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# Multi-perspective performance reporting, continuous improvement and organisational performance

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# **Multi-Perspective Performance Reporting, Continuous Improvement and Organisational Performance**

## **ABSTRACT**

The use of multi-perspective performance reporting systems (MPRS), such as the balanced scorecard (BSC), has become widespread. The BSC reports performance about four perspectives (learning and growth, internal business processes, customer, and financials). Although these systems are important (Libby et al., 2004), research in the area has only just scratched the surface, hence the motivation for this study. Continuous improvement systems (CIS) are another management accounting innovation. These systems constantly look for ways to improve performance and, if implemented, will be used in conjunction with performance reporting systems. This research studies the effectiveness of CIS in organisations using MPRS. The objectives of the research are to study organisations using MPRS and: (1) investigate the dimensions of multi-perspective performance reporting and organisational performance in that context, and (2) explore the relationship between CIS and organisational performance. We found (1) 10 dimensions of performance reporting, 7 multi-item dimensions and 4 single-item measures of performance, and (2) that CIS were positively associated with organisational performance.

**Key words:** multi-perspective; balanced scorecard; performance reporting; continuous improvement; organisational performance.

## INTRODUCTION

Performance reporting is important in contemporary organisations. Ittner and Larcker (1998a) argue that the choice of performance indicators is one of the most critical challenges facing firms. Performance reporting is important in motivating employees to enhance performance (Ittner and Larcker, 1998b, Malina and Selto, 2001) and is an essential element of an organisation's control system.

Traditionally, performance reporting has been in financial terms. However, recently there has been increasing criticism of financial reporting (Kaplan and Norton, 1992, 1996a,b, 2001a,b, Atkinson et al., 1997a, Ittner and Larcker, 1998b, Banker et al., 2000, Hoque and James, 2000). The major criticisms are that current financial reporting is historical in nature and is not a reliable predictor of future financial performance. Kaplan and Norton (1996a, 2001a) argue that current performance reporting does not include information about the drivers of future performance such as customer satisfaction, internal process efficiency, and employee morale and capabilities. The critics refer to examples of recent major corporate collapses in which current financial information did not reveal impending financial disaster.

These problems with financial performance reporting systems have led to multi-perspective performance reporting systems (MPRS) that report non-financial information in addition to the traditional financial information. The AAA Accounting Standards Committee (2002) reviewed the "disclosure of non-financial performance measures" and concluded that, "academic research suggests that non-financial performance measures are relevant for predicting future financial performance and valuing corporate equity". By far the most popular MPRS in practice is the balanced scorecard (BSC), created by Kaplan and Norton (1996a,b, 2001a,b). Actually, the BSC is more than a performance reporting system and according to Kaplan and Norton (1996a) is more appropriately regarded as a "strategic management system". However, we will be restricting our attention to the performance reporting side of the BSC. A BSC reports information about four "perspectives" – learning and growth, internal business processes, customer, and financial. The first three are non-financial and, according to Kaplan and Norton (1996a), are the drivers of future financial performance. Kaplan and Norton (1996a, p. viii) use the term "perspective" to refer to these four views of the firm and we will continue to use

that terminology. Since the BSC has four perspectives it is a multi-perspective system. Kaplan and Norton (1996a) also talk of leading and lagging indicators. The first three perspectives have indicators that lead the financial indicators (lagging indicators).

In practice there are many multi-perspective systems that are not precise implementations of the BSC model (Ittner, Larcker and Randall, 2003, Chartered Institute of Management Accountants, 2002, Eldenburg and Walcott, 2005, p. 643). Some of the implementations have omitted some of the four perspectives and some have changed some of them. In addition, there are MPRS in practice that are broader than the BSC. The broader systems have one or two additional perspectives that normally cover environmental and social matters<sup>1</sup>. The research in this paper will cover MPRS and will not restrict its attention to BSC systems narrowly interpreted. Consequently, we study firms that have one or more perspectives in addition to the traditional financial perspective.

MPRS have become popular in practice. Eldenburg and Walcott (2005, p. 655) refer to a survey of senior executives in which 62% of the organisations were using the BSC. The BSC concept is also highly regarded in the academic community. Atkinson et al. (1997a), Ittner and Larcker (2001), and Libby et al. (2004) argue that the balanced scorecard is among the most significant developments in management accounting. However, research in the field has only just scratched the surface (Atkinson et al., 1997; Said et al., 2003; Bryant et al., 2004). The claim by Atkinson et al. (1997a, p. 94) that the BSC “deserves intense research attention” still remains true today. There is still much we do not know about the extent to which MPRS are related to performance, and about how this relationship is affected by other organisational and environmental variables. The motivation for this research comes from the view that MPRS are important, and much research is needed in the area.

Each of the four perspectives is clearly multidimensional. In other words, each perspective involves more than one dimension or variable (we regard the terms “dimension” and “variable” as synonymous – i.e. a dimension is a variable). For example, Gombola and Ketz (1983) identified eight different dimensions in the financial perspective<sup>2</sup>. Similarly, the internal business processes perspective might involve the dimensions of innovation, quality, and processing efficiency. This paper studies the dimensions within each perspective. With this in mind, the first objective of this paper is to study MPRS

and investigate the dimensions of multi-perspective performance reporting and the dimensions of organisational performance within the context of such systems. There has been little study of these issues in past research.

This research doesn't just study the use of MPRS. It studies the use of, and emphasis given to, each dimension i.e., we study performance reporting emphasis (PRE). We argue that if a dimension is used but given little emphasis it will have little effect on performance. Hence, the degree of emphasis must be studied. The emphasis concept here is similar to the "budget emphasis" variable in the budgeting literature (Covaleski et al., 2003).

Emsley et al. (2006, p. 262) call the BSC a "management accounting innovation". Another management accounting innovation according to Emsley et al. is "continuous improvement systems" (CIS). CIS are systems that emphasises constantly looking for ways to improve performance. These systems may be applied narrowly, broadly or something in between. A narrow application is Kaizen Costing (Imai, 1999), which focuses on improving (reducing) costs (Womack, Jones, & Roos, 1990). "Kaizen" is a Japanese term meaning continuous improvement (small incremental steps). A broad application of CIS would be to focus on improving performance across a broad range of performance reporting dimensions in a MPRS. Kosandal and Farris (2004) reviewed the Kaizen (CIS) literature that cited the BSC model. They found that this literature referred mostly to performance reporting dimensions from the three perspectives financials, customer, and internal business processes. Rarely did this literature refer to dimensions from the learning and growth perspective. If an organisation has a MPRS and a CIS they will be linked together. The continuous improvement would be incorporated into the targets (goals) (Langfield-Smith, et al. 2006, p. 675; Horngren et al. 2005, p. 540). The performance reporting system would then enable the organisation to see if the continuous improvement goals had been met.

As far as we are aware there has been little empirical research into the effectiveness of CIS. Consequently that will be a second objective of this research. We will investigate the effectiveness of CIS over the broad range of performance dimensions found in MPRS.

The remainder of the paper proceeds as follows. The next section reviews relevant literature and develops a proposition for empirical testing. Subsequent sections discuss the research method, results and discussion, and conclusion.

## **LITERATURE REVIEW AND RESEARCH PROPOSITION**

The first objective of this research is to explore the dimensions of MPRS and performance within that context. Kaplan and Norton (1996a, pp. 51, 67, 96, 127.) have suggested that the components within each of the four perspectives of the BSC might be as follows:

### **Financials**

- Revenue
- Costs / productivity
- Asset utilisation / investment strategy

### **Customer**

- Market share
- Customer retention
- Customer acquisition
- Customer satisfaction
- Customer profitability

### **Internal Business Processes**

- Innovation
- Operations (quality)
- Post sale service

### **Learning and Growth**

- Employee capabilities
- Information systems capabilities
- Motivation, empowerment, alignment

However, as far as we are aware, there has been no empirical research into this issue. Consequently, this research will use exploratory factor analysis to explore the dimensions within the perspectives in MPRS and the dimensions of performance in that context.

The second objective of this research is to investigate the effectiveness of CIS over the broad range of performance dimensions found in MPRS. A CIS is a system that emphasises constantly looking for ways to improve performance (Atkinson, et al. 1997b, p. 725; Langfield-Smith et al. 2006, p. 675). The model proposes a priori that the search for continuous improvement will succeed and organisational performance will improve. There is little empirical research that tests this proposition. Two papers that do are Leem and Kim (2004) and Hoffman and Mehra(1999). Leem and Kim (2004)

tested and found positive performance effects from the use of a continuous improvement information system. Hoffman and Mehra (1999) found that a continuous improvement system was associated with organisations achieving higher performance in the customer perspective. The authors are not aware of any other empirical testing of the CIS model. Since the empirical evidence in support of the model is quite limited, this research undertakes further testing. The fact that CIS have survived in practice for many years provides further support for the model. The empirical evidence available and the survival of the CIS model in practice lead to the following proposition that is advanced for empirical testing purposes:

Proposition: The extent to which a MPRS is linked to a CIS will be positively associated with organisational performance in each of the organisational performance dimensions identified.

## **RESEARCH METHOD**

### **PARTICIPANTS, PROCEDURE AND QUESTIONNAIRE**

The population consisted of companies listed in The Business Who's Who of Australia. A random sample of 145 manufacturing companies with sales revenue greater than \$100 million, was selected. Small companies were excluded because they may not use MPRS. A letter was sent to the CEO of each company outlining the research and inviting them to participate. Participation involved an interview of about 45 minutes with one of the researchers. Fifty CEOs (34.5%) agreed to participate, a sample size that was similar to other studies in the field e.g. Chenhall (2005). During each interview one of the researchers completed a questionnaire.

Each participant was first asked if their company had more than one strategic business unit (SBU). If so, they were asked to select one and the questionnaire was completed about that SBU. Kaplan and Norton (1996a, p.36.) argue that BSCs are best defined for SBUs. It may be problematic if BSCs are studied for complete corporations, if a corporation has more than one SBU with each having rather different strategic goals, strategy, and performance reporting emphasis. The fact that the corporation has different SBUs suggests that their goals, strategy, and reporting system are likely to be

different. Studying the complete corporation as one entity would confound the different goals, strategies and reporting systems together and may produce misleading results. Note that the focus of this research on SBUs makes the use of archival data difficult. Most SBUs do not have a stock price or separately published financial reports.

The advantages of the researcher completing a questionnaire in an interview are that it ensures the questionnaire is completed carefully and thoroughly and that terminology can be explained if necessary. It also allows researchers to collect qualitative data. The researchers were very careful not to influence the managers' responses in any way. To help achieve this, questions were read verbatim from the questionnaire. We believe the procedures adopted minimized response bias. Mailed questionnaires, for example, are sometimes criticised on the grounds that they are often completed hurriedly, with little thought, marking the page in approximately a vertical fashion. Our approach helps minimize these problems.

This research is exploratory in nature because knowledge about MPRS and CIS is still in its infancy, and because there are no established instruments to measure multi-perspective performance reporting emphasis and performance in that context<sup>3</sup>. The same applies to CIS. Consequently, this research developed its own instruments that were contained in the questionnaire. Chenhall (2005) recently published a study in this field in which he also used an undeveloped instrument because of the non-existence of refined measures (Chenhall, 2005, 415). Chenhall also regarded his study as exploratory.

The questionnaire consisted of three sections:

1. Multi-perspective performance reporting emphasis.
2. Continuous improvement systems.
3. Organisational performance.

The performance reporting emphasis section contained 37 items (indicators) (Appendix 1 outlines the questionnaire). The participant was required to state (yes or no) whether each indicator was used in the performance reporting system for the SBU being studied. If yes, the participant rated on a 9 point scale (1=low, 9=high, "no" was coded as 0) "the extent to which the indicator was emphasised". Note that

indicator emphasis is being measured. Some researchers have simply studied indicator use. However as argued above, we believe that if an indicator is used without emphasis it will have little effect. Indicator emphasis is consistent with the “budget emphasis” construct in the budgeting field. The 37 items covered a broad range of indicators spread over the six perspectives discussed above (financials, customer, internal business processes, learning & growth, environmental, and social). Indicators were extracted from the literature e.g. Kaplan and Norton (1996a), Horngren et al. (2005). We were aware we had not covered every conceivable indicator so there was a section after the 37 items in which participants could list other indicators that they used that were not included. The lists provided can be used for further development of the questionnaire.

The continuous improvement section contained one item. Managers were required to rate on a 9 point scale (1=strongly disagree, 9=strongly agree) the extent of their agreement with the following statement “My performance reports are linked to a continuous improvement system”. If the manager’s company did not have a CIS they would respond “1” to this question. As discussed above, if they had a CIS it would be linked to the performance reporting system. If the company had a broad CIS linked to their performance reporting system, the manager’s response should be towards the high end of the scale. If they had a narrow CIS linked to their performance reporting system, the response should be towards the low end of the scale.

The organisational performance section contained 26 items (indicators) and Appendix 1 summarises their nature. For each item, participants were required to indicate their SBU’s performance “relative to that of competitors by rating it on a scale ranging from one (below average) to nine (above average)”. Note that it is performance relative to competitors that is being measured. The 26 items were extracted from the literature (e.g. Kaplan and Norton (1996a), and Horngren et al. (2005)) and covered a broad range of performance indicators spread over the six perspectives. The Govindarajan and Fisher (1990) instrument was also examined. It contains only five non-financial items, and while these were considered as a guide they were insufficient for our purposes. Appendix 1 shows that our instrument contained 20 non-financial items. Ittner, Larcker and Randall (2003, 728) found that “firm performance is strongly related to sector performance”. Consequently, this research asked participants to rate their

SBU performance “relative to that of competitors”. This approach controls for sector (industry) performance differences. Albright et al., (2007) support this argument.

## VARIABLE MEASUREMENT

### Performance Reporting Emphasis

The mean number of the 37 performance-reporting indicators used was 26.08 (standard deviation = 6.53). The minimum was 13, and the maximum was 36 indicators. Since six of the indicators were financial items, all firms were using some form of multi-perspective performance reporting. To identify the dimensions of performance reporting emphasis (in this paper the terms dimension and variable are regarded as synonymous), the 37 items in the performance reporting emphasis section of the questionnaire were subjected to exploratory factor analysis – see Table 1<sup>4</sup>. The 37 items were first classified into the five perspectives – financials, customer, internal business processes, learning & growth, and environmental/social<sup>5</sup>. An exploratory factor analysis was then carried out for each of these perspectives. Note that we have an adequate number of subjects per item in all of our factor analyses. Tabachnick and Fidell (1983) recommend a minimum of four subjects per item. Our lowest ratio is 4.5. Exploratory factor analysis was carried out because it is not clear what dimensions exist in each perspective.

The factor analysis resulted in ten multi-item factors (see Table 1). In the factor analyses, factor loadings (the cut-off was .4) and Cronbach alphas are at acceptable levels for exploratory research. All of the five perspectives discussed above are covered in the dimensions in Table 1. The following 10 dimensions are identified in Table 1 and classified here according to perspective. Descriptive statistics are shown in Table 3.

Financial Perspective	Mean Emphasis
1. Profit	7.52
2. Cash	7.36
Customer Perspective	
3. Customer Numbers	4.12
Internal-Business-Process Perspective	
4. Innovation - New Products	3.82
5. Innovation – Existing Products	3.68
6. Quality	6.08

Learning and Growth Perspective	
7. Employee Retention	3.66
8. Employee Satisfaction	5.58
9. Information Technology	4.18
Environment/Social Perspective	
10. Social Responsibility	2.76

The list includes the mean emphasis<sup>6</sup> given to each performance-reporting dimension by the respondents. More emphasis is given to the financial perspective than the non-financial perspectives. This finding is consistent with DeBusk et al. (2003) and Ittner, Larcker and Meyer (2003). The list shows that substantial emphasis is also given to quality and employee satisfaction with other dimensions significantly lower. The lowest emphasis is given to social responsibility - 42% of companies had no performance reporting at all for the social responsibility dimension.

#### Insert Table 1 Here

This list of performance reporting dimensions can be compared with the Kaplan and Norton (1996a) list in the literature review. A comparison reveals similarities and differences. The similarities are that both lists include innovation, quality and IT. Also our list contains profit while Kaplan and Norton have the components of profit, revenue, costs and productivity. Our dimension of customer numbers is covered by Kaplan and Norton's customer retention and acquisition. Further, our dimensions of employee satisfaction and retention are similar to Kaplan and Norton's employee capabilities, motivation, empowerment and alignment. Differences are that we have dimensions of cash and social responsibility and Kaplan and Norton do not. On the other hand, Kaplan and Norton have asset utilisation / investment strategy, market share, and post sale service and we do not. Kaplan and Norton also have customer satisfaction and profitability and we do not. We did have a factor covering these matters but the Cronbach alpha was below acceptable standards so we did not include it. This and other differences could be investigated in future research.

#### **Continuous Improvement**

The continuous improvement section of the questionnaire contained one question. Managers were required to rate on a 9 point scale (1=strongly disagree, 9=strongly agree) the extent of their agreement with the following statement "My performance reports are linked to a continuous improvement system".

If the company did not have a CIS the manager would respond “1” to this question. As discussed above, if they had a CIS it would be linked to the performance reporting system. The continuous improvement would be incorporated into the targets (goals) and the performance reporting system would then enable the organisation to see if the continuous improvement goals had been met. If the company had a broad CIS linked to their performance reporting system, the manager’s response would be towards the high end of the scale. If they had a narrow CIS linked to their performance reporting system, the response would be towards the low end of the scale.

### **Organisational Performance**

To identify the dimensions in the 26 organisational performance items in section 3 of the questionnaire the items were first classified into the five perspectives, financials, customer, internal business processes, learning & growth, and environmental/social. The items in each perspective were then subjected to exploratory factor analysis. Table 2 shows the results. The factor analysis produced the following seven multi-item dimensions of organisational performance (relative to competitors).

They are classified according to the 5 perspectives.

#### Financial Perspective

1. Profit/Cash

#### Customer Perspective

2. Customer

#### Internal-Business-Process Perspective

3. Innovation New Products
4. Waste, Rework, Returns
5. R & D, Development of Markets

#### Learning and Growth Perspective

6. Employee Satisfaction

#### Environmental/Social Perspective

7. Social Responsibility

Factor loadings (the cut-off was .4) and Cronbach alphas are at acceptable levels for exploratory research. All of the five perspectives discussed above are covered - once again, the environmental and social perspectives are combined into one (Factor 7).

In addition to the above multi-item factors, it is thought the following single item performance indicators that were included in the questionnaire require consideration as performance measures to see if they are related to continuous improvement.

8. Information Technology
9. Product Quality
10. Sales
11. Costs

Although these items were included in the questionnaire they did not load on a factor. We believe they are important dimensions of performance and future research should check if their failure to load on factors was due to limitations of the questionnaire. If the instrument is developed further, single item variables should be developed into multi-item dimensions for measurement reliability reasons (multi-item variables are more reliable than single items). Descriptive statistics are shown in Table 3.

The dimensions here are similar to those for performance reporting emphasis but a close study shows some differences. The dimensions of organisational performance (relative to competitors) need not be exactly the same as **performance reporting emphasis** dimensions. Performance reporting emphasis will not be the sole driver of performance. Other variables, such as economic conditions, competition, strategy, and leadership style will intervene. Note that all performance dimensions are measured “relative to competitors”.

Insert Table 2 Here

Insert Table 3 Here.

The 11 dimensions used here to measure organisational performance cover nine of the ten items in the Govindarajan and Fisher (1990) measure of organisational performance. We did not include the “political-public affairs” item which is not included in the BSC and in many other MPRS. The Govindarajan and Fisher measure covered five financial and five non-financial dimensions. We considered that it did not have a broad enough coverage of non-financial dimensions for our purposes. Our instrument covers 8 non-financial dimensions with 20 items. Govindarajan and Fisher (1990) also combine their ten items into an overall measure. We do not do this because we want to study the dimensions of organisational performance separately. We believe it is inappropriate to confound the 11 dimensions together by summing them into a combined total.

## **THE USE OF PERFORMANCE SELF-RATINGS**

We use self-ratings to measure organisational performance. There has been some criticism of self-ratings and this must be addressed. We share Dunk’s (2003) view that these criticisms are ill-founded. It

is sometimes argued managers might be lenient when rating their performance. If this occurred, it would be a type of bias and is address by Dunk (2003) as a type of measurement error. Measurement error may be either non-random (systematic bias) or random (Nunnally, 1981). Systematic bias would occur if a constant were added (or subtracted), say due to leniency, to (or from) the “true” score for the dependent variable. However, this addition (or subtraction) of a constant does not change the relationship between the independent and dependent variables in a correlation or regression (Nunnally, 1981). It merely changes the intercept and that is of no interest in this research. If the error is random, it is added to the error term in the regression model (Neter et al., 1985) and thus makes it more difficult, rather than easier, to reject the null hypothesis. Dunk (2003) further points out that Abernethy and Stoelwinder (1991) “found no evidence that managers are consistently lenient when rating performance.”

An argument in favour of using self-ratings is that they overcome inconsistencies and earnings management in archival data. Archival data is inconsistent because different companies might use different accounting methods. The problem of earnings management is widely recognised. A further problem with archival data is that when studying SBUs, as we are, it may not be available if the company has more than one SBU. Weighing up the argument in this section we come to the conclusion that self-ratings are a satisfactory method of performance measurement.

## **THE STATISTICAL ANALYSIS**

We use Pearson Correlation Analysis to test the research hypothesis. Multivariate analysis, such as Canonical correlation and Structural Equation Modelling, was not possible in this project. Such techniques require large sample sizes, much larger than the sample in this project.

## **RESULTS AND DISCUSSION**

This research has identified 10 multi-item dimensions of multi-perspective performance reporting emphasis. It also established that all 50 companies in the sample were engaging in some form of multi-perspective performance reporting i.e., they all had MPRS. Within this context, the research has identified seven multi-item dimensions of performance (relative to competitors). In addition, the research has identified four single item performance measures that we believe warrant further study.

The performance reporting emphasis and performance (relative to competitors) dimensions identified are shown in Table 4 (they are classified according to perspective; dimensions that match are on the same line).

Insert Table 4 Here

The research has developed a proposition concerning the effects of CIS that is advanced for empirical testing purposes. The proposition states that “the extent to which a MPRS is linked to a CIS will be positively associated with organisational performance in each of the organisational performance dimensions identified”. We have argued that if a company has a CIS it will be linked to its performance reporting system (MPRS in the companies in our sample). To test this proposition, the item that measured the extent of the link from a company’s MPRS to a CIS was correlated with each of the performance dimensions. The correlations will measure the relationship between the extent of the link and performance. Table 5 shows significant correlation coefficients – there are six. The extent of the link to a CIS is significantly related to the following performance dimensions:

- Profit/Cash
- Sales
- Customer
- Product Quality
- Employee Satisfaction
- Information Technology

In other words, continuous improvement systems are positively associated with performance on these six dimensions. These dimensions come from all four perspectives in the BSC.

Insert Table 5 Here

However, the extent of a link from the MPRS to a CIS did not have a significant association with performance on the five dimensions: costs, innovation – new products, waste/rework/returns, R&D/market development, and social responsibility. Some possible reasons are as follows. Costs during the period of the study would have been affected by inflation. It is possible that cost reductions due to CIS were masked by cost increases due to inflation. In the areas of innovation and R & D it might be difficult to get improvement continuously. Instead, improvements might occur in an intermittent step fashion. Terziovski and Sohal (2000) indicated that continuous improvement can be separated into

improvement and innovation. They explained the key difference being innovation “involves a step-change in the status quo as a result of a large investment in technology and/or equipment” (Terziovski and Sohal, 2000, p. 540). Regarding waste/rework/returns, some organisations accept returns even if the goods are not defective. Consequently, returns may not be a good measure of quality performance. In the area of social responsibility, many of the companies in our study had little or no interest in this dimension. The mean performance reporting emphasis on this dimension was 2.76 compared with 7.52 and 7.36 for the two financial dimensions, and 42% of the companies had no performance reporting at all in the social responsibility area. If companies had little interest in the social responsibility dimension they would probably have little interest in continuous improvement in the area also. Future research might beneficially study these insignificant effects further.

## **CONCLUSION**

This research has explored the dimensions of (1) multi-perspective performance reporting emphasis, and (2) organisational performance (relative to competitors). It has gone on to study the association between organisational performance and the extent the MPRS is linked to a CIS. There has been little research in this area and we aim to make some contribution to knowledge in that regard. We identified 10 dimensions of performance reporting emphasis, 7 multi-item dimensions and 4 single-item measures of organisational performance. These are shown in Table 4. We regard our research as exploratory with our findings being just a start. Further work is required to (1) see if there are other dimensions we have not found, and (2) refine the dimensions we have found. The paper developed a proposition for empirical testing, and this was partly supported.

The proposition proposed that the extent to which a MPRS is linked to a CIS will be positively associated with organisational performance in each of the organisational performance dimensions identified. We found the proposition was supported in the following six dimensions: profit/cash, sales, customer, product quality, employee satisfaction, and information technology. We believe our study is the first to find empirical support for the effectiveness of CIS across a broad range of performance dimensions. The dimensions supporting the proposition cover all four perspectives of the BSC.

However, the proposition was not supported on five dimensions – new product innovation, waste/rework/returns, R & D/market development, environmental/social, and costs. Since 55% of our tests did support the proposition, we have concluded the proposition is partly supported. Possible reasons for the insignificant results have been advanced above. It might be beneficial to explore them further in future research.

The findings in this research have implications for practice. It seems that CIS are positively associated with organisational performance across a broad range of dimensions covering all four perspectives of the BSC. CIS might be used in practice to improve performance in those areas. However, there were some performance dimensions where CIS did not have a beneficial effect and further research is needed to establish more clearly when CIS have a beneficial effect and when they do not.

There are a number of limitations in this research that might be explored in future research. The dimensions of organisational performance and performance reporting emphasis require further study and the measurement instrument requires further development. The sample size in this study is not large (50). Small samples find it difficult to discover anything other than strong associations and consequently it would be beneficial to replicate the study on a larger sample. However, CEOs are busy and it is not easy to induce them to participate. It would also be useful to see if the results obtained here generalise to nonmanufacturing companies. Further, it might be useful to use another research method such as a longitudinal study that would be able to explore the BSC lead/lag theory. This research was not able to test that theory due to the cross-sectional research method used.

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**Table 1**  
**Dimensions of Multi-Perspective Performance Reporting Emphasis**

**Exploratory Factor Analysis Within Perspective**

<b>Perspective: Financials</b>			
<u>Factor 1 – Profit</u>		<u>Factor 2 – Cash</u>	
<u>Item</u>	<u>Factor Loading</u>	<u>Item</u>	<u>Factor Loading</u>
Return on Investment	.91	Cash Flow	.83
Profit	.86	EVA	.86
Eigenvalue	2.01	Eigenvalue	1.39
% of Variance	33.47	% of Variance	23.22
Coef.Alpha.	.74	Coef.Alpha.	.59
<b>Perspective: Customer</b>		<b>Perspective: Environment/Social</b>	
<u>Factor 3 – Customer Numbers</u>		<u>Factor 4 – Social Responsibility</u>	
<u>Item</u>	<u>Factor Loading</u>	<u>Item</u>	<u>Factor Loading</u>
Number of Customers	.84	Pollution Technology	.81
Customer Acquisition	.78	Pollution Control	.72
Customer Retention	.69	Sport Sponsorship	.49
		Charitable Donations	.62
Eigenvalue	2.28	Eigenvalue	1.80
% of Variance	45.69	% of Variance	45.02
Coef.Alpha.	.73	Coef.Alpha.	.59
<b>Perspective: Internal Business Processes</b>			
<u>Factor 5 – Innovation New Products</u>		<u>Factor 6 – Innovation Existing Products</u>	
<u>Item</u>	<u>Factor Loading</u>	<u>Item</u>	<u>Factor Loading</u>
Sales New Products	.83	Redesigned Products	.60
New Product Introduction	.86	Process Improvements	.78
New Products – time to market	.83	Cycle Time – order to delivery	.77
Eigenvalue	2.98	Eigenvalue	1.68
% of Variance	27.06	% of Variance	15.25
Coef.Alpha.	.82	Coef.Alpha.	.60
<u>Factor 7 – Quality</u>			
<u>Item</u>	<u>Factor Loading</u>		
Product Defects	.91		
Returns – Poor Quality	.74		
Eigenvalue	1.43		
% of Variance	12.96		
Coef.Alpha.	.69		
<b>Perspective: Learning &amp; Growth</b>			
<u>Factor 8 – IT</u>		<u>Factor 9 – Employee Satisfaction</u>	
<u>Item</u>	<u>Factor Loading</u>	<u>Item</u>	<u>Factor Loading</u>
IS Capabilities	.60	Employee Training	.56
Internet Disclosure	.85	Employee Capabilities	.80
E-commerce	.73	Employee Satisfaction	.81
On-line Systems	.85		
Eigenvalue	4.65	Eigenvalue	1.41
% of Variance	42.25	% of Variance	12.77
Coef.Alpha.	.84	Coef.Alpha.	.77
<u>Factor 10 – Employee Retention</u>			
<u>Item</u>	<u>Factor Loading</u>		
Employee Quit Rate	.92		
Employee Retention	.86		
Eigenvalue	1.26		
% of Variance	11.41		
Coef.Alpha.	.90		

Only items that load > .4 are shown.

Bartlett's Test of Sphericity was calculated for all analyses and found to be satisfactory:  $p < .001$ .

In all two item factors, the correlation between items was highly significant ( $p < .01$  in all cases).

Table 2

### Dimensions of Organisational Performance (Relative to Competitors)

#### Exploratory Factor Analysis Within Perspective

<b>Perspective: Financials</b>		<b>Perspective: Customer</b>	
<u>Factor 1 – Financials (Profit, Cash Flow)</u>		<u>Factor 2 – Customer</u>	
<u>Item</u>	<u>Factor Loading</u>	<u>Item</u>	<u>Factor Loading</u>
Profit from Operations	.89	Market Share	.79
Return on Investment	.84	Customer Satisfaction	.79
Cash Flow	.82		
Eigenvalue	2.29	Eigenvalue	1.23
% of Variance	38.14	% of Variance	61.77
Coef.Alpha.	.82	Coef.Alpha.	.51
<b>Perspective: Internal Business Processes</b>		<b>Perspective: Environment/Social</b>	
<u>Factor 3 – Innovation – New Products</u>		<u>Factor 4 – Waste, Rework, Returns</u>	
<u>Item</u>	<u>Factor Loading</u>	<u>Item</u>	<u>Factor Loading</u>
New Products Last 3 Years	.87	Waste & Rework	.83
Time to Market New Products	.86	Sales Returns	.80
Sales New Products	.91		
Eigenvalue	2.90	Eigenvalue	1.43
% of Variance	36.21	% of Variance	17.93
Coef.Alpha.	.87	Coef.Alpha.	.55
<u>Factor 5 – R &amp; D, Market Development</u>			
<u>Item</u>	<u>Factor Loading</u>		
R & D	.90		
Market Development	.67		
Eigenvalue	1.13		
% of Variance	14.17		
Coef.Alpha.	.54		
<b>Perspective: Learning &amp; Growth</b>		<b>Perspective: Environment/Social</b>	
<u>Factor 6 – Employee Satisfaction</u>		<u>Factor 7 – Social Responsibility</u>	
<u>Item</u>	<u>Factor Loading</u>	<u>Item</u>	<u>Factor Loading</u>
Employee Health & Safety	.82	Charitable Donations	.86
Employee Satisfaction	.81	Pollution Control	.86
Workplace Relations	.84		
Employee Training	.60		
Eigenvalue	2.7	Eigenvalue	1.47
% of Variance	44.98	% of Variance	73.52
Coef.Alpha.	.80	Coef.Alpha.	.59

Only items that load > .4 are shown.

Bartlett's Test of Sphericity was calculated for all analyses and found to be satisfactory:  $p < .001$ .

In all two item factors, the correlation between items was highly significant ( $p < .01$  in all cases).

#### Single Item Organisational Performance Measures

8. Information Technology
9. Product Quality
10. Sales
11. Costs

**Table 3**  
**Variable Descriptive Statistics**  
**(n = 50)**

Variable	Mean	Std. Dev	Theoretical		Actual	
			Min	Max	Min	Max
<b>Organisational Performance.</b>						
Profit/Cash	Z scores				-2.30	2.30
Customer	Z scores				-3.23	1.72
Innovation New Product	Z scores				-2.81	2.40
Waste,Rework>Returns	Z scores				-2.90	2.23
R&D,Market Developmnt	Z scores				-3.15	1.94
Employee Satisfaction	Z scores				-2.55	1.74
Social Responsibility	Z scores				-2.43	2.47
Information Technology	5.70	1.95	1	9	1	9
Product Quality	6.56	1.34	1	9	3	9
Sales	6.06	1.60	1	9	3	9
Costs	5.24	1.57	1	9	1	8
<b>Performance Reporting Emphasis (PRE)</b>						
Financials - Profit	Z scores				-3.92	1.16
Financials - Cash	Z scores				-2.94	1.07
Customer	Z scores				-1.47	1.84
Innovation New Products	Z scores				-1.52	1.97
Innovation Existing Prods	Z scores				-1.75	1.98
Quality	Z scores				-2.33	1.74
Information Technology	Z scores				-1.78	1.96
Employee Satisfaction	Z scores				-2.16	2.16
Employee Retention	Z scores				-1.79	2.04
Social Responsibility	Z scores				-1.54	2.11
Extent MPRS Linked to CIS	5.44	2.30	1	9	1	9

Factor scores are in the form of Z scores. Z scores are standardised having a mean of zero and a standard deviation of 1.

**Table 4**

**Performance Reporting Emphasis, and Performance (Relative to Competitors)  
Dimensions Identified**

<b>Performance Reporting Emphasis Dimensions</b>	<b>Performance (Relative to Competitors) Dimensions</b>
<u>Financial Perspective</u>	
1. Profit	1. Profit/Cash
2. Cash	
<u>Customer Perspective</u>	
3. Customer Numbers	2. Sales
<u>Internal Business Processes Perspective</u>	3. Costs
4. Innovation – New Products	4. Customer
5. Innovation – Existing Products	5. Innovation – New Products
6. Quality	6. Product Quality
	7. Waste, Rework, Returns
	8. R & D, Market Development
<u>Learning and Growth Perspective</u>	
7. Employee Retention	9. Employee Satisfaction
8. Employee Satisfaction	10. Information Technology
9. Information Technology	
<u>Environmental/Social Perspective</u>	
10. Social Responsibility	11. Social Responsibility

**Table 5**  
**Pearson Correlation Analysis Between Organisational Performance and the Extent the MPRS is Linked to a CIS**

Organisational Performance Variable (OPV)	Correlation Between OPV and Extent MPRS Linked to CIS
Profit/Cash	.37 ***
Sales	.34 ***
Customer	.33 **
Product Quality	.33 **
Employee Satisfaction	.32 **
Information Technology	.19 *

Only significant relationships are shown.

All tests one tailed (proposition is directional). \*\*\*  $p < 0.01$ , \*\*  $p < 0.05$ , \*  $p < 0.10$   
 $n = 50$  for all analyses.

## Appendix 1

### Outline of Questionnaire

#### Performance Reporting System

Please indicate, by circulating either Y(Yes) or N(No), if each or the following indicators is currently used in evaluating your business unit's performance. If yes, please indicate by circling the appropriate number on the scale provided, the extent to which the performance indicator is emphasised.

Then followed 37 items each with a Y/N, 1-9 scale (1= low emphasis, 9= high emphasis)

Outline of indicator items:

- |                                       |  |
|---------------------------------------|--|
| 1. Number of customers.               | 20. Customer acquisition.              |
| 2. Units of products shipped.         | 21. Customer retention.                |
| 3. Sales growth.                      | 22. Customer satisfaction              |
| 4. Sales – new products.              | 23. Customer profitability.            |
| 5. New product introduction.          | 24. Customer complaints.               |
| 6. Time to market new products.       | 25. Warranty repair costs.             |
| 7. Redesigned products.               | 26. Employee quit rate.                |
| 8. Employee development & training.   | 27. Employee health & safety.          |
| 9. Process improvement & redesign.    | 28. Employee satisfaction.             |
| 10. Product defects.                  | 29. Employee retention.                |
| 11. Cycle time – order to delivery.   | 30. Employee absenteeism.              |
| 12. Returns due to poor quality.      | 31. Pollution control.                 |
| 13. Labour efficiency.                | 32. Pollution free technology.         |
| 14. Employee capabilities.            | 33. Charitable donations.              |
| 15. Information systems capabilities. | 34. Sport sponsorship.                 |
| 16. Return on investment.             | 35. Internet – information disclosure. |
| 17. Operating income.                 | 36. E-commerce.                        |
| 18. Cash flow.                        | 37. On-line information systems,       |
| 19. Economic value added.             |  |

#### Continuous Improvement

One item:

My performance reports are linked to a continuous improvement system.

Strongly										Strongly
Disagree										Agree
1	2	3	4	5	6	7	8	9		

#### Organisational Performance

Please indicate your organisation's overall performance in the following areas relative to that of competitors by rating it on a scale ranging from one (below average) to nine (above average).

Then followed 26 items each with a 1-9 point scale (1= below average, 9= above average).

Outline of performance items:

- |                            |                                  |
|----------------------------|----------------------------------|
| 1. Rate of return.         | 14. Employee health & safety.    |
| 2. Research & development. | 15. Sales growth.                |
| 3. Costs.                  | 16. Time to market new products. |
| 4. Product quality.        | 17. Sales from new products.     |

5. Customer satisfaction.
6. Employee satisfaction.
7. Information technology/E-commerce
8. Waste & rework.
9. Percentage of costs to sales.
10. Sales returns.
11. Market share.
12. New product introduction.
13. Workplace relations.
18. Employee quit rate.
19. Profit from operations.
20. Cash flow from operations.
21. Market development.
22. Employee training & development.
23. Environment pollution control.
24. Pollution free technology.
24. Charitable donations.
26. Sport sponsorship.

## NOTES

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<sup>1</sup> This ties in with triple-bottom-line reporting where the three bottom lines cover financial, environmental and social perspectives.

<sup>2</sup> These are: cash flow, return on investment, capital turnover, financial leverage, short-term liquidity, cash position, inventory turnover, and receivables turnover.

<sup>3</sup> There has been considerable work in the area of organisational effectiveness. However, we believe organisational performance within the context of multi-perspective performance reporting systems such as the BSC and broader systems is quite different.

<sup>4</sup> Some readers may query this use of factor analysis which looks for common dimensions in a data set. They may argue that goals and performance reporting are unique to a particular firm. However, Bryant et al. (2004) argue that firms use generic measures and they study these. Lipe and Salterio (2000) and Roberts et al. (2004) argue that firms use common and unique performance reporting dimensions. When we do factor analysis we will be capturing the generic/common dimensions in our sample. We acknowledge that we may not capture well the unique dimensions. We included in our questionnaire a section where we could record indicators that were being used by the firm that were not included in our items. However, we must leave that issue to another paper.

<sup>5</sup> The environmental and social perspectives were combined since there were only two items relating to each. Further, many companies were not doing much performance reporting in these areas.

<sup>6</sup> To facilitate comparisons, for the factors, the item loading highest on the factor is used to represent the factor. Factor scores are not used because they are z scores and would be difficult to compare with scores for single item variables.