



# The theory and practice of performance measurement



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## ABSTRACT

This paper builds on principles and techniques developed in measurement science, as currently understood in physical sciences and engineering, to improve the theory and practice of performance measurement. To do so, it firstly discusses three fundamental positions on measurement, characterized as metaphysical, anti-metaphysical and relativistic. Subsequently, it lays the foundations of a pragmatic epistemology of measurement in both physical and social sciences. Finally, these insights are integrated through the examination of possible advances in both the theory and practice of performance measurement in organizations.

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## 1. Introduction

Performance is a notion that permeates contemporary societies, as it is used to assess the quality of individual and collective efforts (Corvellec, 1997). In management research, performance is often perceived as encapsulating the unitary purpose of organizations (March and Sutton, 1997). Indeed, organizations are required to 'perform' and to communicate their achievements to key stakeholders. As a consequence, organizational functions and processes are increasingly demanded to demonstrate their contribution to performance.

The need to establish links between planning, decision, action and results has generated substantial interest in the measurement of organizational performance. Scholars from management accounting and other areas of management research have examined a wide range of issues related to the design, implementation, use and review of performance measurement systems (see, for example, Chenhall and Langfieldsmith, 1998; Goold and Quinn, 1990; Hall, 2008; Henri, 2006; Ittner et al., 2003; Neely, 1999). In management practice, organizations have

invested considerable amounts of resources to measure and demonstrate their performance (Hood et al., 2000; Micheli and Manzoni, 2010). However, there is no conclusive evidence over the benefits and shortcomings of introducing performance measurement systems in either private or public sector organizations (Griffith and Neely, 2009; Malina et al., 2007; Power, 2004; Townley et al., 2003).

This paper argues that both research and practice in performance measurement (PM) suffer from an underdeveloped conceptualization of the notion of performance measurability, and of the derived measurement processes. While the study of PM has often led to the critique or support of specific frameworks, such as the Balanced Scorecard (Kaplan and Norton, 1992, 2008), in physical sciences and engineering the very concept of measurement has been extensively debated also at a foundational level. Indeed, in this paper we argue that the current characterization of the concept in purely functional terms (Joint Committee for Guides in Metrology, 2008a) allows its application also to non-physical properties without any reductionist or physicalist implications and, as such, it could inform studies in management research.

By examining PM epistemology, we aim at advancing both the theory and the practice of management in two major ways. First, we draw on fundamental debates on

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measurement science made in physical sciences and engineering to provide more robust theoretical bases to the study of PM. Through the presentation of epistemological analyses on measurement, we re-examine key properties of measurement (e.g., objectivity, accuracy and precision). Moreover, we argue on the implications of adopting a criterion of adequacy, as opposed to a criterion of truth, and of a model-based view, as opposed to a truth-based view, for characterizing measurement and its results. Second, we explain and help address several issues that have emerged in PM related studies. Indeed, the epistemological position we propose offers a relevant perspective on the links between PM and strategy; on the roles of PM in organizations; and on the possibility of developing dynamic PM systems.

We start by providing an overview of current debates on the theory and practice of PM. We then introduce some epistemological analyses on measurement in the physical and social sciences. Subsequently, we present an outline of a conceptual history of measurement, as mainly developed in physical sciences and engineering, by comparing three main paradigms: metaphysical, anti-metaphysical, and relativistic. This discussion leads to the examination of PM as a fundamentally epistemic and pragmatic act, rather than as the determination of the ‘true value’ of organizational performance. We conclude by discussing several implications of this standpoint for measurement of performance in organizations.

## 2. Performance measurement: benefits, limitations and shortcomings

Studies in performance measurement have often focused on procedures and tools that could improve the efficiency and the effectiveness of organizations (Franco-Santos et al., 2007; Kaplan and Norton, 1992). Research has shown that, through appropriate measurement and management of performance, organizations can benefit in the following areas:

- formulation, implementation and review of organizational strategy (Ahn, 2001; Chenhall, 2005; Euske et al., 1993; Govindarajan and Gupta, 1985; Veliyath, 1992);
- communication of the results achieved to stakeholders, and strengthening of brand and reputation (Atkinson et al., 1997; McKevitt and Lawton, 1996; Neely et al., 2002; Smith, 1995a);
- motivation of employees at all levels, creation of a performance improvement culture, and fostering of organizational learning (Gittell, 2000; Henri, 2006; Malina and Selto, 2001; Roos and Roos, 1997).

Several empirical studies have shown how PM can be generally productive and help improve organizational performance (Cavalluzzo and Ittner, 2004; Davis and Albright, 2004; Ittner et al., 2003; Poister, 2003). However, despite considerable resources invested (Neely et al., 2006), PM related initiatives can often fail to deliver on their promises (Neely and Bourne, 2000). Furthermore, if done poorly, they can be not only ineffective, but harmful and indeed destructive (Perera et al., 1997; Royal Statistical Society,

2005). Therefore, it is crucial to understand under which specific conditions performance measurement and management practices can actually deliver improved performance.

So-called ‘alternative approaches’ have looked at PM, considering it more as a social practice rather than as a technical process (Covaleski et al., 1996). In this context, the need for deeper reflections on the conceptual and operative conditions required for the measurement of performance has been advocated (Chua and Degeling, 1993). Indeed, a number of scholars have remarked that PM is often regarded as the objective evaluation of reality by academics and practitioners (Morgan, 1988; Power, 1997). The customary use of adages such as ‘if you cannot measure it, you cannot manage it’ and ‘what gets measured gets done’ (Garvin, 1993; Johnson and Kaplan, 1987; Kaplan and Norton, 1992; Osborne and Gaebler, 1992; Peters and Waterman, 1982) sometimes expresses not only the acknowledged importance of PM in organizations, but also, and far more generally and critically, a (usually unjustified) belief on the epistemic role of measurement. These praising sentences have two major implications: first, they suggest that behaviors and action follow measurement, whereas this is not necessarily the case in organizations (Kennerley and Mason, 2008; Pollitt, 2006; Smith, 1995b). Second, they assume that all the key properties of measurement (e.g., objectivity, accuracy, and precision) are unproblematic and can be taken for granted.

A basic aim of this paper is to argue the underpinnings of such a position and to challenge the widespread, albeit often implicit, view that PM could enable organizations to determine the ‘true value’ of their performance. To this goal, we analyze the epistemological bases of PM, a topic about which, interestingly, little has been written. To do so, we build on debates on measurement in physics and engineering, where key aspects of the measurement process have been extensively discussed. Moreover, we address the fundamental question of what type of measurement (or evaluation) could be undertaken in social sciences.

## 3. Differences between sciences: epistemological preliminaries

While this paper is not aimed at investigating the complex topic of the (possible) methodological characterization of different scientific disciplines, it is important to consider the implications that different modes of explanation and theorization have on the theory and practice of PM. Indeed, important differences between sciences can be recognized in the process of theorization, in the way theories are applied, and how such a use is deemed to affect the behavior of theorized systems (Ghoshal and Moran, 1996). The application of management theories, unlike theories in sciences of inorganic or organic matter, generally has a significant impact on the object they relate to, e.g., the ways in which organizations function. As organizations are adaptive systems, in the social sciences theories tend to be self-fulfilling, whereas in physical sciences they clearly do not (Gergen, 1973). Consequently, the more a theory is based on strong assumptions on human self-interest and opportunism, as is the case of agency theory, the more

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