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Integrating the global enterprise using Six Sigma: Business process reengineering at General Electric Wind Energy

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Abstract

This paper describes the risks involved in business process reengineering (BPR) when a large enterprise company acquires small fast-growing companies to power its own growth engine. Integration of business processes across disparate organizations with different cultures requires careful planning and involves process automation, globalization, system selection, downsizing, and information security. It is important to streamline and automate processes in order to improve efficiency and reduce operating cycle times. Ideally, during reengineering, processes should be built from scratch based on evolving business needs, changing market conditions, as well as innovations in technology. Business realities, however, often force organizations into redesigning peripheral business processes while keeping the core process intact. This helps avoid disruption of organizational operations and allows for more flexible time constraints during implementation. Several compromises must be made during this redesign. This paper presents a framework for BPR using a structured analytic approach to make business decisions. The paper discusses the case of BPR at General Electric Energy's Wind Division to integrate business operations across its globally dispersed acquisitions. The effort involved defining metrics for redesign, identifying alternate tools and processes, and evaluating the alternatives through those metrics employing Six Sigma methodology. The goal of this work is to demonstrate our approach that abstract best practices for process integration across global engineering corporations developed over time at General Electric.
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1. Introduction

Large corporations often make strategic acquisitions of startup or small high-growth companies in order to achieve higher growth rates. Following such acquisitions, disparate processes across the business, e.g., finance, engineering, marketing, and human resources need to coalesce into a streamlined monolithic process. The objective of business process reengineering (BPR) is not only to improve cost and performance, but also to meld organizational cultures and impose parental controls on the acquired business. Mergers offer a tremendous opportunity to improve efficiency and reduce operating costs through consolidation of activities, streamlining of operations, and integration of business processes. Barriers to successful integration include divergent organizational cultures, poor communication, incompatible processes, and language

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problems. If BPR is not properly performed, resulting integration can disrupt operations, impede productivity, hurt employee morale, and stifle growth. Unanticipated organizational changes can threaten the very success of the integration effort (Orlikowski and Hofman, 1996). Careful planning and analysis is essential for a smooth, uninterrupted transition to the new business processes. This paper discusses the conundrum that organizations face in temporarily disrupting current activities and hurting short-term profits versus rebuilding for future growth.

Unless BPR is performed in a systematic and rationale manner, it is just as easy to create permanent damage to reliability, profitability, and efficiency in the organization. Based on the experience at General Electric (GE) through several such endeavors a set of best practices has emerged. The following stepwise approach is typically carried out in such integration efforts. The first step is to create a road map for process integration and to identify all the issues and business requirements involved in the current process. The second step is to determine the root cause of the issues that were identified, understand their business impact, and identify alternate options. Based on the identified solutions a cost–benefit analysis is performed for the different options. Based on the analysis, a comprehensive process is defined and tools are selected, process risks are analyzed, and controls are introduced. Significant due diligence and effort are required, however, this initial effort pays huge dividends by preventing subsequent problems in the redesigned process. Process reengineering efforts in the recent past have relied on technological advancements to automate business processes and improve performance (Venkatraman, 1994; Brynjolfsson and Lorin, 1996). Therefore, it is understandable that particular attention should be paid in ensuring information systems function properly while maintaining (or improving) the basic infrastructure. In attempting to improve operational efficiency the risks associated with exposure of critical data in information systems used to model business processes should not be ignored. On the one hand, process automation increases productivity; on the other hand, it exposes the organization to threats from malicious insiders, competitors, and hackers. In certain circumstances, the tools and processes that shave off cost and time expose the company to serious liability.

A company engaged in BPR after an acquisition aims to ensure continuity, reduction of costs, improvement of productivity, and synchronization of business operations. To achieve these objectives, companies perform extensive cost–benefit analyses both for process refinement and tool selection. However, due to additional upfront costs and complexity, information security issues are seldom incorporated in these analyses and are usually relegated to information technology implementation once the BPR decisions are complete. While we believe that there is great benefit in incorporating security considerations early on during the BPR process, the consequent complexity that inevitably ensues may be too high given that the literature has little to offer in terms of best practices or methodologies for handling such security issues.

The paper analyzes a BPR effort at GE Energy's Wind Division to elucidate the challenges associated with including information security considerations in the BPR process and the compromises that were made. While we were not able to incorporate formal information security risk analysis in the BPR process, information security was included as a high-level metric in the decision-making for tool selection.

BPR is a complex organizational–technical process and close observation of the dynamics involved in the entire process as well as evaluation of technical decisions was required. In conjunction with performance metrics data collection, an empirical action research methodology was employed for this work. One of the authors led the BPR effort for the division and overtly engaged in the interactions among consultants, staff, managers, and IT experts. Action research has been established as a legitimate research approach in information systems literature (Baskerville and Pries-Heje, 1999; Baskerville and Wood-Harper, 1996, 1998).

The paper follows the reengineering effort from conception to completion and provides an in-depth view of the process. First, the business case and analysis of process reengineering in relation to the goals, vision, and metrics of the organization where a detailed structured approach based on Six Sigma methodology (Mikel and Schroeder, 2000; Pande et al., 2000) are described. Subsequently, business decisions made in selecting tools based on cost–benefit analyses are discussed. Tool selection decisions are discussed in context of technical, organizational, and political constraints. This paper makes several key contributions to the literature and offers a more