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The effects of task and information asymmetry on business process redesign

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Abstract

The effective design of business processes is a subject of considerable importance to corporations today. Our research develops a theoretical framework for process design that is aimed at providing practical guidelines for process managers. The abundance of context-specific case studies which exist today share many success stories but provide little in terms of a general methodological approach. In this paper, we describe our general framework for the analysis and design of business processes. We outline a typical business process and critically evaluate typical pre- and post-reengineering process design issues. Explicit aspects of our analysis address workflow design, task bundling, technological enablers, and performance-based incentives. We examine the effects of task size asymmetry and performance information asymmetry on the optimal process design. Our results indicate that, with increased asymmetry, certain types of process designs become more desirable. Furthermore, we look at the interaction between job asymmetry and other process design factors such as knowledge intensity and level of job customization. Finally, we show when asymmetry can cause process reengineering efforts to complement the classic performance-based incentive compensation model. Practical implications of our results are illustrated for a variety of process design cases.

Keywords: Reengineering; Queuing; Organizational design; Incentives; Information systems design

1. Introduction

Business process reengineering has been around for over five years now. The changes advocated by the seminal books and papers in this area (Davenport and Short, 1990, Davenport, 1993, Hammer, 1990, Hammer and Champy, 1993) were supposed to increase productivity dramatically through a set of sweeping process modifications. Since these ideas were published, there have been a number of

stories of their successful application; however, there have also been a number of reengineering failures. The failures are attributed partly to incorrect implementation of these ideas, and partly to the fundamental resistance to change that many organizations are believed to possess. The subsequent body of reengineering literature has been immense. A significant number of articles in the trade press, e.g. (Ballou, 1995, Brittain, 1994, Byrne, 1993, Champy, 1995) has presented case studies and outlined suggestions for implementation approaches. Academic studies have examined strategic (Short and Venkatraman, 1992), technological

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(Earl et al., 1995; Stoddard and Jarvenpaa, 1995), organizational (Brickley et al., 1997; Whinston et al., 1995), or work system oriented (Denning, 1995; Buzacott, 1996) aspects of process redesign. However, existing analytical studies focus on a single aspect of process redesign, and pure case-based studies provide a general set of rules that are clearly not universally applicable.

Our research thus far (e.g., Seidmann and Sundararajan, 1996a, b) and our ongoing work have attempted to fill this gap by analyzing general multidimensional process redesign situations in a rigorous framework. Based on case studies, and our process redesign work with a Fortune 50 company over the last year, we provide a comprehensive analytical framework within which process owners and managers can study when to redesign business processes and how existing process variables affect optimal design. Many of the claims in the original process reengineering articles ignore some of the fundamental trade-offs between old and new job designs; for example, the literature is replete with examples of the successful application and the individual superiority of the case management approach or of the empowered team approach. The advantages of such teams are evident – however, loss of functional specialization and departmental control can adversely affect throughput and quality. The nature of these trade-offs is the focus of Seidmann and Sundararajan (1996b). We also study how simultaneous changes in certain key aspects of the work environment such as the automation of workflows, the introduction of incentive schemes and the elimination of hand-offs affect one another and integrate with the overall organizational structure.

In this paper, we extend this general framework by examining the effects of asymmetry on the optimal design of business processes. The first measure of asymmetry we use is *task-time asymmetry* – the imbalance in the size of the tasks that constitute the job within a process. Certain jobs consist of uniform chunks of work while others are comprised of tasks of highly variable duration. We show that this is a concern in process design, and that it has a significant effect on the gains from process redesign. The other measure of asymmetry we consider is *information asymmetry*. The effects of

information asymmetry on performance-based contracts have been studied extensively by economists and management scientists. Some of the work in this area related to our analysis is discussed in the following section. However, most of these papers ignore the effect of “production” aspects of processes and its relation to information asymmetries.

The rest of this paper is organized as follows. Section 2 describes the background for our analysis. Section 3 outlines our model. Sections 4 and 5 examine the two classes of asymmetry discussed above. Section 6 concludes and offers directions for future research.

2. Background

Process redesign philosophies are most commonly communicated as a set of general case-based rules. The inefficiencies that existed in some corporations were so enormous that these general rules yielded radical improvements, *irrespective of whether they were optimal or not*. We briefly examine some of these rules and the effect they have on a process. We mention cases in which they have been applied and discuss related research. One of our process redesign models is then described – this forms the basis for analysis in the subsequent sections.

2.1. Workflow design

One of the most widely observed effects of process redesign is the consolidation of tasks that were performed sequentially by specialized departments into unified jobs performed by multi-functional workers or teams. The sequential system of work was passed down from the economic and manufacturing philosophies of Adam Smith and Frederick Taylor to the service organizations of today. Systems of this kind enjoyed the benefits of division of labor, described as follows by Adam Smith:

“...the division of labor, however, so far as it may be introduced, occasions, in every art, a proportionable increase in the productive powers of labor.....owing to three different circumstances;

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