An integrated production performance measurement system

Alberto De Toni
Associate Professor of Operations Management, Department of Electric Managerial and Mechanical Engineering, University of Udine, Italy
Guido Nassimbeni
Assistant Professor of Operations Management, Department of Electric Managerial and Mechanical Engineering, University of Udine, Italy
Stefano Tonchia
Assistant Professor of Operations Management, Department of Electric Managerial and Mechanical Engineering, University of Udine, Italy

Presents an original integrated production performance measurement system (IP2MS) based on a model able to examine simultaneously several production performances of different operation centres of a firm. The need for an integrated examination of the performances is of crucial importance for today’s manufacturers in order to achieve a competitive advantage. Obtains a quantitative and homogeneous appraisal of the production performances; furthermore, identifies activities responsible for the major differences between actual and desired levels of performance. The proposed model has been empirically tested in some significant medium-large enterprises of Northern Italy.

Introduction

The re-evaluation of the importance of manufacturing with the aim of achieving competitive advantages and on the other hand the assertion that the pursuit of excellence requires an equilibrated mix of performances (Kaplan and Norton, 1992) and pressure to continuous improvement (Dixon et al., 1990), rather than mere attention to determine standards of efficiency, suggest that the present day performance measurement and control systems should be reconsidered (Hall et al., 1991; Lynch and Cross, 1991). The emergence of the new manufacturing paradigm, known as lean production is imposing changes on the performance measurement systems too (Neely et al., 1995). The new performance measurement systems should be suited to the characteristics of the production systems and the criteria of management adopted (Hronec, 1993), be coherent with the strategies of the firm and give support to their realization (Wisner and Fawcett, 1991), they should integrate with the reporting systems typical of the management accounting on one side and with the manufacturing planning and systems (MPCS) on the other.

These considerations underline two facts: 1 The revolution in industrial accounting that has taken place over recent years, due to the diffusion of activity-based costing – ABC (Berliner and Brimson, 1988)[1], should not be considered as something apart but must involve, in addition to the accountants, also the production managers. There must be an integration of accounting reports and production performance measures (Schnoebelen, 1993), as accounting reports alone are insufficient for estimating the performance of the operations, but nevertheless they can furnish useful information and in an economical way, since they are already used for management accounting, to the production.

2 Traditional operational measures emphasize variance-to-standards rather than encouraging continuous improvement (Fisher, 1992), and they are hardly ever directly related to company’s manufacturing strategy as they are too detailed (White, 1996): they are necessary indicators of synthesis, referring both to single production processes and to the entire production process of the firm (De Toni and Tonchia, 1996), which regard the new manufacturing contexts, where competition is on several issues (Flapper et al., 1996; Ghaliyini and Noble, 1996). Thus the logic of “trade-off” has been overtaken (Schmenner and Vollmann, 1994), by the consideration of a set of competitive priorities to which are linked performances oriented not only towards efficiency (i.e. the productivity of the resources) but also to the dimension of time (time-to-market, reliability, flexibility) (Gerwin, 1993; Kumar and Motwani, 1995) and quality (product performances and product conformity) (De Toni et al., 1995).

For example, a time-based competition strategy (Blackburn, 1991), based on IT principles and regarding the entire value delivery chain (from suppliers to distributors), requires performance criteria that do not emphasize individual operation time standards but instead stress the reduction of the set-up time, the flexibility of the workforce and the capability of producing high quality products by a specified completion date. Criteria, such as direct labour efficiency and machine utilization, may pressure managers and supervisors for short-term results, discouraging process improvement and mislead from real objectives; other criteria, such as inventory level, are less important in an IT environment (Crawford and Cox, 1988).

The authors of this paper have developed an original integrated production performance measurement system (IP2MS), based on a model able to examine simultaneously