The Effects of Information, Data and Redundant Cue Load on Multi-Perspective Performance Reporting

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ABSTRACT

Multi-perspective performance reporting systems have become popular in recent times due to problems associated with traditional financial systems. The most common multi-perspective performance reporting system is the balanced scorecard (BSC). The BSC reports performance information about four perspectives (learning and growth, internal business processes, customer, and financials). BSC theory argues there is a cause and effect relationship from the first to the last perspective. There are broader multi-perspective systems in practice that commonly have two additional perspectives to these four – social and environmental. Atkinson et al. (1997), Ittner and Larcker (2001), and Libby et al. (2004) have argued that the BSC is among the most significant developments in management accounting and that it deserves intense research attention. However, although these systems are an important development, research in the area has only just scratched the surface. The motivation for this paper comes from the importance of BSC and other multi-perspective systems and the lack of knowledge about them. The objectives of this research are to: (1) explore the dimensions of multi-perspective performance reporting and the emphasis being given to each dimension in practice, (2) explore the dimensions of organisational performance, and (3) study the association between (1) on (2). A possible problem with multi-perspective systems is that they may cause information/data/redundant cue (I/D/C) overload and thus detrimentally affect performance. A further research objective is to study this issue. Our study found 11 dimensions of performance reporting information, two of I/D/C load, and 13 of organisational performance. The findings indicate that multi-perspective performance reporting is positively associated with performance. In contrast, I/D/C overload is negatively associated with performance.

Key words: performance reporting, information load, data load.

INTRODUCTION

Performance reporting is vitally 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, 1996, 2001a, 2001b, Shields, 1997, Atkinson et al., 1997, 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 (1992, 1996, 2001a, 2001b) 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. Further, current reporting fails to give adequate attention to intangible assets such as employee morale and intellectual capital. 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 lead to multi-perspective systems that report nonfinancial information in addition to the traditional financial information. The AAA Accounting Standards Committee (2002) reviewed the "disclosure of nonfinancial performance measures" and concluded that, "academic research suggests that nonfinancial performance measures are relevant for predicting future financial performance and valuing corporate equity". By far the most popular multi-perspective performance reporting system in practice is the balanced scorecard (BSC), created by Kaplan and Norton (1992, 1996, 2001a, 2001b). Actually, the BSC is more than a performance reporting system and according to Kaplan and Norton (1996) 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 nonfinancial and, according to Kaplan and Norton (1996), are the drivers of future financial performance. BSC theory argues that the four perspectives are linked in a series of cause-and-effect relationships. Investment in learning and growth leads to (drives) improved internal business processes, which drives improved customer satisfaction which in turn drives higher financial performance. Kaplan and Norton (1996) 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). Some of the implementations have omitted some of the four perspectives and some have changed some of the perspectives (for example, Malina and Selto (2001) study a company that has the following perspectives – competitive advantage, profitability and growth, corporate citizenship, investment in human capital, and other). In addition, there are multi-perspective performance-reporting systems in practice that are broader than the BSC. The broader systems have one or two additional perspectives that normally cover environmental and social matters. The research in this paper will cover multi-perspective performance reporting systems and will not restrict its attention to BSC systems narrowly interpreted. Consequently, we study firms that have one or more performance reporting perspectives in addition to the traditional financial perspective.

Multi-perspective systems have become quite popular in practice. Silk (1998) reports, that 60% of Fortune 1000 firms have experimented with the BSC system. The BSC concept is also highly regarded in the academic community. Atkinson et al. (1997), Ittner and Larcker (2001), and Libby et al. (2004) argue that the balanced scorecard is among the most significant developments in management accounting. However, although BSC and other multi-perspective systems are popular and highly regarded, 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. (1997, 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 the BSC and other multi-perspective systems are related to performance, and about how this relationship is affected by other organisational and environmental variables.

This paper attempts to make some contribution to the research that is needed. The motivation for this research comes from the view that the BSC and related systems are very important in the management accounting field, and much research is needed in the area. Three objectives of this paper are to: (1) explore the dimensions of multi-perspective performance reporting, (2) explore the dimensions of organisational performance that exist in business, and (3) study the association between (1) and (2). This research doesn't just study the use of multi-perspective performance reporting. It studies the use of, and emphasis given to, each dimension. 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).

A potential problem with multi-perspective performance reporting is that as the number of perspectives expands from one to six, information overload, data load, and redundant cue load[1] problems might occur. Several accounting researchers, (e.g. Iselin, 1988, 1993, Chewning and Harrell, 1990, Schick et al. 1990, Stocks and Harrell, 1995, Gadenne and Iselin, 2000) have shown that information overload and data load negatively affect managerial decision quality. Ittner and Larcker (1998b) and Lipe and Salterio (2000) argue that potential information overload problems with the BSC should be investigated in future research. However Kaplan and Norton (1992, 72) claim that information overload is not a problem with the BSC because it "minimizes information overload by limiting the number of measures used." Malina and Selto (2001) claim that Kaplan and Norton's argument is supported by research from Lipe and Salterio (2000). However, we claim these arguments are not sufficiently convincing. Kaplan and Norton (1992, 1996, 2001a, 2001b) give virtually no consideration in any of their work to the containment of information overload. Further, Lipe and Salterio (2000) do not study "the accuracy" of their "participants' evaluations" (i.e. decision quality). Consequently, they do not study the effects of

information overload generated by a BSC on decision quality. Hence we argue that information overload needs further investigation in a multi-perspective performance-reporting context. Data and redundant cue load also require investigation in that context because they have not been studied in that regard at all. Chenhall (2005, 416) argues that "much can be learned … by investigating the information properties of the systems". The fourth objective of this research is to carry out these investigations. A further contribution this research will make is that it will study information overload and data and redundant cue load in a real world field setting. To date they have only been studied by accounting researchers in laboratory experimental research and consequently we will extend this past research.

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

LITERATURE REVIEW AND RESEARCH PROPOSITIONS

As stated above, the most common version of multi-perspective performance reporting is the BSC. The theory regarding the performance effects of the BCS will be explained with the aid of Figure 1. Performance reporting emphasis helps motivate and control workers (Lynch and Cross, 1995; Ittner and Larcker, 1998b; Malina and Selto, 2001). This effect is shown with the non-bold arrows in Figure 1. Performance reporting emphasis compares actual performance with goals and motivates the workers to higher performance. Performance reporting emphasis also acts as a control system enabling the enhancement of good performance and the correction of poor performance. Both of these effects result in higher organisational performance. The performance effect occurs contemporaneously with the performance reporting emphasis. Knowledge by workers that the performance reporting and control is occurring will motivate them to higher performance. This should occur in all dimensions (and perspectives) where there is performance reporting emphasis. The BSC model contains four perspectives – learning and growth, internal business processes, customer, and financial (the first three perspectives are non-financial). BSC theory (Kaplan and Norton, 1996, 30; 2001a, 92) claims that performance in these perspectives is

linked in a series of cause and effect (lead/lag) relationships that are shown in Figure 1 with the bold arrows. Improved learning and growth performance results in workers who are more capable and motivated, who design improved internal business processes in the areas of, for example, quality, after sales service, and innovation that results in new and improved products. The improved performance regarding internal business processes results in improved customer performance such as customer satisfaction, retention and acquisition. Improved customer performance leads to improved financial performance for example in the areas of profits and cash flows. The theory also argues that the three non-financial perspectives are the drivers of future financial performance. The theory further talks about lead/lag relationships. Learning and growth performance leads internal business process performance that lags the former and so on. Similarly, performance in the three non-financial perspectives leads financial performance (which lags the non-financial performance).

Applying the above theory to Figure 1, performance reporting emphasis on learning and growth in time t_1 would result in improved worker motivation and control that would produce improved learning and growth performance in time t_1. According to BSC cause/effect theory, improved learning and growth in t_1 would result in improved IBP performance in t_2. IBP performance in t_2 would also be positively affected by performance reporting emphasis on IBP in t_2 that would produce motivation and control effects. The relationships depicted in the four bottom arrows in Figure 1 are, in principle, the same as those just described for the top three arrows.

As noted above, there are some systems in practice that are broader than the BSC. These normally include the four BSC perspectives plus one or two additional perspectives that concern environmental and social matters. The authors are unaware of any discussion that integrates these two additional perspectives into the BSC cause/effect theory and it is not clear how this would occur. However, the performance reporting emphasis motivation/control theory should be applicable. Performance reporting emphasis on each perspective should result in improved performance in that perspective due to improved motivation and control of workers.

The next question to be addressed is what empirical evidence exists to support the above theoretical argument? Kaplan and Norton (2001a) claim that their theory is supported by their own case study research. However, Ittner and Larcker (1998b) reviewed empirical tests of the BSC theory and found that the evidence was mixed. On the other hand, some more recent research does support the BSC theory. The following evidence supports the BSC cause/effect theory. The AAA Accounting Standards Committee (2002) reviewed the literature in this field and concluded that nonfinancial performance measures are relevant for predicting future financial performance. Banker et al. (2000) found that customer satisfaction performance predicted future financial performance. Studies by Baines and Langfield-Smith (2003), Said et al. (2003), Ittner, Larcker and Randall (2003), and Bryant et al. (2004) all found that nonfinancial performance predicted future financial performance. Malina and Selto (2001, 52) examined literature about the performance reporting motivation/control (monitoring) theory and concluded that evidence was "limited but growing". Specific support for the theory was provided by Banker et al. (2000) who studied a hotel chain that had an incentive plan incorporating performance reporting about customer satisfaction. They found this was associated with customer satisfaction performance. Banker et al. concluded their discussion of this finding with the statement by Singleton-Green (1993, 52) "what you measure is what you get". Hoque and James (2000) found that greater BSC usage was associated with improved performance. This could be support for either or both theories. Because of this recent empirical support for these two theories we regard them as a satisfactory base for the research propositions in this paper.

In the above discussion we have identified six perspectives that are found in multi-perspective systems – learning and growth, internal business processes, customer, financial, environmental, and social. Each perspective consists of a group of variables (dimensions), i.e. each perspective is multi-dimensional[2]. For example, Gombola and Ketz (1983) used factor analysis to identify eight different dimensions in the financial perspective[3]. The customer performance reporting perspective might consist of the dimensions, market share, customer satisfaction, and customer profitability, and factor analysis later in the paper confirms that this is

in fact the case. Factor analysis later in the paper also confirms that learning and growth and internal business processes are multi-dimensional. Dubin (1978) calls groups of variables, such as the perspectives, summative variables and argues they have no place in a scientific theory. Iselin (1998) discusses this issue in an accounting context. Dubin (1978) and Iselin (1998) argue that it is difficult to predict the effects of a summative variable because the degree to which its components are included will vary from time to time. Since each component variable will have different effects on other variables it will be impossible to predict the overall effect of a summative variable without knowing the degree of inclusion of the component variables. Iselin argues that the solution to this problem is to exclude summative variables from research and instead include their components. This approach will be taken in this paper. The authors are not aware of any research that has explored the dimensions of performance reporting emphasis and performance that are found in practice. Further, we are not aware of any research that has studied the association between the two. This provides us with an opportunity to contribute to knowledge in that regard.

The research in this paper uses a cross-sectional study. Consequently, it will not be possible to study the cause/effect (lead/lag) theory in the BSC model. A cross-sectional study collects information at a point in time, and time is not a variable in such studies. However, the BSC cause/effect theory argues that a change in one variable causes a change in (i.e. leads or drives) another variable (which lags the first variable). Since a cross-sectional study collects its data at a point in time it is not able to test if one variable leads another. On the other hand, a longitudinal study is able to test a lead/lag theory because such a study has a time dimension. It is then possible to see if one variable leads another over time. Although this study is unable to test the lead/lag theory in the BSC model, it is able to test the performance reporting motivation/control theory in the model. We argue that the latter theory will apply to each performance reporting dimension identified. This argument leads to the following proposition:

P1: Performance reporting emphasis on a particular dimension will be positively associated with organisational performance in the area of that dimension.

The previous section argued that multi-perspective performance reporting may suffer from information overload and data and redundant cue load problems. Consequently these issues were included in this research. Before developing research propositions for these variables we will define three terms – information load, data load, and redundant cue load. Information load is the number of relevant cues (items) in the performance report(s) (including relevant comparative figures). Relevant cues are those used for decision-making purposes and exclude redundant cues (see below). Redundant cue load is defined as the number of cues (items) in performance report(s) that are relevant for decisions, but are not used for those purposes because they are significantly correlated to other cues that are more relevant. Data load is the number of irrelevant cues (items) in the performance report(s) (including irrelevant comparative figures). Irrelevant cues are not used for decision-making purposes. Research by Gadenne and Iselin (2000) shows that as information load (number of relevant cues) increases, managers' decision-making performance initially improves.[4] This is because as the relevant information increases, the managers' uncertainty reduces and consequently they are able to make better decisions[5]. However, as the information load continues to increase, managers eventually reach the information overload point after which their decision-making performance declines. The decision performance declines because the managers are unable to cognitively process the heavy information load effectively and this detrimentally affects the quality of their decisions. The dependent variables in this paper are dimensions of organisational performance. We argue that performance in these areas will be positively correlated with managers' decision-making performance. This is because managers using the multi-perspective system will make many decisions in the process of managing the four perspectives, learning and growth, internal business processes, customer management, and financial management. The quality of the decisions they make in managing these perspectives will have a significant impact on their performance in the areas of these perspectives.

Iselin (1988) found that information overload effects are stronger when the information is more diverse. The information in multi-perspective reporting will be much more diverse than if

only one perspective (eg. financials) was covered as in traditional systems. The reason is that four perspectives will cover many more dimensions of information than just one dimension. On the other hand, Lipe and Salterio (2002) and Dilla and Steinbart (2005) found that when their participants processed a BSC they categorised the information according to the four perspectives. Chase and Simon (1973) and Shanteau (1988) have found that categorisation facilitates information processing, reducing overload effects. Further, Malina and Selto (2001) found that some BSC systems filter irrelevant information (the system they studied colour coded performance indicators according to whether performance was acceptable, unacceptable, or exceeded acceptability). Consequently, systems in practice have information diversity facilitating information overload, and categorisation and filtering reducing it. Overall, we argue there will be an overload effect in multi-perspective systems but that it will not be strong. The argument in this and the previous paragraph leads to the following two propositions:

P2: In multi-perspective performance reporting systems, as information load (number of relevant cues) increases up to the information overload point, organisational performance will increase.

P3: In multi-perspective performance reporting systems, as information load increases beyond the information overload point, organisational performance will decrease.

Gadenne and Iselin (2000) also studied the effects of data load (load of irrelevant cues) on decision-making performance and found that as data load increased, performance declined. There has been little study of the effects of redundant cue load. However we believe they will be similar to the effects of data load because a decision maker will be aiming to filter both out of the decision process. The decline in decision-making performance occurs because the human filtering process is imperfect leading to reduced decision quality. As with information overload, system filtering will reduce the problem, but we believe it will still occur. This argument leads to the following two propositions:

P4: In multi-perspective performance reporting systems, as data load increases, organisational performance will decrease.

P5: In multi-perspective performance reporting systems, as redundant cue load increases, organisational performance will decrease.

RESEARCH METHOD

PARTICIPANTS, PROCEDURE AND QUESTIONNAIRE

A random sample of 145 manufacturing companies with sales revenue greater than $100 million, was selected from The Business Who's Who of Australia (Dun & Bradstreet, 2000). Small companies were excluded because it was thought they may not use multi-perspective performance reporting. A letter was sent to the CEO of each company outlining the research project and inviting them to participate. Participation involved an interview of about 45 minutes with one of the researchers. The letter was followed by telephone contact with the CEO and 50 (34.5%) agreed to participate, a sample size that was similar to other studies in the field e.g. Hoque and James (2000) and Chenhall (2005). In a large majority of cases the CEO participated personally but in a small number of cases a CEO nominee, who was most commonly a CFO or Manager of Strategy, was interviewed. The researchers required that any nominees were fully familiar with the company's performance reporting emphasis and performance. An appointment was made for each interview during which 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 (1996, 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. 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. However, we acknowledge that the research method introduces the possibility of bias. Nevertheless, 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 multi-perspective performance reporting is still in its infancy, and because there are no established instruments to measure multi-perspective performance reporting emphasis and performance in that context. The same applies to information, data, and redundant cue load. 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. Decision-making environment.
3. Organisational performance.

The performance reporting emphasis section contained 25 items (indicators) and Table 1 summarises the nature of each item. 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. The 25 items covered a broad range of indicators spread over the six perspectives discussed above. Indicators were extracted from the literature e.g. Kaplan and Norton (1996), Horngren et al. (2005). We were aware we had not covered every conceivable indicator so there was a section after the 25

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 decision-making environment section was used to measure information load, data load, and redundant cue load. First these three concepts were defined as discussed above. Then followed six items (using 9 point rating scales) to measure the three concepts (two items each). Three items required the participants to "rate the information load (or data load, or redundant cue load) in your performance report(s)." (1=low, 9=high). These three items will be called the information/data/redundant cue load items. The remaining three questions asked participants to "Rate the extent to which you agree with the following statement. 'The information load (or data load, or redundant cue load) in my performance report(s) is so large that I have difficulty processing it all for decision-making purposes'" (1=strongly disagree, 9=strongly agree). These three items will be called the information/data/redundant cue overload items because they refer to situations in which the manager's cognitive processes are overloaded. Table 2 summarises the nature of the six items.

The organisational performance[6] section contained 22 items (indicators) and Table 3 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 22 items were extracted from the literature (e.g. Kaplan and Norton (1996), and Horngren et al. (2005)) and covered a broad range of performance indicators spread over the six perspectives. Ittner, Larcker and Randall (2003, 728) found that "firm performance is strongly related to sector performance". Consequently, this research asked participants to rate their SBUs performance "relative to that of competitors". This approach controls for sector (industry) performance differences.

VARIABLE MEASUREMENT

Performance Reporting Emphasis

The mean number of the 25 specified performance-reporting indicators used was 17.8 (median, 17). The minimum was 9, and 4 firms used all 25 indicators. Since four 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 25 items in the performance reporting emphasis section of the questionnaire were subjected to confirmatory factor analysis – see Table 1[7]. 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 8.3 (in the analysis in Table 2). Dimensions for confirmation were obtained from the literature (eg. Kaplan and Norton, (1996), Horngren et al. (2005)). The factor analysis resulted in eight multi-item factors and three single item dimensions (see Table 1)[8]. These should be explored further in future research in which they should be converted into multi-item factors (because multi-item factors have greater measurement reliability). In the factor analyses, factor loadings (the cut-off was .4) and Cronbach alphas are at acceptable levels for exploratory research. All of the six perspectives discussed above are covered in the dimensions in Table 1 except that the environmental and social perspectives are combined into one (Factor 4). The following 11 dimensions, identified in Table 1 and classified here according to perspective, will be used as independent variables (IVs) in this research (Note that for each multi-item dimension, factor scores will be used as the IV. Descriptive statistics are shown in Table 4).

Financial Perspective	Mean Emphasis
1. Financials (Profit)	8.22
2. Financials (Cash flow)	7.36
Customer Perspective	
3. Market Share	4.12
4. Customer Satisfaction	6.34
5. Customer Profitability	4.46
Internal-Business-Process Perspective	
6. Innovation	3.02
7. Quality – Product	6.08
Learning and Growth Perspective	
8. Employee Capabilities	4.86
9. Employee Satisfaction	3.92
10. Information Technology	4.18

Environment/Social Perspective
11. Social Responsibility 2.76

The list includes the mean emphasis[9] 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 customer satisfaction and product quality with other dimensions significantly lower. The lowest emphasis is given to social responsibility.

Insert Table 1 Here

Decision-Making Environment

It was not clear from the literature what dimensions were covered in this section of the instrument. Consequently, an exploratory factor analysis was carried out – see Table 2. This table reveals two factors and the rectangular boxes in each show the items that load sufficiently highly on the factor to define it. Factor loadings (the cut-off was .4) and Cronbach alphas are at satisfactory levels for exploratory research. There are five items that load at a high level on Factor 1. These include the three overload items as well as data and redundant cue load. These are all the items that would create cognitive difficulty for the manager when processing the cues (they are all covered by propositions 3,4, and 5, and according to these propositions, they should all be associated with decreases in organisational performance). Consequently this factor makes theoretical sense and it will be called information/data/rednt cue overload (I/D/C Overload for short – collectively they overload the decision processes of the managers). Only one item loads highly on Factor 2 – information load. Note that two of the overload items load negatively on this factor. This suggests that this factor represents the positive aspects of information load i.e. the information load prior to reaching the overload point. This is the information that reduces the manager's uncertainty and improves his/her decision-making performance as explained in the previous section. This factor is labelled information load. When the instrument is developed further, this single item factor should be developed into a multi-item dimension for measurement

reliability reasons. Based on Table 2, the following two variables will also be used as independent variables in this research (Note that factor scores will be used as the IV. Descriptive statistics are in Table 4):

1. Information/data/rednt cue overload
2. Information load.

Insert Table 2 Here.

Organisational Performance

To identify the dimensions in the 22 organisational performance items[10] in section 3 of the questionnaire they were subjected to confirmatory factor analysis – see Table 3. Dimensions for confirmation were obtained from the literature (e.g. Kaplan and Norton (1996), Horngren et al. (2005)) and Table 3 shows the results. The factor analysis produced six multi-item dimensions and seven single item dimensions a total of 13. Factor loadings (the cut-off was .4) and Cronbach alphas are at acceptable levels for exploratory research. All of the six perspectives discussed above are covered except that, once again, the environmental and social perspectives are combined into one (Factor 4). When the instrument is developed further, single item variables should be developed into multi-item dimensions for measurement reliability reasons. The following 13 variables, identified in Table 3 and classified here according to perspective, will be used as dependent variables (DVs) in this research (Note that for each multi-item dimension, factor scores will be used as the DV. Descriptive statistics are shown in Table 4).

Financial Perspective
1. Financials (Profit, cash flow)
2. Financials (Costs)

Customer Perspective
3. Market Share
4. Customer Satisfaction

Internal-Business-Process Perspective
5. Innovation Products
6. Innovation R & D/Markets
7. Internal Processes (Waste & rework)
8. Internal Processes (New product – time to market)
9. Quality (Product)

Learning and Growth Perspective
10. Employee Satisfaction
11. Employee (Quit rate)
12. Information Technology

Environment/Social Perspective
13. Social Responsibility

The dimensions here are very similar to those for performance reporting emphasis but a close study shows some differences[11]. Performance dimensions 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 and information, data, and redundant cue load, will intervene. Note that all performance dimensions are measured "relative to competitors".

Insert Table 3 Here
Insert Table 4 Here.

The 13 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 multi-perspective systems. 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. As can be seen above, our instrument covers 11 non-financial dimensions. Govindarajan and Fisher (1990) also combine their ten items into an overall measure. We do not do this because, as explained above, we want to study the dimensions of organisational performance separately.

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

multiple 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 "Venkatraman and Ramanujan (1987) found that managers' self-ratings are less biased than researchers might expect" and 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 MODELS

We use OLS regression to test the research hypotheses. The following two equations define the analysis:

$$Y_{1\text{-}10} = b_0 + b_1 PR_{1\text{-}10} + e \qquad (1)$$

$$Y_{1\text{-}13} = b_0 + b_1 IL + b_2 OL + e \qquad (2)$$

Where,

$Y_{1\text{-}10}$	are the 10 org. performance variables (DVs) that are identical or in the same area[12] as an IV.
$PR_{1\text{-}10}$	are the 10 performance reporting emphasis variables (IVs) that are identical or in the same area as the 10 DVs ($Y_{1\text{-}10}$).
$Y_{1\text{-}13}$	are the 13 org. performance variables listed above.
IL	is the information load variable listed above.
OL	is the I/D/C Overload variable listed above.

Multivariate analysis, such as Canonical correlation and Structural Equation Modeling, was not possible in this project. Such techniques require large sample sizes, much larger than the sample in this project.

RESULTS AND DISCUSSION

Proposition 1 was tested using equation 1. There were ten instances where there was an IV (performance reporting emphasis dimension) in the same area as a DV (performance (relative to competitors) dimension). These are as follows:

Performance Reporting Emphasis Dimension (IV)	Performance (Relative to Competitors) Dimension (DV)
1.Customer Satisfaction	Customer Satisfaction
2.Market Share	Market Share
3.Innovation – Products	Innovation – Products
4.Product Quality	Product Quality
5.Employee Satisfaction	Employee Satisfaction
6.Information Technology	Information Technology
7.Social Responsibility	Social Responsibility
8.Financials – Profit	Financials – Profit, Cash Flow
9.Financials – Cash Flow	Financials – Profit, Cash Flow
10. Employee Capabilities	Employee Satisfaction

Instances (pairs) 1 – 7 are identical. While instances 8 – 10 are not identical, they are in the same area. In instances 8 and 9, profit and cash flow are separate performance reporting emphasis dimensions but combined in one performance dimension. Both are in the BSC financials perspective, and consequently are regarded as being in the same area. In instance 10, employee capabilities and employee satisfaction are both in the employee area and both are in the BSC learning and growth perspective. The ten instances were analysed by regressing each DV on the corresponding IV and Table 5 shows the results. Eight of the ten models are significant – instances 1,2,3,5,6,8,9,10, involving the dimensions customer satisfaction, market share, product innovation, employee satisfaction, information technology, and financials (profit, cash flow). These dimensions cover all four perspectives of the BSC. Models 4 (product quality) and 7 (social responsibility) are not significant. The social responsibility model may not be significant because many SBUs had little or no performance reporting emphasis in this area[13]. Regarding product quality, we show below that if information load and I/D/C Overload are included in the

regression as control variables, then product quality performance reporting emphasis is significantly and positively related to product quality performance. Since eight of the ten models (80%) are significant (90% if we include product quality) we conclude that Proposition 1 is largely supported. In general, performance reporting emphasis on a particular dimension is positively associated with performance in the area of that dimension. Further, this occurs over all four perspectives of the BSC. This relationship has been supported in the literature for a small number of dimensions (e.g. Banker et al., 2000). As far as we are aware, this is the first study to find support for the relationship over a broad range of dimensions.

Insert Table 5 Here

Table 6 contains the data to test Proposition 2, which predicts that in multi-perspective performance reporting systems, as information load increases up to the overload point, organisational performance will increase. Table 6 has been constructed using equation 2 – in 13 separate regressions each of the 13 DVs (organisational performance variables) has been regressed on the information load and I/D/C Overload variables. First, as far as information load is concerned, five of the models are significant – 3,4,7,9,10. Information load (number of relevant cues) is significantly and positively associated with the performance variables, market share, customer satisfaction, waste and rework, product quality, and employee satisfaction (that cover three of the BSC perspectives). Note that the question on waste and rework is worded in terms of "decrease in percentage of waste and rework", so a positive relationship means that a higher information load is associated with a greater "decrease in waste and rework" i.e. higher performance. Consequently, proposition 2 is supported in respect of these five DVs. However, it is not supported in respect of the remaining eight DVs, and we suggest that future research investigate this further. We conclude P2 is partly supported.

Insert Table 6 Here

Propositions 3, 4, and 5, must be tested together because information overload, data load, and redundant cue load all loaded on the one factor that has been called I/D/C Overload. Propositions 3, 4, and 5 all predict a negative association between I/D/C Overload and the

performance variables (DVs). Table 6 shows the relevant analysis – the 13 performance variables are regressed on the I/D/C Overload variable (and information load). As far as I/D/C Overload is concerned, three of the models are significant – 2, 4, and 9 (costs, customer satisfaction, and product quality – that cover three of the BSC perspectives). The association with customer satisfaction and product quality are negative as predicted by propositions 3, 4, and 5. An increase in I/D/C Overload is associated with lower customer satisfaction and product quality. For costs the effect is positive – an increase in I/D/C Overload results in higher costs which is lower performance. Hence, this also supports propositions 3, 4, and 5. Increased I/D/C Overload is associated with lower performance in respect of costs. While propositions 3, 4 and 5 are supported in respect of three of the DVs, they are not supported in respect of the remaining ten. Hence, we conclude that propositions 3, 4, and 5 are partly supported. When we developed propositions 3, 4, and 5 we argued the effects would not be strong because of system filtering and categorisation. This appears to have been the case because only three of the models have significant associations. In Table 6 as in Table 5, no relationship involving social responsibility is significant. Again this may be due to the fact that a high proportion of SBUs gave little or no performance reporting emphasis in that area.

The above analysis shows that there has been some support for each of the propositions. Our analysis has applied equations (1) and (2) to our database. We will extend our analysis by combining the two equations to ascertain the extent to which the three IVs together increase the proportion of variance in the DVs explained. We do this by adding the information load and I/D/C Overload variables to equation (1) giving the equation:

$$Y_{1\text{-}10} = b_0 + b_1 PR_{1\text{-}10} + b_2 IL + b_3 OL + e \qquad (3)$$

Table 7 shows the results, which should be compared with those in Table 5. Table 7 increases the number of significant models from eight to nine – the social responsibility model (7) is still not significant (possible reasons were given above). In Table 7 the product quality model (4) is now significant and supports proposition 1. In Table 7 the R^2 increases in eight of the models but it reduces in two. We argue that in most cases the addition of IL and OL to the equation improves

the R^2. As far as support for the propositions is concerned, the significant associations in Table 7 are similar to those in Tables 5 and 6. Regarding Proposition 1 the associations are the same in eight models with exceptions in two. The exceptions are that product quality (model 4) is significant in Table 7 but not in Table 5, and the reverse is true for the IV employee capabilities in model 10. Regarding Proposition 2 the associations are the same (note that "waste and rework" is not included in Table 7 because there is not an IV and DV in the same area). Regarding Propositions 3, 4, and 5, the associations are also the same (note that the variable "financials (costs)" is not included in Table 7 because, again, there is not an IV and DV in the same area). To sum up our analysis in Table 7, we conclude it produces very similar results to those in Tables 5 and 6. However, in Table 7 eight of the ten models have a higher R^2 i.e. they explain a higher proportion of the variance in the DV.

CONCLUSION

This research has explored the dimensions of (1) multi-perspective performance reporting emphasis, (2) information, data and redundant cue load, and (3) organisational performance (relative to competitors). It has gone on to study the association between (1) and (3), and (2) and (3). As far as we are aware, this is the first research in this area and we aim to make some contribution to knowledge in that regard. We identified 11 dimensions of performance reporting emphasis, two dimensions of information/data/redundant cue load, and 13 dimensions of organisational performance. 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 five propositions for empirical testing, and we concluded that P1 was largely supported and P2, P3, P4 and P5 were partly supported.

Proposition 1 proposed that performance reporting emphasis on a particular dimension would be positively associated with organisational performance in the area of that dimension. We found the proposition was supported in the following eight areas:

Performance Reporting Emphasis Dimension	Performance Dimension
1.Customer Satisfaction	Customer Satisfaction
2.Market Share	Market Share
3.Innovation – Products	Innovation – Products
4.Employee Satisfaction	Employee Satisfaction
5.Information Technology	Information Technology
6.Financials – Profit	Financials – Profit, Cash Flow
7.Financials – Cash Flow	Financials – Profit, Cash Flow
8.Product Quality	Product Quality[14]

These cover all four perspectives of the BSC. The proposition was not supported on the dimension "social responsibility". Social Responsibility has not been involved in any significant effects in this research and we have suggested this may be due to the fact that few SBUs were undertaking performance reporting in this area. Since 80% of our tests did support P1, we have concluded the proposition is largely supported.

Propositions 2, 3, 4, and 5 were concerned with the effects of information load, information overload, data load, and redundant cue load in multi-perspective performance reporting systems. First it was found that as information load (number of relevant cues) increased up to the information overload point, performance improved on the five dimensions: market share, customer satisfaction, product quality, waste and rework, and employee satisfaction (i.e. covering three of the four BSC perspectives). This supported P2. However, P2 was not supported on eight performance dimensions. Consequently, we have concluded that P2 is partly supported. We suggest further research into the eight dimensions where P2 was not supported. P3, 4, and 5 were tested together because information overload, data load and redundant cue load all loaded on the one factor. This dimension was called I/D/C Overload and we found that it was negatively associated with performance on the dimensions of costs, customer satisfaction, and product quality (that cover three of the BSC perspectives). However, this effect was not strong because it occurred on only three of the 13 performance dimensions. We argue that this may be due to the fact that multi-perspective systems incorporate categorisation and filtering of cues, both of which facilitate human information processing. This I/D/C Overload finding makes a contribution to

knowledge in that it is the first study in this area in a real world field setting. As far as we are aware, all prior research has been experimental in the laboratory using hypothetical situations.

The findings in this research have implications for practice. It seems that multidimensional performance reporting emphasis is positively associated with organisational performance across a broad range of dimensions. Also, as the load of relevant information increases up to the information overload point, the information is positively associated with performance. However, care must be exercised that multi-perspective systems do not produce significant I/D/C Overload that detrimentally affects performance. System filtering and categorisation may help in this regard and this should be recognised in the system design process.

There are a number of limitations in this research that might be explored in future research. As explained at the beginning of this section, the dimensions of performance and performance reporting emphasis require further study and 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 extremely 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 cause/effect theory shown in Figure 1. As explained above, this research was not able to test that theory due to the cross-sectional research method used.

Future research might also study system filtering and categorisation. It could investigate how effective these techniques are in reducing I/D/C Overload effects, and the relative effectiveness of different filtering and categorisation techniques. Future research might further investigate the proposed effects that were not significant in this research. Not all the regression models were significant, and some of the IVs were not significant predictors. It would be interesting to investigate if this always occurs (particularly in large samples), and if so, why.

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Table 1

Dimensions of Multi-Perspective Performance Reporting Emphasis

Confirmatory Factor Analysis

Factor 1 – Employee Satisfaction		Factor 2 – Innovation	
Item	Factor Loading	Item	Factor Loading
Employee Retention	.921	New Products – Time to Market	.864
Employee Quit Rate	.911	Sales from New Products	.831
Employee Satisfaction	.660	New Product Intro.	.811
		Number Redesigned Product	.605
Eigenvalue	2.113	Eigenvalue	2.459
% of Variance	70.433	% of Variance	61.475
Coef.Alpha.	.779	Coef.Alpha.	.788
Factor 3 – Employee Capabilities		**Factor 4 – Social Responsibility**	
Item	Factor Loading	Item	Factor Loading
Employee Capabilities	.872	Pollution Technology	.846
Employee Development	.872	Pollution Control	.775
		Charitable Donations	.603
Eigenvalue	1.520	Eigenvalue	1.680
% of Variance	75.976	% of Variance	55.990
Coef.Alpha.	.683	Coef.Alpha.	.606
Factor 5 – Quality Product		**Factor 6 – Financials (Profit)**	
Item	Factor Loading	Item	Factor Loading
Product Quality	.876	Return on Investment	.902
Product Defects	.876	Operating Income	.902
Eigenvalue	1.536	Eigenvalue	1.629
% of Variance	76.797	% of Variance	81.442
Coef.Alpha.	.692	Coef.Alpha.	.743
Factor 7 – Market Share		**Factor 8 – Information Technology**	
Item	Factor Loading	Item	Factor Loading
Customer Acquisition	.883	On-line IS	.886
Customer Retention	.852	Info. On Internet	.862
Number of Customers	.678	E-Commerce	.831
Eigenvalue	1.965	Eigenvalue	2.221
% of Variance	65.490	% of Variance	73.966
Coef.Alpha.	.730	Coef.Alpha.	.823

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 Performance Reporting Emphasis Dimensions

9. Customer Satisfaction
10. Customer Profitability
11. Financials (Cash flow)

Table 2

Exploratory Factor Analysis – Load and Overload of Information, Data and Redundant Cues

Item	Factor Loadings	
	Factor 1 Information/Data/Rednt. Cue Overload	Factor 2 Information Load
Information Overload	.847	-.109
Data Load	.830	
Data Overload	.823	
Redundant Cue Load	.822	.337
Redundant Cue Overload	.712	-.377
Information Load		.955
Eigenvalue	3.267	1.189
% of Variance	54.449	19.818
Coef.Alpha	.863	.643

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

Table 3

Dimensions of Organisational Performance (Relative to Competitors)

Confirmatory Factor Analysis

Factor 1 – Financials (Profit, Cash Flow)	
Item	Factor Loading
Profit from Ops	.900
Return on Inv	.839
Cash Flow Ops	.833
Eigenvalue	2.207
% of Variance	73.568
Coef.Alpha.	.817

Factor 2 – Market Share	
Item	Factor Loading
Market Share	.878
Sales Growth	.878
Eigenvalue	1.542
% of Variance	77.111
Coef.Alpha.	.702

Factor 3 – Employee Satisfaction	
Item	Factor Loading
Employee Health & Safety	.844
Employee Satisfaction	.835
Workplace Relations	.786
Employee Development	.716
Eigenvalue	2.539
% of Variance	63.463
Coef.Alpha.	.806

Factor 4 – Social Responsibility	
Item	Factor Loading
Charitable Donations	.857
Pollution Control	.857
Eigenvalue	1.470
% of Variance	73.515
Coef.Alpha.	.5917

Factor 5 – Innovation Products	
Item	Factor Loading
New Products Over 3 yrs	.929
Sales New Products	.929
Eigenvalue	1.726
% of Variance	86.291
Coef.Alpha.	.841

Factor 6 – Innovation R & D/Markets	
Item	Factor Loading
R & D	.827
Market Development	.827
Eigenvalue	1.368
% of Variance	68.384
Coef.Alpha.	.536

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 Dimensions

7. Financials (Costs)
8. Internal Processes (Waste & rework)
9. Internal Processes (New product – time to market)
10. Employee (Quit rate)
11. Customer Satisfaction
12. Quality (Product)
13. Information Technology

Table 4

Variable Descriptive Statistics
(n = 50)

Variable	Mean	Std. Dev	Theoretical		Actual	
			Min	Max	Min	Max
Organisational Performance.						
Financials (Profit, C.F.)	Z scores				-2.24	2.15
Market Share	Z scores				-2.89	1.91
Employee Satisfaction	Z scores				-2.93	2.05
Social Responsibility	Z scores				-2.43	2.47
Innovation Products	Z scores				-2.51	2.14
Innovation R & D/Mkts	Z scores				-2.61	1.86
Financials (costs)	5.24	1.57	1	9	1	8
Internal Proc. (waste/r.)	5.42	1.51	1	9	2	9
Internal Proc. (time mkt)	4.80	1.63	1	9	1	9
Employee (quit)	4.32	1.52	1	9	1	8
Customer Satisfaction	6.46	1.28	1	9	4	9
Quality (product)	6.58	1.34	1	9	3	9
Info. Tech.	5.70	1.95	1	9	1	9
Performance Reporting Emphasis						
Employee Satisfaction	Z scores				-1.66	1.69
Innovation	Z scores				-1.39	2.18
Employee Capability	Z scores				-1.67	1.55
Social Responsibility	Z scores				-1.52	1.72
Quality (Product)	Z scores				-2.22	1.23
Financials (Profit)	Z scores				-2.13	1.83
Market share	Z scores				-1.37	1.85
Info. Tech.	Z scores				-1.28	1.70
Customer Satisfaction	6.34	2.78	0	9	0	9
Customer Profit	4.46	3.58	0	9	0	9
Financials (Cash Flow)	7.36	2.38	0	9	0	9
Information Load	Z scores				-2.52	2.23
Info/Data/Cue Overload	Z scores				-1.35	2.64

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 5
Regression Results for Organisational Performance on Performance Reporting Emphasis in the Same Area

Model 1 Performance – Customer Satisfaction	Beta	t	Model 2 Performance – Market Share	Beta	t
Constant		12.819***	Constant		.000
IV:PRE Customer Satis.	.259	1.861**	IV:PRE Market Share	.246	1.762**
Adj. R^2	.048		Adj. R^2	.041	
F		3.463**	F		3.104**
Model 3 Performance – Innovation Products	Beta	t	Model 4 Performance – Product Quality	Beta	t
Constant		.000	Constant		34.666***
IV:PREInnovation Prods	.223	1.581*	IV:PRE Product Quality	.139	.975
Adj. R^2	.030		Adj. R^2	-.001	
F		2.500*	F		.951
Model 5 Performance – Employee Satisfaction	Beta	t	Model 6 Performance – Information Technology	Beta	t
Constant		.000	Constant		23.188***
IV:PRE Employee Satis.	.372	2.779***	IV:PRE Info. Technology	.472	3.706***
Adj. R^2	.121		Adj. R^2	.206	
F		7.722***	F		13.731***
Model 7 Performance – Social Responsibility	Beta	t	Model 8 Performance – Financials (Profit, Cash Flow)	Beta	t
Constant		.000	Constant		.000
IV:PRE Social Respon	.008	.054	IV:PRE Financials–Profit	.314	2.293**
Adj. R^2	-.021		Adj. R^2	.080	
F		.003	F		5.259**
Model 9 Performance – Financials (Profit, Cash Flow)	Beta	t	Model 10 Performance – Employee Satisfaction	Beta	t
Constant		-1.698**	Constant		.000
IV:PRE Fins -Cash Flow	.249	1.783**	IV:PRE Emp. Capabil	.227	1.613*
Adj. R^2	.043		Adj. R^2	.032	
F		3.178**	F		2.603*

All tests one tailed. *** p<0.01, ** p<0.05, * p<0.10
n = 50 for all models. PRE = performance reporting emphasis.

Table 6
Regression Results for Organisational Performance Variables on Information Load and I/D/C Overload.

	Model 1 Performance – Financials (P, CF)		Model 2 Performance – Financials (Costs)	
	Beta	t	Beta	t
Constant		.000		23.572***
Information Load	.165	1.147	-.032	-.226
I/D/C Overload	.050	.347	.201	1.404*
Adj. R^2	-.012		.000	
F		.718		1.011
	Model 3 Performance – Market Share		Model 4 Performance - Customer Satisfaction	
	Beta	t	Beta	t
Constant		.000		36.906***
Information Load	.503	4.011***	.188	1.363*
I/D/C Overload	-.097	-.775	-.263	-1.907**
Adj. R^2	.231		.067	
F		8.344***		2.747**
	Model 5 Performance – Innovation Products		Model 6 Performance – Innovation R&D/Mkts	
	Beta	t	Beta	t
Constant		.000		.000
Information Load	.159	1.113	-.018	-.125
I/D/C Overload	.134	.938	-.125	-.861
Adj. R^2	.002		-.025	
F		1.059		.378
	Model 7 Performance – Internal Procs. (Waste & R)		Model 8 Performance – Internal Procs. (Time to Mkt)	
	Beta	t	Beta	t
Constant		25.924***		20.466***
Information Load	.289	2.073**	.014	.098
I/D/C Overload	.023	.168	-.074	-.507
Adj. R^2	.045		-.037	
F		2.163*		.133
	Model 9 Performance – Product Quality		Model 10 Performance – Employee Satisfaction	
	Beta	t	Beta	t
Constant		43.021***		.000
Information Load	.562	4.882***	.310	2.251**
I/D/C Overload	-.246	-2.134**	-.125	-.907
Adj. R^2	.350		.074	
F		14.194***		2.946**
	Model 11 Performance – Employee Quit Rate		Model 12 Performance – Information Technology	
	Beta	t	Beta	t
Constant		20.060***		20.629***
Information Load	-.115	-.801	.069	.485
I/D/C Overload	.146	1.019	-.182	-1.273
Adj. R^2	-.007		-.003	
F		.840		.928
	Model 13 Performance – Social Responsibility			
	Beta	t		
Constant		.000		
Information Load	-.073	-.502		
I/D/C Overload	-.013	-.091		
Adj. R^2	-.037			
F		.130		

All tests one tailed. *** p<0.01, ** p<0.05, * p<0.10: n = 50 for all models.
Multicollinearity cannot be a problem as Info. Load and I/D/C Overload are orthogonal factors in an exploratory factor analysis.

Table 7
Regression Results for Organisational Performance on Performance Reporting Emphasis in the Same Area, and Information Load and I/D/C Overload

Model 1 Performance – Customer Satisfaction	Beta	t
Constant		12.893***
IV:PRE Customer Satis.	.197	1.368*
Information Load	.190	1.386*
I/D/C Overload	-.201	-1.393*
Adj. R^2	.084	
F		2.489**

Model 2 Performance – Market Share	Beta	t
Constant		.000
IV:PRE Market Share	.239	1.966**
Information Load	.499	4.104***
I/D/C Overload	-.096	-.790
Adj. R^2	.275	
F		7.189***

Model 3 Performance – Innovation Products	Beta	t
Constant		.000
IV:PREInnovation Prods	.236	1.677**
Information Load	.182	1.295
I/D/C Overload	.125	.895
Adj. R^2	.039	
F		1.671*

Model 4 Performance – Product Quality	Beta	t
Constant		43.799***
IV:PRE Product Quality	.198	1.648*
Information Load	.547	4.814***
I/D/C Overload	-.311	-2.595***
Adj. R^2	.373	
F		10.714***

Model 5 Performance – Employee Satisfaction	Beta	t
Constant		.000
IV:PRE Employee Satis.	.331	2.508***
Information Load	.258	1.958**
I/D/C Overload	-.121	-.929
Adj. R^2	.167	
F		4.282***

Model 6 Performance – Information Technology	Beta	t
Constant		23.075***
IV:PRE Info. Technology	.461	3.579***
Information Load	.086	.673
I/D/C Overload	-.133	-1.036
Adj. R^2	.198	
F		5.043***

Model 7 Performance – Social Responsibility	Beta	t
Constant		.000
IV:PRE Social Respon	.021	.143
Information Load	-.076	-.513
I/D/C Overload	-.015	-.103
Adj. R^2	-.059	
F		.092

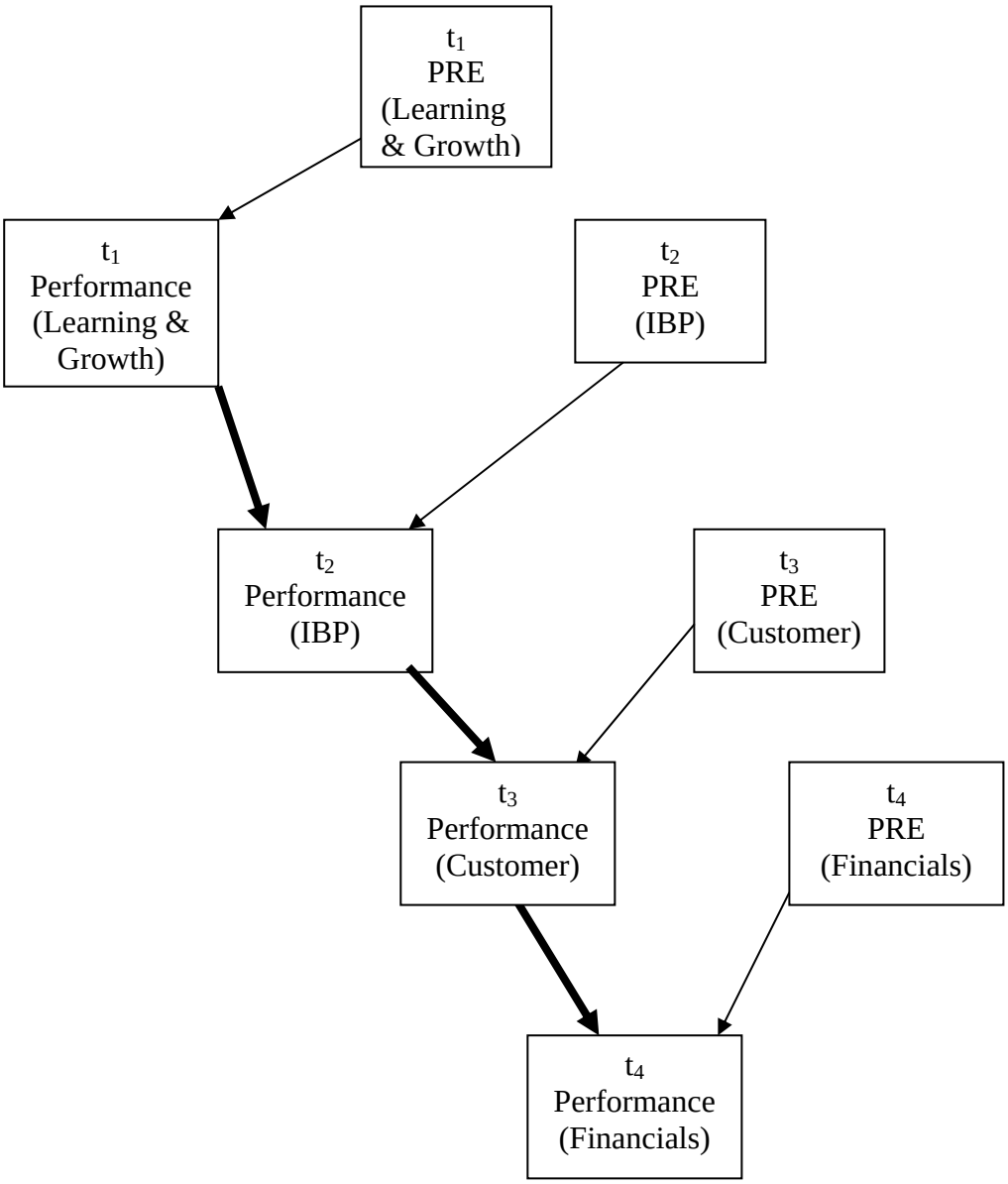
Model 8 Performance – Financials (Profit, Cash Flow)	Beta	t
Constant		.000
IV:PRE Financials–Profit	.294	2.082**
Information Load	.119	.848
I/D/C Overload	.026	.189
Adj. R^2	.055	
F		1.958*

Model 9 Performance – Financials (Profit, Cash Flow)	Beta	t
Constant		-2.280**
IV:PRE Fins-Cash Flow	.392	2.938***
Information Load	.158	1.187
I/D/C Overload	.075	.565
Adj. R^2	.130	
F		3.434**

Model 10 Performance – Employee Satisfaction	Beta	t
Constant		.000
IV:PRE Emp. Capabil	.185	1.281
Information Load	.296	2.164**
I/D/C Overload	-.067	-.469
Adj. R^2	.086	
F		2.538**

All tests one tailed. *** p<0.01, ** p<0.05, * p<0.10
Multicollinearity tests: VIFs were calculated for each predictor variable in each model. All were well below the threat level of 10.
n = 50 for all models. PRE = performance reporting emphasis.

Figure 1
BSC Cause/Effect (Lead/Lag) Relationships and
Performance Reporting Motivation/Control Relationships



PRE = performance reporting emphasis.
t = time.
Bold arrows = BCS cause/effect relationships.
Non-bold arrows = Performance reporting motivation/control relationships.

NOTES

[1] These concepts will be fully explained in the next section of the paper.
[2] We regard a variable as uni-dimensional i.e. a single dimension.
[3] These are: cash flow, return on investment, capital turnover, financial leverage, short-term liquidity, cash position, inventory turnover, and receivables turnover.
[4] When considering information overload effects, some researchers base their argument on the work of Baddeley (1994) and Miller (1956). However, Baddeley and Miller studied the limitations of human **short-term** memory in which the humans do not have the opportunity to process the information. In accounting research we are concerned with human **long-term** memory in which the humans do have the opportunity to process cognitively the information. Gadenne and Iselin (2000) and Iselin (1988) are concerned with long-term memory and are, in our opinion, a more appropriate base for our argument.
[5] For example, suppose a lending manager is deciding whether to make a loan to corporation X and in the process decides that the probability of X failing in the next three years is .5. Suppose that the manager then receives some relevant information about the prospects for X's industry. This information reduces the manager's uncertainty so that (s)he is now able to estimate the probability of X failing as .1. This reduction in uncertainty then enables the manager to make a better decision.
[6] Note, here we are talking about organisational performance, as distinct from performance **reporting emphasis** in the paragraph before last.
[7] 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.
[8] Single item dimensions resulted when there were several items within a perspective but one or two did not load together with others on a factor. For example, Table 1 shows the single item dimensions "customer satisfaction" and "customer profitability" did not load together with the three other customer items in Factor 7 "Market Share". Consequently, the two former items are treated as single item dimensions.
[9] 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. However, for statistical analysis of results later in the paper, factor scores are used.
[10] Note that we are talking about organisational performance here as distinct from performance **reporting emphasis**.
[11]The differences are: (1) there are separate profit and cash flow dimensions in performance reporting emphasis but they are combined into one for performance, (2) there is a costs dimension in performance that does not exist in performance reporting emphasis, (3) there is a customer profitability dimension in performance reporting emphasis but none in performance, (4) there are three internal-business-process dimensions in performance that do not exist in performance reporting emphasis, (5) there is an employee capabilities dimension in performance reporting emphasis but none in performance, and (6) an employee quit rate dimension in performance does not exist in performance reporting emphasis.
[12] The meaning we attach to the term "same area" will be discussed below.
[13] 42% of companies had no performance reporting at all for the social responsibility dimension. The section "Variable Measurement – Performance Reporting Emphasis" above, shows that the mean emphasis for Social Responsibility is only 2.76 compared with 8.22 and 7.36 for the two financial dimensions.
[14] When information load and I/D/C Overload are included as control variables.