



The Use and Usefulness of Nonfinancial Performance Measures

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A SURVEY OF 128 FIRMS LOOKS AT HOW COMPANIES USE FINANCIAL, NONFINANCIAL, AND SUBJECTIVE PERFORMANCE MEASURES IN ORDER TO BETTER UNDERSTAND HOW DIFFERENT PERFORMANCE MEASURE TYPES CONTRIBUTE TO AND AFFECT MANAGEMENT STRATEGIES.

EXECUTIVE SUMMARY Using survey data from manufacturing managers of 128 firms, this study empirically examines the extent to which firms combine financial, quantitative nonfinancial, and subjective performance measures. Both the relative use of measure types and specific measures within each type are found to vary with the companies' manufacturing strategies. This supports claims that the three types of measures play different roles in supporting a firm's operations. A related finding is that the measure types have different impacts on important employee actions, such as risk taking, efforts at innovation, relative emphases on the short vs. long term, and the propensity to game the performance evaluation system.

It is well accepted that performance measurement plays many important roles in running an organization. These include translating strategy into desired behaviors and results, communicating these expectations, monitoring progress, providing feedback, and motivating employees through performance-based rewards and sanctions. For a long time, managers had primarily used accounting-based measures for these purposes. But with the advent of new competitive realities such as increased customization, flexibility, and rapid response to customer expectations, as well as new manufacturing practices such as

Just in Time and total quality management, many have argued that accounting-based performance measurement systems are no longer adequate. In the past decade especially, a wide variety of measures and systems have been proposed and implemented to overcome the purported limitations of accounting-based measures in these environments. A prominent example of these new approaches is integrated performance measurement systems, such as the balanced scorecard.¹

While proponents have made a persuasive case for the new measures and measurement systems, the support they have provided for these new systems mostly

has been in the form of anecdotal evidence with limited scope, claims based on proprietary studies, or even simple, though intuitively appealing, illustrations. Furthermore, there is a tendency to downplay, if not outright ignore, the potential shortcomings and limitations of the alternatives being proposed. While the limited scope of such support does not necessarily negate the potential usefulness of the proposed changes in performance measurement, it is insufficient for guiding informed adoption decisions.

Managers need a more systematic understanding of the advantages/benefits and the disadvantages/costs of the new approaches compared to those of traditional accounting-based systems. The aim of this article is to contribute toward building such an understanding. Specifically, we investigate the relative use of financial, quantitative nonfinancial (“nonfinancial” for short), and subjective performance measures by a sample of 128 firms. The term “subjective measures” is used to represent nonfinancial measures that are derived from subjective judgment. We further explore whether financial, nonfinancial, and subjective performance measures differ on such characteristics as controllability and vulnerability to measurement errors and, more importantly, impact on such behaviors as risk taking, efforts at innovation, and gameplaying.

The results indicate that companies with different manufacturing strategies use different mixes of the three types of measures. This is consistent with each type of measure performing a different role in supporting operations. Further supporting this inference is that the three types of measures do have some different effects and properties which, interestingly, are not always in the directions suggested by prior literature.

To help readers follow our study and to interpret our findings, we start by reviewing the key points that have been made about the characteristics and impacts of financial, nonfinancial, and subjective performance measures. Then we explain our data collection approach and present the results. We conclude with a discussion of the implications for management accounting practice.

COMMON CLAIMS

Recent coverage of performance measures has criticized

periodic financial measures as being too aggregated, too late, and too backward-looking to help managers understand the root causes of performance problems, initiate timely corrective actions, encourage cross-functional decision making, and focus on strategic issues. A typical example used to illustrate these shortcomings is “dollarized” variance information.² Most unfavorable variances have multiple causes that stem from problems in multiple departments. Yet traditional accounting-based reporting systems tend to be structured along departmental lines. This mismatch between the root causes and report structure, along with a focus on the aggregate financial impact rather than operations, may induce managers to avoid taking responsibility, attempt to optimize locally, and/or engage in dysfunctional behaviors to maximize short-term performance at the expense of long-term effectiveness and competitiveness.

These and many other criticisms of financial measures are intuitively appealing and likely have considerable validity. In deciding whether to increase the use of nonfinancial measures—and, if so, which ones—it is important to recognize that nonfinancial measures are not free of limitations. For example, if a firm tracks the percentage of shipments delivered on time, there may be an incentive to sacrifice one late but important shipment to ensure the on-time delivery of many smaller shipments.³ Moreover, at least some nonfinancial performance measures may be difficult to measure accurately, efficiently, or in a timely fashion. In a study of business executives by Wm. Schieman & Associates, the executives widely acknowledged the limitations of traditional financial measures. Nevertheless, they still favored them over nonfinancial measures because they saw them as generally being less ambiguous. As a group, the executives were less willing to bet their jobs on the quality of a variety of nonfinancial information than on the quality of financial information.⁴ This is particularly true when nonfinancial performances are subjectively assessed, due to potential evaluation biases.⁵

It is possible, of course, that examples and studies like these merely reflect how things are instead of how they can be. In other words, financial measures may be inadequate because managers have not fully reaped their benefits—and not because of inherent limitations.

Table 1: Frequencies (Percent of Usage) of Specific Performance Measures[†]

	EMPHASIS ON QUALITY IN MANUFACTURING		
	LOW	HIGH	HIGH-LOW DIFFERENCE
1. FINANCIAL MEASURES			
Asset deployment (e.g., ROI)	33.3	41.0	7.7
Total gross or contribution margin	63.9	74.4	10.5
Unit gross or contribution margin	41.7	48.7	7.0
Total manufacturing cost	66.7	84.6	17.9
Unit manufacturing cost	47.2	66.7	19.5
Manufacturing cost budget line-items:			
Labor cost variances	58.3	76.9	18.6
Material cost variances	55.6	71.8	16.2
Indirect cost (overhead) variances	58.3	71.8	13.5
Maintenance expenditures	32.4	51.3	18.9
Dollar amount spent on manufacturing process improvements	30.6	35.9	5.3
2. OBJECTIVE NONFINANCIAL MEASURES			
2.1. Internal operating measures			
Production volume	62.2	76.9	14.7
Labor productivity	75.7	82.1	6.4
Machine productivity	45.9	41.0	-4.9
Material usage	59.5	79.4	19.9
Setup efficiency	32.4	35.9	3.5
Manufacturing cycle time	40.5	64.1	23.6
Inventory levels	73.0	76.9	3.9
Product defects	83.8	94.9	11.1
New product introductions	16.2	43.6	27.4
New product design efficiency	5.4	35.9	30.5
2.2. Employee-oriented measures			
Employee satisfaction	13.5	61.5	48.0
Employee skills	27.0	61.5	34.5
Employee empowerment	16.2	38.5	22.3
Safety measures	54.1	82.1	28.0
Employee training	32.4	69.2	36.8
Employee turnover	21.6	56.4	34.8
Absenteeism	56.8	64.1	7.3
2.3. Customer-oriented measures			
Market share	19.7	18.2	-1.5
Time to fill customer orders	37.8	59.0	21.2
Delivery performance	83.8	97.4	13.6
Time to respond to customer problems	27.8	56.2	28.4
Product flexibility	27.0	35.9	8.9
Customer satisfaction	37.8	76.9	39.1
Customer acquisition	16.2	25.6	9.4
Customer retention	26.2	43.3	17.1
3. SUBJECTIVE MEASURES			
My long-term perspective on the business	50.0	71.8	21.8
My ability to effectively acquire new skills/knowledge	47.2	59.0	11.8
My willingness to share knowledge within the organization	52.8	69.2	16.4
My cooperation with other departments within the organization	75.0	82.1	7.1
Employee spirit/morale in my department	47.2	79.5	32.3
My management style/leadership skills	83.3	92.3	9.0
My loyalty toward the firm	31.4	59.0	27.6

[†] Several respondents also provided additional write-in measures (typically one or two). Some were highly idiosyncratic to their specific organizations (e.g., my ability to work cooperatively with the Japanese top management). Less idiosyncratic measures provided include capital expenditure measures and cost reduction measures for financial; order backlog, product return turn-around cycle time, and quoted lead time accuracy for nonfinancial; and my ability to manage people and processes under my direct control and influence people and processes under my peers' control for subjective measures.

Similarly, it is possible that the purported shortcomings of nonfinancial measures are the outcomes of ineffective implementation and use. The important point is that the effective design and use of performance measurement systems requires a systematic and balanced investigation of the characteristics, strengths, and weaknesses of financial vs. nonfinancial performance measures.

As academics without a vested interest in particular outcomes, we undertook such an investigation by soliciting the experiences of manufacturing managers from a large sample of firms. While ours is not the first study to survey managers on the topic, a distinguishing feature of our study is that it includes numerous specific performance measures of each type. Another important advance over previous studies is that we distinguish between nonfinancial measures that are quantitative and objectively measured and ones that are subjectively determined. Such a distinction helps to increase understanding of the use and characteristics of subjective performance measures, which is important because subjective measures are increasingly being promoted due to many aspects of work and performance not being readily quantifiable.

We also explored if the relative uses of the three types of performance measures, as well as specific measures within each type, vary with firms' manufacturing strategies. Because a major criticism of financial measures is their inadequate ability to support modern manufacturing systems and initiatives, we focused specifically on firms' relative emphasis on quality. In the specific case of quality-focused manufacturing, proponents of quality initiatives have argued that such initiatives tend to change the focus of work (e.g., prevention vs. inspection) within subunits of the firm and intensify the degree of interdependence among organizational subunits.⁶ Quality strategies also are seen as involving lead-lag relationships (e.g., prevention vs. warranty costs) and aspects of work that are difficult to quantify (e.g., cooperativeness). Because of these attributes, it has been argued that quality initiative implementation is better supported by nonfinancial than financial measures, as the former can more effectively secure commitment to quality initiatives, communicate their significance throughout the organization, and cap-

ture the multiple relevant aspects of complex, diverse, and team-based tasks.⁷

DATA COLLECTION

Consistent with our focus on manufacturing strategy, we limited our sample to the manufacturing sector. Within each firm, we directed our survey to the manager or director of manufacturing. See "Sample Selection" on p. 7 for an explanation on how we obtained the sample of 128 firms.

The first section of the survey asked participants to indicate the specific measures currently used for evaluating manufacturing performance. There was one subsection on financial measures, three subsections on objective nonfinancial measures (internal operating measures, employee-oriented measures, and customer-oriented measures), and one subsection on subjective performance measures. Each subsection listed a large number of performance measures that we had identified based on a wide reading of both the academic and practitioner literatures. Table 1 lists the specific measures in each category. Respondents could check off measures from the list as well as write in additional measures. To curb a potential upward bias in the number of measures reported—in other words, situations where financial, nonfinancial, or subjective performances are tracked *but not used*—we explicitly directed respondents "*to only check (or write in) those measures that are reported, analyzed, and discussed on a regular basis for the purpose of performance measurement and evaluation.*"⁸

Since we wanted to compare the use of performance measures by firms with different emphases on manufacturing quality, we also asked the manufacturing managers to indicate the extent to which the following activities occurred in their firms, where 1="not at all" and 5="very high extent":

1. Nonmanagement employees are evaluated for quality performance;
2. Nonmanagement employees participate in quality improvement decisions;
3. Building awareness about quality among nonmanagement employees is ongoing;
4. Quality performance data are displayed at employee work stations/areas;
5. Suggestion programs for quality improvement among

- nonmanagement employees are used;
6. There are programs in place to improve cycle times (e.g., by reducing time delays or nonvalue-added activities in manufacturing); and
 7. There are programs in place to coordinate quality improvements with other departments within the organization.

These seven practices encompass items consistently identified by the academic and practitioner literature as being critical aspects of quality initiatives: employee involvement, process improvements, and cross-departmental coordination.⁹

SURVEY RESULTS

Across all firms in the sample, the average performance measurement system contains a wide variety of measures, with internal operating measures (26%) and financial measures (25%) used the most. There were lower but still nonnegligible proportions of subjective performance assessments (19%), employee-oriented measures (15%), and customer-oriented measures (15%). Categorizing the measures differently, the average ratio in the sample is about 25 financial performance measures to 75 nonfinancial measures, whereas the average ratio of objective to subjective measures is about 82 objective to 18 subjective.

Table 1 lists the frequency that each specific measure is used by firms that put relatively low vs. high emphasis on quality in manufacturing. Table 2 summarizes these data by measurement category. To make the patterns easier to see, both Tables 1 and 2 compare the one-third of respondents with the highest emphasis on quality manufacturing to the one-third of respondents with the lowest emphasis on quality. The significant differences between the two types of firms in their use of each measure type are shown in Table 2 in bold. (Significant differences are based on *t*-tests at a 10% two-tailed probability level.) The pattern that emerges from the summary presentation in Table 2 is that firms that place relatively greater emphasis on quality in manufacturing use more nonfinancial measures (especially ones relating to internal operations and employees) and subjective measures. What is interesting is that the nonfinancial measures are not used as substitutes for financial measures, as these firms also use more of the latter.

Table 2: Relative Mix and Uses of Different Measure Types by Firms

	EMPHASIS ON QUALITY IN MANUFACTURING	
	LOW	HIGH
1. Financial measures	6	7
2. Objective nonfinancial measures	13	16
2.1. Internal operating measures	6	7
2.2. Employee-oriented measures	3	5
2.3. Customer-oriented measures	4	4
3. Subjective measures	4	5

Does this mean that firms with a greater emphasis on manufacturing quality simply use more of all kinds of measures? The findings in Table 1 suggest that this is not the case. Rather, the firms in the sample use different mixes of specific measures to support their strategy. While firms with greater emphasis on quality in manufacturing report using more of most measures, they use two measures less frequently: machine productivity and market share. In both cases, though, the difference between firms with high vs. low quality emphases is small (4.9% and 1.5%, respectively). At the other end of the spectrum, seven measures have over 30% higher usage rates by firms that emphasize quality: employee satisfaction, customer satisfaction, employee training, employee turnover, employee skills, employee spirit/morale, and new product design efficiency. A further eight measures have higher usage rates by quality-focused firms in the 20%-30% range. Remarkably, none of these 15 measures are from the financial category. The picture that emerges is that firms that emphasize quality also pay more attention to manufacturing and customer-order-filling cycle times, new product introductions and design efficiency, employee skills, safety, training, turnover, empowerment, and employee and customer satisfaction. They also expect managers in charge of manufacturing to have a long-term perspective on the business, engender strong employee spirit or morale in their units, and exhibit loyalty towards the firm. These patterns provide support for claims that nonfinancial performance measures (both objective and subjective) are better than financial measures at helping firms implement and manage new manufacturing.

Table 3: Average Ratings and Significant Differences in Selected Attributes and Consequences of Financial, Nonfinancial, and Subjective Performance Measures

Indicate the extent to which each of the following performance indicators:	FINANCIAL	NONFINANCIAL	SUBJECTIVE
Encourages risk-taking? *†	2.74	3.06	2.90
Encourages innovation? *†	3.14	3.47	3.14
Encourages a short-term focus on the business? *§†	3.29	2.94	2.70
Encourages gamesmanship or manipulation? *§†	2.25	2.08	1.94
Contributes to the quality of the short-term operational decisions you make? §†	3.21	3.27	2.79
Contributes to the quality of the long-term strategic decisions you make? †	3.21	3.27	3.13
Provides focus on the goals of your department? §†	3.68	3.72	3.14
Encourages alignment of objectives across departments? §†	3.31	3.40	3.11
Is influenced by factors outside your control? *§†	3.20	2.79	2.47
Is free from measurement problems? *§†	3.47	3.26	2.83

N = 128.

* = significant difference between financial vs. nonfinancial;

§ = significant difference between financial vs. subjective;

† = significant difference between nonfinancial vs. subjective ($p < 0.10$, two-tailed).

To assess how different measurement types contribute to firm performance more directly, we also asked the manufacturing managers to indicate the degree to which they had found each type to possess the following attributes, where 1=“not at all” and 5=“very high extent”:

1. Encourage risk-taking;
2. Encourage innovation;
3. Encourage a short-term focus on the business;
4. Encourage gamesmanship or manipulation;
5. Contribute to the quality of short-term operational decision making;
6. Contribute to the quality of long-term strategic decision making;
7. Provide focus on the goals of the department;
8. Encourage the alignment of objectives across departments;
9. Be influenced by factors outside the manager's control; and
10. Be free from measurement problems.

Table 3 reports each measurement type's average ratings on each attribute. This table also indicates significant differences across measurement types' average

ratings, based on t -tests at a 10% two-tailed probability level. There is a significant difference for at least one comparison per measurement attribute. Three features of these results are particularly worthy of note.

First, as compared to financial measures, nonfinancial measures are seen by the manufacturing managers as providing the greatest encouragement for risk taking and innovation and also are more effective at curtailing short-termism and gamesmanship. These differences are in line with popular belief. Compared to both financial and nonfinancial measures, subjective measures are seen as being the most effective at curtailing short-termism and gamesmanship.

Second, in contrast to popular claims, nonfinancial measures are not seen as significantly different from financial measures in their contribution to operational and strategic decision making and their capacity to align intra- and interdepartmental objectives. Surprisingly, subjective measures are seen as being the least effective among the three measurement types along these dimensions (except for “strategic decisions”). A plausible explanation for this is that the strongest weight for performance evaluation is still being placed on financial

Sample Selection

To obtain a sufficiently large sample for statistical testing purposes, we collected data from both the United States and Europe. We limited our U.S. sample to firms in Southern California, where the authors' schools are likely to have some goodwill. Using the Explore database from CorpTech for this region, we selected firms with at least \$2.5 million in annual sales and at least 50 people to ensure that firms in the sample would have sufficient scale to use, or need, formal performance measurement systems. We obtained 87 useable responses (representing an effective response rate of 13%). In Europe, we partnered with the Vlerick Leuven Ghent Management School (VLGMS). Here too, we restricted our target sample to Belgium, where VLGMS enjoys considerable goodwill. Using VLGMS's database on Belgian firms, we selected a sample of manufacturing firms that matched the U.S. target sample on sales and employment. We obtained 41 useable responses (representing an 11% response rate).

Thus, our total sample size is 128 manufacturing firms (87 + 41). Across these firms, the average number of employees in the manufacturing department is 227, while that for the firm as a whole is 3,216. The annual average production value (sales) in the manufacturing department is about \$86 million, while that for the firm as a whole is about \$1.2 billion. Thus, the firms in our sample are of at least middle-sized, rather than small, operations. Moreover, the respondents have been working for about 11 years at their current company and six years in their current position as the manager or director of manufacturing, indicating that they are sufficiently experienced for providing knowledgeable answers to our survey. Finally, we observe no key statistically significant differences among firm and respondent characteristics between the U.S. and European samples.

measures. In our sample, the performance evaluation weights are, on average, 49% on financial, 30% on non-financial, and 21% on subjective measures (not tabulated). When financial performance dominates the performance evaluation, it is perhaps no surprise that departmental financial measures provide the primary focus for managers' short-term decision making.

Finally, and perhaps not unexpected, subjective measures are seen as being most susceptible to measurement problems, financial measures are considered the least vulnerable, and nonfinancial measures fall somewhere in between. In contrast, financial measures are considered by the manufacturing managers to be most sensitive to factors outside their control, subjective measures the least, and nonfinancial measures again fall in between. These results suggest that different measures have different limitations. Although financial performance may be measured more accurately, it typically reflects the aggregate impacts of multiple factors and, thus, may be relatively uncontrollable (e.g., aberrations in financial performance caused by market shocks). In contrast, while nonfinancial and subjective performance evaluations may have lower measurement precision, they are focused more easily on components of operations that the manager can control.

THE IMPLICATIONS OF PERFORMANCE MEASURES

This study has sought to advance a balanced and systematic understanding of how different performance measure types—financial, nonfinancial, and subjective—may contribute to effective management. Taken as a whole, a rather clear implication of the findings is the need to be cautious about popular claims that nonfinancial measures are “superior” to traditional financial measures across the board. Rather than being an either/or choice, the challenge is to select the optimal combination of measures across the different types. This inference is supported by our finding that the different measure types are seen as having different strengths and weaknesses (e.g., encouraging risk taking vs. supporting decision making). While some types can be used occasionally as substitutes for others, it may be best to look at the different types of measures as complements to each other. Further support is provided by the pattern of performance measurement usage across firms with different emphases on quality in manufacturing.

While our study sheds some light on the use and selected characteristics of each measure type, much more can be learned about how the attributes and effects of the different measures may vary across con-

texts and for specific purposes (such as supporting decision making vs. conducting performance evaluations and providing incentives). We hope that, in addition to reporting findings of value to managers and management accountants, our study also stimulates future studies in these areas. ■

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