MANUFACTURING PLANNING AND CONTROL (MPC) IN BATCH MANUFACTURING ORGANISATIONS IN INDIA - AN EXPLORATORY STUDY

ABSTRACT

Manufacturing plays a major role in the economic and industrial development of a country. Effective planning and control of manufacturing is the key to developing a good production base, particularly to batch manufacturing firms. The batch manufacturing firms, a major segment of the manufacturing sector, contribute more than 35 per cent of the GNP of our country. In the present day context of liberalisation of governmental controls in India, and the emerging competition, there is a need for developing appropriate manufacturing planning and control systems for batch manufacturing firms.

The review of literature revealed the need to not only understand the influence of managerial, organisational and environmental variables on MPC, but also to conceptualise MPC and to set up tools for its measurement. With a view to provide a fresh appraisal, this study construes MPC as an integrated system, essential to the healthy operation of a complex network of physical, organisational and system relationships. The main objective of this study is to attempt a better understanding of these relationships in batch manufacturing firms in India.

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With this background, this study therefore proposes to (1) study the present status of manufacturing planning and control systems in batch manufacturing firms in India, (2) to identify the natural factors underlying the manufacturing planning and control construct, (3) to identify MPC variables that discriminate the high MPC performing firms from the low MPC performing firms, and (4) to generate and test a few hypotheses relating to MPC in batch manufacturing firms.

A cross-sectional, two-tier research design was adopted in order to achieve the above objectives. A questionnaire (A) was developed to present the profiles of practices of MPC systems and the data were collected from batch manufacturing firms. A total of 159 batch manufacturing firms responded to the survey on MPC practices. A descriptive analysis of MPC practices was compiled. A set of five case studies was prepared and analysed in order to compare and contrast the results with those of the literature review. Integrating the results of the literature review, survey on MPC practices, and the analysis of case studies, a set of variables and measures was identified. Another questionnaire (B) was developed with a five point, self-anchoring scale for measuring the complex relationships which influence MPC.

Out of the 159 firms who responded to the survey on MPC practices, only 147 firms (chemical firms excluded) were contacted of which only 92 responded to the questionnaire.
The reliability and validity of the exploratory instrument were established. Exploratory factor analysis was employed to extract the natural factors of the MPC system and the MPC performance. Multiple discriminant analysis was performed to identify the MPC system variables that discriminate the high MPC performing firms from the low MPC performing firms. Finally, a few hypotheses were generated on the criterion that the high MPC performing firms would have higher scores for the system factors and variables than the low MPC performing firms. These were tested using the two sample t-test.

The descriptive analysis of the MPC practices survey revealed that the degree to which batch manufacturing firms performed MPC depended upon multiple factors. The emphasis of MPC appears to be on the manufacturing planning aspects than on the manufacturing control. The usage of qualitative methods for sales forecasting, and production plan optimisation is quite common. MRP is quite popular, JIT is under study and OPT appears to be relatively unknown in Indian batch manufacturing firms. The major problem faced by the firms is the timely availability of raw materials, followed by fluctuations in demand. The analysis of five cases revealed the importance of organisational and managerial variables like the top management support to APP formulation, the role of MPC function, the reliability of suppliers, and the
importance of the manufacturing strategy in MPC in batch manufacturing firms in India

The multivariate analysis revealed that customer focus, uncertainty, product complexity, production complexity, demand variability, product price, unscheduled MPC meetings and degree of MPC intervention are the factors influencing the MPC system in batch manufacturing firms in India. And the factors underlying the MPC performance are resource control, manufacturing scheduling, material control, external supply and finished goods inventory performance. The results of the study provided empirical support to the hypotheses that the uncertainty factor and the demand variability determined the effectiveness of the manufacturing planning and control system in batch manufacturing firms in India.

From the standpoint of higher effectiveness of MPC, what these results imply is the need for effective management of these variables and factors in the manufacturing planning and control. The results further suggest that the proper identification of the MPC system construct, performance factors and the variables that discriminate the high performing firms from the low performing firms will lead to a comprehensive understanding of the complex phenomena of MPC and a better appreciation of the dynamics of the manufacturing management in a developing country.

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