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# A Model Management Approach to Business Process Reengineering

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Business Process Reengineering is the popular term for reoptimization of organizational processes and structures following the introduction of new information technologies into an organization. There is considerable anecdotal evidence that even small changes in the use of information technology (IT) in an organization may require major restructuring of the organization to take full advantage of the efficiencies created by the technology [3, 11, 12, 13]. Conversely, there is also considerable evidence that without major restructuring, the introduction of IT may not produce savings needed even to justify the investment [33, 36]. Although the evidence for organizational restructuring to accompany technological change is strong, there is much less agreement on exactly what organizational changes are needed to take full advantage of the technology. The controversy includes both the macro and micro level changes. At the macro level, the most salient issue is the change in the degree of centralization of decision making, with related questions about the depth and shape of organizational hierarchies. At the micro level, the most salient issue is the job definition and content, with related questions about communication patterns, job satisfaction of employees, and skill requirements. There is a remarkable degree of disagreement on the impact of IT on organizations in all of these areas. IT may be expected to increase centralization because it increases the information processing capacity of managers, hence, allowing them to centralize more decisions [35, 42, 43]. IT may also be expected to decrease centralization because it reduces the cost of communication and coordination, and allows decisions to be delegated [6, 20, 31, 42]. IT may be expected to decrease the depth of organizational hierarchies since it automates some of the middle management functions, facilitating the movement of information through the organizational hierarchy [7, 42]. IT may also increase the depth of hierarchies by reducing the delays and distortions introduced by the movement of information through the hierarchy [5, 35]. IT may be expected to reduce job satisfaction and diminish skill requirements by routinizing work, by subdividing work into small, highly specialized and repetitive tasks, and by subjecting humans to machine control [6, 42, 43]. IT may also be expected to increase job satisfaction, enrich jobs, and replace low level clerical jobs with high-skill professional jobs by automating the most mundane tasks [2, 23, 43].

One explanation for the inconsistency of the empirical evidence is that the impact of IT on organizations is nondeterministic. IT creates options for the organization, and the organizational choice among those options creates the variation in observed outcomes [10, 28, 43]. This explanation is valuable in establishing the complexity of the

interactions, but not very useful in prediction or prescription, and gives no guidance to the implementor of IT or Business Process Reengineering. A second explanation for the inconsistency of the empirical evidence is in the treatment of IT as one specific factor. In fact, IT contains many diverse technologies that can be used to automate a variety of organizational processes. What gets automated determines what would be the optimum structure for the remaining processes! Clearly, automating clerical tasks would have a different impact on the organization than building Executive Support Systems for the top management [24, 37]. This explanation is valuable in narrowing the research question, and providing a general framework for prediction and prescription. However, general macro level prescriptions about organizational structures are not always easy to translate into specific micro level changes in organizational processes even when those prescriptions are available [21], and further refinement of the prescriptions is often necessary.

This article takes a prescriptive and analytical approach to Business Process processes, and to provide guidance and analytical tools for the reengineering efforts. In the process, a number of organizational issues are explained and quantified, including the concentrate power on top, and may create employee alienation at the bottom, the need for business process reengineering after the introduction of IT, the exact conditions under which IT may and should lead to more or less centralized structures, and the exact location and nature of those structural changes. An information processing-decision making paradigm of organizations is adopted [14, 17, 38, 40]. Organizational processes are viewed as collections of decision models within the general framework of organizational information processing. Each decision model is identified by a type of decision which is its output, and contains a sequence of information processing tasks [26]. The information processing tasks are the smallest identifiable units of analysis, and their optimum arrangement is the critical design variable determining the efficiency of the resulting structures. The structures will be evaluated in terms of the cost of information processing, and the cost of communication among tasks [21]. Both criteria are heavily influenced by the arrangement of tasks, since those arrangements determine what tasks need to communicate with each other, the direction and the content of communication, and the possible sharing of tasks among models.

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