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Usage of performance measurement and evaluation systems: the impact of evaluator characteristics

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Abstract

This paper discusses the relation between characteristics of the evaluating manager and the way performance measurement and evaluation information is used. First a discussion is provided about the dependent variable. It is **recognized** that **categorization** into archetypes (e.g., evaluative styles) is unsatisfactory. Instead the information content/emphasis dimensions financial-non-financial, quantitative-qualitative, process-outcome, past-future and external-internal, along with the dimension flexibility-rigidity of information usage are proposed.

An investigation is made of the relation between the scores on those dimensions and characteristics of the evaluator. Managers with an external locus of control are supposed to use less information in general, but to use more external information, this latter effect may even be so large that the first effect is obfuscated. Managers with an internal locus of control will particularly **emphasize** non-financial, external, process and future-oriented information. Need for achievement will increase the amount of information-in particular quantitative and process **information**—used and the rigidity with which this information is used. Managers with low tolerance will use more information, as long as this information is not ambiguous and the source is traditional. This implies a preference for quantitative and financial information. Risk aversion will result in the usage of more information and in particular process oriented information. Managers with previous experience in the function of the evaluatee will place more emphasis on non-financial and process information. Finally, managers will pass on the information preferences of their own superiors.

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1 Introduction

*This pattern typically began when a researcher presented new findings that seemed like a breakthrough solidly based in research. The findings next became a popular success **and** were soon used as answers for problems in all kinds of situations, even in ones to which they had little relevance. Then **the findings** came generally to be regarded as having failed [. . .] Finally, the pattern started over again with someone else's breakthrough, as likely as not unrelated to earlier ones, so that progress was not achieved.*

Roethlisberger (1977)

The recent hype around the balanced scorecard has given the issue of the dimensions along which performance measurement and evaluation systems (PMS) are designed and used and in particular the relative importance of financial and non-financial measures a new impetus. Kaplan and Norton [11–14] emphasize the importance of using both financial and non-financial, both past and future oriented, both internal and external information and both output and process measures in assessing organizational performance.¹ Implicitly, they seem to assume that all information on the balanced scorecard is quantitative, and in their examples qualitative information is assessed using quantitative measures. Furthermore, they stress the inter-linkages between strategy and performance measurement, indicating that ‘the balanced scorecard is most successful when it is used to drive the process of change’ [12, p.142].

Kaplan and Norton use an implicit model in which strategy influences both design and usage of the balanced scorecard. A more general presentation of a framework describing the influences on PMS design and usage can be found in Figure 1. This figure indicates that both design and usage of a PMS are determined by characteristics of the evaluator, characteristics of the object subject to evaluation, the context of the evaluation and the (not necessarily multiplicative) interactions between those variables. The emphasis placed on those three factors will be different for design and usage. Design of the PMS will largely be determined by what is economically desirable for the organization. The context of the evaluation (e.g., environmental uncertainty, strategy) will be a major influence. Furthermore, the way in which the system is expected to be used will be important: PMS designers will try to avoid (or correct) gamesmanship and other dysfunctionalities.

The decisions made by PMS designers will be an important constraint on PMS usage: they determine what information is available, and possibly even set formal guidelines about how this information should be used. However, an identical PMS in an identical environment may be used differently by different evaluators and differences in usage may also be observed for different objects of evaluation; the usage of PMS will be determined by idiosyncrasies of evaluator and evaluatee. Although it traditionally has been claimed that what you measure is what you get, this point of view mainly concerns the reaction of the evaluatees to the performance measurement system imposed upon them; they will probably aim at optimizing their evaluation. This paper will mainly focus on characteristics of the evaluator, a relatively neglected area of research. First, however, some groundwork needs to be done: the next section will discuss dimensions along which the usage of a PMS may be **characterized**. Next the influence of personality characteristics and other idiosyncrasies of the evaluator on those dimensions will be

¹Although the authors generally refer to those four ‘perspectives’ adherence to those perspectives is not deemed strictly necessary by them: ‘We have yet to see companies using fewer than four perspectives, but, depending on industry circumstances and a business unit’s strategy, one or more additional perspectives may be needed’ [13, p.34].

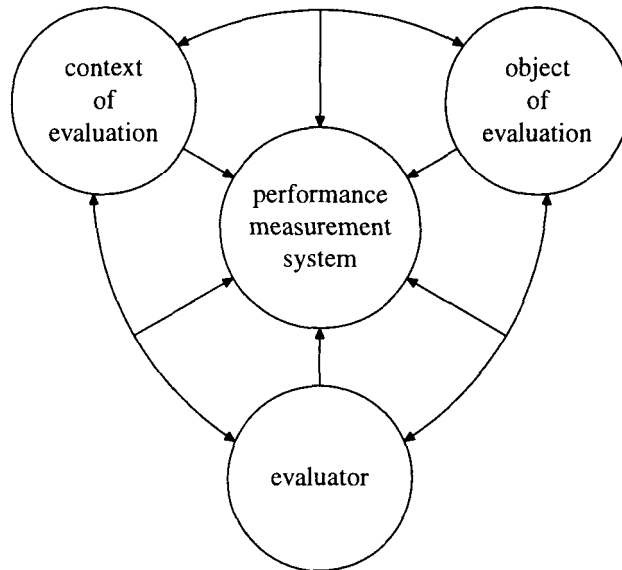


Figure 1: Performance measurement framework.

discussed. An overview of some problems associated with this line of research will conclude the paper.

2 Dimensions underlying PMS-usage

The previous section indicated that the context of the evaluation, characteristics of the evaluator and characteristics of the evaluatee determine the way a **PMS** is designed and used and pointed out that context of the evaluation will be particularly important for design decisions, whereas characteristics of the evaluator will mainly be relevant in assessing how the **PMS** will finally be used. Furthermore, it was indicated that design and usage of the **PMS** mutually influence each other. However, the question how characteristics of a **PMS** and **PMS** usage can be defined, still has to be answered. It obviously is not a good idea to look at the exact data used, some abstraction to underlying dimensions is necessary. However, by deciding on using dimensions, one deviation from other studies in this area is implicitly introduced: the focus is on dimensions rather than clusters ('archetypes'). The 'reliance on accounting performance measures'-studies, on the contrary, typically follow a general approach introduced by Hopwood [10] in which evaluative styles are determined. Managers can be characterized by a budget-constrained style (**BC**), a profit-conscious style (**PC**) and a non-accounting style (**NA**). In the **BC** style, subordinates are evaluated on their ability to meet the budget, whereas in the **PC** style they are 'evaluated on the basis of [their] ability to increase the general effectiveness of [their] unit's operations in relation to the long-term purposes of the organization. [. . .] For this purpose the accounting data must be used with some care in a rather flexible manner.' [10, p. 160]. In the **NA** style accounting data are relatively unimportant and are used together with information from other sources.

As indicated in Figure 2, two dimensions apparently underly this classification: emphasis on accounting-non-accounting information and flexibility-rigidity. Flexibility is deemed necessary to compensate for some shortcomings of accounting information mentioned by Hopwood: incompleteness due to a lack of comprehensive measures and standards, distortion due to the fact that an organization's cost function is not exactly known, concern with outcomes as opposed to processes, and emphasis on short-term performance. In Hopwood's styles the rigidity-

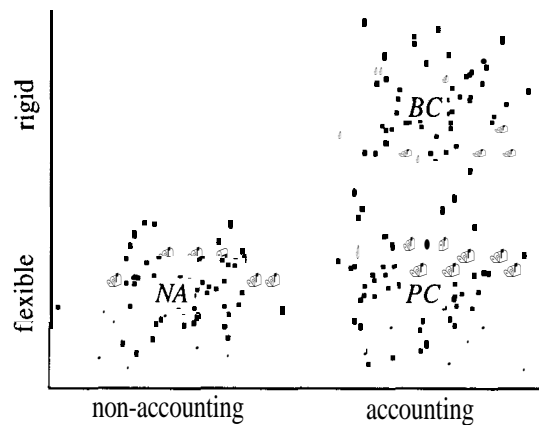


Figure 2: Evaluative styles and their underlying dimensions

flexibility dimension is only concerned with the usage of *accounting* information: the fact that a manager uses not only accounting information but also non-accounting information automatically implies that the accounting information is used flexibly even if the non-accounting information is used rigidly. Noeverman [19] indicates that quantitative non-accounting information may have shortcomings similar to those of accounting information. Consequently it is desirable to apply the rigidity-flexibility to the way performance information in general is used and not to accounting information alone. This implies that the non-accounting style consists of two separate styles, one of which will occupy the, now empty, upper-left quadrant of Figure 2. The recognition of the underlying dimensions instead of the clusters, makes it possible to focus attention on this problem.

Furthermore, the definition of those styles would imply that evaluative styles really cluster around some combined scores on both dimensions (as the pseudo-data in Figure 2 do). However, Hopwood's results indicate that the budget-constrained and profit-conscious style are not necessarily mutually exclusive: a style that scores high on both budget emphasis and profit-consciousness was also found [10]. In a similar vein, Otley [21] indicates that his data suggest a continuum of style, with in his case increasing emphasis on efficiency and decreasing emphasis on meeting the budget. It is probably advisable to concentrate research efforts on assessment of scores on those underlying dimensions. Only in a second stage of research, an attempt can be made to cluster the scores obtained and determine the characteristics of an evaluative style.

The dimensions recognized thus far, can be found in the first two stubs of Table 1. Apart from an accounting-non-accounting, also a quantitative-qualitative dimension is recognized. Those dimensions show overlap by definition, as accounting information is automatically quantitative information (obviously, the reverse is not automatically the case). The flexibility-rigidity dimension is somewhat different from the other dimensions recognized as it bears no direct relation to the content of the information provided, whereas the other dimensions are partially constrained by this factor.

As indicated in the introductory section of this paper, the balanced scorecard papers [1 1–14], although implicitly, also recognize a number of dimensions on which PMS usage can be scored.² A first dimension is financial-non-financial, which maps neatly on the *accounting–non-accounting* dimension of Hopwood. Furthermore, the dimensions past-future, which also

*Kaplan and Norton focus on the provision, rather than the usage of information. For the recognition of underlying dimensions this difference is not important.

paper	dimensions recognized
Hopwood [10]	accounting-non-accounting flexibility-rigidity outcome-process short-term-long-term
Noeverman [19]	quantitative-qualitative flexibility-rigidity
Kaplan and Norton [11–14]	financial-non-financial past-future internal-external outcome-process

Table 1: Dimensions underlying PMS usage.

implies long-term-short-term, internal-external and outcome-process are recognized,³ those dimensions can also be found in Table 1. Kaplan and Norton treat the latter three dimensions as correlated with the financial-non-financial dimension. Financial information is concerned with the past, is internal, and focuses on output. Non-financial information is also future-oriented, external and also focuses on processes. In this world view, the usage of financial information requires flexibility, whereas the usage of non-financial information allows for rigidity. The absolute categorization of Kaplan and Norton, however, seems difficult to defend. It is more prudent to treat the four dimensions separately, recognizing that they may be correlated.

Although the dimensions recognized may not be unique—empirical research on the dimensionality of information usage is clearly needed—they reflect a certain consensus about which dimensions are deemed to be most important, probably because of a presumed relation to quality of decision making and organizational performance. One complementary dimension should be mentioned: the amount of information attended to. Other possible dimensions such as tightness of control and formality of PMS usage seem to map reasonably well on the flexibility-rigidity dimension.

The discussion in this section has provided an overview of the dimensions underlying the provision and usage of information in the context of a PMS, as recognized in the major studies on this topic. In the next section, I will investigate how the amount of information used and the scores on those dimensions can be explained; an attempt to define so-called evaluative styles will not be made.

3 Characteristics of the evaluator

An important characteristic of the evaluator evidently, is the position this person occupies in the organization. However, generally the evaluator will be one level up in the organization compared to the evaluatee. The absolute level at which the evaluator is found, is not deemed to be directly important in the determination of PMS characteristics. More important are the idiosyncrasies of the evaluators themselves. The next subsections will subsequently discuss locus of control, need for achievement, ambiguity tolerance, and risk taking propensity. Next,

³Chenhall and Morris [3] use the label ‘scope’ to indicate the extent to which information is external, non-financial and future-oriented.

two miscellaneous characteristics of the evaluator-experience in the domain of the evaluatee and the way the evaluator is evaluated (although the latter variable may be considered a context rather than an evaluator-related factor)-will be discussed.

3.1 Locus of control

Locus of control (LoC) can be defined as the tendency of a person to attribute outcomes to internal or external causes. Persons with an internal LoC tend to attribute successes or failures to their own efforts, whereas persons with an external LoC tend to attribute those same outcomes to circumstances beyond their control. Therefore, one would theoretically expect that individuals with an external LoC will desire less information than internals, as according to their world view outcomes are beyond their control and consequently this information is of no use for them. This effect is strengthened by the observation that internals are more able to process information and to decide which information they need [7]. Consequently, internals will use more information and are able to use more complicated information.⁴ An empirical study [7] on differences in the valuation of information between internals and externals, however, shows unexpected results: externals value information more than internals do. A possible explanation is that externals require more information in order to defend their attributions or find circumstances to which they may attribute their successes or failures.

A, preliminary, generalization may be that in general individuals with an external LoC will use less information, as their conception that they do not have influence on outcomes implies that this information is of no use to them.

Proposition 1 *Evaluators with an external locus of control will use less information, than evaluators with an internal locus of control.*

However, of the information used by externals a larger proportion will be *external*, as they need this information to justify their external attributions. If the amount of external information attended to is very large, this may even cause the previous proposition to become invalid.

Proposition 1a *Evaluators with an external locus of control will place more emphasis on external information, rather than internal information, than evaluators with an internal locus of control.*

Managers with an internal LoC, on the other hand, have better information processing capabilities and consequently may be able to use information with a broader scope (that is the ratio of non-financial, external, process, future-oriented to financial, internal, outcome and past-oriented information will be larger for managers with an internal LoC).

Proposition 1b *Evaluators with an internal locus of control will use information that has a broader scope, than evaluators with an external locus of control.*

An important additional question with respect to LoC is whether this variable is a useful determinant of PMS characteristics at all. An interaction between LoC of individuals, and the function they occupy in an organization may occur (see e.g., [2] for some empirical evidence). Individuals with an external LoC may be less likely to choose a managerial occupation. Furthermore, performance may influence LoC. It has been observed [18] that a relation between

⁴In the context of CEO strategic planning similar observations have been made: '[i]n order, to garner the information necessary to support strategic planning, internal [locus of control] CEOs would implement monitoring of the environment and set up concomitant boundary-spanning structures and staff' [15, p. 195].

IQ and LoC exists, which is explained by the observation that smarter people are more able to control outcomes. In a similar way better managers may be more able to control outcomes, which may affect their LoC. If either of those effects exists, this may seriously hamper the usability of LoC in explaining the characteristics of a PMS.

3.2 Need for achievement

Individuals with a high need for achievement value achievement as intrinsically rewarding. It has been claimed [15] that they tend to set moderate goals, take moderate risks, and prefer frequent and concrete feedback about their performance. Focusing on CEO's (in their function of designers of PMS), Lewin and Stephens note:

CEOs provide employees with performance evaluation and reward systems that they feel would spur themselves to good performance. CEOs who are achievement oriented should thus favor highly structured incentives, rewards, and performance appraisals because of their own need for formalized means-ends mental maps and concrete goal-oriented feedback. [15, p. 191]

Although this paper investigates usage, rather than design of PMS, it seems acceptable to claim that if managers provided with the freedom to design a system will follow their preferences, they will also follow those preferences when using a system that already exists, provided that the system makes this possible. Consequently, the preferences mentioned by Lewin and Stephens can be translated in one general proposition:

Proposition 2 *Evaluators with a high need for achievement will use more information than evaluators who score low on this characteristic.*

It is possible to make this proposition more specific, by translating formalization into the use of quantitative, rather than qualitative information.

Proposition 2a *Evaluators with a high need for achievement will use more quantitative information, rather than qualitative information, than evaluators who score low on this characteristic.*

Another consequence of the desire for formalization is, that the information will be used rigidly, rather than flexibly, as this enhances the clarity of the means-ends relations mentioned by Lewin and Stephens.

Proposition 2b *Evaluators with a high need for achievement will use performance measurement information more rigidly than evaluators who score low on this characteristic.*

On the other hand, the focus on a means-ends relation may also imply that managers with a higher need for achievement want to know the means by which results have been obtained. In other words, they are likely to put more emphasis on process information:

Proposition 2c *Managers with a high need for achievement will place more emphasis on process rather than outcome information.*

3.3 Ambiguity tolerance

The definition of ambiguity tolerance (AT) has been subject to some debate (see e.g., [6,8,17]) in the academic literature. A debate that is mainly caused by ambiguity in the definition of AT . Budner (cited by Das [4]) defines intolerance of ambiguity as ‘the tendency to perceive (i.e. interpret) ambiguous situations as sources of threat’, whereas another early author in this area, Frenkel-Brunswik, *measures* ambiguity tolerance in terms of the ability to perceive ambiguity. The difference between both operationalizations is recognized by MacDonald [17], who also indicates that a more appropriate term for the construct assessed by the Frenkel-Brunswik AT instrument would be rigidity. Consequently, some research findings that use the words ‘ambiguity tolerance’, but refer to the Frenkel-Brunswik operationalization, should be interpreted as discussing rigidity. Lewin and Stephens, for instance, claim that

People with low tolerance for ambiguity [high rigidity] prefer to reduce complex issues to more tractable forms, to deal with a minimum of information from the environment, and to resist change. [. . .] Since they do not feel compelled to know what their subordinates are doing at all times (thus reducing ambiguity), they would not be expected to implement elaborate monitoring structures or to ‘micro manage’. [15, p. 196].

Rigid people, may not want to see conflicting information. Managers who are not ambiguity tolerant, on the other hand, are likely to implement an elaborate monitoring system, in order to reduce ambiguity resulting from a lack of sufficient information.

This latter statement is easily derived from the AT literature. Budner (quoted in [16, p. 297]) defines an ambiguous situation ‘as one which cannot be adequately structured or categorized by the individual because of the lack of sufficient cues.’ He distinguishes three types of ambiguous situations: completely novel situations, complex situations and contradictory situations (Budner, quoted in [16]). Individuals with a low tolerance for ambiguity, ‘being more troubled by inconsistency than their ambiguity-tolerant counterparts, may attempt to resolve ambiguous situations by collecting more information’ [5, p. 513]. Furthermore, they will show a preference ‘for readily interpretable stimuli. Thus, when evaluating the importance of information, they may tend to judge factual data (e.g., expressed by numbers) to be more important than abstract or conceptual data.’ [5, p. 513]. Individuals who score low on AT will gather more information, unless they deem this information to be ambiguous [20]. Dermer’s [5] results indicate that individuals who are low on AT tend to indicate that a larger number of the information items provided to them in his study is important, whereas at the same time a *smaller* number of information items reflecting behavioral and future data is deemed important. This confirms the expectation that low AT individuals will use more information, as long as it is not ambiguous.

Oliver and Flamholtz [20], discussing HRM practices, notice the possibility of another possible effect of AT : individuals low on AT are supposed to oppose paradigm shifts and hence to use less HRM information. A generalization of this observation would be that individuals with low AT will stick to traditional sources of information, which will generally be accounting information. Das [4], finally showed that more AT is associated with more reliance on intrinsic motivation, but not with less use of extrinsic motivation. Low AT may induce formalization and rigidity in general.

Overall, the discussion above seems to indicate that managers who score low on AT , will use more information in order to reduce ambiguity.

Proposition 3 *Evaluators with low ambiguity tolerance will use more information than evaluators with a high tolerance for ambiguity.*

It is possible to formulate some more specific propositions. Managers who are intolerant of ambiguity are likely to prefer financial data, which is more traditional and communicates an unambiguous message, over less unambiguously interpretable non-financial data in evaluating the performance of managers and business units.

Proposition 3a *Evaluators with low ambiguity tolerance will place more emphasis on financial information, rather than non-financial information, than evaluators with a high tolerance for ambiguity.*

As qualitative information is most ambiguous and the least traditional information source, it is expected that low AT individuals will prefer quantitative information.

Proposition 3b *Evaluators with low ambiguity tolerance will place more emphasis on quantitative information, rather than qualitative information, than evaluators with a high tolerance for ambiguity.*

3.4 Risk taking propensity

A final personality characteristic of supervising managers that may influence their information usage is the extent to which they are able or willing to take risks. Managers with low risk taking propensity, will gather more information in order to reduce uncertainty [23]. In a similar vein, Lewin and Stephen, in a paper also quoted in earlier sections of this paper, remark that '[C]EOs with low risk taking propensity will tend to implement centralized organization designs characterized by high control intensity and direct supervision in order to minimize uncertainty and avoid surprises' [15, p. 197]. This leads to the following proposition:

Proposition 4 *Evaluators with low risk taking propensity will use more information than managers with a high risk taking propensity*

To avoid uncertainty, managers with low risk taking propensity may delve into detailed operational data, rather than outcome data alone.

Proposition 4a *Evaluators with low risk taking propensity will place more emphasis on process information, rather than outcome information, than managers with a high risk taking propensity.*

3.5 Experience in domain of evaluatee

Experience of the evaluator in the domain of the evaluatee combines two effects that may have an opposite influence on information usage. On the one hand, this experience may provide the evaluator with more insight into the functioning of the business unit subject to evaluation. Consequently, more non-financial and in particular more process information will be used. Managers with less experience may prefer financial information, because of the fact that this kind of information brings the activities of the evaluatees and their business units under a common denominator, which is interpretable without detailed knowledge of the underlying primary processes. On the other hand, the evaluatee is likely to be a manager, as well, which implies that experience in the domain of the evaluatee also leads to more managerial experience. Findings of Beyer et al. show that '[m]anagers' functional experience tends to narrow their cognitive processing' [1, p. 730]: information attended to and amount of problems identified decrease. Consequently, although the total amount of information used may diminish, the proportion of non-financial information used for performance evaluation will increase.

Proposition 5 *Evaluators with previous experience in the function of the evaluatee will place more emphasis on non-financial information, rather than financial information than managers without this experience.*

More specifically, it is expected that the usage of process, rather than outcome data will increase.

Proposition 5a *Evaluators with previous experience in the function of the evaluatee will place more emphasis on process information, rather than outcome evaluation than managers without this experience.*

3.6 The way the evaluator is evaluated

In terms of the PMS framework presented in Figure 1, the way the evaluator is evaluated may more strictly be seen as a part of the context of the evaluation, however, as it has been treated in the context of evaluative style research, it will be treated here, as well. Hopwood [9] observed that a manager who is evaluated by a superior with a given evaluative style, will tend to pass down this style to his own subordinates. This observation may be generalized to the usage of information for performance evaluation in general. As evaluators will themselves be evaluated on certain information items, they will also use those items in evaluating their subordinates.

Proposition 6 *Evaluators will tend to use the criteria on which they themselves are evaluated to evaluate their own subordinates.*

4 Discussion

This paper tried to find explanations for differences in PMS practice in similar circumstances by looking at the possibility that idiosyncrasies of the evaluating managers imply preferences for certain information, how rigidly or flexibly this information is used, and how much information is used. Propositions were derived and the discussion in general indicates that personality characteristics, previous experience and the way managers themselves are evaluated provide reasonable explanations for those differences. However, empirical research in this area is scarce and some of the predictions are contradictory. An external locus of control for instance is supposed to have a negative influence of the amount of information used in general. However, this same external locus of control is supposed to have a positive influence on the amount of external information used, and this increase may well be larger than the decrease mentioned earlier. It is necessary to limit the propositions to the relative importance assigned along the information dimensions. Similarly, experience of the manager in the function of the evaluatee may well be positively related to managerial experience. In particular in higher management echelons this will be the case. This, again results in contradictory statements: experience in general tends to show a negative relation to information usage, whereas experience in the domain of the evaluatee is likely to show a positive influence to the amount of information used and in particular the usage of non-financial and process information. Again, it is necessary to retreat to a statement about the relative importance of different kinds of information.

Another important issue is the possible occurrence of interactions between the personality type of an individual and the characteristics of the function this individual will occupy. Intuitively, it seems far from impossible that certain functions and certain organizations attract individuals with characteristics that best fit that function or organization. Possible ways in

which such matching may occur are ‘survival of the fittest’ (individuals with high risk taking propensity are less likely to flourish managing part of a CPA firm) and the desire of the individuals to avoid situations in which they are not at ease (e.g., a manager with low ambiguity tolerance who is responsible for a department carrying out fundamental research) or be attracted by situations fitting their personality (managerial tasks seem suited to individuals with a high need for achievement, but less ideal for individuals with an external locus of control). Although managers definitely will differ, the difference within a group of managers may be smaller than the differences between managers and the general population. Furthermore, situations requiring an emphasis on certain information items (e.g., process information) may attract managers that tend to use this information, further obfuscating the situation. Although the practical importance of the influences mentioned in this paper only increases, when the latter speculation is true (knowledge about data requirements in prospective functions and the tendency of an individual to use this information may for instance be used in an assessment procedure), research possibilities either have to deal with limited variation in the data (and hence a relatively large amount of error) or have to be carried out in a laboratory situation, which may lower external validity of the research findings. Another problem likely to be encountered in empirical studies is the interaction between personality characteristics of the evaluator and response patterns. It is, e.g., not unlikely that ambiguity tolerance will influence *perceived* environmental uncertainty, which may in turn be related to information needs, which hopefully are related to information usage. This brings me to the final remark of this paper: the discussion in this paper has been limited to the influence of characteristics of the evaluator on PMS usage and should not be read to imply that the relation between the other characteristics described in Figure 1 or the design of PMS, or the relation between PMS characteristics should be neglected.

References

- [1] Janice M. Beyer, Prithviraj Chattopadhyay, Elizabeth George, William H. Glick, D.T. Ogilvie, and Dulce Pugliese. The selective perception of managers revisited. *Academy of Management Journal*, 40(3):716–737, June 1997.
- [2] Peter Brownell. Participation in budgeting, locus of control and organizational effectiveness. *The Accounting Review*, pages 844–860, October 1981.
- [3] Robert H. Chenhall and Deigan Morris. The impact of structure, environment, and interdependence on the perceived usefulness of management accounting systems. *The Accounting Review*, 61(1):16–35, January 1986.
- [4] Hari Das. Organizational and decision characteristics and personality as determinants of control actions: a laboratory experiment. *Accounting, Organizations and Society*, 11(3):215–231, 1986.
- [5] Jerry D. Dermer. Cognitive characteristics and the perceived importance of information. *The Accounting Review*, pages 51 1-5 19, July 1973.
- [6] Kevin Durrheim and Don Foster. Tolerance of ambiguity as a content specific construct. *Personality and Individual Differences*, 22(5):741–750, May 1997.
- [7] Cathy Fisher. The impact of perceived environmental uncertainty and individual differences on management information requirements: a research note. *Accounting, Organizations and Society*, 21(4):361–369, 1996.
- [8] Adrian Fumham. A content, correlational and factor analytic study of four tolerance of ambiguity questionnaires. *Personality and Individual Differences*, 16(3):403–410, March 1994.

- [9] Anthony Hopwood. *Accounting and Human Behaviour*. Modern Finance Series. Haymarket Publishing, 1974.
- [10] Anthony G. Hopwood. An empirical study of the role of accounting data in performance evaluation. *Journal of Accounting Research*, pages 156-182, 1972.
- [11] Robert S. Kaplan and David P. Norton. The balanced scorecard-measures that drive performance. *Harvard Business Review*, pages 71-79, January/February 1992.
- [12] Robert S. Kaplan and David P. Norton. Putting the balanced scorecard to work. *Harvard Business Review*, pages 134-147, September/October 1993.
- [13] Robert S. Kaplan and David P. Norton. *The balanced scorecard: translating strategy into action*. Harvard Business School Press, 1996.
- [14] Robert S. Kaplan and David P. Norton. Using the balanced scorecard as a strategic management system. *Harvard Business Review*, pages 75-85, January/February 1996.
- [15] Arie Y. Lewin and Carol U. Stephens. CEO attitudes as determinants of organization design: an integrated model. *Organization Studies*, 15(2): 183-212, 1994.
- [16] Steven Lysonski and J. Craig Andrews. Effects of moderating variables on product managers' behavior. *Psychological Reports*, 66:295-306, February 1990.
- [17] A. P. MacDonald. Revised scale for ambiguity tolerance: reliability and validity. *Psychological Reports*, 26:791-798, 1970.
- [18] Walter Mischel. *Introduction to personality: a new look*. Holt, Rinehart and Winston, 4th edition, 1986.
- [19] Jan Noeverman. Revising the measurement of performance evaluation style. Paper presented at the Advanced Course in Management Accounting Research (Vrije University Amsterdam), November 1997.
- [20] Jan Oliver and Eric Flamholtz. Human resource replacement cost numbers, cognitive information processing, and personnel decisions: a laboratory experiment. *Journal of Business Finance & Accounting*, 5(2):137-157, 1978.
- [21] David T. Otley. Budget use and managerial performance. *Journal of Accounting Research*, 16(1):122-147, Spring 1978.
- [22] F.J. Roethlisberger. *The elusive phenomena: an autobiographical account of my work in the field of organizational behavior at the HBS*. Harvard University Press, 1977. Edited by George F.F. Lombard.
- [23] George M. Zinkhan, Erich A. Joachimsthaler, and Thomas C. Kinnear. Individual differences and marketing decision support system usage and satisfaction. *Journal of Marketing Research*, XXIV:208-214, May 1987.