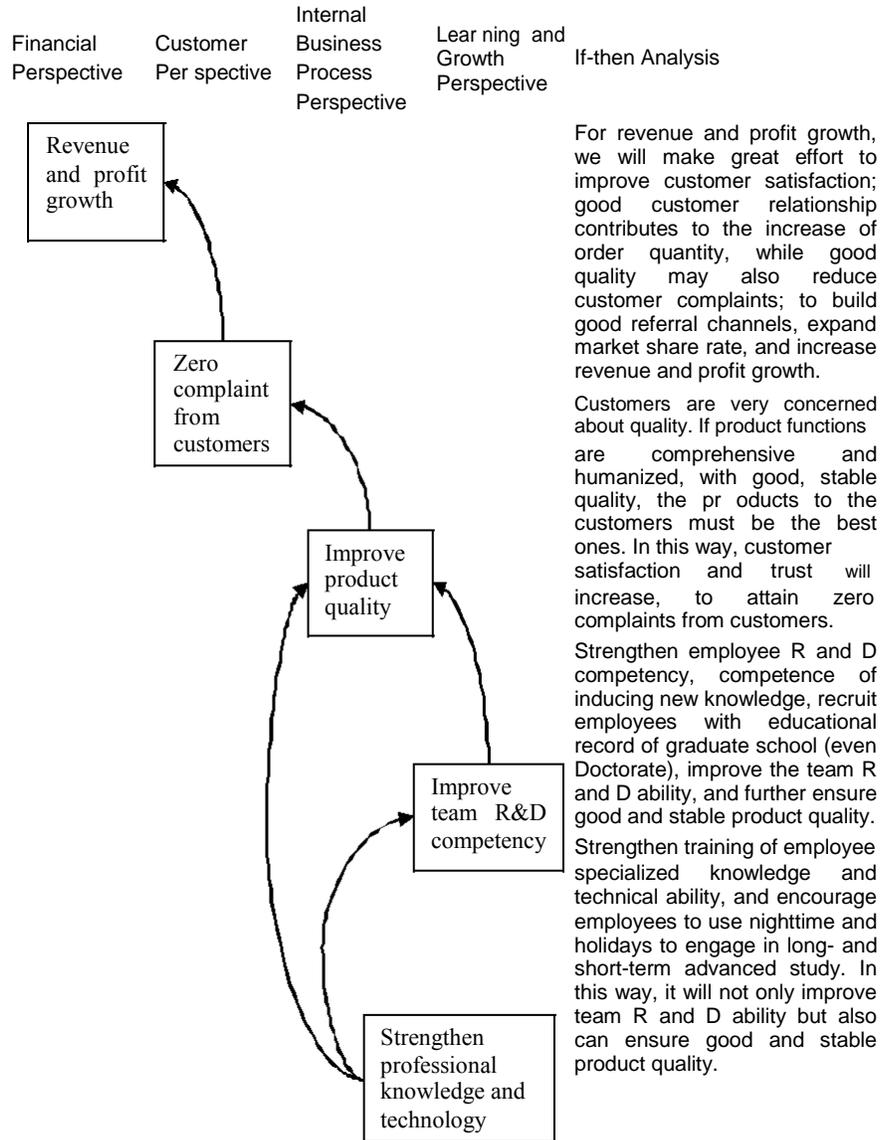


Figure 3. Cause and effect analysis.

of the control groups are shown in Table 4.

Since Company A of the experimental group implemented the balanced scorecard at the beginning of 2004, great progress has been made in customer perspective (Table 4). Company A has better performance in the number of customer complaints than Company C of control group, in customer satisfaction than Companies B and C of the control groups, and in market share growth than Company B of control group. From another aspect, though Company A successfully reduced the number of customer complaints, yet the increment of customer satisfaction did not reach the anticipated target and needs more effort. In terms of market share growth, it also fails to reach the set target. The Marketing Department of the company needs to make further effort or further review to revise the growth rate target.

Internal business process perspective

The measurement indicators of the internal business process perspective in the BSC for Company A are (Table 2): work achievement rate, product delivery delay rate, production cost ratio, comprehensive and humanized product functions, and product stability. The performance comparison results with Companies B and C of the control groups are shown in Table 5. From Table 5, since Company A of the experimental group implemented the balanced scorecard at the beginning of 2004, obvious progress shows in each measurement indicator of the internal business process perspective, and with obviously better performance in reduction of delivery delay rate compared with Companies B and C; in the reduction of production cost ratio, though not fully achieving the target

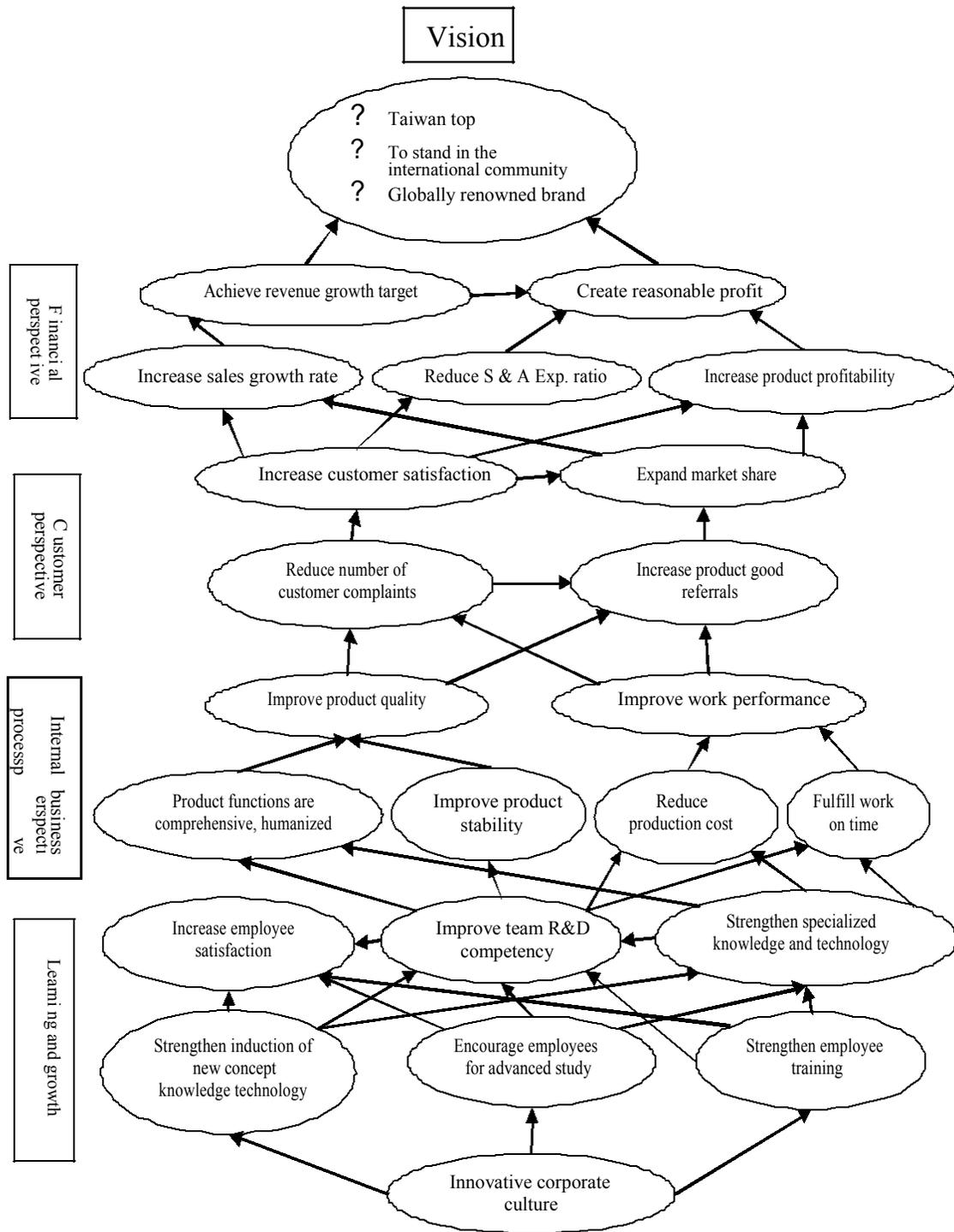


Figure 4. Strategic map of Company A.

achieving the target, yet the performance is still better than Company B of the control group.

Learning and growth perspective

The measurement indicators of the BSC learning and

growth perspective of Company A are (Table 2): employee satisfaction, employee resignation rate, ratio of employee short-term advanced studies (within one year), ratio of employee long-term advanced studies (at least one year), and the ratio of training cost account for total expense. The performance comparison results with Companies B and C of the control groups are shown in

Table 2. Perspective measurement indicators of balanced scorecard (BSC)

BSC perspective	Measurement indicator	Weight*(%)	Measurement method	Data resource
Financial perspective	Sales growth rate	40	(Sales revenue of this period and sales revenue of prior period) / Sales revenue of prior period	Income Statement
	S and A Exp. ratio	30	S and A Exp. / Total operating Exp.	Income Statement
	Product profitability	30	Net product profit / Total product cost	Statement of sales revenue; Statement of manufactured cost
Customer perspective	Number of customer complaints	20	Statistics of number of customer complaints	Records of marketing department
	Customer satisfaction	40	Customer satisfaction index	Customer questionnaire investigation
	Market share growth	40	(Market share of this period and market share of prior period) / Market share of prior period	Investigation data of marketing department
Internal business flow perspective	Work achievement rate	20	Completed piece numbers/required piece numbers for completion	Statistic data of each department
	Product delivery delay rate	20	Completed piece numbers in delivery/ required piece numbers for completion in delivery	Statistic data of each department
	Production cost ratio	20	Production cost / total cost	Statement of manufactured cost; Income Statement
	Comprehensive and humanized level of product functions	20	Customer satisfaction index	Customer questionnaire investigation
	Product stability	20	Customer satisfaction index	Customer questionnaire investigation
	Employee satisfaction	20	Employee satisfaction index	Employee satisfaction questionnaire investigation
Learning and growth perspective	Employee resignation rate	10	Employee numbers in resignation / Total employee numbers	Statistic data of human resources department
	Employee short-term advanced study ratio **	20	Employee numbers in short-term advanced studies / Total employee numbers	Statistic data of training department
	Employee long-term advanced study ratio ***	20	Employee numbers in long-term advanced studies / Total employee numbers	Statistic data of training department
	Ratio of training cost (expense) account for total expense	30	Training expense / Total expense	Statistic data of finance department

Note: *Weight is jointly studied and prepared by the BSC consultants and department managers (included) above. **The annual accumulated period of advanced study is above 20 hours (included), and below 1 year. *** The annual accumulated period of advanced study is above 1 year.

Table 3. Financial performance comparisons between the experimental group and control groups (only in Taiwan).

Year	2003		2004		2005		2006	
Target								
Sales growth rate	Target (%)	Actual (%)						
Company A	3↑	0.5↑	4↑	4.3↑	5↑	4.7↑	5↑	5.4↑
Company B	4↑	1.5↑	3↑	0.5↓	3↑	1↑	4↑	0.5↑
Company C	3↑	1.2↑	3↑	2↓	2↑	1.4↓	2↑	0.5↑
S and A Exp. ratio								
Company A	5↓	0.5↑	4↓	3.8↓	5↓	4.5↓	4↓	4.2↓
Company B	3↓	1↑	3↓	0.5↓	3↓	1.2↑	3↓	0.5↓
Company C	6↓	1.3↓	5↓	0.3↓	3↓	0.6↓	3	0.2↑
Product profitability								
Company A	8↑	1.5↑	6↑	4.3↑	6↑	5.6↑	7↑	6.1↑
Company B	6↑	2↑	5↑	1↑	4↑	0.5↑	4↑	1.5↑
Company C	9↑	4↑	6↑	1.2↑	4↑	0.8↓	3↑	1.2↑

Note: *Company A of the experimental group started to implement BSC at the beginning of 2004.

Table 4. Customer performance comparisons between the experimental group and control groups (only in Taiwan).

Year	2003		2004		2005		2006	
Target								
Number of customer complaints (No. of times)	Target	Actual	Target	Actual	Target	Actual	Target	Actual
Company A	Below 500	566	Below 400	423	Below 400	386	Below 350	325
Company B	na							
Company C	Below 600	702	Below 600	684	Below 600	691	Below 600	678
Customer satisfaction	Target (%)	Actual (%)						
Company A	5↑	2↓	5↑	3.8↑	5↑	3.2↑	5↑	2.8↑
Company B	5↑	1.5↑	5↑	0.2↓	5↑	1.8↑	5↑	0.7↑
Company C	8↑	3↑	5↑	1↑	5↑	1.3↑	5↑	0.3↓
Market share								
Company A	8↑	2↑	8↑	5.4↑	8↑	5.2↑	8↑	6.7↑
Company B	5↑	3↑	5↑	1.3↑	5↑	2.6↑	5↑	2↑
Company C	n a	n a	n a	n a	n a	n a	n a	n a

Note: *Company A of the experimental group started to implement BSC at the beginning of 2004. "na" indicates not available/no announcement.

Table 5. Internal business process performance comparisons between the experimental group and control groups (only in Taiwan).

Target	Year		2003		2004		2005		2006	
	Target (%)	Actual (%)								
Work achievement rate										
Company A	100	81	100	94	100	97	100	97	100	98.5
Company B	na									
Company C	na									
Product delivery delay rate										
Company A	Below 5	10	Below 5	6.5	Below 5	4	Below 5	4	Below 3	2.7
Company B	Below 5	11	Below 5	10	Below 5	12	Below 5	12	Below 5	9.2
Company C	Below 10	15	Below 10	13.5	Below 10	10.2	Below 10	10.2	Below 10	11.3
Production cost ratio										
Company A	30	38	30	33	30	32	30	32	30	30.6
Company B	28	31	28	32	28	33.5	28	33.5	28	31.8
Company C	na									
Comprehensive and humanized product functions										
Company A	Above 90	71	Above 90	83	Above 90	86.6	Above 90	86.6	Above 90	88
Company B	na									
Company C	na									
Product stability										
Company A	Above 95	73.3	Above 95	85	Above 95	90.6	Above 95	90.6	Above 95	93.3
Company B	na									
Company C	na									

Note: *Company A of the experimental group started to implement BSC at the beginning of 2004 "n a" indicates not available/no announcement.

Table 6. From Table 6, since Company A of the experimental group implemented the balanced scorecard at the beginning of 2004, obvious progress is shown in each measurement indicator of the learning and growth perspective. In the aspect of employee satisfaction, each department manager is requested to communicate with employees as much as possible, to replace supervision and blame with concern, assistance and encouragement;

the indicator of employee satisfaction has been close to, or over, the set targets since 2004. In the aspect of employee resignation rate, it showed an obvious reduction from 2004 and gradually reached its target, showing better performance as compared with Companies B and C. In terms of short-term advanced study, Company A has also gradually been close to or over its targets since 2004, showing far better performance as compared

with Company B and Company C. As for long-term advance study, before implementing the BSC, the educational record above graduate school of Company A was rather low (about 8%), but it has actively encouraged and aided employees to get to on-the-job training classes in schools (including Bachelor's Degree, Master's Degree and Doctorate) for advanced studies, thereby gradually approaching its targets since

Table 6. Learning and growth performance comparisons between the experimental group and control groups (only in Taiwan).

Year	2003		2004		2005		2006	
Target								
Employee satisfaction	Target (%)	Actual (%)						
Company A	Above 70	58	Above 70	73.3	Above 80	78.5	Above 80	83.3
Company B	na							
Company C	na							
Employee resignation rate								
Company A	Below 5	9	Below 5	6.7	Below 5	5.3	Below 5	5.1
Company B	na	8.6	na	9	na	8.1	na	8.6
Company C	na	11	na	10.3	na	9.2	na	11.3
Short-term advanced study ratio**								
Company A	70	53	80	74	80	81.5	85	83.3
Company B	75	61.6	75	63.1	75	60	75	66.6
Company C	60	38.5	60	42.4	60	49	60	51
Long-term advanced study ratio***								
Company A	10	5.6	15	13.1	20	16	20	18.6
Company B	12	6.1	12	7.3	12	7.9	12	8.4
Company C	na							
Training expense ratio								
Company A	15	11.3	15	14.6	15	15.4	15	15.1
Company B	na	10.4	na	12.5	na	9.7	na	7.3
Company C	na	7.5	na	8.6	na	8.8	na	7.6

Note: *Company A of the experimental group started to implement BSC at the beginning of 2004. **The advanced study hours of each employee reaching 20 hours annually can then be calculated, including the training planned by the company. ***Including the formal academic record and credit class study of a school "n a" indicates not available/no announcement

targets since 2004, and showing far better performance as compared with Company B. In terms of training expense, Company A has also gradually approached and surpassed its targets since 2004, with the accounting ratio considerably more than those of Companies B and C.

Under the anonymous condition, some companies in the control group were still unwilling to provide data concerning corporate performance due to

business confidentiality and other strategic consideration. Therefore, some data were not compared with those of the experimental group. However, as the experimental companies had complete performance indices, they demonstrated that the degree of performance and accomplishment of strategic goal was higher than those without implementation of BSC, even without comparison. The above results showed that BSC

management positively influences the practice of strategic goal and performance control.

CONCLUSION

Theoretical contributions

According to Whetten's (1989) statement on

theoretical contribution, a complete theoretical development should include what, how, why, and who, when, and where. The fourth factor of who, when, and where is an important step of generalizability of the theory. If the research could demonstrate that the proposition could be successfully validated in different samples, time, or Geographic area, it could enhance external validity of the theory. Therefore, the contribution of a research to theoretical development should include both the validation of causal relation and the demonstration of theoretical generalizability.

In empirical researches, internal validity can be affected due to common method variance (CMV) in common source and self-report. Besides after-control of statistics, the best solution should be the analysis of multiple sources or objective data in order to avoid CMV and enhance internal validity of study (Podsakoff and Organ, 1986). Design of this study was based on quasi-experimental design and longitudinal approach, and objective data were employed for measurement. In comparison to past researches that utilized common sources and self-report (e.g., De Geuser et al., 2009), the generalization of the causal relationship in the findings revealed better internal validity. It is the important contribution of design in this study to theoretical development of BSC management.

Furthermore, most literatures on BSC only focused on western companies (e.g., Davis and Albright, 2004), and there was a lack of validation on eastern enterprises (e.g., China or Taiwan). It is the limitation of related issues in academia, where uncertainty about generalization of BSC management on eastern enterprises arose. Hence, studies with different samples, regions, and time by BSC should be conducted in order to contribute to theoretical development and generalizability for the construct and development of academic theory.

Managerial implications

How can corporate vision be translated into strategy, and how can strategy be translated into substantial targets for realization? During this process, what are the driving evaluation criteria? How to practice effective performance management? These have always been the issues and difficulties concerning both the academic field and industry practice. The balanced scorecard developed by Kaplan and Norton provides some clues and solutions, and is one of the best tools for solving this difficulty. Because it emphasizes the performance management tool and mechanism to translate corporate vision into strategy and substantial action targets, with both lagging and leading dynamic and overall measurement indicators.

The results of this study show that Company A of the experimental group in implementing the BSC system, has attained commendable performance which supports the theories and understandings of the scholars/experts who deem that implementation of the BSC can improve the

overall operation performance of a firm, as well as the results of the empirical studies. For example: up to the end of 2006, the market share of Company A already reached about 12%; the selling and administrative expenses ratio was reduced to 33%, already close to the average level of competitors at 32%; and the ratio of employees with educational record of graduate school and above also reached 11%, the average level of the competitors.

The quasi-experimental design is one of the rather rigid methods among many research methods of social sciences, and can more objectively infer the cause and effect relationship. After comparing the performance of Company A of the experimental group and Company B and Company C of the control groups from 2003 - 2006, it is clear that since Company A of the experimental group implemented the BSC system at the beginning of 2004, no matter whether its performance is in such perspectives as financial, customer, internal business process, or learning and growth, it shows obvious progress. After comparison with the performance of Company B and Company C, the performance of Company A is far better. Therefore, conclusions of this study are: the implementation of the BSC contributes considerable benefit to the performance of Company A in financial, customer, internal business process, and learning and growth perspectives. During the study process, it is also found, the reason why Company A could succeed in implementing the BSC system depends on the following factors:

(1) High concern and full support from top management: In the case of Company A, as early as August 2003 when it initially promoted the BSC system, General Manager X made a clear announcement of his decision to implement the BSC, and assigned Deputy General Manager Y to be the person responsible for "implementing the BSC system". By January 2004, the BSC system was formally enforced. Ten sessions of "the BSC implementation management level meeting" have been successively convened and General Manager X appeared in person for instructions in all these meetings. The resolutions require managers at least participate in the BSC training session held by the company for more than 16 hours, and the test record was listed in one of the performance record items.

(2) Establish an exclusively responsible promotion unit: Company A, in order to demonstrate its decision of implementing the BSC, assigned General Manager X to report to the Board Chairman and the Board, to newly establish an exclusively responsible unit for the BSC – Training

(3) Department. The BSC specialized consultants and university professors were recruited by the company to be instruction consultants, to engage in SWOT analysis of the company and the corporate situation analysis, to study and prepare the company for the BSC implementation plan, including strategy guideline, strategic map,

strategic map, strategic target and performance evaluation, and reward system.

(4) Sufficient communication with employees: General Manager X and Deputy General Manager Y jointly convened department managers and employees in separate groups, to describe the company vision and strategy, and to communicate the target performance criteria of various departments. In case employees have any doubts or opinions, interactive communication and discussion will be conducted immediately. In this way, employees can fully understand and support the BSC system, to ensure that the BSC implementation will be successful.

(5) Incentive system is associated with the BSC: The human resources department, with the basis of the BSC strategic target and performance measurement indicators, reformulates the employee appraisal criteria and incentive system of each department/unit of the company. For example, the performance appraisal of the employees of the marketing department will be associated with such BSC related measurement indicators as: sales growth rate, market share growth rate, product delivery delay rate, and long- and short-term advance studies.

(6) Feedback during the process of executing the BSC: Deputy General Manager Y, the person responsible for executing the BSC, requested that each department takes at least 2 hours each week to discuss the BSC department execution issues, and report to the higher management level at all times. In the routine top management and department manager meeting weekly, the BSC execution condition is listed as one of the core issues. Any issue related to execution or performance criteria/indicators will be sufficiently discussed and resolutions provided. In case an employee has any opinions to express, besides being able to directly report to a department manager, he/she may also e-mail to Deputy General Manager Y.

Suggestions

This study provides the following suggestions about the performance measurement system of implementing the BSC:

(1) In financial perspective: select proper financial evaluation indicators, while in accounting system and execution, it is recommended to adopt Activity-Based Costing (ABC) and responsibility accounting, to allow responsibility division to be more clear, and can better reduce the unnecessary expenditure. The budget preparation shall be sufficiently associated with the BSC performance system. In this way, the budget of each department or unit may be reasonably allocated and the corporate resources can be fully utilized.

(2) In customer perspective: induce in Customer Relationship Management (CRM) system, strengthen communication with customers; in particular the main

customers and potential customers, to understand and conform to their demands in product functions and quality.

(3) In internal business process perspective: induce in such systems as Total Quality Management (TQM), International Standard Organization (ISO) 9000 series, and management by objectives (MBO) to facilitate work procedures to conform to standard operation process (SOP), to improve product quality, and so as to increase the work efficiency.

(4) In learning and growth perspective: encourage and plan employees to engage in continued learning, formulate active and creative corporate culture, to become "learning organization", create new thinking for all corporate members, and increase the corporate competency. Besides, it shall jointly grow with suppliers and customers, to jointly create values. On the other hand, with the human resource management viewpoint, the BSC system shall be associated with incentive system. In this way, employees can be inspired to work hard and attain the targets.

Limitations

The BSC perspectives and the performance measurement indicators of each perspective in this study are studied and prepared by Company A by recruiting BSC specialized consultants and university professors to discuss with the managerial heads, above department managers, of Company A, in accordance with the practical situations repeatedly faced by a company and industry. This study, in view of the configured performance criteria by Company A, only evaluates whether implementation of the BSC attains obvious performance. Its reasonableness or adequacy is not within the research scope of this study.

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