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An example of the application of production system design tools for the implementation of business process reengineering

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Abstract

The concepts behind business process reengineering (BPR) have become an important management tool and are likely here to stay. There have been a variety of BPR implementation approaches developed, but many of them lack the specifies required for an actual BPR implementation.

This paper illustrates how borrowing from the approaches developed for production system design, specifically, binary ordering for machine cell formation for forming business process teams, can open up a whole area of existing tools that can assist in BPR implementation. Simple, yet powerful, the resulting methodology can increase the efficacy of BPR efforts.

Keywords: Business process reengineering (BPR); Business process teams; Production systems; Design tools; Cellular manufacturing

1. Introduction

Some have stated that business process reengineering (BPR) is just a buzz word that will have only a short life like many other so-called managerial "fads". Hansen (Foster, 1994) states that BPR is a misnomer. He concludes that reengineering does not exist because business systems were never engineered in the first place, they simply developed. However, many argue (Berrington and Oblich, 1995; Kirsch, 1994; Hales and Savoie, 1994) that BPR is a fascinating concept that has the potential to save a failing company or give an average company that extra boost to leave its competitors in the dust. A variety of definitions of BPR have been proposed (Klein, 1993; Davenport and Short, 1990; Manganelli and Klein, 1994a; Ovans, 1995) but perhaps the most popular came from Michael Hammer and James Champy in their seminal book *Reengineering the Corporation: A Manifesto for Business Revolution.* Hammer and Champy (1993, p. 32) state that "Reengineering, properly defined, is the fundamental rethinking and radical redesign of business processes to achieve dramatic improvements in critical, contempory measures of performance such as cost, quality, service and speed".

There is agreement in the literature that BPR incorporates the concept of viewing a corporation from a cross-department perspective. Viewing the business from a business processes rather than a

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departmental point of view highlights value-added activities and underscores where there is the most opportunity for improvement. Kim (1994) believes that one of the most important aspects of BPR is the decomposition of the business by cross-functional processes. According to Lester (1994) a business process includes activities that have inputs, add value and results in value for customers.

However, even with agreement on the definition of BPR and the critical aspect of BPR, there has not developed a set of implementation tools to support the adoption of BPR. Rather, a set of general implementation steps or recipes have been proposed. Lee (1995a) suggests that there are six steps in the implementation of BPR: (1) organize the BPR team and prepare in the initial BPR plan; (2) build a customer-focused model of critical core processes; (3) select a critical core process to reengineer; (4) identify additional value-added processes and activities related to the critical core process; (5) benchmark performance and performance drivers; and (6) create vision by designing and implementing the BPR. Yet, no specific tools are proposed to support these six steps. This paper shows how tools developed for the design of production systems can be used to support the second of the six steps (build a customer-oriented model of the organization's critical core processes) in order to form process teams. The process teams are developed using the cellular manufacturing technique of binary ordering. The result of this cross-functional redesign will be improved service because certain business processes will be able to be completed without ever leaving a process team "cell", thus reducing the lead time of that process. Gary Cokins states that BPR is the radical redesigning of processes to speed the flow of materials, information, and decisions (Cokins, 1994). This paper will explain how the creation of these process teams increases the speed of flow of materials, information, and decisions.

2. The cellular manufacturing problem domain

Snead (1989) credits the beginning of group technology to R.E. Flanders who in 1925 described the use of product-oriented departments to minimize transporation costs. In 1937, A.P. Sokolovski proposed the classification of parts with similar features and standardization of similar processes. This concept ultimately developed into Group Technology (GT) – a theory of management which simply states that similar things should be done similarly. Askins and Standridge (1993) describe cellular manufacturing as an approach derived from the principles of group technology where manufacturing facilities are divided into smaller groups or cells that are dedicated to manufacturing a particular type of part.

The concept of cellular manufacturing was developed in order to exploit the advantages of both flow line and job shop layouts. Black (1991) defines cellular manufacturing as "a group of processes designed to make a family of parts in a flexible way". However, flexibility is only one of the advantages associated with cellular manufacturing. Moodie et al. (1994) list other advantages and disadvantages of cellular manufacturing including:

1. *Flexibility.* Cells are more flexible than flow lines, but less flexible than job shops in terms of routing.
2. *Material flow systems.* Cellular manufacturing environments are streamlined compared to job shops and only slightly more complex than flow lines.
3. *Work-in-process.* Cellular manufacturing and flow lines generally result in lower WIP than job shops.
4. *Lead times.* Lead times in cellular manufacturing environments are generally shorter than job-shops, but slightly larger than flow lines.
5. *Production volumes.* The cellular manufacturing environments are most efficient with low-to-medium production volumes. Job shops are most efficient with low volume production and flow lines are generally most efficient with medium-to-high production volumes.

Francis et al. (1992) add to the advantages of cellular manufacturing by stating that a team attitude is developed.

3. The formation of business process teams

Moodie et al. (1994) state that the cellular manufacturing concept is a result of the need to compromise the flexibility of the jobshop in order to boost