



## Non-financial performance measurement in manufacturing companies

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### Abstract

The contemporary manufacturing environment is characterised by increased worker responsibility coupled with the measurement and reporting of numerous aspects of performance. At shop-floor level much of this performance measurement and reporting is non-financial. This paper reports on a large scale, empirical investigation of the measurement practices in British factories at the beginning of the 21st century. Descriptive statistics are provided as well as a classification model of shop-floor non-financial measures. In addition, the relationships between operational measures and contingent firm-specific and external variables are identified. Various partial relationships are found, and 'across the board' high levels of shop-floor performance measurement are found to be associated with a severely competitive environment, an upward communication corporate ethos, and with the adoption of JIT or TQM/TPM. © 2005 Elsevier Ltd. All rights reserved.

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### 1. Introduction

Success in global markets requires products of high quality at low cost, and a first-class customer service. Many companies have responded to these challenges by implementing innovative managerial practices such as JIT, investing in advanced manufacturing technologies such as CAD/CAM, and emphasising quality, delivery, innovation and

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flexibility in meeting customer needs (Banker et al., 1993). Global competition has been met by new management and production techniques and costs controlled through streamlined business processes (IFAC, 1998). These changes are often supported by employee empowerment with increased worker involvement in the control of all phases of manufacturing, and by management information and decision making being diffused throughout the organisation (Kaplan, 1983; Banker et al., 1993; IFAC, 1998). In a parallel, but related, development it has been suggested that ‘day to day’ control of manufacturing and distribution operations is best handled with non-financial measures.

In this paper, cognisant of the enlarged role of workers in contemporary manufacturing environments, we report a detailed, large-scale investigation of the development and application of non-financial measures of performance at the shop-floor level in UK manufacturers. The research is informed by, and builds upon the corporate performance measurement literature. Since our analysis aims to explore possible relationships between performance measures and other organisational characteristics, we follow a broadly interpreted contingency theory approach to the analysis of survey data.

The paper comprises seven sections. First, we review the literature on contingency theory, corporate performance measurement and specific contextual variables in manufacturing companies, concluding with an a priori grouping of variables derived from analysis of the literature. In Section 3, we describe the methodology adopted in gathering and analysing data. Section 4 sets out and provides commentary on the descriptive statistics derived from the raw data. Section 5 reports factor analysis of both the dependent (non-financial performance measures) and contingent variables (such as the adoption of advanced technology, degree of competition etc.) This section concludes with a revised summary of variable groupings, now based on factor analysis, and commentary on the comparison with a priori groupings. In Section 6, we analyse the associations between dependent and contingent variables using Kendall’s non-parametric tau test. Our final section draws conclusions from the analyses and relates these to the extant literature.

## 2. The literature

### 2.1. Contingency theory

Our methodological approach is based on contingency theory, the theoretical perspective that emphasises how contingent factors such as technology and environment affect the design and functioning of organisations. Its central premise is that no universally appropriate organisational structure applies equally to all organisations in all circumstances. Instead, each structure is, or should be, a response to a set of contingencies. The variables most commonly identified in the contingency theory literature are size, environmental uncertainty, production technology, corporate strategy and market environment (Covaleski et al., 1996; Otley, 1995; Mitchell et al., 2000). A company’s management accounting system is a significant element of its organisational structure and the features of an appropriate accounting system will depend upon the specific circumstances that the company faces (Otley, 1980). Accordingly, numerous researchers have attempted to identify important contingencies and assess their impact on the design of management accounting systems. A brief overview of studies that have particular relevance to the themes of this paper is presented below.

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