

# **MANUFACTURING PERFORMANCE: DIMENSIONALITY AND UTILIZATION PATTERNS**

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## **ABSTRACT**

Using a sample of ninety two (92) Portuguese Manufacturing Executives, this study investigates the dimensionality and current utilization practices of manufacturing performance. Factor analysis and cluster analysis are used to analyze the data collected on sixty three (63) performance measures. Based on the results of this study, a framework is advanced to realign the practices and performance measurement systems of Portuguese manufacturing organizations.

## **OBJECTIVE**

The first step toward implementing dynamic, integrated, performance measurement and evaluation systems is the understanding of dimensionality of performance in an organizational context. Thus, the main objective of this research is to investigate the dimensionality of performance in a manufacturing operational context. In the process, the nature and the scope of performance measures utilized by the executives of manufacturing organizations in the evaluation of performance are examined. A sample of ninety two (92) executives of Portuguese manufacturing organizations is used to study the dimensionality of performance and patterns of use of performance measures. As such, understanding the dynamics of the performance measurement and evaluation process should contribute to the successful implementation of performance measurement systems which are badly need in today dynamic and competitive manufacturing environment.

## **OVERVIEW OF RESULTS**

Based on the results of the factor analysis using the component extraction method and the varimax rotation, twelve factors were extracted. The extracted factors explained 66.7 per cent of the total variance.

### **Factor One – The Customer Orientation Dimension**

This first factor includes a set of measures (variables) directly or indirectly related to costumers. This factor (dimension) clearly underscores the importance of the costumer in relations to organizational performance.

### **Factor Two – The Management Dimension**

This factor emphasizes the impact of the quality of management practices on organizational performance. It includes a set of measures related to management and its ability to interact with organizational entities.

### **Factor Three – The Financial Dimension**

This is a traditional performance dimension, which includes a set of traditional financial measures. It is to be noted that one of the traditional financial measures included in the research instrument (earnings per share) was not assigned to any factor. Perhaps this finding can be attributed to the lack of pressure made by external stakeholders to disclose information on this measure. This speculation is based on the fact that the Portuguese stock market is small and includes only few manufacturing firms. The *earnings per share* indicator is typically used by firms which are listed on the Portuguese stock market. Therefore, since their organization is not part of the Stock Market, most Portuguese manufacturing executives feel little external pressure to use such indicator.

### **Factor Four – The Strategic Competitiveness Dimension**

This factor includes performance indicators which relate to three strategic competitiveness sub-dimensions: (i) the product development issues, (ii) the market environment, and (iii) the accounting information quality. It is to be noted that these three strategic sub-dimensions are becoming increasingly important for Portuguese organizations aspiring for global operations and external international financing.

### **Factor Five – The Employee Dimension**

This represents a traditional performance dimension. In this context, it is similar to factor 3. It includes employee-related measures. However this dimension underscores a non-traditional view of employee performance, as it includes both efficiency and effectiveness performance measures.

### **Factor Six – The Maintenance Related Dimension**

Factor six represents important manufacturing performance indicators. This factor stresses the importance of maintenance in relation to efficient performance.

### **Factor Seven – The Marketing Dimension**

This factor represents the marketing dimension. It clearly underscores the importance of market-related measures to performance.

### **Factor Eight – The Cost Efficiency Dimension**

Factor eight also represents a traditional dimension of performance. It is very specific and it includes measures of efficiency. It is to be noted that this dimension is one of the performance dimensions most often criticized in the literature, especially when used as the sole determinant of performance.

### **Factor Nine – The Conflict Dimension**

Factor nine represents an important performance dimension which can make or break an organization. In this context, conflict in most organizations is unavoidable, yet it must be managed effectively for the organization to perform well.

### **Factors Ten, Eleven and Twelve**

The three last factors include only one measure each. They can be attributed to the uniqueness of the Portuguese business culture and its current realities. Practically, the measures assigned to these three factors have particular implications to Portuguese manufacturing organizations. For example,

community involvement has just recently become important due to the relative youth of the Portuguese democracy experience (30 years). Also, costumers' surveys are just beginning to be used by Portuguese manufacturing organizations due to the recent shift to the costumer orientation. With respect to strategic alliances, despite their importance as a strategic tool, they are not commonly used by Portuguese manufacturing organizations as a strategic choice.

Analyzing the most used measures by Portuguese manufacturing executives (clusters one and two), it is verified that financial and cost efficiency measures are the most used. Closely trailing these two dimensions is the maintenance related performance dimension which has two measures in the first two clusters and one in top of the third cluster above the median.

### **CONCLUDING REMARKS**

The objective of this study is to gain an understanding of practices related to the manufacturing measurement process-namely (i) to find performance dimensions characterizing the Portuguese management practice with regard to performance measurement, and (ii) to evaluate the Portuguese executives' priorities in the context of performance measures utilization. The results derived from this study based on a sample of ninety-two (92) Portuguese manufacturing executives and sixty-three (63) performance measures lead to the following conclusions and implications.

The factor analysis procedure extracted twelve performance dimensions. The twelve dimensions include traditional financial and efficiency dimensions, performance effectiveness dimensions, as well as some dimensions specific to the characteristics of the Portuguese management and business environmental practices. It is to be noted that while Portuguese manufacturing executives appear to be aware of the multi-faceted nature of performance, they do not view these different facets equally.

The cluster analysis results underscore the over-utilization of the financial and efficiency performance dimensions, while under-utilizing important effectiveness performance dimensions such as customer orientation, strategic competitiveness, and marketing on the part of Portuguese manufacturing executive. The under-utilization of these dimensions is alarming, as they are critical to the pursuit of competitive advantages in the global market. The relative priorities given to other effectiveness performance dimensions such as management related, employee related and maintenance related are encouraging. Based on the results of this study, it is recommended that Portuguese manufacturing executives are in need of realigning their organizational performance measurement practices and systems. This is by no means an easy task given the mere efficiency orientation of most Portuguese manufacturing organizations which has been prevalent for a long time. For the realignment effort to be effective, organizational culture, structure and information systems must be re-engineered to support the effective utilization of critical performance dimension. In this context, new approaches aimed at improving performance management practices are needed.

References, tables and exhibits available upon request from Mahmoud Yasin