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Information Technology Impact on Inventory Performance

Renu Bala[1]

Abstract— In the past twenty years, financial services have undergone deep and extensive changes in all aspects of their business: product and services, sect oral structure, market segmentation, competitive environment. Globalisation has been particularly pronounced in wholesale banking and over-the counter financial markets such as foreign exchange. Corporate lending and investment banking are dominated by few global players, active in all markets, established or emergent. Modern inventory management systems must have the ability to track sales and available inventory, communicate with suppliers in near real-time and receive and incorporate other data, such as seasonal demand. They also must be flexible, allowing for a merchant's intuition. Inventory management systems are used to track products and provide business intelligence reporting. Inventory management systems are software programs used to maintain, gather and track inventory from the moment it reaches a retail setup to the moment it is sold.

Index Terms— IT, Inventory, Investment, Management.

1 INTRODUCTION

THE automation has increased the efficiency and accuracy of inventory management, allowing companies to get information about a particular product's sale levels and whether it is time to reorder at the very moment the item reaches a predefined stock level. Inventory management systems are the rule for such enterprises, but smaller businesses and vendors use them, too. The systems ensure customers always have enough of what they want and balance that goal against a retailer's financial need to maintain as little stock as possible. Mismanaged inventory means disappointed customers, too much cash tied up in warehouses and slower sales. Factors such as quicker production cycles, a proliferation of products, multi-national production contracts and the nature of the big-box store make them a necessity.

An important aspect of good inventory management is effective use of information. Knowing how to use information effectively also enables a manager to decide what data to collect, buy and store, and what information technology to invest in. Note that information has no value, if it is not used effectively. For example, an inventory manager can obtain order progress information through the use of a tracking technology. If this information is not used to improve replenishment decisions, then neither the information nor the technology used to obtain it has any value. In this paper, provide some examples of how information is incorporated into classical inventory management problems. The second important aspect of good inventory management is to quantify the value of information. A manager may need to invest in a technology that collects and stores information relevant for effective inventory management. The cost of obtaining information is often not difficult to analyze. Quantifying the benefits, however, requires thorough analysis and modeling. Consider, for example, the recent tracking technology known as Radio Frequency Identification (RFID). Quantifying the cost of RFID implementation is relatively straightforward. But the benefit of this technology for the management of inventory is not clear. Comparing inventory models with and without the information obtained through RFID enables an inventory manager to quantify the value of RFID. Modeling examples that illustrate how an inventory manager can quantify the value of information. The third important aspect of good inventory management is to coordinate decentralized operations. The coordination of information and inventory management have become increasingly more difficult with recent increases in supply chain complexity. Such complexities are the result of dramatic changes in manufacturing and distribution, including globalization and outsourcing. As a result, independent firms manage inventory allocated across different parts of the global supply chains. Each firm in the supply chain individually and myopically sets strategic and operational goals to minimize inventory and production related costs. Firms also maximize profits by using local information such as local cost structures, profit margins and forecasts. As a result, the supply chain is sub-optimized and not synchronized.

In this paper, Section A describes the related work and Section B describes the Investment in information technology, Information technology and financial services, direct impact of IT investment on inventory performance and concludes paper.

• *Renu Bala, Research Schloar, Mewar University, Rajasthan, India.*

SECTION-A

2.1 Related Work

Kohli and Devaraj (2003) concluded that the impact of IT investment is most likely to be detected in manufacturing industries. Further, they noted that IT investment's impact is easier to observe with primary data at the firm level than with secondary data at higher levels of aggregation. In contrast, organization systems scholars suggest that similar relationships may exist at multiple levels of an organizational system (Duncan, 1972).

Shin et al. argued that IT is an essential tool, but not sufficient by itself, to be truly effective [1]. Cragg et al. argued that IT needs to be coupled with other factors such as business strategy to have an impact on performance [2]. King et al. have said that firms with extensive IT resources may gain a competitive edge by deploying them in support of or to strengthen their business [3]. Murphy et al. found that Electronic Data Interchange is an important tool if logistic organizations want to be successful international freight forwarders. EDI enables the transfer of data in an agreed electronic format, such as invoices, bills, and purchase orders, between companies [4]. Yan Cheng et al. found that using EDI to support a Vendor-Managed Inventory strategy not only eliminates the bullwhip effect but also enhances the overall performance of the supply chain. VMI is an inventory planning and fulfillment technique in which a supplier is responsible for monitoring and restocking customer inventory at the appropriate time to maintain predefined levels. The vendor is given access to current customer inventory and forecast and sales order information to initiate replenishment as required. VMI directly links suppliers to a manufacturing base and EDI is then applied to generate material "pull" signals. IT also shortens delivery lead time [5].Frohlich et. Al. examined IT from the Internet dimension [6]. Brynjolfsson et al said Internet technology has significantly enabled VMI, Electronic Fund Transfer , and collaborative planning, forecasting and Higher firm value was associated with investments in IT that complemented other organizational features such as greater use of teams, broader decision-making authority, and worker training [7].

2.2 Investment in Information Technology

IT investment is the primary predictor in this paper. The nominal (raw) data and the first-order ratio scales of IT investment (such as IT investment to sales ratio and IT investment to private investment ratio) are strongly time-dependent (or persistent) due to the continuous increase in IT investment over time. Time-dependent data in regression may cause co linearity, inflate regression coefficients, generate serially correlated residuals, and violate the normality assumption for the error terms. Moreover, the ratio scales for IT investment can be biased for a variety of reasons, and require that the measures be calibrated to reduce the bias, using deflators. To mitigate the effects of persistency and possible bias in the ratio scales for IT investment, propose these steps are given below:

$$IT(t) = [(ITR(t) - ITR(t-1))/(ITR(t-1))](ITR(t)) \quad (1)$$

Where IT (t)measures IT investment at time t, ITR(t)represents the ratio of IT investment to total private investment at time t and t represents the year of investment.

In Eq. (1), the term in square brackets, [(ITR (t)–ITR (t-1))/(ITR (t-1))], represents the change in IT investment to private investment ratios over two consecutive years .

In this paper three analyses shown (fig1.) (1) Time (t) is an index of year ranging from 1 to 40 representing the 40 years (1960–1999) in the dataset. Time (t) is included to control for the time dependence (or persistence) in the dependent variables.

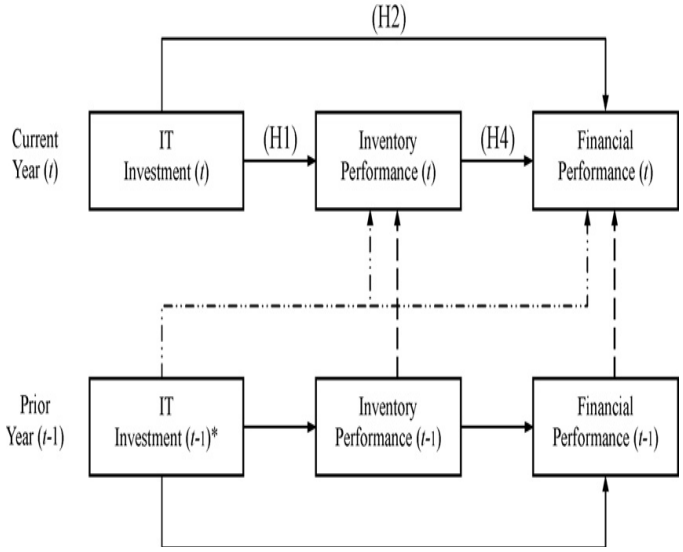

Fig.1 Representation for IT investment

(2) Lagged effects of IT investment (IT(t_1), IT(t_2), and IT(t_3)) are included to examine whether benefits of IT investment occur with a lag of 1, 2 or 3 years after the investment is made (Brynjolfsson and Hitt, 1998). (3) Past performance is an autoregressive term used to control autocorrelation effects of the dependent variable that manifest as ''halo effects'' (Santhanam and Hartono, 2003). Halo effect refers to the phenomenon where past performance significantly affects current performance (Sine et al., 2003).

2.3 Information Technology & Financial Services

While technology constitute a key vector of geo finance, not all the technologies played an equally important role in its development. Among those which did, two appear as core levers.

- **Transaction processing**. Banking automation process has been largely triggered by the need to lower transaction costs and increase transaction throughput. As transaction volume increased, system requirements became more stringent, either in terms of performance or reliability. The key nodes of financial systems: settlement systems, payment networks and market trading systems, all rely on state-of-the-art transaction processing technologies

- **Financial instrument technology**. This technology, which combines software development and pure economic theory, is based on the option theory developed in the early 1970s by US academics Fisher, Black and Merton. The theory, which allows the quantification of the value of future and uncertain cash flows, has played a critical role in the development and explosive growth of organised and informal markets for financial derivatives. More fundamentally, the financial instrument technology contributed to the dematerialisation of financial transactions and financial markets. The main purpose of financial markets is no longer to support trading of physical goods but to exchange of information and to manage risks.

3 SECTION B

3.1 Direct Impact of IT Investment on Inventory Performance

Direct impact of IT investment on inventory performance IT investments have clearly played a leading role in accelerating economic growth during the 1990s. Firms have invested substantial resources in new types of IT enabling them to improve efficiency in and coordination of material-handling operations, thereby reducing inventory levels. A positive influence of IT on inventory performance is well supported at the firm level. For example, previous studies find that an increase in IT investment results in higher inventory turns and lower inventory holding costs. Similarly, a number of case studies and anecdotal evidence support that IT allows business partners to share information related to customer orders and inventory positions in supply chains. Such facilitation of information sharing by IT should help manage inventories more effectively and streamline operations. By observations, an increase in IT investment should lead to better inventory performance at the sector level because dynamics similar to the firm level are also influential at the sector level.

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