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Demand Forecasting in Hybrid MTS/ MTO Production Systems

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ABSTRACT

This article describes how simplifying production-planning approaches for demand responsiveness has been well recognized as an operative means of accomplishing production efficiency. To support an effective decision making in manufacturing environments, this study will focus on adopting time series analysis concepts. It will attempt to focus on bringing forward novel structures for classifications of available surveying materials, which helps companies using time series analysis within production strategies to make a logical prediction of demands in hybrid manufacturing systems. In this regard, the authors will present two different categorizing structures as efficient ways of helping practitioners and academicians to find new approaches for applying near possible future forecasts by means of time series analysis methods.

KEYWORDS

Demand Forecasting, Hybrid MTS/MTO, Production Planning, Time Series Analysis

1. INTRODUCTION

1.1. Motivation and Significance

Literature survey of this paper indicates that there is a need to dedicate research works to the development of techniques, methods, and approaches for forecasting demands in the new aged manufacturing systems, i.e. Hybrid MTS/MTO production systems. With this regard, we embark on applying a time series analysis forecasting within Hybrid production systems to make a more accurate prediction of the possible demands in the future.

1.2. Hybrid MTS/MTO

Production strategies are classified based on their ability to either decrease the customer lead-time (known as responsiveness) or deliver a more customized product (customization). Consequently,

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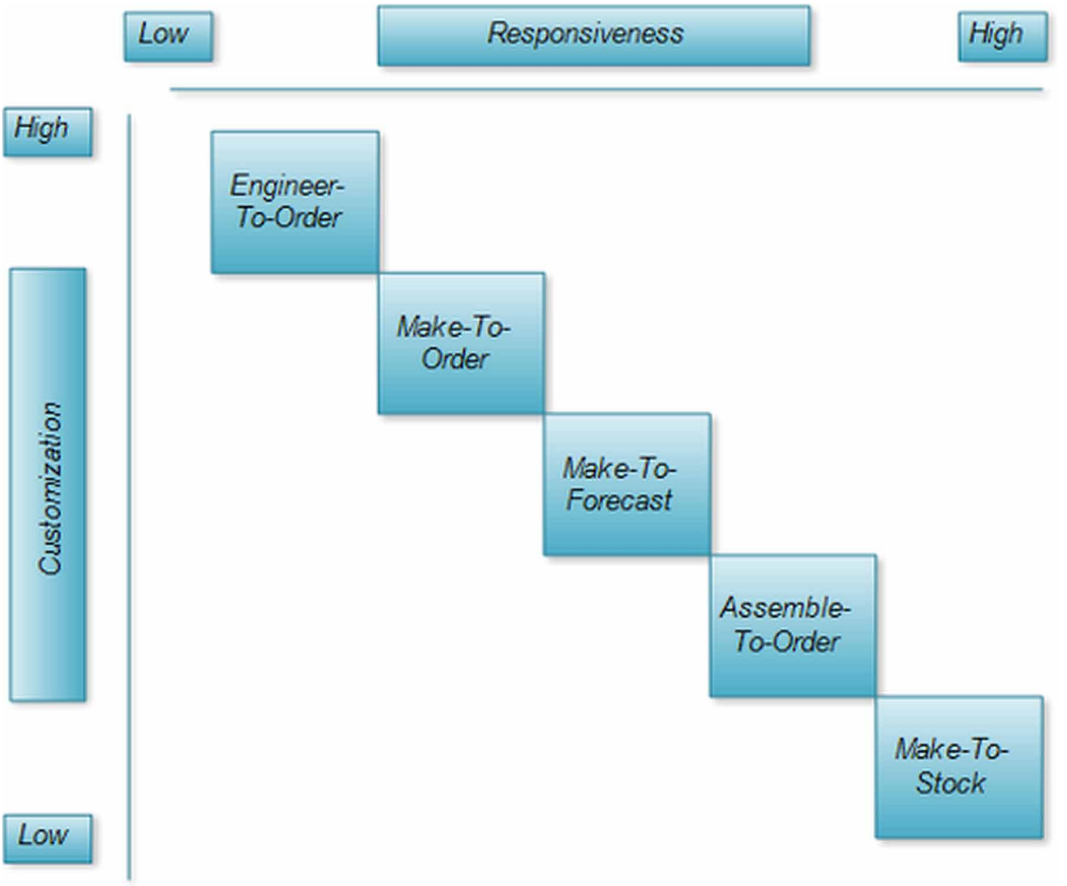
Figure 1. Production strategies to meet customization/responsiveness (Meredith and Aknic, 2007)



from this viewpoint manufacturing strategies change from pure MTS with the maximum level of responsiveness, to pure MTO containing the highest level of customization (Meredith and Aknic, 2007). Figure 1 expresses that between these two approaches, there are several production approaches to meet both customization and responsiveness with an appropriate proportion to each, based on the organization's goal and manufacturing processes. The main discrepancy between MTS and MTO is the timing of the receipt of the customer order as compared to the final assembly of the finished product.

In an MTS environment, products are assembled in expectation of future orders and stored in the finished goods inventory (Youssef et al., 2004), while in an MTO system, the customer order is received before assembly of the final products. A significant proportion of research in the production planning area prior to 1990 was targeted at the requirements of MTS companies (Hendry and Kingsman, 1989). Nowadays, the choice between MTS and MTO for a manufacturing corporation is a strategic one. Firms are trying to analyze different working circumstances with the intention of making the best choice and being more competitive in the ever more intense global economy.

The main advantage of MTS systems is its short lead-time since the final products are already in stock even before receiving the customer order. In an MTO system, the lead-time may take account of design, procurement, final assembly, manufacturing, and shipment stages, whereas for a strictly MTS system the lead-time only involves the shipment period. In a pure MTS environment, the firm's logistics management plays a noteworthy role in maintaining the competitiveness of the company by determining the variety, size, and location of the finished inventories. The main challenge for an