International Journal of Productivity and Performance Management

The effectiveness of strategic performance measurement systems

Kevin Baird,

The effectiveness of strategic performance measurement systems

Kevin Baird
Macquarie University, Sydney, Australia

Received 4 June 2014
Revised 3 February 2016
Accepted 20 May 2016

Abstract

Purpose – The purpose of this paper is to examine how the characteristics of strategic performance measurement systems (SPMSs) influence the effectiveness of such systems. Specifically, the study examines the association between the following three strategic performance measurement approaches with the effectiveness of SPMSs: the use of multidimensional performance measures, the use of performance measures that are linked to value drivers, and the use of performance measures that are linked to strategy.
Design/methodology/approach – Data were collected using a mail questionnaire distributed to a random sample of 800 Australian manufacturing and service business units.
Findings – The use of multidimensional performance measures is found to positively influence the effectiveness of SPMSs.
Practical implications – Organisations need to strive to design their SPMSs in a manner which considers the achievement of both performance- and staff-related goals, with the findings suggesting that managers need to focus on a broad set of performance measures relating to the four dimensions of the BSC (financial, internal, customer, and learning and growth measures).
Originality/value – This study contributes to the literature by examining the important role that SPMSs play in the achievement of organisational process outcomes. The incorporation of a measure of organisational process effectiveness, and the subsequent identification of the performance-related outcome and staff-related outcome dimensions, provides future researchers with an alternative approach to analyse SPMS effectiveness and provides managers with an insight into how to adjust their SPMS to improve their organisational processes.

Keywords Value driver, Strategy, Effectiveness, Multidimensional performance measures, Strategic performance measurement system

Paper type Research paper

Introduction

While many studies have examined the effects of contemporary performance measurement systems (PMSs) in respect to behavioural attributes, organisational capabilities, and organisational performance, in a review of the literature Franco-Santos *et al.* (2012) highlight that there is a lack of consensus regarding the actual consequences of such systems. Accordingly, this study aims to contribute to the PMS literature in two major ways. First, the study extends the PMS contingency literature by empirically examining the effect of strategic performance measurement system (SPMS) characteristics on organisational performance. The importance of SPMSs is highlighted by recent studies which have examined the specific characteristics of SPMSs (Kolehmainen, 2010), and the role of SPMSs in strategy formulation processes (Bisbe and Malagueno, 2012). While the literature has extensively examined the alignment of performance measures with strategy (Lillis, 2002; Norreklit, 2000; Kaplan and Norton, 1996), there is a dearth of empirical evidence evaluating the strategic alignment of PMSs and the effectiveness of such systems (Chenhall, 2005; Ittner *et al.*, 2003). Therefore, this paper contributes to the PMS literature by examining the association between the following three strategic performance measurement approaches with the effectiveness of SPMSs: the use of multidimensional performance measures; the use of performance measures that are linked to value drivers; the use of performance measures that are linked to strategy (using Miles and Snow's (1978) defenders, prospectors, analysers, and reactor strategic typologies).

Second, the study contributes to the literature by incorporating a unique perspective to assess the effectiveness of SPMSs. Specifically, while the majority of studies have relied on

International Journal of Productivity and Performance Management
Vol. 66 No. 1, 2017
pp. 3-21

1741-0401
DOI 10.1108/IJPPM-06-2014-0086

financial measures of organisational performance to evaluate the effectiveness of SPMSs (Crabtree and Debusk, 2008; Davis and Albright, 2004; Ittner *et al.*, 2003), assuming that the SPMS has a direct and immediate impact on performance, this study focusses on the use of the system and the effect on user organisational processes. This approach is in line with Hamilton and Chervany (1981) who imply that PMS effectiveness can be assessed at three levels of objectives (the information provided by the system, the use of the system and the effect on user organisational processes, and the effect on organisational performance) with specific organisational performance objectives (i.e. third level objectives) realized through the use of the system and the effect on user organisational processes (i.e. the second level objectives).

An understanding of the effect on organisational processes is considered important for a number of reasons. First, Simons (2000, p. 59) maintains that "performance measurement and control information can be understood only by reference to some model of underlying organisational processes. In other words, managers must understand the processes by which inputs are converted to outputs". Such understanding is integral in resource allocation decisions, generating value for customers, and creating a sustainable competitive advantage (Beretta, 2002). Second, the focus on organisational processes can serve to make managers and employees aware of such processes (Beretta, 2002), which is essential if they are to be improved (Atkinson *et al.*, 1997). In particular, by concentrating on the effectiveness of such processes, managers will be provided with an insight into deficiencies, thereby enhancing the effectiveness of learning processes (Kueng, 2000). Third, in line with Hamilton and Chervany (1981), an understanding of organisational processes and how they can be improved is integral to the achievement of organisational performance.

A summary of the objectives of the research framework and a preliminary insight into the measurement of the contingent factors is provided in Figure 1.

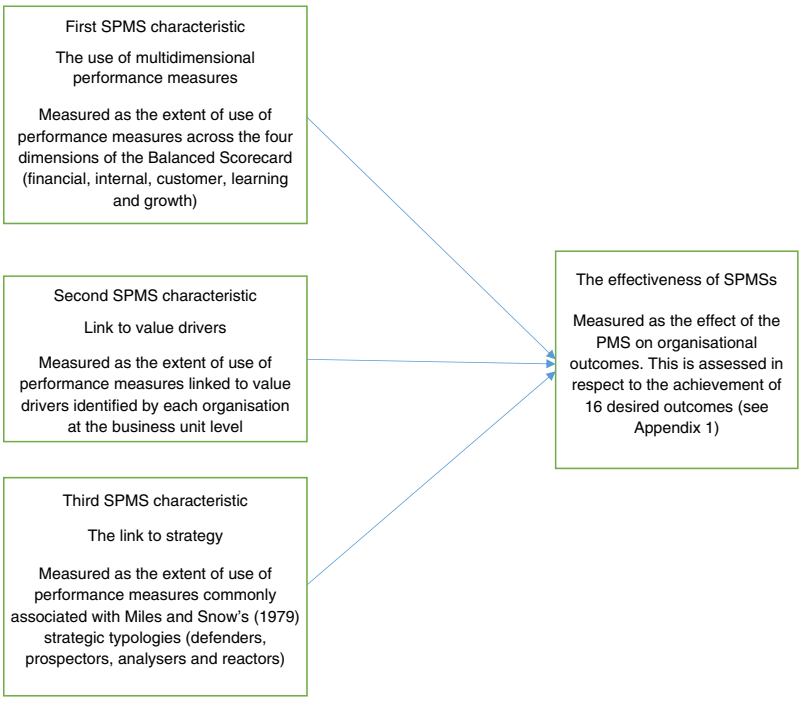

Figure 1.
Research framework

SPMSs

The underlying purpose of a PMS is grounded in agency theory, with such systems being used to align principal (owner) agent (manager) goals and to facilitate accountability in respect to the actions of the agent (Eisenhardt, 1989). For instance, Amaratunga and Baldry (2003, p. 174) define a PMS as:

> A process of assessing the progress towards achieving pre-determined goals, including information on the efficiency with which resources are transformed into goods and services, the quality of those outputs and outcomes, and the effectiveness of organisational operations in terms of their specific contributions to organisational objectives.

Hence, in line with agency theory the PMS represents a mechanism which addresses the information asymmetry problem, and contributes to the alignment of interests and efficiency (Eisenhardt, 1989). While PMSs have traditionally concentrated on the use of financial measures, such measures may encourage dysfunctional "gaming" behaviour (Chow and Stede, 2006). Furthermore, financial measures focus on the final results, ignoring the causes of such results, and fail to concentrate on performance in strategically important areas (Tung *et al.*, 2011). Accordingly, in order to maintain their relevance (Bourne *et al.*, 2003), organisations adapt their PMSs to accommodate changes in their external environment including technological innovations, increased competition, and environmental uncertainty, (Bourne *et al.*, 2003; Hartmann, 2000).

Consequently, contemporary PMSs tend to incorporate non-financial measures to a greater extent with many multidimensional PMSs being developed including the performance pyramid (Lynch and Cross, 1991), the BSC (Kaplan and Norton, 1992) and the Performance Prism System (Neely and Adams, 2000). The management accounting literature generally advocates the use of these contemporary PMSs (Modell, 2007; Almqvist and Skoog, 2006; Bourne *et al.*, 2000).

Contemporary PMSs are multidimensional; incorporate financial and non-financial measures; use leading and lagging indicators; and link performance measures to the strategy of the organisation (Lord, 2007). Many contemporary PMSs have a strategic orientation, focussing on the provision of information which assists with the identification and achievement of strategic objectives (Lillis, 2002; Ittner and Larcker, 2001; Langfield-Smith, 1997). Such PMSs are frequently referred to as SPMSs. SPMSs can be defined as "systems that combine financial, strategic, and operating business measures to gauge how well a company meets its targets" (Gates, 1999, p. 4). Ittner *et al.* (2003) refer to two SPMS approaches the first of which advocates the use of a diverse set of financial and non-financial measures, and the second representing a contingency view in which strategic performance measures are aligned with the strategy and/or value drivers. Similarly, Chenhall (2005, p. 396) states that "there is a wide variation in the nature of an SPMS, ranging from a combination of financial and non-financial measures, to more comprehensive systems; linking operations to various perspectives and to strategy". In line with Ittner *et al.* (2003) this study focusses on the following strategic performance measurement approaches: measurement diversity (hereafter referred to as the use of multidimensional performance measures); alignment with value drivers; and alignment with strategy (Kaplan and Norton, 1992, 1996, 2001).

The use of multidimensional performance measures

There is substantial evidence that organisations are incorporating a diverse set of non-financial performance measures, with such measures assisting organisations in assessing the achievement of their strategic objectives (Ittner *et al.*, 2003; Kaplan and Norton, 2001). This study assesses the use of multidimensional performance measures in respect to the extent to which business units are using the four perspectives of Kaplan and Norton's (1992) BSC: customer, internal, financial, and learning and growth.

The majority of studies have provided evidence in support of the effectiveness of multidimensional PMSs (Ittner *et al.*, 2003), with substantive empirical research supporting a positive association with organisational performance (Ittner *et al.*, 2003; Scott and Tiesen, 1999). In particular, Ittner *et al.* (2003) found that firms using a broad set of financial and non-financial performance measures reported higher satisfaction with their PMS and higher stock market returns. It is envisaged that the use of a diverse set of performance measures will enhance SPMS effectiveness. While principals are primarily concerned with financial outcomes, the focus on customer, internal, and learning and growth perspectives is important as these aspects are future predictors of performance. In particular, the focus on customers can enhance future growth and prosperity, internal measures are important to enhance operations and innovation, and the learning and growth perspective highlights the areas which organisations need to focus on to create value for their stakeholders (Horngren *et al.*, 2005).

The use of a broader set of performance measures can assist in addressing the information asymmetry problem between principals and agents. In particular, the incorporation of a diverse set of measures can serve to provide principals and other stakeholders with increased knowledge regarding the performance of the organisation and the actions of agents. For instance, Ittner *et al.* (2003) maintain that non-financial measures which predict future performance can provide greater information on the "congruence between the agent's actions and the outcomes desired by the principal" (p. 729).

The use of multidimensional performance measures serves to align the interests of managers and principals in the following ways. First, it can assist in the achievement of performance-related goals by reducing the potential dysfunctional effects associated with the reliance on accounting performance measures (Van der Stede *et al.*, 2006). For instance, the use of multidimensional performance measures will reduce the likelihood that managers will ignore relevant performance dimensions or concentrate on improving one measure at the expense of another (Ittner *et al.*, 2003). The broader information can also assist in motivating employees by providing useful feedback and assisting them in evaluating their performance. Furthermore, the use of a PMS which does not focus on financial outcomes exclusively provides employees with the opportunity to demonstrate strong performance in specific areas, while allowing them to identify areas that require improvement. Hence, the use of multidimensional performance measures allows users to focus on the "means to the end" as opposed to just financial results, thereby encouraging both long-term and short-term performance.

It is also envisaged that the more complex information system will assist management in achieving staff-related goals with the additional information used to identify and reward (sanction) good (poor) performing staff and to identify and address staff-related concerns. In particular, the use of a broader range of measures will play a coordinating role, directing the attention of employees to the organisational objectives, a monitoring role, evaluating the ability of employees to meet the principal's objectives, and a diagnostic role whereby it promotes an understanding of how "process performance affects organisational learning and performance" (Atkinson *et al.*, 1997, p. 25):

H1. The use of multidimensional performance measures is positively associated with SPMS effectiveness.

Alignment with value drivers

Banker *et al.* (2004, p. 5) states that "some strategically linked measures may be common to all business units and other measures may be unique to a specific business unit". A value driver is defined as a particular factor which is considered to be integral to the success of an organisation or business unit. Hence, the alignment to value drivers is

assessed in respect to the extent to which business units are using measures relating to the specific value drivers identified as being important to their individual business unit's success.

Organisations should incorporate performance measures which focus on key factors or "value drivers" of their business unit's success (Ittner *et al.*, 2003; Ittner and Larcker, 2001). Specifically, Ittner *et al.* (2003) maintain that the inclusion of performance measures linked to value drivers can lead to improved performance by explicitly communicating the actions required to achieve business unit goals, as well as motivating desirable performance and providing feedback.

It is envisaged that by focussing on measures relating to those factors considered to be important for their business unit's success, managers will be more likely to engage in activities which are aligned with the principal's interests. Specifically, by focussing on measures judged to be integral to success, managers and employees will have a clearer understanding as to what objectives they should strive to achieve, be in a better position to monitor their performance in relation to achieving such objectives, and be more likely to improve organisational processes so as to enhance the likelihood of achieving such objectives:

H2. The extent to which the performance measures are aligned with the unit's value drivers is associated with SPMS effectiveness.

Alignment with strategy

Many studies advocate the importance of aligning PMSs with organisational strategies (Kaplan and Norton, 2001; Norreklit, 2000), with higher organisational performance reported when employed performance measures are more aligned with the organisation's strategy (Govindarajan, 1988; Simons, 1987). For example, Grafton *et al.* (2010, p. 689) state that "the provision of broad-based, strategically aligned performance indicators is expected to improve organisational outcomes by enhancing the decision-relevant information available to managers". This strategic alignment perspective maintains that performance measures need to be aligned with strategic priorities (Verbeeten and Boons, 2009). Similarly, Lillis (2002, p. 497) refers to the "importance of designing PMSs that capture a range of strategically important criteria in financial and non-financial terms".

Aligning the PMS with the strategy of an organisation is expected to enhance SPMS effectiveness as such alignment should "facilitate effective strategy implementation and increase performance" (Verbeeten and Boons, 2009, p. 114; Van der Stede *et al.*, 2006; Chenhall, 2005; Ittner *et al.*, 2003; Said *et al.*, 2003). Hence, by focussing on the use of performance measures commonly associated with the achievement of the objectives of specific strategies, managers will be more likely to successfully align their interests with those of the principal's. For instance, Langfield-Smith (1997, p. 225) maintains that "performance measures direct attention and motivate employees to behave in strategically desirable ways, and help management to assess progress towards strategic goals". Managers will therefore be more likely to focus on achieving the desired objectives, monitoring their performance in relation to such objectives, and improving their organisational processes.

Hence, it is anticipated that SPMSs will be more likely to achieve desired outcomes if they emphasise the use of performance measures which are conducive to the particular strategy adopted. Specifically, it is maintained that business units will be more likely to successfully implement their strategy and achieve performance-related goals when their PMS focusses on measures that support their identified strategy. Similarly, it is maintained that there will be a greater focus on employee concerns and identifying and rewarding (sanctioning) good (poor) performance when the PMS clearly reflects the organisational strategic objectives:

H3. The extent to which performance measures are aligned with the unit's strategy is associated with SPMS effectiveness.

Method

The survey approach was used to collect data. The questionnaires were sent to 400 general managers of both Australian manufacturing and service business units who were identified from the Kompass Australia (2009) directory and Onesource online database, respectively. Business units were chosen as each business unit in the organisation may develop its own BSC measures (Lipe and Salterio, 2000). General managers were chosen as it was expected that they would have knowledge regarding the value drivers, strategy, and use of performance measures within their business unit. They would also be in a position to assess the achievement of organisational outcomes.

The Dillman (2007) Tailored Design Method was used and resulted in a total of 188 questionnaires being returned (23.5 per cent), 98 (12.3 per cent) from the initial mail out, and a further 90 (11.2 per cent) from the follow-up mail out which was conducted three weeks later. A total of 97 (24.3 per cent) questionnaires were returned from manufacturing business units and 91 (22.8 per cent) from service business units. In line with Robert (1999) non-response bias was assessed by a comparison of the independent and dependent variable values between those responding to the initial mail out (early) and the follow-up (late) with the *t*-tests indicating that there were no significant differences detected in any of the comparisons.

Variable measurement

Effectiveness of the SPMS. In line with Atkinson *et al.* (1997) who maintain that the achievement of stakeholder objectives is dependent upon the management of organisational processes, this study assesses SPMS effectiveness in respect to the effectiveness of organisational processes. Specifically, the effectiveness of SPMSs is evaluated based on the achievement of Hamilton and Chervany's (1981) second level objectives (i.e. the use of the system and the effect of the PMS on user organisational processes) with respondents required to indicate the extent to which 16 desired outcomes (see Appendix 1) were achieved on a five-point scale with anchors of "Not at all" and "To a great extent". These items were developed following a review of the relevant literature (Lawler, 2003; Ittner *et al.*, 2003; Kaplan and Norton, 2001, 1996) and were largely based on Lawler (2003) who identified desirable objectives of performance management systems. The approach is consistent with that followed in Tung *et al.* (2011) and Baird *et al.* (2012) with the factor analysis (varimax rotation) resulting in two identical dimensions, labelled "performance related outcomes" and "staff related outcomes", with higher (lower) scores representing a more (less) effective SPMS (Table I).

The effectiveness of SPMSs was also measured using a more simplistic approach in which respondents were required to indicate their overall satisfaction with their business unit's SPMS on a five-point scale, with anchors of "Not at all" and "Completely satisfied". While this approach is fairly simplistic it is commonly adopted in previous studies (Ittner *et al.*, 2003; Banker *et al.*, 2001).

Link to value drivers. The link to value drivers was measured in respect to the use of performance measures relating to those value drivers identified as being important drivers of their individual unit's success (see Appendix 2). First, respondents were required to indicate the extent to which Ittner *et al.*'s (2003) eight value drivers were considered to be important drivers of their business unit's success, using a five-point scale with anchors of "1 – Not at all" and "5 – To a great extent". Assuming that a "3" on this scale is indicative of a neutral position in regards to the importance of a value driver, a particular driver was initially considered to be an "important" driver of success of an individual business unit if respondents indicated a "4" or "5". However, the analysis revealed that on average the responding business units valued six of the eight value drivers and hence in order to ensure

Item	Staff-related outcomes	Performance-related outcomes
Motivating performance	0.307	*0.720*
Developing individual skill and knowledge	*0.526*	0.444
Assisting in the achievement of goals	0.023	*0.734*
Developing a performance-oriented culture	0.200	*0.792*
Supporting change efforts	0.349	*0.630*
Providing useful performance feedback to employees	0.369	*0.610*
Implementing the organisational strategy	0.140	*0.759*
Providing an accurate assessment of performance	0.207	*0.700*
Ensuring staff commitment to organisational objectives	0.429	*0.607*
Addressing the concerns of staff	*0.760*	0.307
Ensuring staff time is used efficiently	*0.672*	0.195
Linking individual performance to unit performance	*0.505*	0.486
Identifying talented employees	*0.847*	0.188
Rewarding talented employees	*0.761*	0.305
Identifying poor performing staff	*0.863*	0.145
Managing poor performing staff	*0.830*	0.165

Table I.
Factor analysis of the SPMS effectiveness measure

that too many measures were not used (Kaplan and Norton, 1996), it was decided to only classify those value drivers identified as driving their business unit's performance to a great extent (i.e. "5" on the scale) as "important".

The score for the link to value driver was subsequently determined based on the extent to which each business unit used performance measures relating to their identified "important" value drivers. These performance measures (see Appendix 2) were identified following the factor analysis (varimax rotation) of 37 different performance measures identified from the BSC literature (Langfield-Smith *et al.*, 2009; Horngren *et al.*, 2005; Morse *et al.*, 2003; Kaplan and Norton, 1996, 2001).

Respondents were required to indicate the extent to which each measure was being used to evaluate their business unit's performance on a five-point scale with anchors of "Not at all" and "To a great extent". Given a different number of performance measures were found to relate to each value driver the extent of use of performance measures relating to each value driver was scored as the average score. Further, given each unit identified a different number of "important" value drivers, the "link to value driver" was determined as the average score in relation to the extent of use of these different performance measures with higher (lower) scores indicating a stronger (weaker) link to value drivers.

Link to strategy. Miles and Snow's (1978) strategic typologies (defenders, prospectors, analysers, reactors) were chosen to measure business unit strategy as they can operate at the individual business unit level and have been extensively applied in the strategy literature (Desarbo *et al.*, 2005). Furthermore, given this study emphasises the alignment of performance measures with strategy, this approach is considered appropriate since Miles and Snow (1978) view strategy as the means by which a business unit aligns its managerial processes with the environment (Desarbo *et al.*, 2005). Respondents were required to indicate their business unit's strategy using the strategic profiles created by Snow and Hrebiniak (1980) (see Appendix 1).

The link to strategy was measured as the extent to which business units were using the specific performance measures relating to value drivers considered to be appropriate for their identified strategy. Hence, while the link to value drivers is assessed at the individual business unit level, the alignment with strategy is assessed based on the extent to which a business unit is using those measures deemed important for all units adopting the same strategy. In identifying the appropriate measures reference is made to Miles and Snow's (1978)

discussion of the nature of each strategy and the strategic profiles developed by Snow and Hrebiniak (1980) and used in this study. Miles and Snow (1978) indicate that defenders need stability and efficiency while the strategic profile refers to "offering higher quality, superior goods and/or service". Consequently, for defenders the link to strategy was measured as the extent to which business units were using performance measures relating to short-term financial performance, operational performance, and product and service quality. Prospectors are proactive and value being "first in" for new products. They also operate in a "broad product domain" and hence need to engage with their customers. Accordingly, the link to strategy was measured as the extent to which prospectors were using measures relating to customer relations, product and service quality, and product and service innovation. Analysers represent a combination of defenders and prospectors. While they attempt to "maintain a stable, limited line of goods and/or services" they still pursue innovativeness. Accordingly, the link to strategy was measured as the extent to which units were using performance measures relating to short-term financial performance, operational performance, and product and service innovation. Given a different number of measures were used in respect to each value driver, average scores were used and the link to strategy was subsequently scored as the average score across the three performance measures. Those business units with a higher (lower) score on this measure had a stronger (weaker) link to strategy.

Use of multidimensional performance measures

The extent to which business units were using multidimensional performance measures was assessed based on the extent to which units were incorporating measures which focussed on each of the four perspectives of the BSC: financial, internal, customer, and learning and growth. For this purpose the same 37 performance measures were classified as being representative of the four dimensions of the BSC (see Appendix 2). However, since there a different number of measures were used across the four dimensions, and conscious of Kaplan and Norton's (1996) concerns regarding using too many measures, the extent of use of measures in respect to each dimension was calculated as the average score across the four most frequently used measures within each dimension. The extent to which each unit was using multidimensional performance measures was subsequently scored as the sum of these averages with higher (lower) scores indicating that multidimensional performance measures were used to a greater (lesser) extent.

Results

Descriptive statistics

Table II shows summary statistics for the independent and dependent variables. For the multi-item scales the actual range was generally comparable to the theoretical range, and the Cronbach's α coefficients exceed the 0.70 threshold considered to be acceptable for scale reliability (Nunnally, 1978, p. 245).

The mean value of the link to strategy (3.27) and the link to value drivers (3.26) are both close to the midpoint of the range, indicating that the extent of use of performance measures relating to individual unit's value drivers and value drivers considered appropriate for specific strategies is low. The mean score in relation to the use of multidimensional performance measures (3.76) was higher with Table II showing that the internal measures were used to the greatest extent (4.18) followed by the financial (3.84), learning and growth (3.62) and customer measures (3.42).

Table II reveals that business units rated their PMS as being moderately successful with an overall level of satisfaction of 3.34 being reported. In relation to the outcome measures, the SPMSs were more successful in achieving the performance-related outcomes (3.63) than the staff-related outcomes (3.20).

Variables	n[a]	Mean	SD	Minimum actual (theoretical)	Maximum actual (theoretical)	Cronbach's α
Independent variables						
Link to strategy	178	3.27	0.72	1.13 (1)	5 (5)	–
Link to value drivers	169	3.26	0.73	1.30 (1)	5 (5)	–
Use of multidimensional performance measures	188	3.76	0.53	2.13 (1)	5 (5)	–
Dependent variables						
Performance-related outcomes[b]	186	3.63	0.66	1.63 (1)	5 (5)	0.88
Staff-related outcomes[b]	186	3.20	0.81	1.13 (1)	5 (5)	0.91
Satisfaction	187	3.34	0.84	1 (1)	5 (5)	–
Balanced scorecard dimensions						
Financial perspective	186	3.84	0.79	1 (1)	5 (5)	0.77
Internal perspective	188	4.18	0.70	1.5 (1)	5 (5)	–
Customer perspective	188	3.42	0.81	1 (1)	5 (5)	–
Learning and growth perspective	188	3.62	0.76	1.5 (1)	5 (5)	–

Notes: [a]Not all respondents completed every question included in the questionnaire; [b]for the purpose of brevity the statistics for the individual items are not presented but they are discussed in Appendix 2

Table II. Descriptive statistics of independent and dependent variables

Factors affecting the effectiveness of the SPMS

SPSS was utilised to test the hypotheses. The associations between the link to value drivers, the link to strategy, and the use of multidimensional performance measures with the effectiveness of the SPMS were assessed using stepwise regression analysis (see Table III). The results confirm the association between the use of multidimensional performance measures with SPMS satisfaction and both dimensions of SPMS effectiveness (performance-related outcomes and staff-related outcomes), thereby providing support for *H1*. However, the link to strategy was not associated with the effectiveness of the SPMS, while the only identified association for the link to value drivers was with performance-related outcomes and was in the opposite direction to that predicted. Hence, *H2* and *H3* were not supported.

Further analysis was undertaken to explore the hypothesised associations for business units from the manufacturing and service sectors (Table IV) and for business units adopting each strategy (Table V). Table IV reveals similar results in respect to the service and manufacturing industries, with the use of multidimensional performance measures found to be positively associated with SPMS satisfaction and both dimensions of SPMS effectiveness.

	PMS satisfaction		Performance-related outcomes		Staff-related outcomes	
Variables	Coefficient	*t*-statistic (significance)	Coefficient	*t*-statistic (significance)	Coefficient	*t*-statistic (significance)
Link to value drivers	−0.22	−2.41 (0.02)	−0.27	−3.00 (0.00)	–	–
Link to strategy	–	–	–	–	–	–
Use of multidimensional performance measures	0.49	5.39 (0.00)	0.54	5.96 (0.00)	0.42	6.35 (0.00)
F-value	15.31		18.44		40.31	
p-value	0.00		0.00		0.00	
R^2	0.16		0.18		0.18	
Adjusted R^2	0.15		0.17		0.17	
n	167		166		185	

Table III. Results of stepwise regression analysis of the effect of link to value drivers, link to strategy, and the use of multidimensional performance measures on the effectiveness of SPMSs

Table IV.
Results of stepwise regression analysis of the effect of link to value drivers, link to strategy, and the use of multidimensional performance measures on the effectiveness of SPMSs for manufacturing and service organisations

Variables	PMS satisfaction Coefficient	PMS satisfaction *t*-statistic (Significance)	Performance-related outcomes Coefficient	Performance-related outcomes *t*-statistic (Significance)	Staff-related outcomes Coefficient	Staff-related outcomes *t*-statistic (Significance)
Panel A: manufacturing						
Link to value drivers	–	–	–	–	–	–
Link to strategy	–	–	–	–	–	–
Use of multidimensional performance measures	0.40	4.28 (0.00)	0.45	4.87 (0.00)	0.43	4.68 (0.00)
F-value		18.33		23.68		21.86
p-value		0.00		0.00		0.00
R^2		0.16		0.20		0.19
Adjusted R^2		0.15		0.19		0.18
n		95		95		95
Panel B: service						
Link to value drivers	–	–	−0.29	−2.35 (0.02)	–	–
Link to strategy	–	–	–	–	–	–
Use of multidimensional performance measures	0.29	2.87 (0.01)	0.50	4.04 (0.00)	0.42	4.28 (0.00)
F-value		8.21		8.17		18.30
p-value		0.00		0.00		0.00
R^2		0.08		0.17		0.17
Adjusted R^2		0.07		0.15		0.16
n		90		80		89

For service units the link to value drivers exhibited a significant negative association with the performance-related outcome dimension, while the link to strategy did not exhibit a significant association with any of the three SPMS effectiveness measures.

As with the overall results, Table V (Panel C) highlights the importance of using multidimensional performance measures for those units using defender, prospector, and analyser strategies, although for defenders this association was not exhibited in respect to performance-related outcomes. Again, the link to strategy was not associated with SPMS effectiveness, while the only association found for the link to value drivers was in relation to performance-related outcomes for prospectors, and this association was in the opposite direction to that predicted.

Conclusion

This study examined the association between three SPMS approaches with the effectiveness of SPMSs, with effectiveness assessed in terms of the use of the system and the effect on organisational processes. While numerous studies have referred to the importance of aligning performance measures with strategy (Verbeeten and Boons, 2009; Van der Stede *et al.*, 2006; Chenhall, 2005; Ittner *et al.*, 2003; Said *et al.*, 2003) this study contributes to the literature by providing empirical evidence in respect to the impact of such an alignment on SPMS effectiveness. In addition, while Ittner *et al.* (2003) and the majority of other studies have evaluated SPMS effectiveness in relation to organisational performance, this study contributes to the literature by examining the important role that SPMSs play in the achievement of organisational process outcomes. In particular, the study enabled an assessment of the extent to which SPMSs were effective in achieving 16 desirable objectives. These objectives were found to reflect two dimensions of PMS effectiveness, performance-related outcomes, and staff-related outcomes, with a moderate level of SPMS effectiveness reported in respect to both outcomes.

Variables	PMS satisfaction Coefficient	PMS satisfaction *t*-statistic (Significance)	Performance-related outcomes Coefficient	Performance-related outcomes *t*-statistic (Significance)	Staff-related outcomes Coefficient	Staff-related outcomes *t*-statistic (Significance)
Panel A: defenders						
Link to value drivers	–	–	–	–	–	–
Link to strategy	–	–	–	–	–	–
Use of multidimensional performance measures	0.30	2.10 (0.04)	–	–	0.39	2.90 (0.01)
F-value		4.42		–		8.43
p-value		0.04		–		0.01
R^2		0.09		–		0.16
Adjusted R^2		0.07		–		0.14
n		47		47		47
Panel B: prospectors						
Link to value drivers	–	–	−0.33	−2.52 (0.01)	–	–
Link to strategy	–	–	–	–	–	–
Use of multidimensional performance measures	–	–	0.69	5.23 (0.00)	0.44	4.09 (0.00)
F-value		–		14.08		16.70
p-value		–		0.00		0.00
R^2		–		0.32		0.20
Adjusted R^2		–		0.30		0.19
n		58		62		69
Panel C: analysers						
Link to value drivers	–	–	–	–	–	–
Link to strategy	–	–	–	–	–	–
Use of multidimensional performance measures	–	–	0.30	2.31 (0.02)	0.41	3.36 (0.00)
F-value		–		5.35		11.30
p-value		–		0.02		0.00
R^2		–		0.09		0.17
Adjusted R^2		–		0.07		0.15
n		58		57		58

Table V. Results of stepwise regression analysis of the effect of link to value drivers, link to strategy, and the use of multidimensional performance measures on the effectiveness of SPMSs for defenders, prospectors and analysers

Such findings have two important implications for organisations. First, it is apparent that organisations need to strive to design their SPMSs in a manner which considers the achievement of both performance and staff-related goals. Second, the moderate level of SPMS effectiveness highlights the need for management to consider the means by which they can improve their SPMS. The study's subsequent examination of the association between the SPMS approaches and SPMS effectiveness assists management in this regard by providing advice in relation to the ideal SPMS characteristics.

It was noted that the SPMS was more effective in achieving the performance-related outcomes as opposed to the staff-related outcomes, suggesting that organisations' SPMSs are primarily focussed on the achievement of performance outcomes with less concern shown towards their employees. This finding suggests that organisations need to focus more on how their SPMS can be used to assist in achieving staff-related goals. This is particularly important given the significant amount of evidence stressing the important role of employee organisational commitment in directly influencing job performance (Riketta, 2002; Ketchand and Strawser, 2001), and employee turnover rates (Stallworth, 2004) and indirectly influencing productivity and overall organisational performance (Chow, 1994; Mathieu and Zajac, 1990).

The analysis of the association between the performance measure characteristics of the SPMS and its effectiveness revealed that there was an insignificant association between the link to strategy with SPMS effectiveness. Hence, it is apparent that focussing on measures relating to units adopting the same strategy (link to strategy) does not affect SPMS effectiveness. This finding suggests that the use of common performance measures for organisations using the same strategy is undesirable. However, given this finding may be attributed to the difficulty in classifying an organisation's strategy and/or problems in identifying the ideal performance measures for specific strategies, future studies may consider this issue further. Alternatively, the use of performance measures relating to value drivers exhibited a negative association with performance-related outcomes. Such a finding is consistent with the agency theory argument that managers are pursuing individual unit goals at the expense of organisational performance-related outcomes. Hence, it is implied that the use of performance measures aligned with individual business unit values is undesirable as it may result in dysfunctional behaviour if the objectives of individual units and organisations are not aligned.

The use of multidimensional performance measures was the only approach found to have a positive influence on SPMS effectiveness. Specifically, the use of multidimensional performance measures was significantly related to SPMS satisfaction, and the achievement of performance-related outcomes and staff-related outcomes. Such findings were reiterated in both the manufacturing and service sectors, and for units employing a defender, prospector, and analyser strategy and confirm the findings of Ittner *et al.* (2003) and Tung *et al.* (2011).

The findings contribute to the literature in the following two ways. First, the study highlights the importance of examining SPMS effectiveness in respect to organisational processes. The incorporation of a measure of organisational process effectiveness, and the subsequent identification of the performance-related outcome and staff-related outcome dimensions, provides future researchers with an alternative approach to analyse SPMS effectiveness and provides managers with an insight into how to improve their organisational processes. Second, the study provides an insight into developing an actionable SPMS approach which can enhance SPMS effectiveness with the implication being that managers need to focus on a broad set of performance measures relating to the four dimensions of the BSC (financial, internal, customer, and learning and growth measures).

However, while the implication is that managers need to incorporate a broad-based set of performance measures it should be noted that the nature of the specific measures is unique to each organisation. In particular, since the extent of use of multidimensional performance measures was conceptualised in respect to the extent to which organisations were using the four most commonly used measures of each BSC dimension, the findings suggest that organisations need to be aware of those measures that are commonly used, and ensure a greater focus on such measures in order to enhance PMS effectiveness. Hence, while the findings overcome the "too many measures" criticism levelled at the BSC (Pfeffer and Sutton, 2000) by suggesting that managers should direct their attention to four measures of each BSC dimension, in line with the objectives of the balanced scorecard, different measures of performance are relevant for different organisations (Kaplan and Norton, 1992). Hence, while it is suggested that organisations should consider using a balanced set of performance measures, each organisation is required to identify and enhance their focus on those specific measures which enhance their performance. One way in which this may be encouraged is through the use of performance evaluation and incentive systems with Grafton *et al.* (2010) reporting that managers are encouraged to use broad-based performance information when the performance evaluation schemes reflect such measures. Finally, in line with the performance measurement maturity literature (Jaaskelainen and Roitto, 2015; Nudurupati *et al.*, 2011; Aken *et al.*, 2005) organisations will need to consider

the design, implementation, and the role of PMSs in the management of the organisation, and monitor the development and effectiveness of their business unit's performance measures over time.

Limitations and suggestions for future research

The study is subject to the usual limitations associated with the use of questionnaires. These limitations include the failure to identify causal relationships and the absence of an opportunity to probe answers. In addition, given the study relies on self-reported data there is potential for common method bias. However, Harman's (1967) single-factor test indicated that the total variance explained by a single factor is 37.2 per cent which is below the 50 per cent threshold indicative of common method bias problems (Podsakoff *et al.*, 2003).

Furthermore, in measuring the link to value drivers it is acknowledged that the identification of each unit's value drivers is dependent upon the respondents opinion, while the value drivers identified in respect to the link to strategy measure were determined based on a review of the literature. In an attempt to overcome these problems sensitivity analysis was conducted to measure these variables. While the findings were similar and hence these results are not reported, future studies could use alternative methods to encapsulate these variables. Furthermore, we acknowledge that there is a disconnect between the assessment of the value drivers at the business unit level and the determination of performance at the organisational level. Future studies may attempt to reconcile this problem by incorporating unit level performance measures. Future studies could also explore alternative research methods to get a deeper insight into the factors that affect the effectiveness of SPMSs and/or examine the association between SPMSs and their effectiveness in other industries and in other countries. Finally, in line with the Cocca and Alberti (2010) who indicate that the PMS literature fails to consider organisational size, future studies could also examine the effectiveness of SPMSs across different sized organisations.

References

Aken, E., Letens, G., Coleman, G., Farris, J. and van Goubergen, D. (2005), "Assessing maturity and effectiveness of enterprise performance measurement systems", *International Journal of Productivity and Performance Management*, Vol. 54 Nos 5/6, pp. 400-418.

Almqvist, R. and Skoog, M. (2006), "Management control transformations: change mechanisms and their constant impact on management control systems", *Journal of Human Resource Costing and Accounting*, Vol. 10 No. 3, pp. 132-154.

Amaratunga, D. and Baldry, D. (2003), "A conceptual framework to measure facilities management performance", *Property Management*, Vol. 21 No. 2, pp. 171-189.

Atkinson, A., Waterhouse, J. and Wells, R. (1997), "A stakeholder approach to strategic performance measurement", *Sloan Management Review*, Vol. 38 No. 3, pp. 25-37.

Baird, K., Schoch, H. and Chen, Q. (2012), "Performance management system effectiveness in Australian local government", *Pacific Accounting Review*, Vol. 24 No. 2, pp. 161-185.

Banker, R.D., Chang, H. and Pizzini, M.J. (2004), "The balanced scorecard: judgmental effects of performance measures linked to strategy", *The Accounting Review*, Vol. 79 No. 1, pp. 1-23.

Banker, R.D., Janakiraman, S. and Konstans, C. (2001), *Balanced Scorecard: Linking Strategy to Performance*, Financial Executives International, New York, NY.

Beretta, S. (2002), "Unleashing the integration potential of ERP systems: the role of process-based performance measurement systems", *Business Process Management Journal*, Vol. 8 No. 3, pp. 254-277.

Bisbe, J. and Malagueno, R. (2012), "Using strategic performance measurement systems for strategy formulation: does it work in dynamic environments?", *Management Accounting Research*, Vol. 23 No. 4, pp. 296-311.

Bourne, M., Mills, J.F., Wilcox, M., Neely, A.D. and Platts, K. (2000), "Designing, implementing and updating performance measurement systems", *International Journal of Operations and Production Management*, Vol. 20 No. 7, pp. 754-771.

Bourne, M., Neely, A.D., Mills, J.F. and Platts, K.W. (2003), "Implementing performance measurement systems: a literature review", *International Journal of Business Performance Management*, Vol. 5 No. 1, pp. 1-24.

Chenhall, R. (2005), "Integrative strategic performance measurement systems, strategic alignment of manufacturing, learning and strategic outcomes: an exploratory study", *Accounting, Organizations, and Society*, Vol. 30 No. 5, pp. 395-422.

Chow, C.W. and Stede, W.A. (2006), "The use and usefulness of nonfinancial performance measures", *Management Accounting Quarterly*, Vol. 7 No. 3, pp. 1-8.

Chow, I.H. (1994), "Organisational commitment and career development of Chinese managers in Hong Kong and China", *The International Journal of Career Management*, Vol. 6 No. 4, pp. 3-9.

Cocca, P. and Alberti, M. (2010), "A framework to assess performance measurement systems in SMEs", *International Journal of Productivity and Performance Management*, Vol. 59 No. 2, pp. 186-200.

Crabtree, A.D. and DeBusk, G.K. (2008), "The effects of adopting the balanced scorecard on shareholder returns", *Advances in Accounting*, Vol. 24 No. 1, pp. 8-15.

Davis, S. and Albright, T. (2004), "An investigation of the effect of balanced scorecard implementation on financial performance", *Management Accounting Research*, Vol. 15 No. 2, pp. 135-153.

Desarbo, W.S., Di Benedetto, C.A., Song, M. and Sinha, I. (2005), "Revisiting the miles and snow strategic framework: uncovering interrelationships between strategic types, capabilities, environmental uncertainty, and firm performance", *Strategic Management Journal*, Vol. 26 No. 1, pp. 47-74.

Dillman, D.A. (2007), *Mail and Internet Surveys: The Tailored Design Method*, 2nd ed., John Wiley and Sons, Inc., New York, NY.

Eisenhardt, M.K. (1989), "Agency theory: an assessment and review", *Academy of Management Review*, Vol. 14 No. 1, pp. 57-74.

Franco-Santos, M., Lucianetti, L. and Bourne, M. (2012), "Contemporary performance measurement systems: a review of their consequences and a framework for research", *Management Accounting Research*, Vol. 23 No. 2, pp. 79-119.

Gates, S. (1999), *Aligning Strategic Performance Measures and Results*, The Conference Board, New York, NY.

Govindarajan, V. (1988), "A contingency approach to strategy implementation at the business-unit level: integrating administrative mechanisms with Strategy", *Academy of Management Journal*, Vol. 31 No. 4, pp. 828-853.

Grafton, J., Lillis, A. and Widener, S. (2010), "The role of performance measurement and evaluation in building organizational capabilities and performance", *Accounting, Organizations and Society*, Vol. 35 No. 7, pp. 689-706.

Hamilton, S. and Chervany, N.L. (1981), "Evaluating information system effectiveness – part I: comparing evaluation approaches", *MIS Quarterly*, Vol. 5 No. 3, pp. 55-69.

Harman, H. (1967), *Modern Factor Analysis*, University of Chicago Press, Chicago, IL.

Hartmann, F.G. (2000), "The appropriateness of RAPM: towards the further development of theory", *Accounting, Organizations and Society*, Vol. 25 Nos 4/5, pp. 451-482.

Horngren, C.T., Bhimani, A., Datar, S. and Foster, G. (2005), *Management and Cost Accounting*, 3rd ed., Pearson Education, Essex.

Ittner, C. and Larcker, D. (2001), "Assessing empirical research in management accounting: a value-based management perspective", *Journal of Accounting and Economics*, Vol. 32 Nos 1-3, pp. 349-410.

Ittner, C.D., Larcker, D.F. and Randall, T. (2003), "Performance implications of strategic performance measurement in financial services firms", *Accounting Organizations and Society*, Vol. 28 No. 7, pp. 715-741.

Jaaskelainen, A. and Roitto, J. (2015), "Designing a model for profiling organizational performance management", *International Journal of Productivity and Performance Management*, Vol. 64 No. 1, pp. 5-27.

Kaplan, R. and Norton, D. (1992), "The balanced scorecard: measures that drive performance", *Harvard Business Review*, Vol. 70 No. 1, pp. 71-80.

Kaplan, R. and Norton, D. (1996), *The Balanced Scorecard: Translating Strategy into Action*, Harvard Business School Press, Boston, MA.

Kaplan, R. and Norton, D. (2001), *The Strategy Focused Organisation: How Balanced Scorecard Companies Thrive in the New Business Environment*, Harvard Business School Press, Boston, MA.

Ketchand, A.A. and Strawser, J.R. (2001), "Multiple dimensions of organizational commitment: implications for future accounting research", *Behavioral Research in Accounting*, Vol. 13 No. 1, pp. 221-251.

Kolehmainen, K. (2010), "Dynamic strategic performance measurement systems: balancing empowerment and alignment", *Long Range Planning*, Vol. 43 No. 4, pp. 527-554.

Kompass Australia (2009), *Kompass Australia Business Directory*, Peter Isaacson Publications, Prahran.

Kueng, P. (2000), "Process performance measurement system: a tool to support process based organizations", *Total Quality Management*, Vol. 11 No. 1, pp. 67-85.

Langfield-Smith, K. (1997), "Management control systems and strategy: a critical review", *Accounting, Organizations and Society*, Vol. 22 No. 2, pp. 207-232.

Langfield-Smith, K., Thorne, K.H. and Hilton, R. (2009), *Management Accounting: An Australian Perspective*, 6th ed., McGraw-Hill, Sydney.

Lawler, E.E. (2003), "Reward practices and performance management system effectiveness", *Organisational Dynamics*, Vol. 32 No. 4, pp. 396-404.

Lillis, A.M. (2002), "Managing multiple dimensions of manufacturing performance – an exploratory study", *Accounting, Organizations and Society*, Vol. 27 No. 6, pp. 497-529.

Lipe, M.G. and Salterio, S.E. (2000), "The balanced scorecard: judgmental effects of common and unique performance measures", *Accounting Review*, Vol. 75 No. 3, pp. 283-289.

Lord, B.R. (2007), "Strategic management accounting", in Hopper, T., Northcott, D. and Scapens, R. (Eds), *Issues in Management Accounting*, 3rd ed., FT Prentice Hall, Harlow, pp. 135-153.

Lynch, R.L. and Cross, K.F. (1991), *Measure Up! Yardsticks for Continuous Improvement*, Basil Blackwell, Cambridge.

Mathieu, J.E. and Zajac, D.M. (1990), "A review and meta-analysis of the antecedents, correlates, and consequences of organisational commitment", *Psychological Bulletin*, Vol. 108 No. 2, pp. 171-194.

Miles, R.E. and Snow, C.C. (1978), *Organizational Strategies, Structure and Process*, McGraw-Hill, New York, NY.

Modell, S. (2007), "Managing accounting change", in Hopper, T., Northcott, D. and Scapens, R. (Eds), *Issues in Management Accounting*, 3rd ed., FT Prentice Hall, Harlow, pp. 335-355.

Morse, W.J., Davis, J.R. and Hartgraves, A.L. (2003), *Management Accounting: A Strategic Approach*, 3rd ed., South-Western, Mason, IA.

Neely, A. and Adams, C. (2000), *Perspectives on Performance: The Performance Prism*, Gee Publishing, London.

Norreklit, H. (2000), "The balance on the balanced scorecard – a critical analysis of some of its assumptions", *Management Accounting Research*, Vol. 11 No. 1, pp. 65-88.

Nudurupati, S., Bititci, U., Kumar, V. and Chan, F. (2011), "State of the art literature review on performance measurement", *Computers & Industrial Engineering*, Vol. 60 No. 2, pp. 279-290.

Nunnally, J.C. (1978), *Psychometric Theory*, McGraw-Hill, New York, NY.

Pfeffer, J. and Sutton, R. (2000), *The Knowing-Doing Gap: How Smart Companies Turn Knowledge into Action*, Harvard Business School Press, Boston, MA.

Podsakoff, P., MacKenzie, S., Lee, J. and Podsakoff, N. (2003), "Common method biases in behavioral research: a critical review of the literature and recommended remedies", *Journal of applied Psychology*, Vol. 88 No. 5, pp. 879-903.

Riketta, M. (2002), "Attitudinal organisational commitment and job performance: a meta analysis", *Journal of Organisational Behaviour*, Vol. 23 No. 3, pp. 257-266.

Robert, E.S. (1999), "In defence of the survey method: an illustration from a study of user information satisfaction", *Accounting and Finance*, Vol. 39 No. 1, pp. 53-77.

Said, A., Hassab Elnaby, H. and Wier, B. (2003), "An empirical investigation of the performance consequences of nonfinancial measures", *Journal of Management Accounting Research*, Vol. 15 No. 1, pp. 193-223.

Scott, T. and Tiesen, P. (1999), "Performance measurement and managerial teams", *Accounting, Organizations and Society*, Vol. 24 No. 3, pp. 263-285.

Simons, R. (1987), "Accounting control systems and business strategy: an empirical analysis", *Accounting, Organizations and Society*, Vol. 12 No. 4, pp. 357-374.

Simons, R. (2000), *Performance Measurement and Control Systems for Implementing Strategy*, Prentice Hall, Upper Saddle River, NJ.

Snow, C.C. and Hrebiniak, L.G. (1980), "Strategy, distinctive competence, and organizational performance", *Administrative Science Quarterly*, Vol. 25 No. 2, pp. 317-336.

Stallworth, L. (2004), "Antecedents and consequences of organisational commitment to accounting organisations", *Managerial Auditing Journal*, Vol. 19 No. 7, pp. 945-955.

Tung, A., Baird, K. and Schoch, H. (2011), "The effectiveness of performance measurement systems", *International Journal of Operations and Production Management*, Vol. 31 No. 12, pp. 1287-1310.

Van der Stede, W.A., Chow, C.W. and Lin, T.W. (2006), "Strategy, choice of performance measures, and performance", *Behavioral Research in Accounting*, Vol. 18 No. 1, pp. 185-205.

Verbeeten, F.H. and Boons, A.N. (2009), "Strategic priorities, performance measures and performance: an empirical analysis in Dutch firms", *European Management Journal*, Vol. 27 No. 2, pp. 113-128.

Further reading

Choong, K.K. (2013), "Has this large number of performance measurement publications contributed to its better understanding? A systematic review for research and applications", *International Journal of Production Research*, Vol. 52 No. 14, pp. 4174-4197.

De Geuser, F., Mooraj, S. and Oyon, D. (2009), "Does the balanced scorecard add value? Empirical evidence on its effect on performance", *European Accounting Review*, Vol. 18 No. 1, pp. 93-122.

Malina, M.A. and Selto, F.H. (2001), "Communicating and controlling strategy: an empirical study of the effectiveness of the balanced scorecard", *Journal of Management Accounting Research*, Vol. 13 No. 1, pp. 47-90.

Whorter, L.B. (2003), "Does the balanced scorecard reduce information overload?", *Management Accounting Quarterly*, Vol. 4 No. 4, pp. 23-27.

Appendix 1. Measurement of SPMS effectiveness and strategy

SPMS effectiveness

Performance-related outcomes

Motivating performance.
Assisting in the achievement of goals.
Developing a performance-oriented culture.
Supporting change efforts.
Providing useful feedback to employees.
Implementing the organisational strategy.
Providing an accurate assessment of performance.
Ensuring staff commitment to organisational objectives.

Staff-related outcomes

Developing individual skill and knowledge.
Linking individual performance to unit performance.
Addressing the concerns of staff.
Ensuring staff time is used efficiently.
Identifying talented employees.
Rewarding talented employees.
Identifying poor performing staff.
Managing poor performing staff.

Types of strategy

Type 1: this type of organisation operates in a relatively stable product or service area. The organisation offers a more limited range of goods and/or services than its competitors, and attempts to protect its domain by offering higher quality, superior goods and/or service, lower prices, and so forth. Often this type of organisation is not at the forefront of developments in the industry.

Type 2: this type of organisation operates within a broad product-market domain that undergoes periodic redefinition. The organisation values being "first in" in new product (goods and/or service) areas even if not all of these efforts prove to be highly profitable. However, this type of organisation may not maintain market strength in all of the areas it enters.

Type 3: this type of organisation attempts to maintain a stable, limited line of goods and/or services. The organisation adapts quickly to new developments in areas compatible with its stable product-market base. While the organisation is seldom "first in" with new goods or services, it can frequently be "second in" with a more cost efficient good or service.

Type 4: this type of organisation does not appear to have a consistent product-market orientation and is usually not as aggressive in maintaining established products (goods and/or services) and markets as some of its competitors. The organisation does not take as many risks as its competitors and only responds to environmental pressures when forced to.

NB type 1 – defender; type 2 – prospector; type 3 – analyser; type 4 – reactor

Appendix 2. Measurement of SPMS approaches

The following performance measure data are used to illustrate the calculation of the three independent variables: the use of multidimensional performance measures, link to value drivers, and link to strategy. Note that the eight value drivers are numbered one to eight with the related performance measures listed under each value driver and the relevant classifications in respect to the use of multidimensional performance measures indicated in brackets after each performance measure (Table AI).

Link to value drivers

The link to value drivers was assessed based on the extent of use of performance measures related to important drivers of success. These "important" drivers of success were determined based on the individual business unit's identification of "important" drivers. Hence, in this example the study first looked at the assessment of the importance of each of the eight value drivers

Value driver and related performance measures	Score	Value driver and related performance measures	Score
1. Short-term financial performance	4	*2. Customer relations*	3
Sales revenue (F)	5	Surveys of customer satisfaction (C)	3
Cashflows (F)	4	Number of customer complaints (C)	2
Operating income (F)	3	On-time product delivery (C)	4
Debt ratio (F)	3	The number of new customers (LG)	3
		Sales to new customers as a proportion of total sales (LG)	2
3. Employee relations	3	*4. Supplier relations*	4
Staff turnover rates (LG)	3	Percentage of orders delivered by suppliers on time (I)	4
Improvements made to employee facilities (LG)	4	Percentage of orders from suppliers rejected (I)	3
Time spent developing employee programmes (LG)	3	Success of suppliers at meeting cost-down targets (I)	4
Employee satisfaction ratings (LG)	3	Supplier satisfaction surveys (I)	3
Suggestions implemented per employee (LG)	2	Number of disputes with suppliers (I)	3
5. Operational performance	5	*6. Product and service quality*	5
Cost effectiveness of providing services (I)	4	Quality of products (I)	5
Usage/wastage of resources (I)	5	Costs of quality (I)	4
Productivity (I)	4	Internal product defect rates (I)	4
Cycle time (I)	3	Number of product returns (C)	5
Hours/number of machine breakdowns (I)	4	Expenditure on warranty claims (C)	4
7. Alliances with other organisations	2	*8. Product and service innovation*	3
Number of new alliances formed (LG)	2	Number of new products introduced (LG)	3
Involvement/connectedness with other organisations (LG)	2	Time to market for new products (LG)	3
Percentage of sales to sales from new alliances (LG)	1	Percentage of revenue from new products/new applications (LG)	3

Table AI. Measurement of SPMS variables

Notes: F, financial; C, customer; I, internal; LG, learning and growth. NB: two of the 37 items did not load onto any dimension and were removed from the analysis

by the responding business unit. It was considered that a specific driver was "important" if the respondent indicated a "5" on the scale. Therefore, in examining the data above it can be seen that this respondent classified the following drivers as being important: operational performance, and product and service quality. The link to value drivers was then assessed based on the extent of use of performance measures relating to these specific value drivers. For operational performance the total of the five items was 20 with the average equal to 4. For product and service quality the total of the five items was 22 and the average is equal to 4.4. The link to value driver was subsequently measured as the average of these two average scores (4 and 4.4) and hence is scored as 4.2 (i.e. 8.4/2).

Link to strategy

Assuming that the above data are for a prospector, to calculate the link to strategy the study focussed on the extent of use of performance measures relating to customer relations, product and service quality, and product and service innovation. For customer relations there were five measures with the total score being 14 and the average equal to 2.8. For product and service quality there were five measures with the total score being 22 and the average equal to 4.4. For product and service innovation there were three items with the total score being 9 and the average equal to 3. The link to strategy is subsequently measured as the average of these three average scores (2.8, 4.4, and 3) and hence was scored as 3.4 (i.e. 10.2/3).

Use of multidimensional performance measures

The total score and average scores for the items classified under each of the multidimensional performance measure dimensions are shown in Table AII. The use of multidimensional performance measures was assessed as the sum of these averages i.e. $(3.75 + 4 + 4.5 + 3.25) = 13.89$.

BSC dimension	Number of items	Total score (four highest scoring i.e. used the most)	Average score
Financial	4	15	3.75
Customer	5	16	4
Internal	13	18	4.5
Learning and growth	13	13	3.25

Table AII. Measure of BSC dimensions

About the author

Dr Kevin Baird has extensive experience of teaching undergraduate and postgraduate subjects in the management accounting area. He has also supervised numerous Honours and PhD students and conducted research covering many topic areas within the management accounting discipline including: activity-based management practices; total quality management; performance measurement systems; management control systems; outsourcing; employee organisational commitment; and employee empowerment. His work has been published in many top ranking journals such as *Accounting, Auditing and Accountability Journal*, *Management Accounting Research* and *International Journal of Human Resource Management*. Dr Kevin Baird can be contacted at: kevin.baird@mq.edu.au