Chapter II

Redefining the Manufacturing Enterprise through Information Technology

Qiang Tu
Rochester Institute of Technology, USA

Wei Wang
Rochester Institute of Technology, USA

ABSTRACT

This chapter identifies the profound impact of modern information technology on the manufacturing industry. Advanced manufacturing technologies, coupled with organization-wide information systems infrastructures, have offered manufacturing firms tremendous opportunities for sustainable competitive advantages. To fully realize the new technologies' strategic benefits, however, manufacturing management must both abandon traditional industrial mindsets and redesign manufacturing systems for maximum enterprise integration. Technology is, after all, merely an enabling factor. It requires other corresponding organizational changes to reach its full potential. We, the authors, also introduce current research ideas in the areas of information technology and of manufacturing strategic management.

INTRODUCTION

A much talked about topic in recent years is the emergence of a "new economy," characterized by sustained economic growth in the late 1990s (Gordon, 2000). Many researchers attribute the accelerated productivity growth to heavy investment and to rapid developments in information technology (IT) (Oliner & Sichel, 2000). A study by the Joint Economic Committee of the United States Congress (Feroli, 2001) concludes that information technology is an important factor in the recent acceleration of productivity growth and that both the production and the use of IT contribute to the productivity revival. Indeed, the new generation of IT, especially web-based electronic business technologies, have dramatically changed the nature of business competition and have altered the structure of markets in a number of industries (Segars & Grover, 1995; Stroeken, 2000).

Significant advances in the related technologies of computers, telecommunications, data access and storage devices, and software packages have created a wide spectrum of new opportunities for organizations. The speed, cost, size, and capabilities of the new IT continue to improve rapidly, and there appear to be unlimited applications that could be computer-enhanced. As the backbone of the U.S. economy, the manufacturing industry may well be the biggest beneficiary of all of these IT innovations (Shaw, Seidmann & Winston, 1997; Barua & Lee, 1997).

Manufacturing has traditionally been viewed merely as a functional area buffered from environment, but Skinner (1969) points out that some of the seemingly routine manufacturing decisions may, in fact, significantly influence corporate strategy. Wheelwright (1984) further defines the missing link between manufacturing strategy and corporate strategy. Subsequently, manufacturing is increasingly viewed as a strategic enterprise covering the entire value chain of new product development, materials purchasing, production, product distribution, and customer service (Doll & Vonderembse, 1991). The changing role of manufacturing is due, in large part, to rapid advances in both power and functionality within the new IT, especially with the help of highly-integrated and computerized supply chain management (SCM) systems (Keah, 2002). Interestingly, contemporaneous information systems (IS) literature discusses the changing role of IS from a back-office support function into a competitive weapon (Ives & Learmonth, 1984; Sethi & King, 1994). This is not mere coincidence. Researchers indicate that today's turbulent manufacturing environment is primarily customer-driven but, more importantly, that it is IT-enabled (O'Halloran & Wagner, 2001).

It is also necessary to clarify the scope of IT within this article. In a narrow sense, IS literature defines IT as information systems hardware and software used to organize, store, retrieve, and transfer data. It also facilitates communications such as office automation systems, management information systems,

12 more pages are available in the full version of this document, which may be purchased using the "Add to Cart" button on the publisher's webpage: www.igi-global.com/chapter/redefining-manufacturing-enterprise-through-information/6101

Related Content

Developing the Commitment to Virtual Community: The Balanced Effects of Cognition and Affect
Sumeet Guptaand Hee-Woong Kim (2007). *Information Resources Management Journal (pp. 28-45).*
www.irma-international.org/article/developing-commitment-virtual-community/1305

Media Richness in Online Consumer Interactions: An Exploratory Study of Consumer-Opinion Web Sites
Irene Pollach (2010). *Global, Social, and Organizational Implications of Emerging Information Resources Management: Concepts and Applications (pp. 280-295).*
www.irma-international.org/chapter/media-richness-online-consumer-interactions/39247

A Case Study of Teaching Parallel and Distributed Computing Topics on a Computer Cluster
Hong Lin (2014). *Journal of Cases on Information Technology (pp. 58-71).*
www.irma-international.org/article/a-case-study-of-teaching-parallel-and-distributed-computing-topics-on-a-computer-cluster/112091

Semantic Synchronization in B2B Transactions
Janina Fengel, Heiko Paulheimand Michael Rebstock (2009). *Journal of Cases on Information Technology (pp. 74-99).*
www.irma-international.org/article/semantic-synchronization-b2b-transactions/37394

Introducing Java to the IT Master's Curriculum
Wendy Lucas (2005). *Encyclopedia of Information Science and Technology, First Edition (pp. 1663-1668).*
www.irma-international.org/chapter/introducing-java-master-curriculum/14492