Information & Management 45 (2008) 270–280

Contents lists available at ScienceDirect

Information & Management

journal homepage: www.elsevier.com/locate/im

Assessment of process improvement from organizational change

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ARTICLE INFO

Article history:
Received 15 April 2003
Received in revised form 20 October 2003
Accepted 31 December 2003
Available online 5 May 2008

Keywords:
Process improvement
Organizational change
Resource utilization
Cycle time
Cost reduction

ABSTRACT

In order to enhance their performance, many organizations have initiated change projects. However, management is reluctant to initiate them due to their enterprise-wide impact and costs that are higher than those of traditional system development projects. Thus, there is a need to assess the value of the redesigned process of a successfully implemented organizational change projects. The purpose of this study was therefore to assess process improvement from organizational change in the areas of resource utilization and allocation and cycle time and cost reduction. The candidate process and design alternatives were identified from organizational requirements analysis. The variables and their relations were defined to perform task activity analysis, bottleneck analysis, cycle cost analysis, and resource utilization analysis. A case study of a manufacturing company indicated that the assessment method was a promising approach for identifying alternative processes that leads to better organizational performance.

1. Introduction

Companies redesign business processes to achieve improvements in their performance (such as better service and quality). Practitioners and researchers have suggested organizational change using information technology (IT) to alter organizational structures and boundaries [16,21] and help redefine industry structure and competition [4]. Organizational change or related concepts such as business process redesign or reengineering (BPR) and organizational transformation have been the most important issue faced by IS executives since the early 1990s [27]; in fact, in 1994 nearly two-thirds of IS executives indicated that their firms were undertaking organizational change projects [12]. Many firms have redesigned existing business processes to achieve significant performance improvement.

Successful organizational change, which is not always radical, requires effective formulation of process alternatives, their evaluation, and implementation of the selected process. Many companies, however, are quick to attempt to "radically design" business process without a comprehensive analysis of its impact [15]. This often leads to irrevocable process change that yields little improvement in organizational performance. Hence, it is necessary to assess the value of the change by examining the expected performance of the alternatives. The most common reasons that people resist change include a belief that it does not make sense for the organization or there is a misunderstanding of its implications.

Hence, the issue of concern is to understand the multifaceted nature of the improvement before its implementation. In an effort to categorize and interpret the potential organizational outcomes of organizational change, this study suggested an assessment model of process improvement that views the organizational outcomes of change initiatives. The required variables and their functional relations were defined to conduct task activity, bottleneck, cycle cost, and resource utilization analyses of the alternatives. These were defined to gain a detailed understanding of the old and future process and to provide an objective basis for the redesign decision-making before firms undertake reengineering. The descriptions of outputs from these analyses are given in Table 1.

2. IT-enabled organizational change

The multifaceted nature of organizational change raises issues in managing the complex change process [3,14]. IT is used as a lever to create and design new business processes, simplify work procedures, and manage coordination to obtain competitive advantage. Human labor and intermediaries from business processes are eliminated and monitoring business process status and analysis of information and decision-making are improved through its use. Traditional hierarchical or matrix-based organizations are increasingly replaced with team-based organizations,

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doi:10.1016/j.im.2003.12.016

Table 1
Analysis of redesigned process

Analysis	Description of outputs
Task activity analysis	The number of employees working for the task The number of times that the task is performed in the time period The number of work hours per employee for the period The time required to perform the task (processing time) and the delay time for the task (delay time) Cycle time
Bottleneck analysis	Capacity (total available resources): the number of employees in the position to which the task is assigned × the number of work hours per period Load: the number of times the task is performed in the time period × the time required to perform the task Excess capacity: (capacity − load)/capacity
Cycle cost analysis	Labor, overhead, and total cost associated with each task
Resource utilization analysis	The number of work hours that the employee of each type spends on tasks assigned to that position

where IT is used to support management coordination of work and organization by division of knowledge.

Despite the higher cost and larger enterprise-wide impact of process redesign projects compared to the traditional IS development projects, the results are ambivalent at best [8].

3. Assessment of process improvement

Identification of the right measures for a process is not straightforward. Process modeling or management methods may be adapted from total quality, industrial engineering, and IS practices and are suited to unstructured decision-making inherent in the assessment of organizational change [11]. The notion of going beyond typical financial indicators to collecting process information and metrics is critical in process measurement [5]. There are various process modeling methods that test the performance and feasibility of the process alternatives: systems analysis and design technique (SADT) [18], Jackson systems development (JSD) [13], dynamic systems, analysis, design, and evaluation (DSADE) [7], a cognitive approach to manage complex business activities [25], work flow management systems for data flow analysis [20], a composite stage–activity (S–A) framework for business process change (BPC) methodologies which has been recently applied to public sector [19], and data flow diagrams through fisheye views [22]. These are used for process modeling or simulation. Critical is the notion of process measurement and metrics. Information about process characteristics, outputs, and performance is obviously critical for process management, which provides the direction of potential process improvement and supports problem diagnosis with processes. The process performance information, however, is not fully provided by these models, making the definition of variables and their relationships elusive and difficult. Firms have given less attention to the virtues of measurement and analysis and ongoing process management than to the creative side of process change [6]. Measure selection and development should be carefully conducted to identify the specific output requirements and a detailed model to produce them, allowing a reliable analysis of predicted process performance.

Business process improvement is often measured in terms of lead time, service time, wait time, and resource utilization [17]. The purpose of process improvement assessment in organizational change projects is to select the alternative process that has the greatest organizational impact. That process will be used by the design team to decide whether to go through another redesign and simulate the process or to finalize the design and move on to its implementation. In the absence of a rich, consistent measurement approach, it should not be surprising that disparate and incomplete views have been made regarding the organizational impacts of change.

4. Assessment model of process improvement

4.1. Description of four analyses

For the evaluation of organizational impact, a multifaceted approach using four factors (cycle time, process bottleneck, cycle cost, and resource utilization) was chosen.

Cycle time is the total time needed to complete a business process; it is one measure of process efficiency. Completing each task activity involves delay and processing time. The reduction of cycle time for those processes critical to the firm, such as time-to-market and time-from-order-to-delivery, is the major thrust of reengineering. At Hallmark Corp., for example, the development of a new greeting card took 2 years due to a long list of serial procedures in sketches, approvals, and cost estimates. After process reengineering efforts, the cycle time was reduced by half. After a series of reforms to improve collaboration between functional departments, Modicon Inc. brings products to market in one-third of the time it would formerly have taken.

Process bottleneck represents the extent to which each task in a process is likely to limit its output. While jobs wait for resources, they are bottlenecked. Design effort, no matter how ingenious, can hardly improve system throughput if this lowers system performance [24,26]. In a manufacturing environment, a bottlenecked process increases work-in-process inventory costs. A bottleneck occurs whenever the excess capacity of a task is less than that of the preceding task. Excess capacity is found by dividing the difference between the capacity and the load by capacity. Capacity is calculated by multiplying the number of employees in the position at which a task is performed by the time required to perform the task. A process bottleneck becomes apparent when excess capacity for each task is present. Fig. 1 illustrates an example of bottleneck analysis. A bottleneck occurs in Task B in the process stream; one also occurs in Task D, but to a lesser extent. The organizational change project team can eliminate bottlenecks by adding additional employees to the positions responsible for these tasks.

Cycle cost is the total spent for completing tasks in a process. It is the sum of overhead and labor costs. If they are assigned to specific

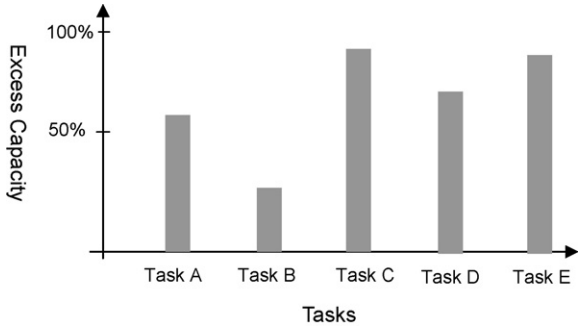

Fig. 1. An example of bottleneck analysis.