

Evaluating the Effectiveness of a Balanced Scorecard System Implemented in a Functional Organization

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ABSTRACT

Recognizing that the strategic performance of a business can not be evaluated using traditional financial measures alone, the balanced score card (BSC) complements financial measures with non-financial measures in the expectation that the non-financial performance will drive the financial success of the business. However, when the BSC is deployed at the departmental level, the commonly used hierarchical and top-down approach tends to ignore the need for cross-departmental cooperation and teamwork and thus leads to an inappropriate assignment of the strategic objectives to individual departments. Accordingly, this study proposes a diagnostic process for calibrating both the firm level and the departmental level performance measures of a BSC implemented within a functional organization. In the proposed approach, a questionnaire-based survey is conducted to ascertain employees' opinions regarding the relevance of the departmental performance measures as regards their contribution to the achievement of the firm level measures. Causal strength matrixes are then employed to summarize the survey results and to analyze the usefulness of the individual department's performance measures. The proposed approach is demonstrated using an example of a machine tool manufacturer in Taiwan for illustration purposes.

Keywords: *Balanced scorecard, Strategic management, Functional organization, Performance measures*

INTRODUCTION

The balanced scorecard (BSC), devised by Kaplan and Norton in 1992, translates a company's vision and strategy into specific performance measures in order to facilitate the implementation of the company's strategic objectives. In the past, companies generally emphasized the importance of achieving short-term financial goals, and thus failed to establish a link between their long-term strategy and their short-term actions, resulting in a gap between the planned strategic development and its actual implementation. In an attempt to resolve this problem, the BSC complements traditional financial measures with performance measures relating to other perspectives of the company's business, typically categorized in terms of the customer, internal business process, and learning and growth aspects of the business, respectively. Although non-financial in nature, these measures are nonetheless drivers of the company's future financial performance. The defining characteristic of BSC systems is the setting of targets for strategy implementation which not only help the staff to understand the vision and strategy of the company more clearly, but also allow management to monitor the results of strategy implementation more easily.

The merits of the BSC in enabling management to formulate an integrated strategic plan have been well addressed by Kaplan and Norton (1996). Many researchers have demonstrated the power of BSC in formulating corporate strategy (Figue, Hahn, Schaltegger and Wagner 2002; Banker, Chang and Pizzini 2004). However, empirical evidence suggests that current methods for developing BSC systems do not necessarily deliver the anticipated results (Ruhtz 2001). For example, a study of the top 200 companies in Germany, of which 46% had implemented a BSC system, reported that only a minority of respondents felt that the BSC improved their planning, budgeting and resource allocation, strategic learning, or bottom line (Krause 2003). The respondents cited particular difficulties in developing cause-and-effect chains and in defining meaningful metrics. Moreover, the empirical evidence revealed that the tools used for BSC implementation lacked operational qualities (Krause 2003).

Krause (2000, 2001, 2002) analyzed various commonly used methods for developing performance management systems and highlighted a number of shortcomings. Of these various shortcomings, one of the most problematic is that the development of such systems is generally based on the company's existing organizational structure rather than on the desired business processes even though these processes are the means by which an organization achieves its goals (Krause 2003). Performance management systems developed in this way decouple the linkage between the performance measures and the expected performance:

As organizational performance is driven by people and resides in its processes, the common organizational structure driven approach is a serious flaw. It results in a disconnection between performance planning and performance generation. This disconnection has its root in the failure to link outcomes to the critical success factors at the level of organization-specific processes' (Krause 2003).

Recent findings (Beiman and Sun 2003) regarding the implementation of BSC systems in China support this argument. For instance, it was found that the introduction of a BSC created considerable tension between departments within a joint venture company (Beiman and Sun 2003). Through a process of information gathering and an analysis of the goals specified at the company and departmental levels, respectively, Beiman and Sun (2003) concluded that an important cause of this tension was that the company objectives had been set functionally without considering the need for cross-departmental cooperation and teamwork.

The BSC is not only a strategic measurement system, but also a strategic control system capable of aligning departmental and personal goals with those of the company's overall strategy (Kaplan and Norton 1996). However, this expectation can be realized only when the performance measures are appropriately formulated at the departmental and individual employee levels. Krause (2003) and Beiman and Sun (2003) both reported that the implementation of BSC in functional organizations often pre-engages in its physical structure and ignores the teamwork and cooperation required in such organizations. Such ignorance may result in the setting of inappropriate performance measures which are inconsistent with the strategic objectives of the company and result in a dysfunctional organizational behavior and sub-optimal performance (de Haas and Kleineld 1999, p.244).

To optimize their operations, enterprises adopt different organizational designs or even multiple organizational designs within a single unit. Two organizational designs of particular prevalence are the functional organization based on specialized proficiency and the cross-functional matrix organization based on business processes (Droge and Germain 1989; Silvestro and Westley 2002). Of the two designs, the functional organization is the most commonly adopted design and particularly prevalent in small- and medium-sized enterprises (SMEs) (Nebel, Rutherford, and Schaffer 1995).

Even though the BSC has been widely studied over the past decade, the literature focuses primarily on the formulation and implementation of the BSC at the strategic level rather than on the deployment of the strategic-level BSC at the functional departmental level. Beiman and Sun (2003) cited the separation between functional departments as one of the major obstacles in executing strategy and stated that this separation was a major source of the difficulties encountered during the early stages of a BSC implementation within functional organizations. The authors commented that by analyzing and improving its cross-functional business processes, a company could perform more effectively and with significantly improved teamwork across departmental boundaries. However, appropriate techniques for analyzing the problem and formulating appropriate corrective actions were not discussed. In general, the experience, techniques and knowledge of performance management system projects possessed by an organization are not readily accessible, and hence the solutions developed for each new project are not easily reused (Krause 2003). Therefore, a requirement exists for a simple, systematic, and easy-to-operate approach to assist functionally organized companies to resolve their difficulties when implementing BSC systems.

Accordingly, the present study develops a process for reviewing a BSC system under development or implemented within a functional organization. The aim of the review process is to determine whether or not the performance measures formulated for each functional department are consistent with the overall objectives of the organization as prescribed by the firm level performance measures. The following section of this paper discusses the particular characteristics of functional organizations and reviews the potential difficulties which may arise when implementing a BSC system in such organizations. Section 3 introduces the proposed process for evaluating the

appropriateness of the performance measures formulated at the departmental level. Section 4 presents a case-study company with typical BSC implementation processes and describes its problems. Section 5 applies the proposed process to the company's BSC system and describes the review results. Finally, Section 6 provides some brief concluding remarks and indicates the intended direction of future research.

FUNCTIONAL ORGANIZATIONS AND POTENTIAL DIFFICULTIES IN BSC IMPLEMENTATION

The process of implementing a BSC system commences with a clarification of the firm's vision, and then proceeds to an elicitation of the firm's goals, the formulation of strategies, the deployment of these strategies to a set of perspectives, the derivation of performance measures within each perspective, and eventually a breakdown of the firm level performance measures to departmental or even personal performance indicators. This process implies causal relationship between the company's objectives and the departmental performance indicators provided that the latter are appropriately formulated, and the formulation of the performance measures must take into account the teamwork and cooperation required within completing tasks within the organization.

Table 1 BSC of the Case-Study Company

Perspective	Strategic objective	Performance measure	Department						
			GA	MF	QA	LG	FI	RD	MS
Financial	S1	P1							
		P2							
	S2	P3							
		P4							
		P5							
Customer	S3	P6							
		P7							100%
	S4	P8							100%
		P9							100%
		P10			100%				
	S5	P11							
P12								100%	
Internal process	S6	P13							100%
		P14							100%
		P15							100%
		P16						100%	
		P17							100%
	S7	P18		100%					
		P19				50%			50%
		P20						100%	
	S8	P21			50%	50%			
		P22			100%				
P23			100%						
S9	P24						50%	50%	
	P25	100%							
Learning & growth	S10	P26							100%
		P27	100%						
		P28	100%						
	S11	P29	100%						
		P30							

GA: General Administration; MF: Manufacturing; QA: Quality Assurance; LG: Logistics; FI: Finance; RD: Research and Development; MS: Marketing and Sales

As pointed out by Norreklit (2000), the method with which Kaplan and Norton (1996) implement the BSC is hierarchical and top-down. In this manner, top management defines the local conditions and local units cannot act on

their own (Mouritsen *et al.* 1995). The deployment of the firm level BSC at the departmental level is a top-down process in which firm level performance measures are assigned to functional departments within the organization. In implementing this process, ignoring the teamwork and cooperation aspects of a functional organization will result in an inappropriate setting of the performance measures at the departmental level. Table 1 presents the BSC of the company considered in the present study. As shown, the four perspectives are formulated as thirteen strategic objectives, S1~S13, and these objectives are further break down to 29 firm level performance measures which are then directly assigned to designated departments. For example, performance measure P6 is assigned solely to the Marketing and Sales department, while performance measure P24 is assigned jointly to the Research and Development and Marketing and Sales departments. Based on these assignments, the individual departments then formulate their own performance measures. In a top-down approach, these assignments are determined by top management executives within the company without considering the support required by the individual departments from other departments in achieving these performance measures. However, adopting this method of assigning the firm level performance measures can be problematic, as illustrated by the following scenario. Suppose that in practice the Marketing and Sales department can not achieve performance measure P6 alone, but requires the support of the Manufacturing department. Since this performance measure was not assigned to the Manufacturing department, the Manufacturing department will most likely be reluctant to provide its assistance, and thus the Marketing and Sales department must face the failure of its assigned objective alone. Furthermore, if the Manufacturing department decides to support the Marketing and Sales department, but receives no recognition or reward for doing so, it will inevitably distrust the BSC system, resulting in its eventual failure.

REVIEW PROCESS FOR DETERMINING APPROPRIATENESS OF BSC DEPLOYED IN FUNCTIONAL ORGANIZATION

The objective of the review process is to clarify two questions, namely whether or not the formulated performance indicators link to the company's objectives, i.e. the existence of the causal relation, and whether the interactions required between individual departments are explicitly recognized in the formulation of performance indicators. The review process consists of two stages. The process commences by performing a questionnaire-based survey of the individuals involved in the BSC project, including the members of the BSC implementation team, the departmental managers and the members of staff who participated in its deployment. The purpose of this survey is to collect opinions regarding the causal strength between the firm level and the departmental level performance measures as well as the degree of requirement for cross-departmental support in achieving the various performance measures. The data acquired from the survey are then formatted in a matrix form and analyzed to answer the two questions posed above.

Questionnaire design

The current study emphasizes the importance of establishing a strong causal relationship between the performance measures at the departmental level and those at the firm level as a means of ensuring the achievement of a company's objectives. Accordingly, the principal aim of the questionnaire is to investigate the respondents' perceptions of the strength of the linkage between the two sets of performance measures. In addition, the questionnaire also identifies the support required by a department from other departments in achieving its performance measures.

In completing the questionnaire, the respondents indicate their judgment regarding the strength of the causal relationship between the performance measures deployed in their department and the firm level performance measures assigned to them by top management using Likert scales (1932) with five degrees, namely *unrelated*, *weakly related*, *more or less related*, *moderately related*, and *strongly related*, respectively. The layout of the questionnaire is illustrated in Figure 1, in which the lines drawn in different styles express the degree of causal strength corresponds to the Likert scale, i.e. double, double-dotted, single-solid and single-dotted lines represent the degree of causal relation varying from strongly related to weakly related, respectively, and no line is drawn in the event that a pair of measures is deemed to be unrelated. Meanwhile, the respondents use the check boxes to indicate whether or not they feel that support is required from other departments to satisfy each departmental performance measure.

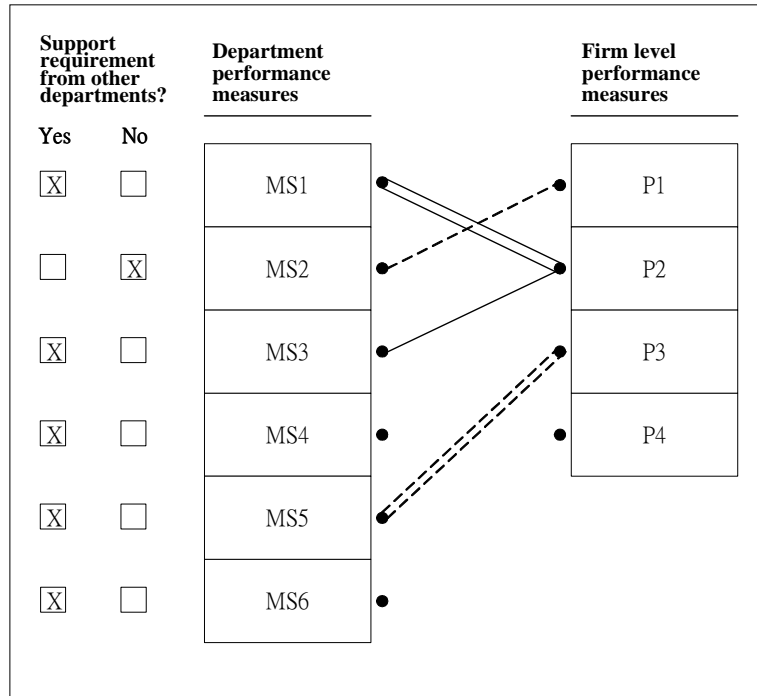


Figure 1 Sample Questionnaire Result

Questionnaire analysis

The analysis involves reviewing the usefulness of the departmental performance measures, i.e. determining whether a particular departmental performance measure links to the firm level performance measures which are assigned to this department. To facilitate the analysis, the Likert scale data are converted to a numerical scale of 1~5 in an ascending order of causal strength, and the questionnaire results are then compiled in matrix form, as illustrated in Table 2.

Table 2 Causal Strength Matrix for a Department

	P_1	P_2	...	P_n	$K_i^{\max} = \max_j \{\bar{r}_{ij}\},$ $j \in \{j P_j \text{ is assigned to this department}\}$
K_1	\bar{r}_{11}	\bar{r}_{12}			
K_2	\bar{r}_{21}	\bar{r}_{22}			
:			\bar{r}_{ij}		
K_m					
$E_j = \bar{r}_{ij} \geq 3 / m$					

In this table, $P_j, j=1, \dots, n$ denote the firm level performance measures, while $K_i, i=1, \dots, m$ are the performance measures deployed in a particular department. Meanwhile, the cell entries, \bar{r}_{ij} , indicate the average score assigned by the respondents when evaluating the causal strength of the linkage between K_i and P_j . The row of E_j computes the ratio of the department's performance measures that are at least moderately related to P_j . A small E_j indicates that most of the department's measures are not related to P_j . The row maximum K_i^{\max} is defined as the maximum score of K_i among all the performance measures P_j that are assigned to this department, and it is used to evaluate the usefulness of the performance measure K_i . A small K_i^{\max} indicates that the inclusion of K_i in the BSC is problematic.

The check boxes in the questionnaire relating to the support required by a department in achieving its performance measure provide an additional source of useful information when reviewing the appropriateness of the firm

level performance measure assignments given in Table 1. In the event that a department has a high support requirement from other departments to satisfy a firm level performance measure but such a situation was not considered in the assignment in Table 1, then top-management should redesign such an assignment.

ILLUSTRATION BY CASE-STUDY COMPANY

In this section, the review process described above is applied to an internationally known machine tool manufacturer based in Taiwan. The company has 2000 employees, supplies drilling machines and various woodworking machines to more than 70 countries around the world, and has subsidiaries and manufacturing sites not only in Taiwan, but also throughout China, America, Europe and Japan. As shown in Figure 2, the company is functionally organized into seven departments, namely General Administration, Manufacturing, Quality Assurance, Logistics, Research and Development, Marketing and Sales, and Finance. The General Administration department is organized into three sub-departments, i.e. Information Management, Human Resources and Business Management.

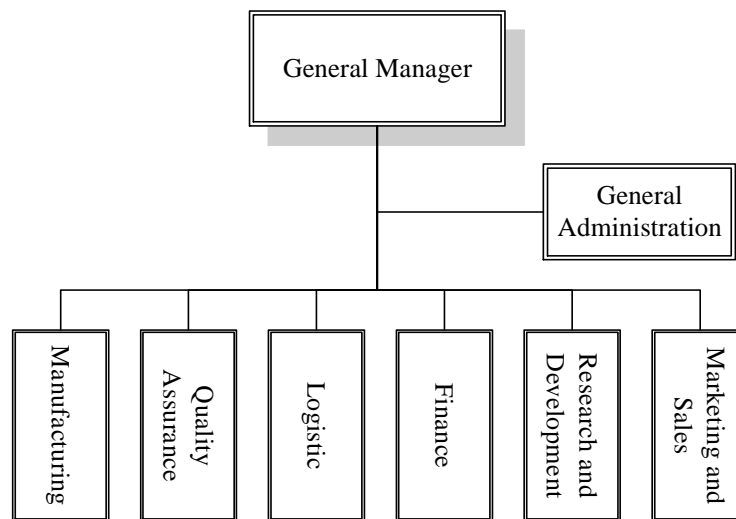


Figure 2 Organizational Structure of the Exemplified Company

Survey of the case-study company management and employees

Interviewing the managers who had participated in the original BSC implementation procedure, two particular characteristics of the implementation process became clear. Firstly, the firm level performance measures were generally assigned to a single department only; the measures were assigned to multiple departments only in the case where a debate existed regarding the most appropriate department. As a result, just 3 out of 29 of the firm level performance measures were assigned to multiple departments (see Table 1). Secondly, the interviews revealed that the departments tended to formulate performance measures which were largely irrelevant to the assigned firm level measures, but were designed instead to satisfy their own internal requirements.

The questionnaire illustrated in Section 3 was used to conduct a survey of the employees at the case-study company. However, to simplify the survey, the firm performance measures were replaced by the strategic objectives. To reflect the varying content of each department's BSC, nine different questionnaires (each with the format shown in Figure 1) were distributed to the six departments (i.e. Manufacturing, Quality Assurance, Logistics, Research and Development, Marketing and Sales, and Finance) and three General Administration sub-departments (Information Management, Human Resources, and Business Management). The respondents targeted in the survey included both the original BSC project members and the managers and members of staff of each department.

A total of 53 questionnaires were distributed, of which 31 were returned, representing a return rate of 59%. All of the returned samples were completely and correctly compiled. Of the 31 respondents, 9.7% were managers, 38.7% were project members, and 51.6% were departmental staff members. Furthermore, 19.4% were in possession of a

master degree or higher, 74.2% held a college degree, and 6.5% had a high school diploma. In terms of their length of service, 19.4% had served with the company for more than 10 years, 35.5% for between 5 and 10 years, 35.5% for between 3 and 5 years, and 9.7% for less than 3 years.

The reliability (i.e. consistency) of the returned questionnaires was evaluated via the Cronbach's α value. Since the survey contained a total of nine different questionnaires, the Cronbach's α value was calculated based on the common questions among the different questionnaires. The Cronbach's α value was found to vary between 0.7 and 0.8, thus confirming the reliability of the results.

Analysis results

As described in Section 3.2, the questionnaire results were summarized in the form of causal strength matrixes to facilitate their analysis. Table 3 presents the results acquired for the Marketing and Sales department. (Note that the equivalent causal strength matrixes for the other departments are omitted here due to space constraints).

Table 3 Causal Strength Matrix of Marketing and Sales Department

	S1	S2	S3	S4	S5	S6	S7	S8	S9	S10	S11	S12	S13	Max
MS1	4.40	5.00	1.60	3.80	3.20	2.20	4.00	1.60	1.40	1.60	1.60	1.60	1.60	4.00
MS2	4.80	4.80	1.60	5.00	4.60	2.20	4.60	1.60	2.20	1.60	1.60	1.60	1.60	5.00
MS3	4.80	5.00	1.60	5.00	2.40	1.60	3.80	1.60	2.20	1.60	1.60	1.60	2.20	5.00
MS4	1.60	3.00	3.00	3.20	2.60	1.80	3.40	2.40	1.40	2.40	2.20	2.20	2.00	3.40
MS5	2.40	3.60	3.80	2.00	2.20	1.40	3.80	1.60	1.40	2.40	4.00	2.60	2.20	4.00
MS6	3.40	5.00	1.60	2.80	2.00	1.80	4.80	1.60	2.00	2.20	1.60	1.80	2.40	4.80
MS7	2.20	1.60	2.40	1.40	1.40	1.00	1.60	2.20	3.00	1.60	2.20	2.00	2.80	2.20
MS8	5.00	3.60	1.40	2.20	3.00	1.80	2.40	1.60	2.20	1.60	2.20	1.60	1.60	3.00
MS9	5.00	3.60	1.40	2.00	3.60	2.40	2.40	1.60	3.00	1.60	2.00	1.60	1.60	3.60
MS10	3.00	3.60	3.20	2.00	1.40	3.60	2.20	1.60	4.60	4.20	1.60	1.60	1.60	4.20
MS11	1.60	1.60	2.80	2.00	1.40	2.40	1.40	3.00	2.00	2.20	3.40	4.20	3.40	3.40
<i>E</i>	0.54	0.82	0.27	0.36	0.36	0.09	0.54	0.09	0.27	0.09	0.18	0.09	0.09	

The result in Table 3 indicates that the performance measure formulation of the Marketing and Sales department was not successful. Although strategic objectives S4, S5, S7, S8, S10 and S11 were assigned to this department (Table 1), the ratios of the department's performance measures that coincide to these assignments are very low, i.e., 0.36 for S4, 0.36 for S5, 0.54 for S7, 0.09 for S8, 0.09 for S10, and 0.18 for S11. Contradictorily, this ratio is very high (0.82) for S2, which was not assigned to any department. This result also implies that the assignments in Table 1 to this department may not be appropriate. As for individual performance measure of this department, The maximum score of MS7 and MS8 are relative low, i.e. 2.20 and 3.00 respectively. The reconsideration of these two measures is demanded immediately.

The analysis process for other departments is similar to the above discussion. Due to space constraints, here we only provide in Table 4 a general distribution of the scores of performance measures within all departments. From inspection, it seems that only the Research and Development department and the Marketing and Sales department perform well in their performance measure designs. However, if combining with the result in Table 5, we realize that the performance measures of the Marketing and Sales department are not coincided with the assignments in Table 1. Thus, we can conclude that the company's BSC was not appropriately formulated.

Table 4 Scores of Performance Measures of All Departments

Department		Scores		
		5 points	3~4 points	2 points or below
GA	IM	0.0%	7.7%	92.3%
	HR	25.0%	75.0%	0.0%
	BM	33.3%	33.3%	33.3%
MF		61.5%	0.0%	38.5%
QA		21.4%	14.3%	64.3%
LG		33.3%	26.7%	40.0%
FI		13.6%	54.6%	31.8%
RD		61.5%	30.8%	7.7%
MS		81.8%	18.2%	0.0%
Average		36.8%	29.0%	34.2%

GA: General Administration; IM: Information Management, HR: Human Resources, BM: Business Management; MF: Manufacturing; QA: Quality Assurance; LG: Logistics; FI: Finance; RD: Research and Development; MS: Marketing and Sales

In the questionnaire, the requirement for support from other departments is also indicated via the use of check boxes located next to each performance measure (see Figure 1). Table 5 indicates the percentage of performance measures within each department requiring support from other departments. As shown, all of the departments require cross-departmental support to achieve the majority of their performance measures (74.87% on average).

Table 5 Percentage of Performance Measures Requiring Support from other Departments

	GA	MF	QA	LG	FI	RD	MS	Average
Need	77.37%	84.62%	64.29%	73.33%	68.18%	73.08%	78.18%	74.87%
No need	22.63%	15.38%	35.71%	26.67%	31.82%	26.92%	21.82%	25.13%

GA: General Administration; MF: Manufacturing; QA: Quality Assurance; LG: Logistics; FI: Finance; RD: Research and Development; MS: Marketing and Sales

In the interview process, the majority of the interviewees reported that the assignation of a firm performance measure to a single department was unrealistic. Furthermore, they pointed out that the assignment of firm level performance measures to single departments resulted in inter-departmental conflict. Although some project members commented that they had raised this potential problem during the initial stage of the BSC implementation, the assignment of the firm performance measures to the individual departments was not adjusted in response to their concerns. The interviewees commented that the inappropriateness of the resulting assignment had caused some employees to lose faith in the BSC, and to question its value or even resist its use.

CONCLUSIONS

In general, BSC systems complement financial measures with non-financial measures under the assumption that these non-financial measures are direct drivers of the company's future financial performance. When designing the performance measures at the lower level, the causal relationship between the lower-level measures and the firm level performance measures must also be guaranteed. Unfortunately, such a causal linkage is often missing in the BSC deployment process. In particular, the functional structure adopted in many organizations may result in flaws in the deployment process if the effects and importance of teamwork and cooperation between the functional divisions are not taken into account.

To enable the identification of inappropriate performance measure designs at the departmental level of a functional organization, this study has proposed a review process for verifying the BSC system following its implementation. The process consists of a questionnaire designed to investigate employees' opinions regarding the strength of the causal relationship between the departmental performance measures and the firm level measures (or the

firm's strategic objectives) and a set of causal strength matrixes to enable analyses to be performed to assess the usefulness of the department's performance measures in achieving the firm's objectives. The proposed approach has been demonstrated using a machine tool manufacturer in Taiwan.

In the case-study company, the BSC was deployed using a hierarchical, top-down process. In the implementation process, the firm level performance measures were directly assigned to a single department or to a small number of departments without considering the requirement for cross-departmental support. The case study results revealed that the performance measure designs of departments did not align with the firm level performance measures assigned to departments. In addition, the functional departments considered that 74.87% of their performance measures required the support of one or more other departments; a fact which was generally ignored by senior management when assigning the firm level performance measures to the departments. Interviewing the employees, it was found that this inappropriate assignment of the firm level performance measures resulted in some members of the firm questioning the value of the entire BSC system and resisting its operation.

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