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Linkages among manufacturing concepts, inventories, delivery service and competitiveness

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Abstract

In this paper, we analyze a model that states that investing in progressive manufacturing programs, combined with a modern approach to supplier issues, has a direct effect on inventory level and structure, which in turn directly affects delivery service and delivery related competitive advantages. The model was tested on data from the Global Manufacturing Research Group. This data was broken up into three groups: the United States, Western Europe and Transitional Economies of Central and Eastern Europe. The results of a set correlation analysis showed that in all three groups of countries: (1) investing in progressive manufacturing programs and using modern approaches in dealing with suppliers were significantly linked to inventory level and structure; (2) inventory level and structure were linked to delivery service; (3) delivery service was related to competitive advantage. Companies from the transitional economies differed from the other two groups in that they did not show a relationship between inventory structure and competitiveness. This may demonstrate that management in transitional economies may still be working to achieve a more successful linkage between inventory structure and competitiveness.

Keywords: Inventory management; Comparative studies; Customer service; Competitiveness

1. Introduction

This paper presents a cross-country comparison of inventories in specific manufacturing industries. More specifically, we take a look at the idea of "inventory structure", which is the relative levels of raw materials, work in process and finished goods in the total inventory. We use this to compare the market economy of the United States, Western European market economies, and "transitional" economies (i.e., formerly communist countries in Eastern Europe). Issues of customer service in these countries are also discussed. What we are asking in this paper is, first, whether inventory structure is related to competitiveness. Then, we investigate if the formerly centrally planned economies implemented progressive management concepts, would they succeed in producing an inventory structure similar to that of the market economies, which in turn would lead to greater customer service and thus, competitiveness.

This study tested hypotheses that previous research has attempted to answer, with the intent if

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seeing of the conclusions drawn in previous studies still hold. Dubin [1] discussed the importance of replication, yet this is not something that is commonly observed in our field. It is hoped that this paper will show the usefulness of replication, and lead to further insights into the inventory structures and customer service levels that exist at a country level.

As noted by Chikán [2], the general theory of inventories is still mostly unexplored from the viewpoint of cross-country comparison. Since that article, there has not been much additional research in this area. This is somewhat disappointing, as we had a very interesting development over this period of time, namely the conversion of a number of economies from begin centrally planned to being market-based. As Chikán [3] stated in a later article, formerly centrally planned economies underwent three dramatic changes:

(1) Paternalistic state behavior stopped. That is, government subsidies were reduced or stopped altogether.
(2) Extended privatization started. In essence, this is the ultimate stoppage of government subsidies, as formerly government-controlled firms moved toward market control.
(3) Restructuring of production was necessary. As firms would more and more have to answer to the consumer, and not to the central planner, a new paradigm of production was required in the formerly centrally planned economies.

Each country went about this change differently, as has been well documented by the popular business press. For instance, Poland went through what has been described as "shock therapy", while on the other end of the scale, Hungary started market reforms in the 1960s. Russia's transition has been somewhere in between.

The operations management community has had not much to say about the issue of transition economies and the inventory structures of these countries. As an example, using the search term "transition economy and inventory" on the popular ABI Inform database yielded three hits when done in mid-1999. This paper should thus help fill a gap in the literature.

2. Literature review

In the case of the transition economies, Chikán [2] noted that there is a distinct difference in the inventory structures between market and centrally planned economies. Centrally planned economies tend to have a greater proportion of raw materials inventory and a lower proportion of finished goods than is found in market economies. He attributed this to the lack of "intercompany cooperation" in centrally planned economies. Chikán explained that this situation was caused by the lack of reliable relationships between firms in centrally planned economies. In effect, firms in centrally planned economies were "hoarding" materials to mitigate the effects of shortages.

This issue of firms hoarding goods leads to another issue. If firms in centrally planned economies are hoarding raw materials and not holding much in the way of finished goods, they are acting in a sellers' market. Getting goods is difficult, and selling them is easy as demand is exceeding supply. Chikán and Demeter [4] used the term "permanent overdemand" to describe this situation. Thus, a firm in this situation has no particular need to be responsive to its customers, but must beg and plead with its vendors (or central planners) to get needed materials. By way of contrast, it is a staple of introductory business classes how beholden market economy firms are to their customers.

Kisperska-Moron [5] studied the particular case of Poland's transition. The article's findings appear to be at odds with Chikán's. Specifically, it was found that the proportion of finished goods inventory was actually dropping as Poland was going through the transition to a market economy. Further, the proportion of work-in-process inventory was decreasing. The first finding appears to be in direct conflict with the trend that Chikán had noted. In the particular case of Poland, however, Kisperska-Moron noted that the most likely reason for the decline of finished goods inventory was the high interest rates Poland was experiencing at the time. It should be noted that these interest rates were the result of the "shock therapy" transition plan mentioned earlier. The second finding was attributed to poor managerial practices, which one