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Int. J. Production Economics 50 (1997) 91–104

international journal of
**production
economics**

The role of information technology in business process reengineering

A. Gunasekaran^{*, a}, B. Nath^b

^a *Department of Manufacturing and Engineering Systems, Brunel University, Uxbridge, Middlesex UB8 3PH, UK*

^b *School of Computing and Information Technology, Monash University, Churchill, Vic. 3842, Australia*

Abstract

This paper discusses the role of information technology in business process reengineering (BPR). BPR was introduced in manufacturing/service industries with the objective of changing the management of the supply chain. In manufacturing, the nature of material flow determines the type of information and decision support systems required to achieve system integration and hence the overall effectiveness of the system. A conceptual model has been developed in this paper to illustrate the role of information systems in BPR and the type of information systems required to integrate functional areas in manufacturing. Hammer's (1990) message "Reengineering work: don't automate, obliterate" stresses a radical process simplification as the way to reduce time and cost, and to eliminate or at least simplify processes, not just speed them up. There has been tremendous interest on how to simplify the process and hence the information system required for effective management of material flow in manufacturing. The implementation of BPR using innovative application of information technology (IT) aims at flexible, team-oriented, and cross-functionally co-ordinated management. A framework has been presented in the paper to design a more effective BPR system with the help of advanced IT. Finally, a summary and conclusions are presented.

Keywords: Business process reengineering; Information technology; Framework for BPR system

1. Introduction

Business process reengineering (BPR) concerns the fundamental rethinking and radical redesign of business processes to obtain dramatic and sustaining improvements in quality, cost, service, lead time, outcomes, flexibility and innovation. A group of related tasks that together create value for a customer is called a business process. Common corporate goals have been (a) customer satisfaction, (b) return on investment, and (c) market share (Hewitt, 1995). These require process inter-dependencies and system

dependencies that are established through integration of various business processes. The basic objective in BPR is to develop integrated inventory management and logistics strategies and processes to ensure their implementation through procedures and systems across the company based on the business process.

A business process can be identified as the type of commodity that flows through the system. For example, a product development and its transformation into a final product can be viewed as a process. BPR focuses on the whole process, say starting from product conceptual stage to final product design. Process focus provides the opportunity to reengineer the process or radically reduce the number of activities it takes to carry out a process with the

* Corresponding author. Tel.: +44 1895 274 000, Ext. 2634; fax: 44 1895 812 556; e-mail: emstagu@brunel.ac.uk.

help of modern IT (Hammer, 1990; Hammer and Champy, 1993; Peppard and Rowland, 1995). New developments in IT such as multimedia, image processing and expert systems can be used to reduce the number of non-value added activities. Organizational restructuring including job redesign, can be used to improve the delivery process of goods and services.

Process simplification is the first major step in BPR. Therefore, a process improvement team should be established with an objective to analyze the whole process and then to identify non value-added activities such as storage and inspection, and eliminate them. The delivery process emphasizes cross-functional performance rather than encouraging departmental optimization and the consequent system-wide sub-optimization.

The role of IT in re-engineering can be viewed from two perspectives: (i) the role of the IT function (e.g. Internet, Multimedia, EDI, CAD/CAM, ISDN), and (ii) the role of the technologies themselves (e.g. CD-ROM, ATM, fibre optics). The IT have played a vital role in the success of the overall re-engineering initiative. Information management throughout the company should be encouraged to develop skills in computer-aided systems engineering (Davenport and Short, 1990; Hewitt, 1995).

Realizing the importance of IT in BPR, an attempt has been made in this paper to understand first the concept of BPR and its importance to improve the competitiveness of firms and second the role of IT in BPR. Finally, a framework has been presented that provides a stage-wise design of a BPR system. The organization of the paper is as follows: Section 2 presents the concept of BPR. Advances in IT are discussed in Section 3. The role of information systems in BPR is discussed in Section 4. Section 5 presents a framework for the design of BPR system. A list of suggestions for BPR is presented in Section 6. The final section contains the conclusions of the paper.

2. Business process reengineering (BPR)

The keywords for the BPR are fundamental, radical, dramatic and process. The business process has to undergo fundamental changes to improve productivity and quality. Radical changes, as opposed to incremental or adjustment of what exists, are made

to create dramatic improvements. Re-engineering is not about fine tuning or marginal increases. It is for ambitious companies that are willing to do whatever is necessary to improve performance significantly. Most companies are function- or department- and not process-oriented. Often many people are involved in order fulfilment, but no one person tracks a product and can report the status of an order directly. Reengineering makes one individual responsible for a complete process (Self, 1995). There are factors that will prevent re-engineering and hence innovation and growth: (i) Correcting the process instead of changing it, (ii) loss of nerve, (iii) the barons, (iv) change of company champion, (v) settling for minor results, (vi) culture, attitudes and skill base, (vii) skimping on resources, and (viii) pull back when people resist change. Childe et al. (1994) have presented frameworks for understanding BPR. BPR focuses upon the sequence of activities which form various processes involved in doing business. BPR should enable firms to model and analyze the processes that support products and services, highlight opportunities for both radical and incremental business improvements through the identification and removal of waste and inefficiency, and implement improvements through a combination of IT and good working practices.

A conceptual model explaining the major elements of BPR is shown in Fig. 1. As discussed earlier, an effective delivery process system can be achieved by BPR. BPR requires organizational restructuring with the help of simplification and standardization, and IT such as Multimedia, Internet, MRP II, CAD/CAE, Electronic Commerce (EC) and Concurrent Engineering (CE). The organizational restructuring by standardization and simplification eliminates barriers for a smooth flow of information and hence an efficient flow of materials along the supply chain. The smooth flow of information can be facilitated by the use of various IT to improve the integration of various functional areas. The basic aim of BPR is to deliver quality goods at competitive prices in a timely fashion. The manufacturing system as well as the enterprise structure should be modified emphasizing *simple co-ordination* of the basic business processes in the chain from the suppliers to the customers, as opposed to the existing complex structures of the functional differentiability hierarchies. The behavioural changes should precede the reengineering of

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