

Effectiveness of the Balanced Scorecard: The Impact of Strategy and Causal Links

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Abstract

Many of the claimed benefits of the Balanced Scorecard (BSC) rely on the linkage of its performance measures to strategy and on causal relations among its measures. Using a survey research method, this study examines the extent to which adopters of BSC consider these features and whether they result in more effective performance measurement systems.

A survey of medium and large Australian manufacturing organisations reveals that varying forms of scorecards are used in practice and that managers who perceive that their scorecard measures are linked to strategy and affect each other in a causal manner also perceive a higher level of effectiveness of the BSC. The study also suggests that strategic use of BSC is not as widespread as might be expected.

Keywords

**Balanced Scorecard
Performance Measurement Systems
Performance Measurement and
Management Systems
Strategy Link
Casual Links**

Introduction

The balanced scorecard (BSC) was introduced by Kaplan and Norton in the early 1990s as a framework to provide a structure for various measures of organisational performance. Since its introduction it has evolved and gained a high degree of recognition as one of the most widely used recent innovations in management accounting (Lawrie and Cobbold, 2004), possibly due to the vigour of its attributes (Nørreklit and Mitchell, 2007). Kaplan and Norton (2001) state that the BSC takes performance measurement systems (PMSs) a step forward by moving away from a checklist for managers, to a strategic performance measurement and management system.

Although the benefits of the BSC have been noted often in the literature (e.g. Malmi, 2001; Mooraj, et. al., 1999; Ittner, et. al., 2003), research that examines the extent and the nature of its use provides mixed findings. While some research reveals that the BSC is effectively used by organisations to achieve their goals, and also is widely used (Mooraj, et. al., 1999; Davis and Albright 2004; Hoque and James, 2000; Malmi, 2001), other research raises concerns about the effectiveness of the BSC and the extent of its use in organisations (Nørreklit, 2003; Speckbacher, et. al., 2003; Perera, et. al., 2007). Existing literature also reveals the diversity of performance measurement systems labelled as BSCs which often vary from what was initially proposed by its proponents (e.g. Speckbacher, et. al., 2003; Ax and Bjørnenak, 2005; Ahn, 2001). For instance, while some organisations measure performance along the four perspectives (i.e., financial, customers, internal business processes, and learning and growth) that were initially recommended by Kaplan and Norton (1992), there are other organisations who selectively use these perspectives and incorporate further perspectives (Bedford, et. al., 2006).

Concerns have also been expressed about the extent to which certain design features that are crucial to the successful

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implementation of the BSC are considered by BSC adopters (e.g. Malmi, 2001; Bedford, et. al., 2006). Two features that distinguish the BSC from more traditional PMSs are: (i) the development of performance measures by translating mission, objectives and corresponding strategies of the organisation (hereafter strategy link); and (ii) linking together of the measurements under the perspectives in a causal chain (hereafter causal links). In particular, in relation to the second feature (i.e., the causal links), Nørreklit and Mitchell (2007, p. 177) state that ‘without this characteristic a true BSC does not exist’. Although the existing literature suggests that not all organisations develop the measures within their scorecards based on the strategy link (Speckbacher, et. al., 2003) and causal links (Malmi, 2001), there has not been any systematic empirical investigation to understand the extent of such varying forms of BSC applications in practice.

Theoretically, the effectiveness of the BSC as a PMS depends, to a large extent, on the strategy link and causal links within the BSC (Kaplan and Norton, 1996; 2001). A clear link between the organisation’s strategy and performance measures enables the BSC to be used effectively not only as a measurement system but also as a management system. For instance, the strategy link helps to identify, monitor and manage critical success factors, including both quantitative and qualitative factors, as well as to communicate and implement the organisation’s strategy. Cause and effect relations among measures within the scorecard also ensure that the measurement system drives every part of the organisation to aim towards achieving organisational-wide objectives and hence promotes goal congruent behaviour. These two design features of the BSC which distinguish it from the more traditional performance measurement systems, are claimed to make it an effective strategic performance measurement system as well as a management system (Kaplan and Norton, 1996b; 2000). Nevertheless, only limited attention has been paid in the existing literature to empirically examine the impact

of these two links on the effectiveness of the BSC.

This study aims to make a contribution to the existing literature on the BSC by examining (i) the nature and the extent of use of the BSC in Australian manufacturing firms; and (ii) whether BSC adopters who perceive that their scorecard measures are linked to strategy and affect each other in a causal manner also perceive a higher level of effectiveness of the BSC. The study uses survey research method to gather data from medium and large Australian manufacturing organisations in order to examine the research questions.

The remainder of the paper is divided into five sections. The section that follows develops the theory and presents the hypotheses. Section three outlines the research method. Results of the study are presented in section four followed by a summary and conclusions in section five.

Hypotheses Development

Effectiveness of the BSC

Kaplan and Norton (1996) note that the BSC has the capacity to serve a number of purposes. These include clarifying and gaining consensus about strategy, aligning departmental and personal goals to strategy, linking strategic objectives to long-term targets and annual budgets, identifying and aligning strategic initiatives, and obtaining feedback to learn about and improving strategy (Kaplan and Norton, 1996, p. 19). Additionally, they also note that the BSC enables organisations to focus on all strategic areas within the organisation, monitor short-term results from the four perspectives, namely financial, customer, internal business process and learning and growth perspectives, and communicate and implement strategies throughout the organisation. It also helps to generate superior financial outcomes due to the inclusion of measures for both tangible and intangibles assets. Mooraj, et. al., (1999) observe the BSC as a “necessary good” for today’s organisation and state that it not only adds value by offering both relevant and balanced information, but creates a learning environment where the causal

hypothesis can be tested, and strategies can be modified.

Research on the BSC, in general, shows that the BSC helps to improve organisational performance. For instance, subsequent to the introduction of the BSC in their organisations, most of the respondents in Malmi's (2001) study noticed improvements in a number of areas such as logistics, delivery reliability, real time changing targets and warehouse turnover. Hoque and James (2000) also reveal improved performance with a greater usage of the BSC in a sample of Australian manufacturing companies. Their study measured organisational performance in terms of return on investment, sales margin, capacity utilisation, customer satisfaction, and product quality. Similar improvements were also found in service industries. For instance, Davis and Albright (2004) studied the BSC in the banking industry in the US and found superior financial performance for branches adopting the BSC compared with the non-BSC adopting branches. Additionally, companies implementing more sophisticated BSCs have been found to claim greater benefits and satisfaction than those with less developed BSCs (Speckbacher, et. al., 2003).

In addition to the improvements in financial performance and other more material gains, the BSC has also been found to lead to outcomes of a more qualitative nature. For example, Ittner, et. al., (2003) found that the BSC is associated with high level of measurement system satisfaction. Epstein and Mansoni (1998) note that the BSC provides the managers a more "balanced view of the whole organisation, allows managers to keep an eye on the way performance is achieved, and offers the organisation a clear way to communicate and reinforce its strategy" (p. 196). Moreover, Malina and Selto (2001) state that the BSC has potential to motivate lower-level managers to align their actions with organisational strategy and to improve sub-unit performance. Their study reveals that the BSC provides a greater opportunity to develop, communicate and implement organisation strategy.

Nevertheless, not all studies show a positive association between BSC adoption and the desired outcomes. Ittner, et. al., (2003), for instance, found a negative association between the BSC usage and return on assets, and also found that the use of the BSC is not statistically related to sales growth or either 1-year stock return or 3-year stock return. Ittner and Larcker (1998) found that scorecard usage assisted only a minority of managers in understanding goals and strategies or in relating their jobs to business objectives. Chenhall and Langfield Smith (1998) reported that while BSC were part of the 'best practices' of high performing firms, they were also evident in poor performing firms that had less developed management techniques. Although Bedford, et. al., (2006) found a significant positive relationship between the use of the causal links within the BSC and organisational performance, especially for the users of management by objectives (MBO), the extent of implementation of the BSC, however, had only limited impact on organisational benefits.

In summary, the findings on the effectiveness of the BSC appear to be inconclusive. One contributing factor leading to the conflicting findings on the effectiveness of the BSC could be the varying forms of BSCs in practice. This suggests the importance of understanding the features that make the BSC an effective PMS. The proponents of the BSC suggest that *inter alia* strategy and causal links within the BSC could have a significant effect on the effectiveness of the BSC as a performance measurement and management system. Consequently, the effectiveness of the BSC is likely to be dependent on the extent to which such links are considered when designing and implementing the BSC.

Strategy link and the Effectiveness of the BSC

In practice, the BSC appears to vary from a mere selection of multi-dimensional performance measures to systems that constitute measures that are linked to strategy. According to the proponents of the BSC, measures that are developed based on the strategy of the organisation ensure a

more strategic approach to management, and are likely to enhance organisational performance. This process enables firms to consider how strategies are to be affected by their impact on various perspectives on the BSC, and the performance implications of strategies for each of those perspectives.

Organisations that adopt the BSC are expected to translate their mission and strategy into objectives and performance measures respectively (Kaplan and Norton, 1996; Langfield Smith, et. al., 2006). Developing performance measures based on the strategy of the organisation is a fundamental feature of the BSC (Kaplan and Norton, 1996; Atkinson, et. al., 1997; Malina and Selto, 2001). This feature transforms performance measurement systems from a simple operational checklist to a comprehensive strategy implementation system (Kaplan and Norton, 1996). It not only helps managers focus on measuring and managing strategic areas, but also helps communicate strategy throughout the organisation (Kaplan and Norton, 1996). Furthermore, the strategy link within the BSC enables aligning strategic stakeholder management with strategic performance management (Atkinson, et. al., 1997). Such a link also helps in assessing the current strategy, and assists in formulating future strategy (Mooraj, et. al., 1999).

Additionally, the need to translate the organisation's strategy to measures of performance could force managers to identify the key success factors based on the organisation's strategy and then develop measures to assess and manage those key success factors (Langfield Smith, et. al., 2006), and hence the BSC helps to tie strategy and operational actions together (Malmi, 2001). As a result, the BSC represents a PMS with a practical meaning for management (Nørreklit and Michell, 2007). These benefits, however, can be gained only through careful designing of the scorecard (Malina and Selto, 2001).

It can be argued that the presence of strategy link within the BSC makes it an effective performance measurement and management system by providing relevant information for planning, control, and

decision making (Morse, et. al., 2003; Horngren, et. al., 2005), and also by facilitating communication, implementation, evaluation and revision of organisational strategy (Kaplan and Norton, 1992, 1996). PMSs, in general, are increasingly considered as a methodology to control and align organisational strategy (Malina and Selto, 2001; Ittner, et. al., 2003). Such purposes can be served only when due consideration is given at the design stage of the PMS to clearly understand what the strategy of the organisation is.

Contingency theorists highlight the importance of establishing an appropriate fit between an organisation's strategy and its management control system (Fisher, 1995; Langfield Smith, 1997; Miles and Snow, 1978; Govindarajan, 1988). Since PMSs are a component of management control systems (Flamholts, et. al., 1985), it is possible to argue that a fit between PMSs and organisational strategy could have an impact on organisational performance (Abernethy and Guthrie, 1994; Govindarajan and Gupta, 1985) as well as on the effectiveness of the PMS (Kaplan and Norton, 2001). Accordingly, organisational performance and effectiveness of PMS is likely to be improved if the gap between a firm's strategy and its PMS is minimised (Fisher, 1995; Langfield Smith, 1997) by implementing the strategy link at the design stage of the measurement system.

Based on the above reasoning it can be argued that the strategy link within the BSC contributes to the effective use of the BSC for planning, control and decision making as well as for development, communication, and implementation of the strategy within the organisation. Based on this argument the following hypothesis is proposed.

Hypothesis 1: *The implementation of the strategy link within the balanced scorecard is positively associated with the effectiveness of the balanced scorecard.*

Causal Links and the Effectiveness of the BSC

A “scorecard should contain outcome measures and the performance drivers of those outcomes linked together in a cause and effect relationship” (Kaplan and Norton, 1996, p.53). The cause and effect chain (i.e., causal links) is a central feature of the BSC, which makes it an effective performance measurement and management system (Kaplan and Norton, 1996). Kaplan and Norton (1996) articulate that the measures of learning and growth are the drivers of the measures of internal business processes, which then become the drivers of measures in the customer perspective. The measures in the customer perspective, in turn, drive measures in the financial perspective.¹

A well designed BSC should contain a mix of outcome measures (i.e., lag indicators) and performance drivers (i.e. lead indicators). The measures within the BSC can, therefore, be sub-divided as lead (driver measures) and lag indicators (outcome measures) based on causal links between measures within each perspective as well as across different perspectives (Langfield Smith, et. al., 2006). Lead and lag indicators apply horizontally within the areas, and vertically between areas (Nørreklit and Mitchell, 2007). For instance, delivery time and customer satisfaction are commonly used measures within the customer perspective, and since delivery time (a lead indicator) drives customer satisfaction (a lag indicator), a cause-and-effect relationship exists between these two measures in the customer perspective. Measures across different perspectives are also expected to affect each other in a causal manner. Accordingly, financial outcomes of the organisation can be influenced by adding value to the intangibles (e.g. efficient operation process) through the cause-and-effect chain involving two or three intermediate stages within the BSC (Heskett, et. al., 1994; Huselid, 1995; Becker and Huselid, 1998). For example, a good customer relationship (an intangible) could be built through

extensive employee training (stage 1) and effective operational processes (stage 2). In the case study of a U.S. financial service firm, Davis and Albright (2004) concluded that employees with more knowledge and skills (Learning and Growth perspective) were better able to identify customer needs, which in turn led to more satisfied customers (customer perspective). They concluded that due to such causal relationships within the BSC, the BSC was able to drive improved financial performance. Banker et. al. (2000) also found that customer satisfaction is significantly associated with future financial performance.

Causal links within the BSC could contribute to the effectiveness of the BSC as a performance measurement and management system. Such links could lead to effective measurement and management of key success factors throughout the organisation. Also, the need to establish causal relations among measures could force managers to choose the most relevant measures, and hence prevent them being overwhelmed with a broad set of *ad hoc* measures (Langfield Smith, et. al., 2006). Causal links also make sub-unit managers consider activities in other parts of the organisation when planning and making decisions in their own sub-units. Developing causal links among the measures across perspectives as well as within each perspective could provide valuable assistance for management planning. For instance, in order to increase the sales volume (a lag measure in the financial perspective), managers should not only identify lead measures in the customers perspective (e.g. customer satisfaction), but also lead measures within the financial perspective (e.g. sales mix). Similarly, if the management plans to improve customer satisfaction (a lag measure in the customers perspective), they need to identify, measure and manage lead measures in the internal business processes perspective (for instance, the number of units completed) as well as lead indicators in the customers perspective (for instance, on-time delivery). Causal links help managers focus on activities that will in fact drive high performance in different

¹ Nørreklit (2000), however, argues that the BSC does not have causal links but only logical connections.

strategic areas rather than paying attention to a broad set of activities on an *ad hoc* basis. Additionally, as causal links help to integrate various strategic areas within the organisation and improve information flow across these strategic areas (Kaplan and Norton, 1996), BSCs with causal links could become instrumental in effective communication of strategy throughout organisations.

Based on the above reasoning, it could be argued that causal links within the BSC could contribute to its effective use for better planning, efficient control and effective communication and implementation of organisational strategy. This argument leads to the following hypothesis.

Hypothesis 2: *The implementation of causal links within the balanced scorecard is positively associated with the effectiveness of the balanced scorecard.*

Strategy and Causal Links and the Effectiveness of the BSC

As argued above, strategy and causal links could have a positive effect on the effectiveness of the BSC independently. When both these links are considered in designing the BSC and exist within the BSC, the effectiveness of the BSC is likely to be greater than when only one of the links exists. The increase in the effectiveness of the BSC under this condition is likely to be associated with the interaction effect of strategy and causal links. Having both links together is likely to have a stronger effect on strategic planning, controlling, and decision making, and could lead to more effective communication and implementation of strategy down to the more micro department or operational levels within an organisation.

The effectiveness of the BSC as a PMS could be compromised if an organisation chose to adopt only one of the two links. If the BSC has been designed using only the strategy link, the organisational members may better understand the strategic plan and objectives of the organisation through the strategy link, but the limited attention to

causal links may make it difficult for the management to identify factors that drive the desired outcomes of the strategic plans. Additionally, even when the strategy link enables management to determine measures that are relevant to assess the progress of strategy implementation, unless cause and effect relations are recognised, measures could be selected on an *ad hoc* basis leading to a loss of a clear management control focus. Additionally, although the strategy link helps to select the more appropriate measures based on the strategy of the organisation, failure to establish cause and effect relations among measures could limit effective implementation of the strategy throughout the organisation, hence leading to lower organisational performance.

In a similar vein, the effectiveness of the BSC as a PMS could also be compromised if an organisation emphasises causal links without considering the strategy link. Although the causal links on its own accord could help achieve the given objectives, it may not necessarily lead to achieving the organisation's strategic objectives. Furthermore, although the presence of causal links could improve communication and coordination across different strategic areas, what is being communicated might not be relevant at times due to the limited consideration of the strategy of the organisation.

Overall, it could be argued that the benefits resulting from the presence of both strategy and causal links within the BSC are likely to be greater than when only one of the links is present. Based on this argument the following hypothesis is proposed.

Hypothesis 3: *There will be an interaction effect of strategy and causal links on the effectiveness of the balanced scorecard.*

Research Method

Using a questionnaire survey, data for this study was obtained from a randomly selected sample of large and medium size manufacturing organisations in Australia. The sample was selected from the Kompass data base, which is a commercially available data base. Dillman's (2000)

Tailored Design Method was used in this study in designing the questionnaire and in administering the survey. For instance, in designing the questionnaire, every effort was made to make it 'respondent-friendly', and when administering the survey, a number of measures were taken to improve the response rate (e.g. multiple contacts, personalisation of correspondence, a thank you postcard) (Dillman, pp. 150-152). Three measurement instruments were developed and used to measure the two independent variables (i.e., strategy link and causal links) and the dependent variable (i.e., the effectiveness of the BSC). Strategy link is the manager's perception of the extent to which the sub-unit's BSC measures are linked to the strategy. The causal links is the manager's perception of the extent to which causal relations are recognised among the performance measures within each BSC perspective and across BSC perspectives. The effectiveness of the BSC is the manager's perception of the effectiveness of the BSC. In this study, the effectiveness of the BSC is defined as the ability of the BSC to be used for planning, control and decision making as well as for development, communication, and implementation of the strategy.

The questionnaire had five sections. Section A had one item aiming to identify the level of adoption of the BSC and nine items to help understand the use of multi-dimensional measures by the BSC adopters. All items in Section A were forced-choice questions. Section B had six items designed to measure the level of the perceived strategy link within the BSC. Section C had eight items designed to measure the level of the perceived causal links within the BSC. Section D had eight items to measure the perceived effectiveness of the BSC.² All items in Sections B, C and D used a seven-point Likert type scale, ranging from "strongly disagree" (1) to "strongly agree" (7). Section E of the questionnaire was

designed to gather relevant demographic information from the participants.³

The survey instrument was sent to 280 medium and large size manufacturing companies randomly selected from the Kompas database. They were addressed to the CEO, CFO, financial controller, senior accountant or the finance director of each company. Since the aim of this study is to examine the design features of the BSC and its use for management purposes, it was envisaged that these position holders were likely to have a sufficient understanding of the relevant issues in order to respond to the questionnaire. Each company in the sample received a survey questionnaire, a cover letter, a self addressed envelope and a postcard. Respondents were requested to return the postcard separately after returning the completed questionnaire to prevent a follow-up questionnaire being sent to them. Two weeks after the initial mail-out of the survey instrument, a follow-up questionnaire was sent to the non-respondents. From the 280 organisations, 75 responses were received (47 after the initial mail-out and 28 after the follow-up mail-out), resulting in a 26.8% response rate. Of these 75 responses, one response was incomplete, hence was removed from the final analysis. This led to 74 usable responses, resulting in a 26.4% response rate. The early vs. late test conducted to check for potential non-response bias showed no significant difference (p-values = 0.681; 0.506; 0.635 for the strategy link, causal link and effectiveness respectively) between the means of early and late responses for the two independent variables and the dependent variable. The early vs. late test was also conducted in relation to question one, where respondents had to indicate the extent to which BSC is used in their organisations. This was deemed necessary to verify whether those who responded late had relatively little use of the BSC. However, the test showed no significant difference (p-values = 0.663) between the means indicating that late respondents had the same responses as the

² The instrument developed by Bedford et al. (2006) to measure the benefits of the BSC was largely used in developing this instrument.

³ A copy of the questionnaire could be obtained from the corresponding author upon request.

early respondents, and hence no evidence of non-response bias.

Extent of the Adoption of the BSC

In order to test the hypotheses, it was necessary to identify those organisations that had adopted the BSC. In section one of the questionnaire, respondents were

required to select one of the five options in relation to the degree of adoption of the BSC, namely “Not considered”, “Implemented then abandoned”, “Gaining acceptance”, “Used to some extent” and “Used extensively”. Table One reports the responses to this question.

Table One: Adoption of the BSC

Degree of Adoption	Number of Organisations	Percentage
Not Considered	17	23%
Implemented then Abandoned	1	1.3%
Gaining Acceptance	15	20.3%
Used to Some Extent	32	43.2%
Used Extensively	9	12.1%
Total	74	100%

Table One shows that the largest group comprises organisations that used the BSC to some extent, which represents 43.2% of the sample. For the purpose of hypotheses testing, the last three groups (Gaining acceptance, Used to some extent and Used extensively) were considered as BSC adopters (56 companies). The “Gaining acceptance” group was classified as BSC adopters with the assumption that the BSC has already been designed and implemented and is gaining acceptance from members of the organisation. The “Used to some extent” group also implies that the BSC has

already been designed and implemented although the extent of its use may be limited. However, a further examination of the responses to the multi-item instrument in Section A identified twelve companies that used only one or two perspectives in their BSCs. Although all these twelve companies have claimed that the BSC is gaining acceptance, they were removed from the sample used for analysis, leaving 44 companies in the final sample as BSC adopters. The sample of companies used in the final analysis is presented in Table Two.

Table Two: BSC Adopters

Degree of Adoption	Number of Organisations	Percentage
Gaining Acceptance	3	6.8%
Used to Some Extent	32	72.7%
Used Extensively	9	20.5%
Total	44	100%

This study shows that organisations identified as BSC adopters, in general, are using multi-dimensional performance measures. While all companies in the sample used measures in the financial perspective, only 65.9% used measures in the learning and growth perspective. The study suggests that the customer perspective and internal business processes perspective are measured relatively widely

(93.2% and 90.9% respectively) by those who claim to adopt the BSC. In addition to these four perspectives (i.e., financial, customer, internal business processes, and learning and growth) initially recommended by Kaplan and Norton (1992, 1996), some companies in the sample measure other perspectives such as environment (13.6%), safety (6.8%), people and behaviour (6.8%), community (2.3%), and ethics

(2.3%). Overall, 24 firms (54.5% of the adopters) have all four perspectives elaborated by Kaplan and Norton (1992), while twenty firms (45.5% of the adopters) have only three of those perspectives.

Measurement of Variables

The Strategy Link

The strategy link was measured by the sum of the scores of the six items used to measure the perceived strategy link. The Cronbach's alpha for the strategy link construct is high at 0.913, indicating a high level of reliability. Factor analysis undertaken to test the construct validity suggests that the items used to measure strategy link explain 70.622% of the variance, and they load into one factor with all individual loadings greater than 0.7, indicating they meet an acceptable level of construct validity (Nunnally, 1978) (see Appendix). Pearson's correlations show that all items within the strategy link construct are significantly correlated with each other at 1% significance level indicating a high level of convergent validity.

The Causal Links

The causal links was measured by the sum of the scores of the eight items used to measure the perceived causal links. The Cronbach's alpha for the causal links construct is high at 0.909, indicating a high level of reliability. The items in the construct were developed to represent the two major components of the causal links (the causal links within each perspective and across perspectives). Factor analysis undertaken to test the construct validity suggests that the instrument used to measure causal links explains 61.742% of the variance, and load into one factor with all individual loadings, except for one, greater than 0.7 indicating they meet an acceptable level of construct validity (Nunnally, 1978) (see Appendix).⁴ Pearson's correlations reveal that all items

within the causal links construct are significantly correlated with each other at 1% significance level, indicating a high level of convergent validity.

The Perceived Effectiveness of the BSC

Eight items were used to measure the perceived effectiveness of the BSC. The sum of the scores of these eight items generated the value for the effectiveness of the BSC. The Cronbach's alpha statistic for the effectiveness construct is high at 0.923, indicating a high level of reliability. The factor analysis shows that the items used to measure effectiveness explain 80.142% of the variance. They load into two factors with all individual loadings greater than 0.7 (see appendix). As the first factor explained 65.57% of the variance one factor was considered to be sufficient for use in the analysis. Pearson's correlations reveal that all items within the effectiveness construct are significantly correlated with each other at 1% significance level.

Data Analysis Technique

Hypotheses one and two propose associations between the effectiveness of the BSC and strategy link and causal links respectively. The following two simple regression models are used to test these two hypotheses.

$$\text{Effectiveness} = a_0 + a_1 * \text{Strategy link} + e \quad (1)$$

$$\text{Effectiveness} = b_0 + b_1 * \text{Causal link} + e \quad (2)$$

If the coefficient a_1 is significantly greater than zero, this study will provide support that strategy link is positively associated with the effectiveness of the BSC. Similarly, if the coefficient b_1 is significantly greater than zero, this study will provide support that causal links is positively associated with the effectiveness of the BSC.

Hypothesis three proposes an interaction effect of strategy and causal links. The following multiple regression model is used to test this hypothesis.

⁴ Item two within the causal link construct had an individual loading of .692. The item was, however, retained because it captures the causal link between the learning and growth perspective and the internal business process perspective within the BSC.

$$\text{Effectiveness} = c_0 + c_1 \cdot \text{Strategy link} + c_2 \cdot \text{Causal link} + c_3 \cdot (\text{Strategy link} \cdot \text{Causal link}) + e \quad (3)$$

If the coefficient c_3 is significantly greater than zero, this study will support the hypothesis that the interaction between strategy and causal links is positively associated with the effectiveness of the balanced scorecard.

Results

Table Three presents the descriptive statistics for the three variables of interest in the study. As shown in the table, the observed ranges for the three variables (i.e.,

Strategy link, Causal links, and Effectiveness) are 19-42, 28-56 and 24-54 respectively. This indicates that some organisations have selected “7” (strongly agree) to every item in the three instruments, and that no organisations have selected “1” (strongly disagree) to every item in the three instruments. The means for these three variables are 32.57, 40.18 and 40.77 respectively, indicating a trend for organisations to favour the agreement end of the item scale. Organisations which were ambivalent on every item would have an expected score of 24, 32 and 32 respectively for the three variables.

Table Three: Descriptive Statistics

	N	Theoretical Range	Observed Range	Mean	Std. Deviation
Strategy link	44	6 – 42	19 – 42	32.57	5.70
Causal links	44	8 – 56	28 – 56	40.18	7.26
Effectiveness	44	8 – 56	24 – 54	40.77	7.91

Using histograms, the distributions of the frequencies for individual items and the three variables were also examined. This analysis showed that it was reasonable to believe that the data for the three variables of interest follow a normal distribution, and confirmed that the selection of the point on the scale for each item within each instrument by the respondents was reasonably consistent. There were no respondents who had selected low points on the scale for some items, and at the same time, selected high points on other items within the same instrument.

Table Four presents the correlations between the variables of interest in the study. The high positive correlations between all variables indicate that organisations which had high scores on the strategy link also tend to have high scores

on the causal link, and vice versa. Organisations with high scores on the strategy and causal links tend to have high scores for effectiveness. The high correlation between the strategy and causal links does however indicate that the respondents may not have clearly distinguished between the strategy link construct and the causal link construct. This was confirmed by examining the AVE statistics for these constructs, which were found to be lower than the correlations between that construct and other constructs, indicating a low level of discriminant validity. This implies that items in different constructs may measure the same thing, which is a potential limitation of the study. However, items in the questionnaire were developed based on the theoretical arguments in relation to the three variables.

Table Four: Pearson Correlations Between Variables

	Effectiveness	Strategy link	Causal link
Strategy link	.853(**)	1	
Causal link	0.860(**)	.791(**)	1
<i>** Correlation is significant at the 0.01 level (2-tailed).</i>			

Table Five presents the results of fitting the simple regression model proposed for the first hypothesis. These results suggest that the coefficient for the strategy link term in this model is positive (1.185) and

significant (p-value < 0.001) indicating that the stronger the strategy link, the more effective is the use of the BSC, and hence provides strong support for H1.

Table Five: Association between Strategy Link and the Effectiveness of the BSC

Variable	Standardised Coefficient	Coefficient	Std. Error	t ratio	p-value
Constant		2.183	3.693	0.591	0.558
Strategy link	0.853	1.185	0.112	10.604	0.000
$R^2 = 0.728$; $Adjusted R^2 = 0.722$; $D-Watson = 2.159$; $n = 44$					

Table Six presents the results of fitting the simple regression model proposed for the second hypothesis. These results suggest that the coefficient for the causal links term in this model is positive (0.937) and

significant (p-value < 0.001) indicating that the stronger the causal links, the more effective is the use of the BSC, and hence provides strong support for H2.

Table Six: Association Between Causal Links and the Effectiveness of the BSC

Variable	Standardised Coefficient	Coefficient	Std. Error	t ratio	p-value
Constant		3.137	3.498	0.897	0.375
Causal links	0.860	0.937	0.086	10.931	0.000
$R^2 = 0.740$; $Adjusted R^2 = 0.734$; $D-Watson = 1.778$; $n = 44$					

Table Seven presents the results of fitting the moderated multiple regression model proposed for the third hypothesis. The results presented in Table Seven show that the coefficient for the interaction term is not

significant (p-value > 0.10). This indicates there is insufficient evidence to suggest that the relationship between the effectiveness of the balanced scorecard and the use of the strategy link is moderated by causal links.

Table Seven: Association between Strategy Link, Causal Links and the Effectiveness of the BSC

Variable	Standardised Coefficient	Coefficient	Std. Error	t ratio	p-value
Constant		-25.471	15.526	-1.641	0.109
Strategy link	0.967	1.343	0.474	2.833	0.007
Causal links	1.096	1.193	0.435	2.740	0.009
Interaction	-1.052	-0.19	0.012	-1.559	0.127
$R^2 = 0.830$; $Adjusted R^2 = 0.817$; $D-Watson = 1.796$; $n = 44$					

Although these results do not suggest a relationship between effectiveness and the strategy link which is moderated by the causal link, and vice versa, they do suggest that an additive effect of the two links. Therefore, a further multiple regression model was fitted, to examine the additive effects of the strategy and causal links.

In the additive model, both variables (i.e., strategy link and causal links) are included. This model implies that effectiveness may be related to both these variables, but that the relationship between effectiveness and one variable is not modified by the relationship between effectiveness and the second variable. The additive model implies that there is a constant rate of change in effectiveness per unit change in strategy, for instance, and this rate of change is not

modified by the relationship between effectiveness and causal links. By including both variables in an additive model, it is possible to investigate whether effectiveness is related to both strategy link

and causal links, but not in a way where one variable modifies the effect of the other. The results of this analysis are given in Table Eight.

Table Eight: Association between Strategy Link, Causal Link and the Effectiveness of the BSC

Variable	Coefficient	Std. Error	t ratio	p-value
Constant	-1.761	3.165	-0.556	0.581
Strategy link	0.641	0.151	4.257	0.000
Causal link	0.539	0.118	4.563	0.000

R² = 0.820; Adjusted R² = 0.817; D-Watson = 1.917; n = 44

The results presented in Table Eight show that the coefficient for the strategy link is positive (0.641) and significant (p-value = 0.000). This indicates there is a significant association between the effectiveness of the balanced scorecard and the strategy link, after the effect of the causal links has been taken into consideration. Similarly, the results presented in Table Eight show that the coefficient for the causal links is positive (0.539) and significant (p-value = 0.000). This indicates there is a significant association between the effectiveness of the balanced scorecard and the causal links, after the effect of the strategy link has been taken into consideration. Variance Inflation Factors (VIF) for this regression were 2.674 for each variable, indicating that multi-collinearity is not a problem in this case.

Overall, the results of this study suggest that both strategy link and causal links are significant predictors of the effectiveness of the BSC, and that the additive effect of strategy and causal links is greater than when only one of the links exists. The significant results for the two predictors are especially noteworthy because they are quite highly correlated (see Table Four). The results suggest that even when the

positive impact of the strategy link on the effectiveness of the BSC is considered, the causal links adds an additional significant positive impact, and vice versa. Additionally, the adjusted R Squared for the regression model is approximately 0.830, indicating relatively high explanatory power of the theoretical model. It also reinforces a strong relationship between the two predictors and the effectiveness of the BSC.

In order to understand the extent of recognition of the strategy and causal links within the BSC by the adopters of the BSC, responses to strategy and causal links items were classified into three categories as ‘low adopters’, ‘average adopters’ and ‘high adopters’ of each of the two design features. Those who selected scores less than 4 on the seven point Likert type scale were regarded as ‘low adopters’, those who selected scores less than 6 but greater than 4 were regarded as ‘average adopters’, and those who selected scores above 6 were regraded as ‘high adopters’. Table Nine presents the extent to which strategy and causal links were perceived to be adopted by the organisations who participated in this study.

Table Nine: Extent of Use of Strategy and Causal Links

	Strategy link (Number)	Strategy link (Percentage)	Causal links (Number)	Causal links (Percentage)
High Adopters	15	34%	8	18%
Average Adopters	26	59%	29	66%
Low Adopters	3	7%	7	16%

Table Nine shows that most organisations who claim to adopt the BSC do not seem to have scorecards that have been designed according to Kaplan and Norton's (1992, 1996) initial recommendations. While 34% of the organisations in the sample perceive that their scorecard measures are strongly linked to the strategy of the organisation, only 18% of the organisations in the sample perceive that causal relations among measures are highly recognised when designing the BSC. However, most organisations in the sample (59% and 66% respectively) perceive that strategy and causal links have been considered to some extent when designing their BSCs. Overall, the limited attention given to the strategy and causal links by BSC adopters suggests that strategic use of BSC is not as widespread as might be expected.

Summary and Conclusions

The BSC came to be known widely, first, as a comprehensive performance measurement system that helps to overcome the limitations of the traditional measurement systems, and second, as a performance management system. Its ability to function as a strategic performance measurement and management system, however, depends to a large extent on its unique design features. The literature on the BSC does not provide conclusive evidence, either on the extent of its adoption, or the factors that influence its effectiveness. This study provides new insights into (i) the extent of adoption of the BSC as a PMS; (ii) the extent of adoption of two of its critical design features, namely strategy link and causal links; and (iii) the impact of those design features on the perceived effectiveness of the BSC.

The findings of this study on the extent of adoption of the BSC in large and medium size manufacturing organisations in Australia suggest that although the BSC has been known among academics as well as practitioners for more than a decade, the extent of its adoption in practice is rather limited. In particular, the performance measurement systems that are claimed as BSCs do not often seem to embrace the characteristics of a typical BSC. As noted

by Nørreklit and Mitchell (2007), the failure to incorporate some of the essential characteristics of the BSC (such as strategy link and causal links) could result in systems that are not 'true BSCs'.

In this study, approximately 59% of the respondents claimed to have adopted the BSC. However, only 20% of the respondents used it 'extensively', and the majority (73%) of the BSC adopters in the sample used it only 'to some extent'. Additionally, only 54.5% of the BSC adopters had all four perspectives (i.e., financial, customers, internal business processes, and learning and growth) within their BSCs. It was found that although all the respondents had financial perspective in their BSCs, the other three perspectives did not have the same level of importance, with 93% respondents having customer's perspective and 91% having internal business processes perspectives and only 66% having learning and growth perspective in their BSCs. This study suggests that while manufacturing organisations are still placing a relatively high emphasis on the financial aspect of organisational performance, customer and internal business process strategic areas are also gaining recognition in measurement systems. Learning and growth still seems to attract less attention as a critical strategic area in performance measurement systems. Although intangible assets such as intellectual capital have been regarded as a major source of competitive advantage, and the BSC has been recognised for its ability to measure intangibles (Kaplan and Norton, 1996, 2000, 2001), approximately 34% of the responding organisations in this study do not seem to measure such intangibles. Nevertheless, there were a number of organisations that used additional perspectives, such as environment, safety, people/behaviour and ethics. The inclusion of further perspectives in the BSC may be due to the nature of those organisations' mission and strategy (Kaplan and Norton, 1996).

The finding that indicates that 93% (41/44) of the responding organisations are using both financial and non-financial measures is encouraging as it suggests that although the

BSC is still not used extensively, organisations are moving away from the more traditional financial focused measurement systems to multi-dimensional measurement systems. In contrast to uni-dimensional measurement systems, multi-dimensional systems enable organisations to enhance their performance effectively across different dimensions of organisational performance and encourage a longer term focus.

Strategy link and causal links have been suggested as the features that make the BSC an effective strategic performance measurement and management system (Kaplan and Norton, 1996; 2001). This study provides empirical evidence to support that proposition. The study found that both the strategy link and the causal links are positively associated with the effectiveness of the BSC, and the additive effect of those two links on the effectiveness of the BSC is greater than when only one link exists. However, no significant interactive effects between the strategy and the causal links have been found on the effectiveness of the BSC.

This study also shows that most organisations who claim to adopt the BSC do not seem to recognise the importance of incorporating these critical design features in their BSCs. Of the 44 firms in the sample, only 15 (34%) firms and 8 (18%) firms paid a high level of attention to incorporating strategy and causal links respectively when designing their BSCs. It appears that managers consider the strategy link relatively more than the causal links when developing the BSC, and this could be due to managers' limited understanding of the meaning and importance of the causal links (Malmi, 2001). More disturbing was to find out that only a very small number of adopters (16%) incorporate both the strategy link and the causal links to a large extent in their BSCs.⁵

⁵ In order to examine whether the "used extensively" group has more strategy and causal links than the others, we compared the average scores of the strategy and causal links of the two groups and found that the "used extensively" group had a higher score for both links.

These findings indicate that although these two design features have been considered as fundamental features of the BSC in making it an effective PMS, often they are not being considered to any large extent when designing BSCs. However, the significant positive association between the two design features and the effectiveness of the BSC found in this study further suggests that managers should seriously consider incorporating strategy and causal links when designing and using their BSCs.

The findings of this study are interesting for a number of reasons. Firstly, the study found that the strategy and causal links within the BSC are positively and significantly associated with the effectiveness of the BSC implying that BSC adopters should pay careful attention to those features when designing their BSCs. Secondly, the study provides empirical evidence to suggest that even after more than a decade since its initial introduction, the BSC is still not widely used in large and medium size manufacturing organisations in Australia. Thirdly, the study shows that BSCs used by different organisations seem to have different design features. For instance, they vary in terms of the number of perspectives within the BSC as well as the extent of consideration given to organisations' strategy and the causal links between measures when designing the BSC. This finding (in relation to the varying use of the BSC) is consistent with Ax and Björnénak (2005). Fourthly, the study suggests that the strategic use of BSC by organisations is not widespread due to the limited attention paid to the strategy and causal links within the BSC. Nevertheless managers might still find the BSC effective for other purposes that concern employing multiple measures. Fifthly, although these two features are not extensively used by most organisations, managers who perceive that their scorecard measures are linked to strategy and affect each other in a causal manner also perceive a higher level of effectiveness of the BSC. Sixthly, the study also suggests that some companies that claim to use the BSC may either not be using it, or may be using some other form that fits their requirements better.

There are a number of limitations of this study. Despite the use of Dillman's (2000) Tailored Design Method meticulously in this study, the response rate was relatively low which may generate some concerns about the validity of the findings. The two measurement instruments developed in this study to measure the two independent variables may need further validation. Additionally, although the early vs. late test was used to test non-response bias, using late respondents to proxy for non-responders is somewhat weak.

This study was unable to undertake an in-depth analysis of the reasons for the limited use of the BSC as well as organisations' failure to incorporate the key design features of the BSC. This is an important area of investigation, and field studies using semi-structured interviews with organisations who claim to use (and not use) BSCs may provide richer data to improve our understanding of the use of the BSC. Future research may also consider using a larger sample to replicate this study. Further, a more refined questionnaire instrument with additional items could provide a more comprehensive data set to enable an improved analysis.

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Appendix

Factor Analysis for Strategy Link

Total Variance Explained

Component	Initial Eigen values			Extraction Sums of Squared Loadings		
	Total	% of Variance	Cumulative %	Total	% of Variance	Cumulative %
1	4.237	70.622	70.622	4.237	70.622	70.622
2	.601	10.011	80.633			
3	.417	6.957	87.590			
4	.316	5.273	92.863			
5	.268	4.467	97.329			
6	.160	2.671	100.000			

Extraction Method: Principal Component Analysis.

Loadings for Individual Items of the Strategy Link

Items	Component Loading
Our performance measurement system (PMS) translates the mission and firm's strategy into specific objectives.	.901
Our PMS translates the firm's objectives into operational performance measures that are actionable at the local level.	.863
Our PMS communicates the strategy to all levels of the organization.	.859
Our PMS aligns both departmental and individual objectives with firm's strategy.	.870
Our PMS evaluates the strategy in the light of the recent performance of the firm.	.700
In our PMS, performance measures are linked to the strategy of the firm.	.835

Factor Analysis for Causal Links

Total Variance Explained

Component	Initial Eigen values			Extraction Sums of Squared Loadings		
	Total	% of Variance	Cumulative %	Total	% of Variance	Cumulative %
1	4.939	61.742	61.742	4.939	61.742	61.742
2	.784	9.799	71.541			
3	.586	7.319	78.861			
4	.559	6.993	85.854			
5	.463	5.792	91.647			
6	.333	4.161	95.807			
7	.206	2.572	98.379			
8	.130	1.621	100.000			

Extraction Method: Principal Component Analysis.

Loadings for Individual Items of the Causal Link

Items	Component Loading
Our PMS identifies and measures the drivers of performance within each strategic area. (For example, if improving Return on Equity is a key performance indicator, cost per unit can be one of its drivers).	.733
Our PMS recognizes that performance in the Learning and Growth area affects the performance in the Internal Business Process area.	.692
Our PMS recognizes that performance in the Internal Business Process area affects the performance in the Customer area.	.760
Our PMS recognizes that performance in the Customer area affects the performance in the Financial area.	.787
Our PMS recognizes that the performance within each strategic area (Learning and Growth, Internal Business Process and Customer) drives the firm's financial performance.	.823
In our PMS, individual performance measures within each strategic area are linked in a cause-and-effect manner.	.818
In our PMS, the measures between strategic areas are linked in a cause-and-effect manner.	.885
Our PMS has causal links of measures within each strategic area as well as between strategic areas.	.774

Factor Analysis for Effectiveness of BSC

Total Variance Explained

Component	Initial Eigen values			Extraction Sums of Squared Loadings			Rotation Sums of Squared Loadings		
	Total	% of Variance	Cumulative %	Total	% of Variance	Cumulative %	Total	% of Variance	Cumulative %
1	5.246	65.569	65.569	5.246	65.569	65.569	4.021	50.269	50.269
2	1.166	14.573	80.142	1.166	14.573	80.142	2.390	29.874	80.142
3	.432	5.401	85.543						
4	.329	4.117	89.660						
5	.297	3.715	93.375						
6	.244	3.044	96.419						
7	.166	2.081	98.500						
8	.120	1.500	100.000						

Loadings for Individual Items of the Effectiveness of BSC

Items	Component Loadings	
	1	2
Our PMS helps us in developing the long-term strategy of the firm.	.836	.205
Our PMS makes us focus on our firm's strategy.	.882	.272
Our PMS helps us in clarifying and communicating the firm's strategy.	.909	.164
Our PMS makes the management focus beyond the short-term financial performance.	.828	.353
Our PMS helps to link long term strategic planning with short-term activities/actions.	.824	.370
Our PMS encourages us to give stronger consideration to non-financial drivers of performance.	.403	.793
Our PMS encourages us give more consideration to different stakeholders.	.073	.879
Our management regards the our PMS as an effective strategic PMS.	.429	.764

