The British Accounting Review 44 (2012) 173–188

Contents lists available at SciVerse ScienceDirect

The British Accounting Review

journal homepage: www.elsevier.com/locate/bar

# Inventory investment & control: How have UK companies been doing?

Christopher K.M. Pong [a], Falconer Mitchell [b,*]

[a] Nottingham University Business School, Jubilee Campus, Wollaton Road, NG8 1BB Nottingham, UK
[b] University of Edinburgh Business School, 29 Buccleuch Place, EH8 9JS, Edinburgh, UK

ARTICLE INFO

*Article history:*
Received 2 March 2010
Received in revised form 1 March 2012
Accepted 6 March 2012

*Keywords:*
Enterprise Resource Planning Systems
Inventory control
Just-in-Time
Supply Chain Management
World Class Manufacturing

ABSTRACT

Since the 1980s UK manufacturers have been exposed to the strong promotion of inventory control and reduction as a component of Just-in-Time (JIT), World Class Manufacturing (WCM) and Supply Chain Management (SCM) supported by a range of Enterprise Resource Planning System (ERPS) software packages. There is evidence that these ideas have found extensive favour in practice although existing research studies have also shown that inventory control and reduction is challenging and its impact on performance appears mixed. However, the questions of whether inventory reduction has been achieved and whether it has been beneficial to corporate performance have not been subject to systematic investigation in the UK setting. This study rectifies this deficiency by providing evidence on inventory and inventory turnover levels and trends in UK manufacturers over the two decades ending in 2005. This is supplemented, by benchmarking UK companies against those of Japan, USA and Germany, by investigating possible factors that can explain variation in inventory levels, and by exploring the association between high standards of inventory control and the financial performance of companies.



## 1. Introduction

Since the 1980s, several of the most prominent developments in management (i.e. just in Time (JIT), World Class Manufacturing (WCM), supply Chain Management (SCM) and Enterprise Resource Planning Systems (ERPS)) have specifically highlighted inventory reduction and control as both beneficial and achievable. However, while these recent management developments appear to have found considerable favour in practice, their implementation has also proved challenging.

This is to be expected, as the possession of inventory has both pros and cons which are dependent on the circumstances of the individual firm. In general, inventory remains a substantial business asset (see Table 3) and impacts directly on customer service. The possession of inventory delivers a series of advantages (see, for example, Aschner, 1990; Lambert & Stock, 1993) as follows. Most importantly it acts as a demand/supply buffer facilitating prompt, off-the-shelf customer service. Such a buffer may reduce operational costs (Protopappa-Sieke & Seifert, 2010) and will be particularly valuable for firms that are unable to achieve the operational changes in production speed and flexibility that are needed to cope with lower levels of inventory. The value of this benefit is likely to be greater where manufacturing lead times are long or sales fluctuate or lack predictability. As firms expand, the long established inventory control model based on economic order quantities indicates that optimal inventory investment will represent an economy of scale as inventory increases proportionately by less than the sales rise. The possession of inventory, through judicious purchasing and manufacture, can, in times of escalating prices, generate cost savings. It may also be economically sensible to create or procure inventory where economies of scale can be obtained from long production runs or discounts obtained from large volume purchases.

* Corresponding author. University of Edinburgh Business School, 29 Buccleuch Place, Edinburgh EH8 9JS, UK.
*E-mail address:* F.Mitchell@ed.ac.uk (F. Mitchell).

0890-8389/$ – see front matter 
http://dx.doi.org/10.1016/j.bar.2012.07.008

One further, but less obvious, attraction of inventory for management lies in its potential influence on the computation of profit (Pong & Mitchell, 2006). Inventory is a component of the annual cost of sales computation. Any increase (decrease) in closing inventory reduces (increases) the cost of sales and thereby increases (decreases) profit. The significance of the impact of this type of inventory change on profit is created by the prevailing accounting standard (International Accounting Standard 2) which requires inventory to be valued at full (as opposed to variable) production cost. This accounting practice allows profitability to be boosted by the build up of inventory through the carry forward of fixed production cost in inventory. Considerable criticism has been levelled at this accounting method as it provides management with a convenient earnings management tool which can also encourage the proliferation of inventory, counter to the best interests of owners of the firm (Kaplan, 1984, 1987).

Despite these potential benefits, the possession of inventory can also have disadvantages and its control and reduction can be rewarding. Inventory control means working capital investment needs are reduced and funds freed for alternative uses. There is also a containment of those costs directly caused by the existence of inventory (e.g. storage, security, insurance, obsolescence and waste). In times of falling costs, for example where commodity prices are volatile), inventory control can lead to cost savings if purchase of, or production for, inventory is delayed. It is claimed that the reduction of inventory, by taking away the convenient supply/demand buffer, puts pressure on internal operations to improve. For example, quality, logistics, scheduling, production flexibility and operational efficiency all have to improve in order to ensure timely and quality supply when the comfort of servicing customer demand from existing inventory is eliminated or reduced. If enhancements such as these can be carried out successfully then they can have a positive influence on firm performance.

In recent years, as the literature review below shows, it has been these latter arguments against inventory that have been promoted strongly. However, empirical evidence on the value of inventory reduction in terms of its impact on corporate performance has been mixed. This is apparent, firstly, in a series of USA studies. Balakrishnan, Linsmeier, and Venkatachalam (1996) discovered that a superior performance in inventory management was not associated with superior return on assets (ROA) and, similarly, Vastag and Whybark (2005) found no relationship between inventory turnover and an index of reported corporate performance. Chen, Frank and Owen's (2005) study revealed that exceptional inventory performers did not have exceptional share price performance and Cannon (2008, p. 591) concluded from his empirical study that "inventory performance did not measure up as a robust indicator of overall performance." In contrast, Huson and Nanda (1995) found that companies that had adopted JIT had higher inventory turnover and earnings per share than those not using JIT. In addition, inventory turnover had a strong association with improved ROA, return on sales and cash flow margin (Fullerton, McWatters, & Fawson, 2003) and with a higher return on sales (Demeter, 2003). Chen et al. (2005) also found that abnormally high inventory was associated with poor share price performance. Kinney and Wempe (2002) discovered that JIT adopters improved their profit margin performance relative to non-adopters. However, this only applied to larger companies in their sample. Sim and Killough (1998) produced results suggesting that JIT only had a positive influence on performance when combined with total quality management (TQM) and performance goals. In Belgium, Deloof (2003) found that lower inventories were associated with higher profits and Ramachandran and Jankriaman (2009) confirmed this finding in Indian companies.

Thus, prior studies show no clear consensus on the relationship between inventory control and corporate performance. This may be a reflection of the advantages and disadvantages that the possession of inventory brings as well as the differing abilities of firms to cope with the challenges of operating with tight inventory control. The adoption of initiatives such as JIT and WCM requires significant organisational effort and change. Without wholehearted commitment their success can be compromised. As a consequence not all companies may decide to pursue them and among those that do there are likely to be failures. The level of success of these initiatives in the UK is an empirical question that remains to be fully addressed.

In the UK, empirical evidence is lacking on how manufacturing companies have improved inventory control and whether this has been consistent with corporate financial performance improvements. It is the purpose of this study to provide such evidence. The following four specific aims are pursued: to identify inventory and inventory turnover (as measured by inventory days) levels and trends in UK manufacturing companies between 1986 and 2005; to assess the quality of UK inventory control by comparing UK levels of inventory days with those of international competitors; to explain variation in inventory control by using publicly available information to test for factors related to inventory days; and to assess the significance of inventory control by investigating whether superior performance in inventory control is associated with better corporate financial performance.

The rest of the paper is structured as follows. First, a review is undertaken of the relevant literature. Second, the research design is outlined and explained. Third, the empirical results are presented. The results are then discussed and finally some conclusions are drawn.

## 2. Relevant literature

The literature review focuses on the nature of the various initiatives that have been prominent in promoting inventory control during the period of the study and on the empirical evidence that relates to corporate experience of them. It is therefore designed primarily to provide an indication of the inventory control environment of UK manufacturers at this time.

### *2.1. Just in Time (JIT) and Supply Chain Management (SCM)*

The Japanese JIT system was developed in the 1950s and 1960s by Taiichi Ohno for Toyota (Monden, 1983). JIT subsequently came to prominence in the West in the mid to late 1980s. JIT is a broad managerial philosophy which covers the whole