Measure of the Balanced Scorecard evaluation factors for hot spring hotel industry: The Expert System Application

Wen-Cheng Lin,
National Taipei College of Business, Department of Business Administration, Taipei, Taiwan
e-mail: wencheng@webmail.ntcb.edu.tw
Tel: 886-2-23226506

Wen-Shiow Hsu
Chien Hsin University of Science and Technolog, Department of Business
Administration, Taoyuan, Taiwan
e-mail: wshsu@uch.edu.tw

Li-Hua Huang,
National Taipei College of Business, Department of Accounting Information, Taipei, Taiwan
e-mail: dbacpa@webmail.ntcb.edu.tw
Tel: 886-2-23226559

Measure of the Balanced Scorecard evaluation factors for hot spring hotel industry: The Expert System Application

- C994 -

Abstract

The purpose of this paper is to measure the indicators of balanced scorecard elements on business performance through expert system technique. The technique is built using the analytical hierarchy process (AHP) and empirical data from the hot spring hotel industry in emerge Taiwan market. The leisure industry in Taiwan has proposed a reputation of rapid growth and global competitive capabilities. The hotel's competitive power and performance are largely influenced by its performance. In a word, this paper constructs the balanced scorecard indicators by an expert system. This paper proposes an integrated approach for the balanced scorecard tool and benchmarking selection using the analytic hierarchy process (AHP) method. The paper is a seminal work to help management identify relevant performance evaluation elements and their indicators to enhance hot springs hotel's performance.

Keywords: Balanced scorecard (BSC), Analytic hierarchy process (AHP), Hot spring hotel.

1. Introduction

The service industry is the fastest growing industry in the 21st century (Fatma and Timothy, 2005), and tourism is viewed as having excellent prospects, along with high-tech industries. According to the forecast from the Pacific Asia Travel Association (PATA), the tourism industry will be the fastest growing industry in the Asia-Pacific region over the next decade. Taiwan is an island located at the pivot of Asia-Pacific region. Its spectacular landscapes, diverse culture, highly developed technology, delicious cuisine, and enthusiastic people make it a good tourist destination. During 2012, 4.25 million foreign tourists are expected, creating 62 billion dollars in foreign exchange earnings. Performance is conventionally defined either as organizational outputs or inputs, or as a relationship between them (usually stated as efficiency). The technical efficiency of a company is a comparative measure of how well it actually processes inputs to achieve its outputs.

Although balanced scorecard (BSC) is often emphasized more in technological industries, no industry has escaped its touch. BSC is fundamental to firms, communities and societies (Edvinsson, 2002). New opportunities in, and threats to, the hot spring hotel are springing from assets based on knowledge. Such assets are defined as non-financial perspective. Knowledge economy can be defined as an economy guided and directed by knowledge. Unlike for the traditional economy in which tangible assets leverage the shipping industry, today knowledge is the main driving force behind the shipping industry. Tangible assets like buildings, ships, equipment, etc., will always create value in the shipping industry, but an even greater part of the value in the hot spring hotel for which customers are willing to pay now comes from intangible values.

The purpose of this paper is to investigate BSC in the hot spring hotel. After a brief literature review on BSC, this paper explores the categories of BSC and its flows in the hot spring hotel; and examines the categories of BSC and its flows and impacts on financial performance in Taiwan's hot spring hotel. The purpose of this article is to propose a mathematical programming technique that is referred to as Analytic hierarchy process (AHP) to appraise the service performance of the hot spring hotel industry. The AHP model can be used to measure the respective performance of service consumption and service production at the individual service business level simultaneously. Hot spring hotel are used as an example to illustrate the process. The remainder of this paper is organized as follows. Section 2 presents a review of the relevant literature. Section 3 outlines the methodology leading to our separation. Section 4 describes the data, while Section 5 discusses the empirical findings and concludes.

2. Literature Review

The Balanced Scorecard (BSC) approach is a strategic planning and management system that is used extensively in business and industry, government, and non-profit organizations worldwide to align business activities to the vision and strategy of the organization, improve internal and external communications, and monitor organization performance against strategic goals. It was originated by Robert Kaplan (Harvard Business School) and David Norton Renaissance Solutions Inc.) as a

performance measurement framework that added strategic non-financial performance measures to traditional financial metrics to give managers and executives a more "balanced" view of organizational performance (Kaplan and Norton, 1992；1993).

The BSC provides a framework that not only provides performance measurements, but also helps planners identify what should be done and measured, and thus enables executives to truly execute their strategies (Kaplan and Norton, 1996). Thus, BSC is mainly focused on two major problems of modern business organizations: the effective performance measurement and the evaluation of successful implementation of organization's strategy.

In general, a BSC system is considered to be a performance measurement system, a strategy evaluation system, and a communication tool, at the same time (Kaplan and Norton, 1996a；1996b), defined by the following four distinct perspectives:

- Financial perspective (the tangible outcomes of the strategy using traditional financial terms, like economic value added, revenue growth, costs, profit margins, cash flow, net operating income, etc.).

- Customer perspective (the value proposition that a business organization adopts in order to satisfy its customers).

- Internal Business perspective (the internal business processes that create and deliver the customer value proposition).

- Learning & Growth perspective (the intangible assets of an organization which refer to internal skills and capabilities that are necessary to support the value-creating internal processes).

Recognizing some of the weaknesses and vagueness of previous management approaches, the BSC approach provides a clear prescription as to what companies should measure in order to ''balance'' the financial perspective. As emphasized by several researchers, the BSC is not simply a measurement system; it is actually a management system that enables organizations to clarify their vision and strategy and translate them into action. (Niven, 2002; Olson, 2002; Nair, 2004).

There is no universally accepted definition of BSC in the literature. Following Edvinsson and Malone (1997), BSC is "the possession of knowledge, applied experience, organizational technology, customer relationships and professional skills that provide the firm with a competitive edge in the market". On the other hand, Bontis *et al.* (1999) stressed the importance of BSC flows and defined BSC as "the collection of intangible resources and their flows". This definition implies the dynamic nature of BSC and its development through time. Lev (2001) says that BSC is "a claim to future benefits that does not only have a physical or financial embodiment". There is a widely accepted three-category BSC classification into besides financial capital; (i) human (Learning and Growth), (ii) structural (Internal process), and (iii) customer or relationship capital (customer) (Saint-Onge, 1996; Edvinsson and Malone, 1997; Sveiby, 1997; Roos *et al*., 1997; Stewart, 1999). First, human capital is represented by the intangible assets embodied by individuals. Roos *et al.* (1997) argued that people generate capital through competence (represented by skills and education), their attitude (which covers the behavior of employees towards their work) and their intellectual agility (represented by

innovativeness and openness to changes).

Kaplan and Norton (1996b) summarized that the Scorecard is used for (i) clarifying and updating strategies; (ii) communicating strategies throughout the company; (iii) aligning unit and individual goals with strategies; (iv) identifying and aligning strategic initiatives; and (v) conducting periodic performance reviews to learn about the upsides and downsides for improving strategies. In fact, the Balanced Scorecard has been adopted by the building and construction industry for years in various areas, such as performance management (Kagioglou et al., 2001), benchmarking organizational safety culture (Mohamed, 2003), measuring business performance (Bassioni et al., 2005), measuring partnering project performance (Lo et al., 2006), and improving suppliers' performance (Doolen et al., 2006).

Furthermore, Demarest (1997) argued that the most obvious link between IC and enhanced economic performance is in the area of innovation. Drucker (1993) and Popadiuk and Choo (2006) also pointed out that innovation depends on BSC and application. Thus, BSC can not only improve the level of performance and productivity but move people and organizations toward innovation (Johannessen *et al.*, 1999; Gold et al., 2001; Grewal and Haugstetter, 2007). Basically, IC can result in innovations in products, process, services, and responsiveness to market change (Gold *et al.*, 2001).

3. Methodology

This part divided two aspects: AHP technique and the four category IC model for the shipping industry

3.1 AHP technique

The AHP method was developed by Saaty (1977, 1991 and 1999). It is a multi-criteria decision-making method (of the third generation which was mentioned in the previous section), and provides for alternative prioritization. The AHP is based on the use of pair-wise comparisons, which lead to a detailed ratio scale. Moreover, the AHP provides for refining of the decision-making process while examining the global coherence of the user's preferences, as it can include the calculation of an overall consistency ratio.

Saaty scales are likely to be used when performing these comparisons. Pair-wise comparisons generate square matrices, the diagonal elements of which are equal to 1 while the other elements verify the fact that, for i different from j, both inferior to the matrix dimension, the i–j element is equal to the inverse of the j–i element. Priorities are then determined, thanks to these matrices; then a global consistency test can be performed to judge of the coherence the user's judgments.

The AHP allows group decision making, where group members can use their experience, values and knowledge to break down a problem into a hierarchy and solve it by the AHP steps. Brainstorming and sharing ideas and insights (inherent in the use of Expert Choice in a group setting) often leads to a more complete representation and understanding of the issues.

3.2 The four category BSC model for the hot spring hotel industry

Based on Kaplan and Norton's balanced scorecard approach, the literature review, expert opinions,

brain storming and inter- views with management of hot spring hotels, we proposed specific perspectives for evaluating performance, as illustrated in Table 1.

Table 1
Hot spring hotel performance evaluation factors.

Perspective			
Learning and growth	Enterprise's internal processes	Customer	Finance
Criteria			
Employee education	Ability to keep existing customers	Customer satisfaction	Return on assets
Employee satisfaction	Speed of new product launch	Service quality	Personnel cost ratio
Employee professional ability	Time reduction for in handling customer complaint	Hotel image	Revenue growth rate
Employee productivity	Hotel management efficiency enhancement	Customer loyalty	Return on investment
Average employee resignation rate	Ability to respond to emergencies	New customer increase rate	Revenue from new customer ratio
Employee knowledge sharing	Training in environmental hygiene and cleaning operation	Traffic convenience	Group revenue growth rate
Employee ability to use IT products	Hotel product's innovative quality and uniqueness	Market share	Service cost reduction
Employee ability to manage emergencies	Time reduction of operation cycle	Customer relationship management	Net profit ratio
Employee effective use of marketing information	Sales promotion ability enhancement		Peripheral merchandise revenue ratio
	Customer background information compilation		
	Effective problem-solving percentage		

Source: 1. Bierley and Chakrabarti (1996); 2. Denton and White (2000); 3. Suzanne et al. (2001); 4. Ellinger et al. (2002); 5. Tippins and Sohi (2003); 6. Davis and Albright (2004); 7. Banker et al. (2004); 8. Papalexandris et al. (2005); 9. Getz and Brown (2006); 10. Prieto and Revilla (2006); 11. Wu and Hung (2008); 12. McPhail et al. (2008).

In this way, a heterogeneous categorization of all customers has been segmented in two more homogeneous groups that require different treatment and exert influence in different ways. It is not only the categories of BSC but the flows between them that influence performance in the hot spring hotel industry.

A list of factors that can enhance the performance of hot spring hotels was collected from the performance dimensions listed in Table 1. The questionnaire was designed to include these. The relative importance criteria were found by asking experts to answer the questionnaire, selecting the important criteria. Question responses ranged from 1 to 9 with a high score meaning high importance. In order to ensure effective pair-wise comparisons and good consistency, Saaty (1980) suggests that there should be a limited number of factors in a single construct. In this study we asked three scholars in the tourism industry, six hot spring hotel proprietors and one government official in charge of tourism, to fill in the questionnaire.

4. Empirical results

Based on findings in the literature and our extended four-category model of BSC, four perspectives have been posited. The first perspective claims that pairs of learning and growth, internal process, customer and financial perspective in the hot spring hotel industry in Taiwan are positively correlated. The second perspective claims that BSC positively influences financial performance in the hot spring hotel industry. Further, based on the review of BSC literature by Saint-Onge (2001) and Stewart (1999), it has been assumed that the category of internal process factors has the strongest direct impact on financial performance in hot spring hotel industry. In 2009, a survey was undertaken in an attempt to determine the validity of our hypotheses. A four part questionnaire was designed. All items in the questionnaire were derived from a comprehensive review of the existing literature on BSC and applied to the hot spring industry. The results of experts survey shows as on Table 2.

Table 2. the results of experts' survey on indicators of Intellectual Capital

Perspectives	sub-categories (priority)	BSC indicators	Priority

Perspectives	sub-categories (priority)	BSC indicators	Priority
Learning and growth	Employee competence (0.4354)	Employee ability to use IT products	0.5268
		Employee professional ability	0.3426
		Employee education	0.1406
	Employee attitudes to work (0.3587)	Employee satisfaction	0.5072
		Average employee resignation rate	0.3214
		Employee productivity	0.1714
	Employee innovativeness (0.2059)	Employee knowledge sharing	0.6542
		Employee ability to manage emergencies	0.2457
		Employee effective use of marketing information	0.1101
Internal process	Management philosophy (0.2563)	Time reduction for in handling customer complaint	0.8524
		Ability to respond to emergencies	0.1476
	Culture (0.4762)	Training in environmental hygiene and cleaning operation	0.5743
		Sales promotion ability enhancement	0.4257
	Business processes (0.4852)	Hotel management efficiency enhancement	0.5372
		Effective problem-solving percentage	0.3548
		Ability to keep existing customers	0.1268
		Time reduction of operation cycle	0.0812
	Information technology (0.2177)	Customer background information compilation	0.5105
		Hotel product's innovative quality and uniqueness	0.2673
		Speed of new product launch	0.2222
Customer	Customer satisfaction and loyalty (0.7426)	Customer satisfaction	0.5000
		Customer loyalty	0.5000
	Image and brand (0.2465)	Hotel image	0.4143
		Customer relationship management	0.3738
		Market share	0.2219
	Service process (0.0109)	Service quality	0.4759
		New customer increase rate	0.3652
		Traffic convenience	0.1589
Financial	Profitability (0.4372)	Return on assets	0.5518
		Revenue growth rate	0.3482
		Return on investment	0.1237
		Net profit ratio	0.0237
	Revenue turnover (0.3425)	Revenue from new customer ratio	0.5122
		Group revenue growth rate	0.3878
		Personnel cost ratio	0.1001
	Cost control	Service cost reduction	0.6428

Perspectives	sub-categories (priority)	BSC indicators	Priority
	(0.2203)	Peripheral merchandise revenue ratio	0.3572

Statements regarding the proportion of seasonal workers, the formality of communication, and the bureaucracy of relationships with commercial partners were reverse coded. This study's chosen BSC indicators are defined using the modified Delphi method and AHP technique. Business administrators (such as director-general, industry high-level officers) and government officers altogether from ten expert areas were chosen. Then they were issued a preliminary expert questionnaire in which four BSC's perspectives evaluation criteria based on BSC framework were incorporated. (see Table 3.)

Table 3. The priority item for four BSC categories applying AHP technique

Learning and growth	Internal process
● **Employee competence**	● **Management philosophy**
1. Employee ability to use IT products	1. Time reduction for in handling customer complaint
2. Employee professional ability	2. Ability to respond to emergencies
3. Employee education	● **Culture**
● **Employee attitudes to work**	1. Training in environmental hygiene and cleaning operation
1. Employee satisfaction	2. Sales promotion ability enhancement
2. Average employee resignation rate	● **Business processes**
3. Employee productivity	1. Hotel management efficiency enhancement
● **Employee innovativeness**	2. Effective problem-solving percentage
1. Employee knowledge sharing	3. Ability to keep existing customers
2. Employee ability to manage emergencies	4. Time reduction of operation cycle
3. Employee effective use of marketing information	● **Information technology**
	1. Customer background information compilation
	2. Hotel product's innovative quality and uniqueness
	3. Speed of new product launch

Customer	Financial
● **Customer satisfaction and loyalty**	● **Profitability**
1. Customer satisfaction	1. Return on assets
2. Customer loyalty	2. Revenue growth rate
● **Image and brand**	3. Return on investment
1. Hotel image	4. Net profit ratio
2. Customer relationship management	● **Revenue turnover**
3. Market share	1. Revenue from new customer ratio
● **Service process**	2. Group revenue growth rate
1. Service quality	3. Personnel cost ratio
2. New customer increase rate	● **Cost control**
3. Traffic convenience	1. Service cost reduction
	2. Peripheral merchandise revenue ratio

5. Conclusion and discussion

Saaty (1999) presented an AHP method which provides a rational decision-making process while examining the indicators' coherence of the user's preferences; including the determination of an overall consistency ratio. This paper presents the development of a four-category BSC model for the hot spring hotel industry that distinguishes between learning and growth, internal process, customer and financial by AHP technique. As noted above, in this stage of maturity, hot spring hotels at many hot spring sites

are faced with increasing market competition. Due to restriction on development in hot spring areas, mostly such hotels are small or medium sized. They are often at a disadvantage in comparison to large hotel chains in terms of products, pricing and promotions. Large fluctuations in the economic and financial environment can make it difficult to make a profit or achieve growth.

Therefore, this study incorporates the application of BSC and AHP to a hot spring hotel industry. Analysis of survey results is utilized to provide and prioritize the factors necessary to improve and to develop a strategy map that can be used as a reference for the industry. According to the results of ANP, the top criteria or key factors that can enhance the performance of hot spring hotels are defined. Based on the strategy map developed by Kaplan and Norton (2004), we formulate a strategy map designed to enhance performance. It is hoped that this can assist hot spring hotels to maintain competitiveness. Also of interest would be the extension of theoretical and empirical BSC research to other sectors of the tourism industry.

Acknowledgement

Reference

1. Bassioni, H A, Price, A D F and Hassan, T M (2005) Building a conceptual framework for measuring business performance in construction: an empirical evaluation, Construction Management and Economics, 23(5): 495-507.

2. Bontis, N., 1996. There's a Price on your head: managing intellectual capital strategically, Business Quarterly, 60(4): 40–46.

3. Bontis, N., et al., (1999), The knowledge toolbox: a review of the tools available to measure and manage intangible resources, European Management Journal, 17(4): 391–402.

4. Demarest, M., (1997). Understanding knowledge management, Long Range Planning, 30(3): 374–384.

5. Doolen, T, Traxler, M and McBride, K (2006) Using scorecards for supplier performance improvement: case application in a lean manufacturing organization, Engineering Management Journal, 18(2): 26-34.

6. Drucker, P. F., (1993). Post Capitalist Society. Harper Business, New York.

7. Edvinsson, L. and Malone, S. M., (1997). Intellectual Capital: Realizing Your Firm's True Value by Finding Its Hidden Brainpower. Harper Collins Publishers, New York.

8. Edvinsson, L., (2002). Corporate Longitude. Book House Publishing, Harlow.

9. Fatma, P., Timothy, N.H., 2005. Patient satisfaction in a preoperative assessment clinic: an analysis using SERVQUAL dimensions. Total Quality Management, 16 (1): 15-30.

10. Gold, A. H., Malhotra, A., Segars, A. H., (2001). Knowledge management: an organizational

capabilities perspective, Journal of Management Information Systems, 18(1): 185–214.

11. Grewal, D. and Haugstetter, H., (2007). Capturing and sharing knowledge in supply chains in the maritime transport sector: critical issues, Maritime Policy and Management, 34(2): 169–183.

12. Johannessen, J., Olsen, B., Olaisen, J., (1999). Aspects of innovation theory based on knowledge-management. International Journal of Information Management, 19(2): 121–139.

13. Kagioglou, M, Cooper, R and Aouad, G (2001) Performance management in construction: a conceptual framework, Construction Management and Economics, Vol. 19 No 1 pp 85e95

14. Kaplan RS, Norton DP.(1993), Putting the balanced scorecard to work. Harvard Business Review,71:134–47.

15. Kaplan RS, Norton DP. (1992) The balanced scorecard measures that drive perfor- mance. Harvard Business Review,70: 71–9.

16. Kaplan RS, Norton DP. (1996a) The balanced scorecard: translating strategy into action. Massachusetts: Harvard Business School Press.

17. Kaplan RS, Norton DP. (1996b) Using the balanced scorecard as a strategic management system. Harvard Business Review. 74: 75–85.

18. Lev, B., (2001). Intangibles: Management, Measurement, and Reporting. Brookings Institution Press, Washington, DC.

19. Lo, T, Wong, P S P and Cheung, S O (2006) Using balanced scorecard (BSC) approach to measure performance of partnering projects, Surveying and Built Environment, 17(1): 45-57.

20. Mohamed, S (January/February 2003) Scorecard approach to benchmarking organizational safety culture in construction, Journal of Construction Engineering and Management, 80: 88-95.

21. Nair M. (2004) Essentials of balanced scorecards. New Jersey: John Wiley and Sons.

22. Nemec Rudež, H., (2004). Intelektualni kapital v slovenskih turističnih podjetjih, Doctoral dissertation. University of Ljubljana, Ljubljana.

23. Niven PR. (2002) Balanced scorecard step-by-step: maximizing performance and maintaining results. New York: Jon Wiley and Sons.

24. Olson EM, Slater SF. (2002) The balanced scorecard, competitive strategy, and performance. Business Horizons, 45:11–6.

25. Popadiuk, S. and Choo, C. W., (2006). Innovation and knowledge creation: how are these concept related? International Journal of Information Management, 26(4): 302–312.

26. Roos, J., et al., (1997). Intellectual Capital: Navigating the New Business Landscape. Macmillan Press Ltd., London.

27. Saaty, T. L., (1977). A scaling method for priorities in hierarchical structures. Scand, Journal of Forest Research, 15: 234-281.

28. Saaty, T. L., (1991). Response to holder's comments on the Analytic Hierarchy Process, Journal of Operation Research, 42(10): 909-914.

29. Saaty, T. L., (1999). Decision-making for leaders: The Analytic Hierarchy Process for decisions in a complex world, Pittsburgh, Pennsylvania: RWS Publications.

30. Saint-Onge, H., (1996). Tacit knowledge: the key to the strategic alignment of intellectual capital,

Strategy & Leadership, 24(2): 10–14.

31. Stewart, T.A., (1999). Intellectual Capital: The New Wealth of Organizations. Currency Doubleday, New York.

32. Sveiby, K. E., (1997). The New Organizational Wealth: Managing & Measuring Knowledge–Based Assets. Berrett-Koehler Publishers, San Francisco.