Measuring Intangible Investment

Measures that Matter: An Exploratory Investigation of Investors' Information Needs and Value Priorities

by

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MEASURES THAT MATTER: AN EXPLORATORY INVESTIGATION OF INVESTORS' INFORMATION NEEDS AND VALUE PRIORITIES*

1. Abstract

Policy-making groups are calling for improved performance evaluation techniques. This study evaluates the validity of those calls by examining investors' use of non-financial performance measures. Empirical results collected using revealed preference analysis suggest that non-financial measures of quality and strategic achievement have a profound effect on investment and valuation.

An increasing number of private and public organisations are now issuing calls for the reform of traditional financial reporting and disclosure requirements. Among this growing set of critics are executive groups like the Capital Allocation Subcouncil of the Competitiveness Policy Council. In its recently published report (Capital Allocation Subcouncil, 1995), the group presents an extensive criticism of our conventional reporting framework which highlights, for example, the inability of current financial statements to capture or communicate the value of strategy, processes, and such intangible assets as knowledge, innovation and customer loyalty. The report asserts that accounting's traditional focus on what is historic and tangible has had a profound and depressing impact not only on companies' valuations but also on the nation's growth, productivity, employment levels, and wage rates.

Similar criticisms of traditional performance measurement systems can be found in the academic accounting and performance measurement literature. In this literature, these "rule-bound" systems are referred to as outdated, inaccurate and increasingly irrelevant in today's service-oriented and knowledge-based economy. Empirical evidence buttressing these criticisms can be found in papers such as the 1996 working paper by Lev and Zarowin (Paper 11 in this compendium), which presents evidence of a dramatic shift in the market valuation of publicly traded firms over the past 20 years. Using data compiled for some 300 firms for the period 1973-92, Lev charts a change in the ratio of market equity to book equity values from a level of approximately 0.811 in 1973 to a level of approximately 1.692 in 1992. According to Lev, this trend represents not only a revolutionary change in the process of economic value creation but, more seriously, a decline in the value relevance of traditional financial measures. Summarising, Lev writes: "The gap in 1992 indicates that roughly 40 per cent of the market valuation of the median corporation was missing from its balance sheet. For high-tech firms, whose median market-to-book ratio in 1992 was 2.09, the proportion of value missing from the balance sheet is over 50 per cent." (Lev and Zarowin, 1996, Paper 11 in this compendium).

Lev's study is just one among a number of recent academic studies which collectively identify the limitations of traditional performance measurement techniques and simultaneously call for changed

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perspectives and innovation in valuation. Of particular note in these papers is the increasing importance now ascribed to non-financial measurement and measures of strategic achievement, product and process quality, customer satisfaction and organisational learning, for examples. The academic accounting literature is particularly devoted to identifying those non-financial measures which can be used to explain or predict share price and share price movements. Amir and Lev (1996), for example, suggest that the single strongest predictor of the share value of cellular phone service provides is not revenues or net income or even earnings expectations but current catchment area population levels or "POPS". Ittner and Larcker (1995) similarly find strong association between customer satisfaction and share price levels. Outside the accounting domain, Jarrell and Easton (1996) find that firms recognised for their "above average implementation" of a TQM (total quality management) programme accrued excess share returns of some 15 per cent over the five-year period following the programme launch. Still other studies provide evidence of strong association between firm's equity market values and new product announcements (Chaney, Devinney and Winter, 1991), product quality levels (Heller, 1994), and employee development programmes (Gordon, Pound and Porter, 1994), for examples.

The central message of these studies is *not* that financial indicators are unimportant or that investors' concern for the bottom line has abated in any way. The papers imply simply that in a world of increasing technological change and shortened product life cycles, and in a world where "knowledge-work" and intangible assets have become of profound importance, future financial performance is often better predicted by non-financial indicators than by financial indicators.[1]

The intent of this study is to pursue this hypothesis and to evaluate critically the influence of non-financial data in the performance evaluation and investment context. When and under what conditions do investors find value in non-financial data? Which types of non-financial data do they value most? To what extent do changes in non-financial performance influence the investment decision? The specific objectives of the study are threefold: *i)* to extend prior investigations of investors' information requirements; *ii)* to investigate the use of non-financial data by investors and their advisors; and *iii)* to evaluate the influence of non-financial data on the share purchase decision. What distinguishes this study from earlier analyses is its methodology and its direct assessment not only of investors' information requirements but also their decision-making routines and value priorities. This study is also among the first to offer an explicit assessment of the valuation impact of non-financial performance improvement.

Using data collected from over 250 institutional portfolio managers, project investigators have compiled an array of evidence which strongly support the study's basic hypothesis that non-financial performance data are relevant to shareholder evaluations and investment decisions. According to the results, we conclude that the "typical" institutional investor does devote substantial attention to non-financial performance issues. In brief, it appears that approximately 35 per cent of the investment decision is driven by the investor's evaluation of non-financial data.

Not all non-financial data are considered equally useful by the study participants, however. According to the study's respondents, measures of strategy implementation, management credibility, innovativeness, market share and the firm's ability to "attract and retain talented people" are identified as being substantially more useful than measures of customer complaints, quality award programmes, employee training programmes or environmental and social policies, on average. Interestingly, the data suggest little variation across types of investors in the perceived importance of particular types of non-financial data. We interpret this result as an indication of the general applicability of non-financial data. That is, the value of non-financial data appears not to be specific to any particular investment strategy or investor type. Note, however, that these results are derived from our analysis of investors' evaluation of firms with significant capitalisation levels. Consequently, the results may not be generalisable to the small-firm population or to investors devoted to small-cap investment strategies.

In the last phase of analysis, we, the project investigators, used experimental data collected through investment simulations to draw association between financial and non-financial data, i.e. to "value" the non-financial data. As will be described in greater detail below, we estimate the relationship between non-financial performance and the propensity of the investor to acquire firm shares. This procedure effectively allows certain elements of non-financial performance improvement to be "priced". Results of the analysis conducted specifically for firms in the pharmaceuticals industry show strong variation in the estimated "value" of certain types of non-financial performance improvement. Improvements in the "quality of products and services" appear to be evaluated more highly than improvements in "investor communications", for example. Nonetheless, the data suggest strong returns to improvements in investor communications. According to our estimates, a "one unit"[2] improvement in the quality of investor communications by a large firm operating in the pharmaceuticals industry would be equivalent in the minds of shareholders to a 0.5 per cent increase in share price. For a firm like Merck, this measure could translate into a market valuation gain of $140 million.[3] (See Section 5 below for more detailed discussions of our valuation results.)

This paper is organised into a total of six sections, including this introductory section. Section 2 reviews previous studies of investors' information needs and decision styles and attempts to position the issue of investors' use of non-financial data in its larger economic and managerial context. Section 3 provides information on the research methodology, survey design, and sample selection techniques. Section 4 provides data on investors' stated use of non-financial data and the source of that data while Section 5, as noted above, provides discussion of the results of the revealed preference study. Section 6 concludes with a brief summary of the results and offers suggestion for continuing policy and research analyses.

2. Investors' information needs and the value relevance of non-financial data

Over the past five years, the management community has witnessed an explosion of interest in non-financial performance measurement. According to a survey conducted recently by the Institute of Management Accountants, fully 64 per cent of US controllers surveyed report that their companies are actively experimenting with new ways of measuring, collecting and reporting non-financial data. This flurry of corporate action has been encouraged by the publication of an expanding number of books and articles which suggest that new "strategic" performance measurement systems (Vitale, Mavrinac and Hauser, 1994; Atkinson and Waterhouse, 1996), "balanced scorecard" systems (Kaplan and Norton, 1993, 1995), or "expanded" measurement systems (Kron, 1994) can enhance both managerial understanding and control of the firm's value creation process. In effect, these papers all suggest that non-financial performance indicators can be used productively as leading indicators of future financial performance.

The financial regulatory community appears to have adopted much the same conclusion. Over the past two years, an increasing number of professional and regulatory bodies have published policy statements calling for expanded disclosure of non-financial data. In 1991, the American Institute of Certified Public Accountants (AICPA) created a Special Committee on Financial Reporting to address increasing public concern over the relevance of current financial and disclosure policies. In its final report, the committee concluded that while the current measurement and reporting framework had recognised strengths, it also offered substantial opportunities for improvement. Among the many suggestions the committee made was one encouraging corporations to provide more "forward-looking" information and "enhanced discussion of the non-financial performance factors that create longer-term value". The Association for Investment Management and Research (AIMR), a professional body representing US chartered financial analysts, presented similar statements in its 1993 position paper on the future of financial reporting. In its recommendations section, Peter Knutsen, the paper's author, writes:

For financial analysts to make sound judgements and draw rational conclusions, they must judge the performance of individual business enterprises. To do so, they need information of two types. First, management should explicitly describe its strategies, plans, and expectations. Much of this must come in the form of narrative descriptive material. (1993, p. 85)

Still more recently, the Securities and Exchange Commission (SEC), acting on the initiative of Commissioner Steven Wallman, sponsored a two-day symposium at which both academic and corporate presentations focused closely on the value of expanding firms' disclosures of intangible assets, strategic aims and non-financial performance. While the issue of expanded disclosure was hotly debated, there was general consensus among symposium participants on the utility of non-financial metrics as indicators of internal operating performance and strategic achievement.

Despite the increasing interest and support of policy makers and professional bodies in the disclosure of non-financial data to the investor community, there is still only limited evidence of their value relevance. To what extent is non-financial performance data impounded in share prices? Can differences in non-financial performance be used to explain differences in share price and valuation levels? To what extent are non-financial disclosures valued by the market as "new" data? As noted above, there are relatively few studies which address these questions specifically. However, there are a number which touch upon the relationship between financial and non-financial performance more broadly.

Among the handful which address the value relevance of non-financial data *per se* are the studies by Lev (1996), Amir and Lev (1996) and Heller (1994) mentioned above and a study by Larcker and Ittner (1996) which examines the information content of announcement of corporate customer satisfaction rankings. This study offers not only preliminary confirmation of the value relevance of customer satisfaction data but also suggests that the disclosure of such non-financial data offers new information to the market, i.e. data which not has not been previously communicated through more traditional accounting media.

In addition to these studies, there are a variety of other research studies which analyse the relationship between non-financial performance and either net income levels or aggregate expense. Descriptions of some of these studies can be found in a series of white papers sponsored by the US Department of Labor. The most recent of these reviewed several hundred research reports examining the financial and non-financial returns to innovative workplace practices.[4] In its conclusion, the report notes that: "In most of the papers reviewed, firm financial performance and intermediate workplace outcomes, like product quality and customer satisfaction, did increase with strategic investments in innovative employee management and compensation programmes, process management, and total quality management programmes." The explicit conclusion of this white paper is that non-financial performance indicators, and more specifically, indicators of internal workplace achievement, can serve as leading indicators of future financial performance.

Despite these studies and despite their illustration of the statistical association between non-financial and financial performance, the research community still has little data on the extent of investor demand for non-financial data. Still less is understood about how investors might use non-financial data in the course of their decision making. What little data do exist are derived from survey studies which solicit from investors either their stated rankings of the "value" of non-financial data or an open-ended list of the most valued types of non-financial data. One such study was conducted in 1987 by the Financial Executives Research Foundation (FERF). This survey suggests that, on average, investors, analysts and other users of financial reports would find value in more extensive disclosure of the company's market and competitive position, management goals and objectives and business segment data (SRI, 1987). Another more recent survey study conducted by Eccles and Mavrinac (1995) for the Ernst & Young

Center for Business Innovation also found modest interest on the part of investors and analysts for increased non-financial disclosure. Approximately one-third of the analysts and investors responding to the survey agreed with the statement that increased disclosure of non-financial data should be mandated. Interestingly, the proportion is significantly higher for analysts following growth industries than for consolidating or mature industries. As noted in Table 1 below, approximately 35 per cent of the investors and over 40 per cent of the analysts following growth industries would encourage the institution of new non-financial disclosure requirements.

Table 1. **Corporate managers, analysts, and investors**
Attitudes towards increased non-financial disclosure requirements

Respondent group	Percentage approving	Percentage disapproving	Percentage unsure
Corporate managers			
Consolidating industries	0	60	40
Mature industries	7	87	6
Service growth industries	10	87	6
High-tech growth industries	14	82	4
Financial analysts			
Consolidating industries	0	100	0
Mature industries	26	72	2
Service growth industries	44	56	0
High-tech growth industries	41	45	14
Portfolio managers and investors	35	56	9

In another series of questions, the survey asked respondents to evaluate the usefulness of some 26 different financial and non-financial measures. While few non-financial measures were ranked as "extremely useful" by either investors or analysts, some were considered sufficiently useful to be included in the list of these users' top ten most valued measures. As noted in Table 2 below, investors appear to value not only earnings and cash flow measures but also measures of market growth, new product development, market share and R&D productivity as among the most valuable measures they receive.

Table 2. **Investment analysts' and portfolio managers'**
Most useful investment measures by rank

Rank	Sell-side investment analysts	Portfolio managers
1	Earnings	Market growth
2	Cash flow	Earnings
3	Market growth	Cash flow
4	Segment performance	New product development
5	Market share	Costs
6	Capital expenditure	Market share
7	Costs	Capital expenditure
8	R&D investment	Segment performance
9	Strategic achievement	R&D investment
10	New product development	R&D productivity

Not all non-financial measures were evaluated highly, however. Despite the empirical evidence attesting to the return on investments in employee training and development,[5] it appears that neither investors or analysts place a great deal of value on measures of employee satisfaction, training, or turnover. Like measures of environmental compliance and ethical conduct, employee measures were, on average, ranked as being "of little use".

While survey studies like the Ernst & Young study described above provide valuable descriptions of the perceived needs and interests of capital market participants, their interpretation is constrained by the fact that their results are based solely upon stated preferences and subjective attitudes which at the time of testing are subject to any number of both overt and subtle influences.[6] Another, more recent, study attempts to overcome this limitation. The results of the study, presented in a working paper by Mavrinac and Boyle (1996), focus on the relationship between financial analysts' use of non-financial data and the analysts' forecast accuracy. In contrast with survey studies which rely on respondent statements, this study was designed to critique actual behaviour as revealed through assessment of the analysts' own published research reports. The study builds upon the content analysis of some 300 investment reports and on an analysis of the frequency with which the author/analysts considered non-financial performance issues.[7] The results of the study suggest that a wide range of non-financial factors are considered by analysts, although the types of issues considered vary strongly across industry. The results of the study also provide modest support for the hypothesis that analysts who consider non-financial data more frequently are able to generate more accurate earnings predictions. Specifically, the investigators find that the forecast error is decreasing with the frequency of non-financial performance review. In short, the results of the study suggest that analysts *do* treat non-financial performance data as leading indicators of future financial performance.

This study is one of the first to document analysts' interests in non-financial data. It is also one of the first to identify the *consequences* of non-financial disclosure; however, its observations and results are limited to the extent that they consider only the routines and information usage patterns of analysts rather than investors *per se*. Do investors also find non-financial data useful? To what extent is the

investment decision itself influenced by non-financial data? To what extent do investment patterns change as a result of changes in non-financial performance?

The tests described below in Sections 4 and 5 were designed to extend the findings of this preliminary analysis of analysts' information needs, and, importantly, to shift the focus of attention from the analyst to the investor himself or herself. Specifically, the study was intended: *i)* to offer more concrete behavioural evidence of *investors'* use of non-financial data; *ii)* to examine the value relevance of non-financial data; and *iii)* to estimate the relative influence of non-financial data on the investment decision. The study also attempts to extend previous studies documenting investors' stated information needs by soliciting more detailed survey descriptions of preferred non-financial measures.

The primary research tool used to collect the study data was a mailed survey instrument designed using experimental methodologies which allowed the investigators to capture and record behavioural patterns and implicit preferences. By generating this rich, behavioural understanding of investors' information needs and valuation styles, this study should contribute significantly both to policy debates and to managerial development of improved performance measurement and communications strategies. By illustrating the value and potential of a new methodology, the study should also make a contribution to the academic community interested in performance measurement. As will be discussed below, the research methodology used for this study builds upon a set of experimental survey and statistical modelling procedures which are now extensively employed by the marketing research community (see e.g. Ben-Akiva, Morikawa and Shiroishi, 1990, and Ben-Akiva and Morikawa, 1990). However, this particular methodology has not to date been applied in any investigation of the investor community or performance measurement preferences, despite the opportunity it offers to obtain behavioural insight using controlled procedures. To the extent that it also allows examination of respondents' valuation of data which are not easily quantifiable, this methodology opens up a new avenue of exploration and facilitates examination of information types which to date have not been readily amenable to research.[8]

3. Research methods

In this section, we provide a brief description of the research method, our sample selection procedures and our techniques for designing the survey instrument. Section 3.1 below focuses explicitly on the sample selection process and provides a description of the type and variety of respondents participating in the study. Section 3.2 provides information on the structure of the survey instrument and the procedures used to ensure the validity of the instrument. Section 3.3 provides a description of the analytic tools used to organise and understand the survey results.

3.1 Sample selection techniques

All research results were generated using information and data provided by 275 portfolio managers representing virtually all major types and classes of active institutional investors.[9] The final sample was drawn from a database detailing the population of US portfolio managers which is researched and updated annually by the Georgeson Group, a United Kingdom-based investor relations and proxy solicitation firm. At the close of 1995, this database included a total of just over 1 900 individuals representing both private and public funds and institutions. Table 3 below provides some descriptive information allowing comparison between the study sample and this larger population. Specifically,

Table 3 presents data on the type of investment account, the portfolio's composition and the manager's investment style.

Table 3. **Population *vs.* respondent characteristics: portfolio size, investment style, and fund type**

Panel A: Portfolio size

	Survey sample (%)	**Study population (%)**
Median assets (million $)	173	183
Average no. of stocks held	132	149
% S&P 500 stocks	64	58

Panel B: Fund type

	Survey sample (%)	**Study population (%)**
Mutual fund	13	19
Bank	22	14
Money market fund	51	53
Insurance company	9	9
Private pension	4	3
Public pension	1	2

Panel C: Investment style

	Survey sample (%)	**Study sopulation (%)**
Aggressive growth	8	14
Growth	35	34
GARP	15	14
Balanced	8	10
Classic value	11	13
Value income	22	15

Comparison of the population *vs.* sample values suggests that the characteristics of the sample closely approximate those of the population at large, with only slight differences in the proportion of mutual fund and bank representatives. Note also that the sample of 275 represents approximately 14 per cent of the total population, a level which minimises the standard errors of the estimates.

A four-step mail/telephone procedure was used to collect the study data. In Step 1, investigators posted an introductory letter to all potential respondents informing them of the purpose of the survey and inviting their attention and participation. This initial contact was quickly followed in Step 2 by a telephone call during which paid interviewers confirmed the respondent's appropriateness for the study and solicited their commitment. Those agreeing to participate were mailed the survey in Step 3 and invited to return their responses either by mail or over the phone. Repeated phone calls were used in Step 4 as necessary to encourage response. The return rate from qualified, participating respondents was 42 per cent.

3.2 Survey design

As noted above, the primary research tool used to reach this survey sample was a mailed survey instrument which was constructed to allow collection of both "stated" and "revealed" preference data. "Stated" preference data represent respondents' own statements of the influence a particular information item has on their decision-making routines. Stated preference questions are a popular form of survey question and have been the only type of question used to solicit investors rankings of information usefulness to date. When revealed preference data is collected, the importance of particular information items is identified indirectly by evaluating the subjects' behavioural response to certain choice tasks. For the purposes of this study, respondents were asked to select or reveal their preference for certain equities over other after evaluating various performance data sets. Analysis of the covariation between the subjects' investment choices and changes in the equities' performance attributes reveals the relative importance and/or contribution of each attribute to the subjects' decision-making process.

The instrument itself was divided into four parts. The first and final parts of the survey (Parts 1 and 4) were used to collect essential demographic and investment profile data. The second Section (Part 2) was used to collect "stated" preference data, i.e. participants statements about their use of, or preferences for, particular types of investment data. Specifically, the survey instrument prompted participants: *i)* to state what percentage of their investment decisions are based on non-financial data; *ii)* to rate the usefulness of 40 different types of non-financial data; and *iii)* to rate the value of different data sources.

The third Section (Part 3) was designed to collect the study's experimental or behavioural data, i.e. the respondents' "revealed" preferences. This section presented the respondents with a series of hypothetical share purchase scenarios. In each scenario, the respondent was asked to allocate some portion of an investment fund across four companies operating in either the computer, oil and gas, food processing, or pharmaceuticals industries.[10] Specifically, each respondent was asked to allocate 100 per cent of their "fund" to one or more of four companies within the industry. To ensure sufficient experimental observations, each industry-specific allocation scenario was run four times for a total of 16 allocation scenarios. (See Appendix A for an example of this experimental design.) In each scenario, the respondent was provided with a set of financial performance data including, for example, price/earnings ratios, sales growth rates, earnings per share data, etc. As noted above, by varying the characteristics and the performance of these firms and by monitoring how the investment allocations changed along with the firms' changing performance, the investigators were able to deduce or "reveal" through a multinominal regression technique investors' preference for particular performance indicators.[11] With additional modelling and by combining the non-financial data with the financial data in the

regression analysis, the investigators were ultimately able to "value" the usefulness of each different type of non-financial data in share price terms.

The process of survey design was constructed to comply with the normative protocol specified in Rossi, Wright and Anderson (1953), Payne (1951) and Dillman (1978). Initial drafts of the survey were prepared and reviewed by representatives of all major research constituencies: other researchers, subject experts, typical participants, and potential users of the data. The final draft was tested on a focus panel of six "typical" respondents, each of whom was selected to represent one of the population's significant demographic constituencies. The comments and suggestions received from this group were fully incorporated into the final version mailed to survey respondents.

3.3 Data analysis and modelling techniques

Data analysis and modelling procedures used to identify investors' "revealed" preferences for non-financial information were designed following the procedures established by Ben-Akiva and Morikawa (1990). The principal statistical test involved estimation of a multinominal logit regression explaining allocation levels as a function of: *i)* the financial characteristics presented in the experimental scenarios;[12] and *ii)* a set of eight non-financial characteristics whose company-specific values were evaluated by the respondent using an 11-point Likert scale extending from 0 to 10. Specifically, each respondent was asked to evaluate the performance of all 16 companies along the following dimensions: 1) Quality of management, 2) Quality of products and services, 3) Customer satisfaction, 4) Strength of corporate culture, 5) Quality of investor relations, 6) Executive compensation, 7) Quality of new product development, and 8) Strength of market position.[13]

A score of 5 was indicative of "average" performance relative to industry levels, a score of 10 was used to indicate above-average performance, and a score of 1, below-average performance. Note that virtually all company ratings were highly correlated, raising concerns about the collinearity of the data used for the regression. To reduce the significance of this threat to statistical validity, the investigators decomposed the sources of variability using structural equations modelling techniques. These techniques allowed the investigators to isolate the brand "halo" effects, i.e. the bias or weight introduced to the performance rankings as a result of unique company "reputation". The final regression included only the residual of the model, or the "pure" ranking dissociated from the company halo.[14]

In the process of generating the final statistical model, the investigators evaluated a number of other potential influences on the allocation decision, including: the investment style of the portfolio manager, the size of the portfolio, the type of fund managed and the demographic background of the manager, for examples. None of these factors was found to play a statistically important role in the regression. We consequently interpret the model as being reasonably robust and generalisable across investor groups.

4. The stated value of non-financial data

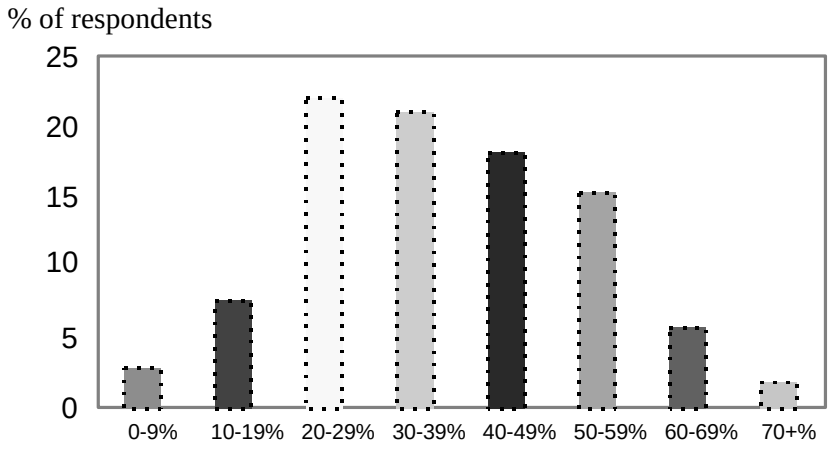
In many studies of investors' information needs, survey respondents are asked to rank the usefulness of particular types of non-financial data. While certain types of data, like quality of management or measures of market growth, for example, are consistently evaluated as "extremely useful", most discrete elements are evaluated as only modestly useful on average. In contrast with these earlier studies, this study attempted to measure the contribution not only of discrete items but also of the non-financial dataset, more generally. That is, while this study assessed the usefulness of discrete data types, it

also queried respondents about the value of non-financial data as a whole. For example, we asked respondents to indicate what percentage of the investment decision was influenced by non-financial data. The response to this question was, on average, 35 per cent. That is, about one-third of the information used to justify the investment decision is non-financial -- a significantly larger fraction than anticipated.

Figure 1 below provides illustration of how widely responses varied around this average. The data presented here indicate clearly that this average response is not driven by a small fraction of investors who rely entirely on non-financial data. On the contrary, well over 60 per cent of the survey population estimated that non-financial data drove between 20 and 50 per cent of the investment decision. Just slightly less than 20 per cent estimated that non-financial data influenced 50-59 per cent of the decision.

Figure 1. **The stated usefulness of non-financial data**

% Influence of non-financial measures *vs.* % respondents



In addition to this aggregate valuation, the survey asked respondents for their evaluation of certain discrete data elements. To express their evaluation, respondents used a 7-point Likert scale where a score of 1 represented "not at all important" and a score of 7, "very important". Appendix B presents a list of the 40 specific non-financial data elements examined and their mean scores. Note that only six of the 40 received mean scores of less than 4, signifying that they were considered "somewhat important". Of the remaining 34 items, 31 received scores between 4 and 5, suggesting that almost all types of non-financial data, from that indicating "innovativeness" (score: 5.77) or "quality of the workforce" (score: 5.12), to that measuring "global capability" (score: 4.94), are considered to be valuable to the average shareholder.

Interestingly, in comparison with the results compiled by Eccles and Mavrinac (1995), these data suggest that employee information is reasonably valued by investors. Note, for example, that measures indicating "the company's ability to attract and retain talented people" received an importance score of 5.61, an exceptionally high score in comparison with that associated with other information types. Indeed, the only employee-related data element not receiving a score of at least 4 was the one measuring "use of employee teams". In summary, it appears that investors' most valued measures are measures which reveal the productivity and creativity of the organisation's people and people-oriented systems. Although the

quality of the business plan or strategy is also considered crucial by investors, it appears that investors ultimately place more weight on the ability of the management team to deliver, i.e. the focus is on action.

The scores reported in Appendix B provide insight into the "average" valuation, i.e. the ranking provided by the "average" investor. However, exploration of the variation in rankings across respondents reveals the heterogeneity of investor attitudes towards non-financial performance data. To explore the nature and extent of variation in the data scores the investigators looked specifically at the ten data types which were ranked most important or least important, on average. Table 4, Panels A and B, below provide lists of those data elements along with additional information on the dispersion of the rankings and the percentage of respondents who classified the data type as "very important" or "not at all important". Examination of the information displayed in the tables suggests that the ten data types receiving the highest mean scores were considered "very important" not only by the "average" respondent but by the majority of respondents. For example, almost 90 per cent of respondents ranked "execution of corporate strategy" (average score: 6.26) as very important, with scores of either 6 or 7. There appears to be slightly less consensus surrounding the data elements with the lowest scores. For example, far less than 50 per cent of the respondents evaluated "use of employee teams" as being "not at all important".

Table 4. **Investigating variation in response**
Rankings of least and most valued non-financial data types

Panel A		**Panel B**	
Most valued measures		**Least valued measures**	
Measurement type	**Mean score**	**Measurement type**	**Mean score**
Execution of corporate strategy	6.26	Quality of guidance	4.48
Management credibility	6.16	Employee turnover rates	4.42
Quality of corporate strategy	5.92	Experience of IR personnel	4.36
Innovativeness	5.77	Number of cust. complaints	4.32
Ability to attract employees	5.61	Quality of cust. service dept.	4.29
Market share	5.60	Quality of published materials	3.91
Management experience	5.54	Product quality awards	3.53
Quality of compensation Policies	5.48	Process quality awards	3.39
Research leadership	5.40	Environmental and social policies	3.36
Quality of processes	5.34	Use of employee teams	3.26
Customer satisfaction	5.33	Compensation ratios	3.22

Given that most investors do value and actively use non-financial data, the issue of how investors receive this data becomes critical. To learn more about which media are preferred, we presented our survey respondents with an extensive list of data sources and asked them to rank their value using the traditional 7-point Likert scale. Again, a score of 7 was used to represent a "very important" media while a score of 1 was used to suggest that the media was "not at all important". Table 5 below provides a list of the media considered and the mean scores received. Not unexpectedly, management presentations are ranked as the most important source of non-financial data, on average, suggesting the importance of unstructured discussion and question and answer periods. Interestingly, "online services" are considered

relatively unimportant, at least in comparison with management presentations or company reports, for example. Apparently, competitors are also a major source of corporate performance data.

Table 5. **Collecting non-financial information: evaluating alternative media**

Source	**Mean score**
Management presentations	5.54
Company filings	5.34
Sell-side analysts	4.82
Competitors	4.77
Business press	4.56
Company investor relations personnel	4.56
Customers	4.55
Buy-side analysts	4.53
Trade press	4.51
Informal networks	4.27
Independent ranking agencies	3.99
Industry trade associations	3.93
Online services	3.77

5. The relative value of performance improvement

The first phase of analysis described above offers an extension of previous studies of investors' information requirements and provides important new information on the extent to which non-financial data influence the investment decision on aggregate. Most importantly, however, this phase of analysis offers justification for the more detailed modelling required in the second phase of the study.

As described above, this second phase of work relies upon the data compiled from the experimental investment simulations. As described above, those simulations prompted our survey respondents to allocate a hypothetical portfolio across four firms operating in either the computer, oil and gas, pharmaceuticals, or food processing industries. In every case, these companies were large firms whose non-financial attributes were well recognised by respondents. (See Table 6 below for a list of the companies included in the study by industry.) By varying the characteristics and performance of these companies in the simulation and by registering the consequent changes in the amount of investment funds allocated to the firm, the investigators were able to estimate the amount of influence each financial and each non-financial characteristic had on the investment decision.

Table 6. **Subject companies by industry**

Computer systems industry	Hewlett Packard
	Sun Microsystems
	Compaq
	Dell
Food products industry	General Mills
	H.J. Heinz
	CPC International
	Ralston Purina
Pharmaceuticals industry	Merck
	Pfizer
	Bristol-Meyers
	Warner-Lambert
Oil and gas industry	Exxon
	Chevron
	Atlantic Richfield
	Phillips Petroleum

The quantitative results were generated through estimation of a multinominal logit regression. In general, the results of the full study estimation correspond well with the results of the stated preference study described above. According to our statistical estimates, approximately 33 per cent of the investment decision can be explained with reference to non-financial data.[15] Recall that the response to our request for an estimate of "how much importance you place on financial *vs.* non-financial considerations" was 35 per cent, on average.

Table 7 below provides a description of model output for tests run using data compiled for all four subject industries: the oil and gas, pharmaceuticals, computer systems, and food processing

industries. The data presented in this table should be interpreted as the implicit value "scores" received by each of the non-financial factors, i.e. as the revealed values of the non-financial data in the investment allocation context. Note that these are relative scores, i.e. scores determined in relation to the value assigned to the firm's price/earnings ratio. Specifically, each score represents the change in the price/earnings ratio which would have the same utility or value for the investor a one-unit change in non-financial performance. For example, for a large firm operating in the biotechnology/drug development industry, a one-unit change in the quality of products and services would be equivalent in value, and would have the same impact on investor demand levels, as a 0.9 per cent increase in the firm's price/earnings ratio. Similarly, for a firm operating in the food processing industry, a one-unit increase in the quality of products and services would be equivalent in utility or value terms to a 1.4 per cent change in firm's price/earnings ratio.

Table 7. **Model output: investor valuation of non-financial performance improvement**

	Industry			
	Computer	**Drugs**	**Food**	**Oil and gas**
Quality of management	7.6	2.6	1.4	4.2
quality of products and services	2.4	0.9	1.4	5.8
Customer satisfaction	0.0	0.0	0.0	0.0
Strength of corporate culture	0.0	0.0	0.0	0.0
Quality of investor Relations	0.8	0.5	0.3	0.9
Executive compensation	0.9	0.6	0.4	1.1
Quality of new product dev.	0.0	5.3	0.9	1.6
Strength of market position	3.1	0.3	0.0	7.3

Note: Scores indicate equivalent percentage increase in a company's P/E ratio for a 1 point improvement in investor perceptions of non-financial performance

The implications of these findings can be made more obvious with some simple calculations. Note first that reported earnings do not change frequently. On the contrary, they are reported quarterly at best. Given this fact, we can restate the relationship, defining a one-unit improvement in the quality of products and services in the pharmaceuticals industry as equivalent to a 0.9 per cent increase in share price, *ceteris paribus.* For a firm like Merck whose share price was approximately $44.00 in the spring of 1996 and which had over 1 145 million shares outstanding, this 0.9 per cent increase in share price would be manifest as a $447 million increase in market value. That is, for the average shareholder, a one-unit increase in the quality of Merck's products and services would be equivalent to, or worth to the shareholder, approximately $447 million.

Further inspection of the results presented in Table 7 suggests that by far the largest value gain for a firm operating in the pharmaceuticals industry would flow from improvements in the quality of new product development. For a firm like Merck, a one-point improvement in the quality of new product development would be "valued" by investors at a sum topping $2.6 billion.

According to our calculations, improvements in the quality of management would also be valued highly by shareholders. For a firm like Hewlett-Packard, for example, which operates in the computer systems industry, a one-unit improvement in the quality of management would be equivalent in shareholder value terms to a $1.3 billion gain in market value, given the performance of the firm in the spring of 1996.

Interestingly, neither increase in customer satisfaction or improvements in the strength of corporate culture are valued highly by shareholders. To generate a more complete interpretation of these results, project investigators augmented the statistical analysis with in-depth, unstructured interviews with proto-typical respondents. One subject simply dismissed the relatively low customer satisfaction and corporate culture weights, saying:

> "Culture, customers ... I don't have time to interview employees and customers and no good independent source of information about them exists, so I largely ignore them."

Another noted that:

> "For these types of companies, if they have high-quality management and are offering a high-quality produce through well-developed distribution channels, then they must have satisfied customers."

The data collected to date are insufficient to answer all the questions which are raised by these findings. Nor is there point in undertaking such a task. The intent of this study was simply to gain some perspective on investors' perceptions of and need for non-financial data. We also hoped to test and to illustrate the usefulness of this experimental methodology which has not to date been applied in any given study of investor decision making. Extensions of this study are clearly warranted, however, to realise greater insight into results like those discussed above.

6. Summary and conclusions

At a recent symposium sponsored by Commissioner Wallman of the Securities and Exchange Commission, it was agreed that if solutions to the problems engendered by traditional reporting systems were to be realised, a more constructive dialogue between users and preparers, regulators, auditors and policy makers must ensue. A first step in shaping that dialogue will be to make more evident the information needs and interests of shareholders.

The intent of this report is to offer data which might be used not only in this reform dialogue but also and more immediately by corporate managers who have interest in advancing their performance measurement programmes, shaping their own communications with shareholders, or, most importantly, assessing the returns to their strategic endeavours. In brief, the results of the study offer new and compelling evidence of shareholders' strong reliance on a broad range of non-financial factors and indication of investors' real appreciation of investments in employee development, process quality, and the corporate innovations which will provide the foundation for tomorrow's financial performance. The study also offers specific information on the types of non-financial metrics which are most valued by the investor community. Most significantly, the study is one of the first to provide quantitative evidence of the value impact of non-financial performance improvements. As illustrated in Table 7 above, improvements in investor communications, product quality and the perceived quality of management can drive hundreds of millions of dollars of shareholder value if these improvements are communicated clearly to the market.

While this paper should offer insight and perspective to the manager attempting to shape his or her strategic agenda, the paper is first intended to provide empirical illustration of the value relevance of non-financial data and to encourage continued academic exploration of the role of expanded performance measurement in the implementation of corporate strategy. It is hoped that the study can also offer an illustration of the usefulness of behavioural and revealed preference experiments in this type of research. Certainly, the topic is deserving of additional exploration.

APPENDIX B. NON-FINANCIAL DATA ELEMENTS EXAMINED

1. Quality of Corporate Strategy
2. Product Defect Rates/Service Failure Rates
3. Customer Satisfaction Level
4. Quality of Workforce
5. Accessibility of Management
6. Alignment of Compensation with Shareholder Interests
7. Research Leadership
8. Global Capability
9. Quality of Organizational Vision
10. Product Quality Awards
11. Ability to Attract and Retain Talented People
12. Quality of Published Materials
13. New Product Development cycle Time
14. Innovativeness
15. Execution of Corporate Strategy
16. Customer perceived Quality
17. Quality of Employee Training
18. Performance-based Compensation Policies
19. Strength of Marketing and Advertising
20. CEO Leadership Style
21. Number of Customer Complaints
22. Quality of Guidance
23. Brand Image
24. Management Experience
25. Employee Turnover Rates
26. New Product Development Efficiency
27. Environmental and Social Policies
28. Quality of Customer Service Department

29. Percentage of Revenues Derived from New Product
30. Process Quality Awards
31. Ratio of CEO Compensation to Workforce Compensation
32. Repeat Sales Level
33. Use of Employee Teams
34. Market Share
35. Management Credibility
36. Quality of Major Business Processes
37. Quality of Incentive Performance Systems
38. Knowledge and Experience of Investor Relations Contact
39. Product Durability
40. Process Efficiency

NOTES

1. Consider, for example, the development and production processes of a biotechnology firm. Financial analysts following the biotech industry commonly assert that the value of these processes and the value of the company as a whole is based less on the company's investment in property, plant, and equipment, i.e. the assets on the balance sheet, than on the company's investment in intellectual capital or research and development capability. The CFO of one California biotech company described the situation, saying: Biotechnology is a unique sector in that valuation for emerging companies is largely based on projections of future timing, utility, performance of research/development projects which aren't commercialisable until years from now. Short-term financial performance is correspondingly of little use in determining corporate value.

2. In this study, a one-unit change in non-financial ranking, e.g. a movement from a rank of 6 to 7, represents a relative change of less than a half a standard deviation.

3. To calculate this hypothetical return, the authors share price and earnings numbers collected for the period. At the end of month, year, Merck's share price was approximately $70 while its earnings were $3.50/share.

4. See Mavrinac, Jones and Meyer (1995).

5. See Mavrinac, Jones and Meyer (1995).

6. Note also that the stated "importance" of an item need not reflect the utility or actual influence of the item in decision making. The actual influence of any particular type of item may be strongly affected by the availability of information substitutes or proxies, for example.

7. A stratified sampling plan was used to select the company reports. The procedure was designed to accommodate variation in the density of the information environment which might result from or be associated with variation in firm size or market value, exchange listing and industry.

8. See Ben-Akiva, Morikawa and Shiroishi (1990) for additional discussion of the benefits of discrete choice experiments incorporating revealed and stated preference data.

9. Note that the only investors systematically excluded from the sample were those investing exclusively in small to medium-sized firms. The study's focus on "active" investment also necessarily precluded analysis of the decision-making styles of managers controlling indexed funds.

10. Studies by Eccles and Mavrinac (1995) and Lev (1996), for example, suggest that the usefulness of non-financial data might vary across industries and firm growth categories. To accommodate these findings, the investigators selected industries which varied strongly along the aggregate growth dimension. Using data on average company sales growth rates collected from Standard & Poor's publications, the investigators specifically identified the pharmaceuticals and computer industries as "high growth" industries, the food processing industry as a "moderate growth" industry, and the oil and gas industry as a "slow growth" or declining industry.

11. This particular technique has a long history of use in such fields as marketing. The response variable can be either discrete or continuous. With a continuous response, the proportions assigned to each category or choice must sum to one. As a consequence, the responses across choices are negatively correlated and the variance of the response becomes a function of size, making OLS or WLS techniques inappropriate.

12. Repeated measures ensured within subject variability as well as between subject variability.

13. Note that these ratings were introduced as covariates with only between-subject variability.

14. An often appealing alternative to structural equations modelling is factor analysis. Note, however, that a fundamental assumption of factor analysis is that the variance to be parsed is strictly between items. In this survey, individuals were asked to evaluate non-financial performance dimensions for each of 16 companies, raising the possibility of an additional source, i.e. an individual source, of variation. To the extent that structural equations modelling can accommodate multiple sources of variation, it appears preferable to factor analysis for the purposes of this study.

15. Estimates were derived from comparison of relative size of log-likelihood ratios of the models including *vs.* excluding non-financial information.

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