

# Formal Measures in Informal Management: Can a Balanced Scorecard Change a Culture?<sup>†</sup>

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Since at least Holmstrom (1979), agency theorists and managerial accountants have analyzed what kinds of performance measures should be used in formal incentive contracts.<sup>1</sup> For example, when Kaplan and Norton (1992, 1993, 1996, 2001) proposed that company performance be measured with a “balanced scorecard” of both financial and non-financial measures, accounting scholars envisioned its role only in formulaic compensation contracts.<sup>2</sup>

We describe an alternative view of the scorecard, in which its formal measures are created for and used in informal management. By “informal” we do not mean casual, haphazard, or capricious behavior, but instead managerial behavior not fully determined by rules or formulas—where executives use discretion and judgment rather than managing solely “by the numbers.” Examples of informal management include adaptation, coordination, politics and influence, leadership, and informal authority.

Section I of this essay extends the use of formal measures from formal to informal management. We review the role of formal measures in formal agency contracts and then discuss relational incentive contracts that use informal weights on formal performance measures. More importantly, however, we depart from

agency models entirely by suggesting roles for formal measures in other models of informal management.

Section II is both more novel and more speculative. Our focus shifts from using formal measures in informal management to *developing* informal management in the first place. Imposing ostensibly perfect measures on an organization from outside can work less well than having key stakeholders participate in developing their own, potentially inferior, performance measures. In this sense, it is not the use of a balanced scorecard but rather its internal creation that can change an organization’s culture (defined below).

## I. Using Formal Measures in Formal and Informal Management

Most models of performance measurement concern agency problems.<sup>3</sup> In actual practice of course, managers use performance measures in many ways beyond compensation. We therefore begin with agency but then shift to other uses for performance measures.

### A. Formal Measures in Agency Problems<sup>4</sup>

Consider the following example of a formal measure in *formal* management.<sup>5</sup> An agent’s total contribution to firm value is  $y = f_1 a_1 + f_2 a_2 + \varepsilon$ , whereas the agent’s measured performance is  $p = g_1 a_1 + g_2 a_2 + \phi$ .

<sup>3</sup>Again, see Demski (2008) for a review.

<sup>4</sup>Space constraints dictate that the descriptions of models be terse and their analyses non-existent. On agency models like those described here, see Gibbons (2010, Section 2) for an introduction and Gibbons and Roberts (2013) for a survey.

<sup>5</sup>This basic model was developed by Feltham and Xie (1994) and is in the spirit of Holmstrom and Milgrom (1991) and Baker (1992).

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<sup>1</sup>See Demski (2008) for a review.

<sup>2</sup>For example, see Ittner, Larcker, and Rajan (1997) or Lambert (2001).

The agent's total contribution to firm value,  $y$ , is too nuanced to be verifiable by an auditor or adjudicated by a court. The agent's measured performance,  $p$ , however, is verifiable so that compensation contracts can take the form  $w = s + bp$ . If both parties are risk-neutral, with payoffs  $\Pi = y - w$  to the principal and  $U = w - c(a_1, a_2)$  to the agent, the optimal bonus rate is  $b^* = \frac{\|f\|}{\|g\|} \cos(\theta)$ , where  $\theta$  is the angle between the coefficient vectors  $f$  and  $g$ .

Even in formal management, we can model how a balanced scorecard might be superior to purely financial measures. For example, the principal can pay  $k$  to change from  $p$  to a new measure  $q$  that has a smaller  $\theta$ . Another approach (which surfaces the idea that a scorecard contains multiple measures) is to imagine that paying  $k$  makes not only  $p$  but also  $q$  available, so that both measures can be used in the agent's compensation formula.

As a first example of *informal* management (but still within an agency setting), we turn from formal to relational incentive contracts.<sup>6</sup> In a repeated version of the setting above, the parties may be able to utilize  $y$ , even though it is not an auditable performance measure. Consider the relational incentive contract  $w = s + B(y)$ . The first-best bonus function would be  $B(y) = y$ , but this bonus will not be feasible if the parties are too impatient, so the second-best equilibrium in the repeated game will entail  $B(y) < y$ .

This model of relational incentive contracts describes *informal* measures used in informal management. Formal measures could be added in several ways. Most simply, one could combine the two models above:  $w = s + bp + B(y)$ . More realistically, there could be a vector  $\underline{p}$  of performance measures (as in a scorecard), not just a single measure  $p$ .

Continuing in this vein, consider informal weights on formal measures:  $w = s + bp + B(y) + \beta(\sigma)p$ , where  $\sigma$  is a signal that each party commonly observes but an auditor or court cannot. In fact, if  $y$  were "subjective" (i.e., observed by only the principal) then needing to induce the principal to reveal  $y$  would create inefficiencies, so the parties might

prefer informal weights on formal measures, to the exclusion of any role for  $y$ .

Finally, in multi-lateral relational contracting (such as between a principal and two agents), if agent  $i$ 's output  $y_i$  is not observable to agent  $j$ , the parties might again prefer informal weights on formal measures, such as  $\beta(\sigma_i)p_i$ , if  $\sigma_i$  and  $p_i$  are commonly observed by all three parties.<sup>7</sup>

### B. Beyond Agency

Organizations also use performance measures in many important roles beyond incentive contracting. Case studies of such uses include the interactive budgeting system at Johnson and Johnson (Simons 2000), benchmarking of clinical outcomes at a surgical practice (Porter, Deerberg-Wittram, and Marks 2014), aligning branded gasoline stations to a common value proposition (Kaplan 1996), and communicating customer-service goals to bank employees (Campbell and Kazan 2014).

These and other uses of performance measures (and information systems more generally) relate to the growing literature on information and decisions in organizations.<sup>8</sup> Gibbons, Matouschek, and Roberts (2013)—henceforth, GMR—provide the following simple framework that nests many models from this literature:

- (i) The state of the world  $s \in S$  is drawn from the distribution  $f(s)$ .
- (ii) Player 1 privately observes the signal  $\theta$  drawn from the distribution  $g(\theta | s)$ .
- (iii) Player 1 chooses an *influence action*  $a \in A$ .
- (iv) Player 2 privately observes the signal  $\sigma$  drawn from the distribution  $h(\sigma | s, a)$ .
- (v) Player 2 chooses a *decision*  $d \in D$ .
- (vi) The players receive payoffs  $U_i(s, a, d)$  for  $i = 1, 2$ .

<sup>6</sup>The classic models are MacLeod and Malcomson (1989) and Levin (2003). See Malcomson (2013) for a survey.

<sup>7</sup>See Baker, Gibbons, and Murphy (1994); Fuchs (2007); and Levin (2002) for models that have been or could be elaborated in these directions.

<sup>8</sup>See Gibbons (2010, Section 3) for an introduction.

Prominent applications of this framework concern politics and influence, leadership, coordination, and informal authority.<sup>9</sup> Two points are more important for present purposes: (i) these are models of informal management<sup>10</sup> and (ii) the framework can be used to explore the role of formal measures in such models.

As just one illustration of the latter, consider specializing the framework to analyze adaptation and coordination.<sup>11</sup> Let the state of the world have two dimensions:  $s = (s_1, s_2)$ , where  $s_i = s_0 + \varepsilon_i$ , and let  $\theta = s_1$  and  $\sigma = s_2$ . Consider a team-theoretic model:  $U(s, a, d) = -\alpha(a - s_1)^2 - \gamma(a - d)^2 - \alpha(d - s_2)^2$  for both players, where  $\alpha$  reflects the importance of adaptation and  $\gamma$  of coordination.

In this setting, it is easy to imagine an organization paying cost  $k$  to create a public signal  $\eta = s_0 + \xi$  in stage (1). In addition, one could improve player  $i$ 's information about  $s_j$ , although the importance of coordination may limit how much information it is useful to convey to individual decision-makers. Finally, if the players did not have identical interests, given the inefficiencies that arise in signaling models and the like, there could be roles for information systems that reduce the information available to interested parties.<sup>12</sup>

In sum, this subsection surfaces the importance of informal management beyond incentive contracting. More importantly, its primary purpose has been to highlight the potential roles of formal measures for informal management. We envision a rich research stream that asks questions like Holmstrom's (1979)—namely, how would one use a new performance measure and, hence, what value would it create?

<sup>9</sup>See Milgrom and Roberts (1988); Hermalin (1998); and Aghion and Tirole (1997) for specific models, GMR Section 2 for further interpretations, and GMR Section 3 for enrichments.

<sup>10</sup>To repeat, our definition of an informal management process is one where managerial behavior is not fully determined by rules, formulas, or contracts. In a model, one can tell that a decision is chosen informally if it is freely chosen rather than determined by a rule, formula, or contract—none of which appear in the framework.

<sup>11</sup>See Dessein and Santos (2006); Alonso, Dessein, and Matouschek (2008); and Rantakari (2008) for richer treatments.

<sup>12</sup>See Section 4 of GMR for existing work in this vein.

## II. Developing Informal Management

An even more ambitious agenda asks how informal management arises in the first place. Rather than parachuting formal measures into a firm, managers who develop a balanced scorecard internally can discuss both *why* certain measures should be selected and *how* they should be used. The benefit from such a development process was articulated well by Brian Baker, CEO of Mobil US Marketing and Refining, after six years of successful strategy execution with the balanced scorecard:

*You could take our scorecard and give it to a competitor and it wouldn't work. You had to have sweated through the hours and hours of work and effort that went behind the card to get the benefits from the measures. That's what brings it to life. It's got to become part of the company's belief system, almost a religion—the benefits don't come just from having a piece of paper with a scorecard on it.*<sup>13</sup>

Kaplan and Norton (1992, 1993) envisioned a firm that already had a well-understood strategy. The firm selected financial and nonfinancial measures in a balanced scorecard to (i) allocate resources toward implementing the strategy, (ii) empower decentralized decision-makers to adapt to local conditions while remaining coordinated around the overarching strategy (as in the example above), and (iii) assess the performance of divisions and managers. Even in this setting, where the firm has a well-understood strategy, developing the scorecard internally communicates and builds agreement on *how* the scorecard measures will be used.

Kaplan and Norton (1996, 2001) extended these ideas by considering a firm that does not yet have agreement about its strategy. Its internal development of a scorecard involved active debates about the strategy's objectives and measures, including *why* certain measures were selected and others excluded.

Brian Baker's comment illustrates that the process of developing the strategy's performance measures gives clarity to the strategy, helps to create a consensus among the executive team about the strategy and how it will be imple-

<sup>13</sup>Baker (2000).

mented, and builds understanding about how executive performance will be evaluated. In the spirit of Gibbons and Henderson (2013), these outcomes of developing a scorecard internally are examples of management practices that rely on relational contracts among the members of the executive team. As Gibbons and Henderson argue, such relational contracts require both “task” knowledge (of what is supposed to be done) and “relational” knowledge (of how managers should react after unanticipated events occur).

Viewed through the lens of relational contracting, developing a scorecard of formal measures internally creates not only the formal measures themselves but also agreement among the participants about how the measures will be used in informal management. In this sense, the internal development of the scorecard helps to create a new corporate culture aligned to the strategy, where we define “culture” as described by Schein (2010)—shared assumptions about: mission, strategy, and goals; the means to achieve the goals; the measurement of results; and how to react when things do not go according to plan. We eagerly await new models of how the development and use of performance measures can play these complex roles in informal management.

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