

An organizational perspective on inventory control: Theory and a case study

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Abstract

Inventory control is a well-covered area in literature. Nowadays, many concepts and techniques are available for effectively controlling inventories. Eminent examples are stochastic models to determine order quantities, techniques for forecasting demand and different kinds of ABC analysis. Remarkably enough, the theoretical backgrounds of these concepts and techniques show a great deal of similarity: they all stem from the field of operations management and operations research. Despite the value of the available concepts, such a one-sided approach has its limitations in practice. In this article it is argued that it is important to take a broader view when dealing with practical inventory control problems. First of all, an organizational perspective on inventory control is developed. The main idea behind this perspective is the importance of the organizational context of inventories. This means that in addition to the traditional points for attention, such as order quantities and replenishment strategies, other aspects need attention as well. They are, for example, the allocation of responsibilities and authorities regarding inventory management, the quality of inventory information and the relevant decision-making processes. These contextual factors as well as the traditional factors are mapped out and integrated into a framework to be used in solving practical inventory control problems. One of the main features of the framework is that it is useful in both analyzing and redesigning an inventory situation. Secondly, this article describes the results of a case study regarding the application of the organizational perspective to a practical inventory control problem. The central issue of the case study is the spare parts inventory of a missionary aviation organization in Africa. The case study shows that the organizational perspective on inventory control is very helpful in dealing with inventory control problems. It is illustrated that taking into account the organizational context of inventories, especially the responsibilities and authorities of the persons concerned, is a necessity to accurately understand inventory control problems. In addition, it is illustrated that the organizational perspective leads to a more appropriate redesign.

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1. Introduction

During the last few decades inventory control has been the topic of many publications. It may fairly be called one of the classics in operations literature. As a result, a large collection of

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concepts and techniques is available for effectively controlling inventories. There are for example stochastic models to determine order quantities, techniques for forecasting demand and different kinds of ABC analysis. Recently management systems such as manufacturing resource planning (MRP) and enterprise resource planning (ERP) have been added. However, most of these contributions have similar theoretical background: the field of operations management and operations research. This means the concepts and techniques are mainly based on mathematical assumptions and modeling inventory situations. Although this established approach to inventory control has proved to be very valuable in determining inventory parameters and planning resources, its value can be questioned in dealing with practical inventory control problems. Plossl and Welch for instance state that many firms have inventory control techniques working but they are not reducing inventories. On the other hand, some others are doing a fine job of managing the total inventory investment even without these tools (Plossl and Welch, 1979, p. 26). In addition, nowadays' authors realize that many of the quantitative methods from the field of operations management and operations research are insufficient to cope with today's organizational complexity (e.g. Hayes, 1998; Lovejoy, 1998; Machuca, 1998). These authors favor a broader scope on operations management issues, including qualitative aspects and linkages with other functional areas in an organization. Therefore, there seems to be a need for an extended view on inventory control.

In this article we argue that it is highly important to take the organizational context of inventories into account when dealing with inventory control problems. This means that in addition to the traditional points for attention, such as order quantities and replenishment strategies, contextual aspects need attention as well. They are for example the allocation of responsibilities and authorities regarding inventory management, the quality of inventory information and the relevant decision-making processes. These contextual factors as well as the traditional factors can be integrated into an organizational perspec-

tive on inventory control. The development and practical application of this organizational perspective are the main topics of this article.

The article is organized as follows. First, the organizational perspective on inventory control is developed. To that end, the organizational context of inventories is investigated to determine aspects that play a part in inventory control. Second, a framework is presented to facilitate the application of the organizational perspective to practical inventory control problems. The third section of this article describes the research methodology of a performed case study in which the organizational perspective has been applied. The case study regards the spare parts inventory of a missionary aviation organization in Africa. Fourth, the results following from the case study are presented. It can be concluded that taking the organizational context of inventories into account leads to a better understanding of the problem and to a more appropriate redesign of the inventory situation. The final section of this article summarizes the conclusions.

2. An organizational perspective on inventory control

Within the area of operations management and operations research many contributions regarding inventory control can be found. Traditionally they focus on three topics that are widely recognized to play an important part in inventory control: order quantities, order intervals and inventory control systems. See, for example, Plossl (1985) and Silver et al. (1998). The first topic regards order quantities or how much to order. In order to determine economic order quantities, several costs associated with inventories play a part, such as ordering costs and inventory carrying costs. The second topic regards the order interval or when to order. In this respect demand and lead-time processes are important. Finally, the third topic regards the inventory control system. Common subjects concerning systems for controlling inventories are ABC classifications and information systems. These three aspects represent the traditional characteristics of an inventory situation. In

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