From Business Reengineering to Business Process Change Management: A Longitudinal Study of Trends and Practices

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***Abstract*—Business process reengineering has been prominently discussed and implemented in a large number of firms around the world. While the notion of radical change is intuitively appealing to "fix" organizational woes, it has not always met with the degree of success originally claimed by its many proponents. This article studies the evolution of the reengineering concept and its evolution toward the broader notion of process change management. Reported here are the results of two studies that explore reengineering from a project implementation perspective and an organizational perspective at two different points in time. The results show remarkable consistency in the importance of nontechnology management issues concerning strategy, change, and people. Further, the notion of continuous change seems to be becoming more important. The study provides a foundation for identifying key variables that can be studied in order to effectively manage this multifaceted phenomenon.**

***Index Terms*—Business process reengineering, change management, process management, project implementation problems, radical change, reengineering success, survey, technology management.**

I. Introduction

REENGINEERING (or business process reengineering [BPR]) has been the buzz word of the 1990's. We have seen dramatic success stories touted again and again by both the popular press as well as in scholarly prose. "Ford cuts accounts payable head count by 75%"; "Mutual Benefit Life improves insurance underwriting efficiency by 40%"; "Xerox redesigns its order fulfillment process and improves service levels by 75–97% and cycle times by 70% with inventory savings of 500 million"; "Detroit Edison reduces payment cycles for work orders by 80%." If improvements are so dramatic, is BPR the panacea for organizational ills or is it just the latest recipe being offered for business survival? Everyone seems to have an opinion on it. There are enough terms for it or its variations that use combinations of the words business, process, redesign, reengineering, and innovation. Early books on the topic have become phenomenal bestsellers with millions of copies sold. Consultants are repackaging old methodologies and glossy brochures and charging thousands for their claimed proprietary solutions. Surveys of senior executives indicate that reengineering is the number one initiative taken by companies to achieve strategic goals. Academics, both cynics and proponents, are beginning to jump on the bandwagon and write scholarly prose on why they have seen it all before or why such a significant change is good. All this in the midst of our increasingly competitive global economy, corporate downsizing and layoffs, and incredible improvements in computing technologies.

More recently however, after a few years of hype, a more temperate tone seems to be setting in. Reports of reengineering failures are coming to the forefront, with some numbers indicating that almost 70% of reengineering projects fail and $20 out of $32 billion was invested in efforts in 1994 that would fail [3]. Also, the radical nature of reengineering is being challenged [6]. While such major change might yield improvements in cycle time or cost structures, is it necessarily palatable with the interests of employees, the human resource that is the essence of the contemporary organization? Is the corporate mandate for reengineering and the technology prerogative too much of an intrusion on individuals and their creative contributions? Or is reengineering just too threatening to be always effective?

These questions are being asked after hundreds of corporations around the world have and are trying their hand at reengineering. However, now we are in a position to evaluate and learn from these experiences. We believe that a more tempered phase of reengineering is beginning. This phase can be conveniently housed under the notion of "process change management." In this paper we examine the notions of reengineering and the evolving concept of continuous process management. We also report the results of two studies, conducted longitudinally, in order to examine and describe the reengineering phenomenon both as a radical process change initiative, and under the broader theme of process change management.

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II. From Reengineering to Process Change Management

It is difficult to ascertain the exact origins of reengineering. It seems that a number of simultaneously occurring factors provided the impetus for the concept and mobilized its subsequent popularity. These factors are described below.

TABLE I
REENGINEERING AND OTHER CHANGE PROGRAMS

	Rightsizing	Restructuring	Automation	TQM	Reengineering
Assumptions Questioned	Staffing	Reporting Relationships	Technology Applications	Customer Needs	Fundamental
Focus of Change	Staffing, Job Responsibilities	Organization	Systems	Bottom-Up Improvements In Many Places	Radical Changes Over Broad Core Entities
Orientation	Functional	Functional	Procedures	Processes	Processes
Role of IT	Often Blamed	Occasionally Emphasized	To Speed Up Existing Systems	Incidental	Key
Improvement Goals	Usually Incremental	Usually Incremental	Incremental	Incremental	Significant
Frequency	Usually One Time	Usually One Time	Periodic	Continuous	Usually One Time

Around the mid-1980's, the idea of redesigning business processes was being brandied about by large consulting units such as Peat Marwick and McKinsey. Index Group and Michael Hammer directed programs on cross-functional systems in which several firms were studied (including Mutual Benefit Life and Ford). These firms used many of the components of reengineering, particularly the notion of information technology (IT) to make radical changes in cross-functional processes. Also, around the same time, the idea of improving business processes was being prominently discussed. Total Quality Management (TQM) as a part of the "quality movement" focused on Japanese *Kaizen*, or continuous improvement. The focus of this movement was on statistical process control and following quality guidelines and standards. Further, quality, service, and time-based competition all brought the notions of process and performance into management agendas.

In addition to the "process think" notions, the recession through the late 1980's and early 1990's placed pressure on corporations to think of new ways to reduce costs. Increasing global competition further squeezed profits and led to reactive approaches and cost-cutting/downsizing programs. The bulging middle manager levels which focus on white collar processes came under particular pressure in these programs, which were also aimed at increasing a company's ability to be flexible and responsive. Inside the Washington beltway, proponents of the "productivity paradox" were mourning the large dollar investments in IT (about $900 billion in the past ten years) in the high-growth services industry, with minimal corresponding productivity growth (estimated at around 0.7%). This hoopla created the impetus for companies that had spent (and were spending) vast amounts of money on newer and more powerful IT's to leverage this investment by tying these investments to process changes.

And finally, much of the reengineering phenomenon was legitimized by the two early seminal articles on the topic, [7] and [18], that appeared in journals that interfaced academia and practice. This was followed by books entitled *Reengineering the Corporation* by Hammer and Champy and *Process Innovation* by Davenport. Both these books were tremendously popular and spurred a lot of reengineering activity in both practice and academia. In addition, some of the early aggressive adopters of reengineering like Cigna, MBL, Xerox, IBM, etc., were highly publicized in the popular press. Consulting firms and IT vendors (with their own vested interests) began to repackage their products and market proprietary solutions for reengineering. The rhetoric of reengineering transcended the original concept and was often used to describe any change or system initiative.

Therefore, it can be said that the notion of reengineering came at the right place at the right time. Pushed by consultants at a time when businesses were really looking for answers on how to compete effectively in the changing marketplace, the concept, conceptually appealing in its simplicity, was embraced. Correspondingly, a number of other terms (often used in conjunction or in lieu of reengineering) describing initiatives undertaken by organizations came (and are still coming) to the forefront during this period of reinvention. These initiatives, based on the work of Manganelli and Klein [26], are summarized along key dimensions in Table I. We believe that of these initiatives, those that emphasize process as opposed to task will be the ones that will sustain their impact and lead to the revitalization of corporations.

However, since its original conception, various realities of accomplishing radical change and minimizing the pain have set in, especially when recessionary pressures have somewhat alleviated. The reengineering concept is being tempered with this reality. As corporations continue to engage in restructuring efforts, one fact is apparent: reengineering does fail and it does succeed. But it only succeeds in some firms and under certain conditions. With these realities comes the natural evolution of the concept. Even those who pioneered the concept are questioning many of the tenets of reengineering. For instance,

the notion of reengineering as a radical one-time clean-slate approach is changing as many firms are not willing to invest the money and time to implement from a clean slate. Also, some firms are finding that continuous improvement through stewardship of processes may be more beneficial in the long run. Others are distinguishing between clean-slate design, which is not particularly expensive, and clean-slate implementation (given the realities of the existing slate). Further, the breakthrough performance gain is being challenged as benchmarking and measurement of these gains can prove elusive. In many cases, more moderate gains that are consistent with the organizational culture and orientation define success. For instance, intrafunctional piecemeal improvements can add up to significant change, despite reengineering's focus on cross-functional processes.

The tenet "reengineering must be conducted from the top down" is also being challenged since often detailed understanding of process design resides with people who do the work. Also, some bottom-up process change initiatives endorsed by top management, with strong inputs from line workers, have proven successful. In some cases, tremendous resistance to new work designs has occurred when people do not want their jobs defined by someone else. Many process change projects are defended based on cost objectives achieved through downsizing with few opportunities for retraining. In other words, there is limited consideration of employees in these projects.

While IT is an exciting catalyst of reengineering efforts, it may not be a necessary one. Numerous organizational innovations involving people, jobs, skills, and structures can facilitate process-oriented behaviors and may not involve or require IT. Also, the notion of one single approach to organizational change (i.e., reengineering, quality, restructuring, etc.) is growing out of favor. Different organizational contexts are increasingly being recognized as critical to change decisions and subsequent success [15].

So where does that leave us? It seems that reengineering will evolve through a growth cycle, will be tempered by reality during maturity, and the more sustainable concepts will sustain themselves beyond that, possibly through cycles of newer terminology and "fads." As of now, it seems that the reengineering concept is being tempered. The strong positions of "radical change," "core processes," "top-down," "breakthrough performance," etc., are giving way to the reality that there is more than one way of conducting major change. Incremental and continuous approaches with bottom-up involvement within functions might be appropriate for some companies and not for others. Classical reengineering might be appropriate for others. While these approaches were diverging just a couple of years ago, they now seem to be converging. Perhaps, the more sustainable notion is that of "process change management" which involves the management of the multiple facets of process change—including the technology, people, change, and strategy, along with planning, structuring, and evaluation of business processes. Firms should engage in process change management and apply a multitude of methods to gather information, redesign (perhaps radically followed by incrementally), and assess their processes. This portfolio of change programs could include some high risk/reward programs and some low risk/reward ones.

Below, we describe two studies that focus on providing a description of both reengineering and process change management. The first study conducted in 1994 describes reengineering projects, their implementation and success [12]. The second study conducted in late 1996 examines process change management in its broader sense from a small subsample of the former study's sample. This study confirms and builds on the first study.

III. Study 1—Implementation of Reengineering Projects

The primary focus of Study 1 was to examine implementation problems of reengineering projects and their impact on reengineering success.[1] Since these projects often involve fundamental change in various components of a process, such as people, structure, technology, and reward systems, they are not easily accomplished. Understanding potential impediments to implementation of such changes and the use of appropriate tactics to minimize these impediments can increase chances of success. In fact, there is a large body of literature in implementation, planning, innovation, and organizational development and organizational change that identifies implementation problems and can be applied and tested in the reengineering context. This study draws from this literature base and focuses on the following question: what are the problems and underlying dimensions related to implementation of business reengineering and how do they relate to project success?

The implementation literature is primarily concerned with determinants of successful institutionalization/implementation (e.g., [23]). The strategic IT planning literature highlights initiation, the innovation literature mainly deals with adoption—factors influencing the adoption of innovation (e.g., [4] and [28]), while the organization-development literature is concerned with the spectrum of managing organizational change (e.g., [25]). Sixty-four problems were identified based on an extensive review of this literature and interviews with executives engaged in reengineering endeavors. This list was refined using Q-sort techniques.

A survey instrument was used to solicit data on the significance of the problems for an identified project. Respondents were asked to rate the extent to which they have encountered each problem on a five point scale where $1 =$ not a problem, $2 =$ a minor problem, $3 =$ a significant problem, $4 =$ a major problem, and $5 =$ an extreme problem. Several studies have used similar scales [24]. Reengineering success was approached in multidimensional terms using two different perspectives: perceived level of success and goal fulfillment. These perspectives have been used in prior work where the former approach seeks to assess the degree of attainment in relation to the targets and the latter approach determines success by attainment of a normative state [17], [29]. Specifically, the goal-fulfillment perspective evaluated success based

[1] Study 1 is presented in order to provide a complete description of the longitudinal methodology. More details of Study 1 are published in [12].

on the extent to which five commonly emphasized goals of reengineering were fulfilled. These were: 1) cost reduction; 2) cycle-time reduction; 3) customer satisfaction level increase; 4) worker productivity increase; and 5) defects reduction [7], [10]. Also, a single-item perceived measure of success was used.

Key informants were those who had actively participated in at least one reengineering project. However, it was not possible to obtain information directly about reengineering team members. Thus, questionnaires were sent to members of the Planning Forum, which is the international business organization focusing on strategic management and planning. It was recognized that Planning Forum members were interested and involved in many business reengineering projects, possibly because of the top-down strategic nature of most reengineering endeavors [13], [14].

A total of 853 questionnaires were mailed to members of the Planning Forum with a follow-up questionnaire and letter 40 days after the first mailing. Each questionnaire was sent with a cover letter, a self-addressed stamped envelope, and a donation slip which offered a $2 donation to charitable organizations. The cover letter explained the purpose of the study and asked that the instrument be completed by the person who had participated personally in a reengineering project as a team member. Finally, a total of 239 usable responses were returned, resulting in a final response rate of 29.2%. This response rate compares favorably to many mail surveys reported in the IS literature. To assess whether the respondents reflect the sample frame of Planning Forum members, nonresponse bias was assessed. Early respondents were compared against late respondents across a number of key organizational characteristics—viz. distribution of industry type, number of employees, company annual sales, organization type, etc. [9]. None of the chi-squares or t-tests were significant, supporting any claims of generalizability to the sample frame.

Of the 239 respondents, 105 (44%) had concluded at least one reengineering project and were able to respond to the entire instrument. Almost two-thirds of the responding companies were either in the manufacturing industry, the financial sector, or in the service industry. The average number of employees was 7141. Ninety-one (38.1%) companies had fewer than 1000 employees while 40 (16.8%) employed more than 10 000 people. Ninety-seven companies (40.6%) had between 1000 and 10 000 employees. Of the 105 reengineering projects studied, the three most popular target processes were: customer service; product development; and order management process.

The results of this study were very interesting. Four of the five problems viewed most severe by the respondents concerned the management of change. Principal component analysis, which was used to further refine problem dimensions, revealed nine categories of problems. These categories were then aggregated and correlated with the success variables. The results are summarized in Table II. The overall pattern of results indicates that: 1) change management constitutes the most significant problem set for reengineering, and alleviation of these problems enhances success and 2) there are two other groups of problems, those that are considered very severe but solving them does not increase success, and those that are not considered very severe but are critical for achieving success. The first group of problems relates to the general project context and environment (i.e., technological competence, time frame, strategic planning, and management support). These problems are generally discussed in information systems implementation and are not unique to reengineering. The second set of problems correspond to more "micro" aspects of implementation (i.e., human resource, process delineation, project management, and tactical planning) and are treated erroneously as less severe. These core aspects seem to be critical to success and cannot be underestimated.

In sum, Study 1 provides empirical evidence for the dimensions of reengineering problems. Managing this complex multifaceted process requires aspects of change management, project management, technology management, strategic planning, and process management. The importance of change management is emphasized. Factors classically considered integral to implementation projects in general (like technological competence and management support) are often overestimated but do not seem to always facilitate project success. In contrast, potential underestimation of core tasks of reengineering, like process delineation and project management, could be a problem.

Study 2 follows up these findings after a two-year period by: 1) validating some key assertions made in Study 1 and by 2) examining broader aspects of process change management as the concept of reengineering evolves. As such, while the unit of analysis for Study 1 was the individual reengineering project, the unit for Study 2 is the organization.

IV. Study 2—Organizational Process Change Management

The 105 participants in Study 1 that engaged in reengineering projects were contacted for purposes of the follow-up study. Of these, 35 (33%) agreed to participate. These participants were all senior planning or general management executives that had actively participated in process change activities in the organization. The companies represented had completed an average of 11.5 major business process change projects. The average date of their first project was approximately 1991, indicating about five years of process change experience. Three projects on average were still active in these companies. Therefore, while this representation cannot be generalized to the broader population of firms engaged in these endeavors, it does provide an indication of how firms experienced in reengineering are coping with various facets of process change management. The objectives of the study can be stated as follows:

1) to follow up the project-oriented study with a broader organizational study;
2) to reexamine key findings of Study 1 within this broader context;
3) to describe the various management facets of process change.

As such, this represents exploration of the evolving notions of process change in a contemporary context.

TABLE II
SUMMARY OF RESULTS FROM STUDY 1—IMPLEMENTATION PROBLEMS AND SUCCESS

Problem Categories	Brief Description	Sample Items Used	Severity Score[4]	Relationship With Success[5]
Change Management	potential problems due to failure to manage change from the old process to the new process.	Failure to anticipate resistance; Failure to consider politics; Failure to communicate reasons for change; etc.	**High**	**Strong**
Technological Competence	problems relate to the IT infrastructure and expertise within the organization	Limited IT application portfolio; Lack of expertise; Limited database infrastructure; Limited telecommunications infrastructure; etc.	**High**	**Weak**
Strategic Planning	High level planning problems	Lack of Strategic Vision; Lack of Alignment between corporate planning and IT planning; Identification of candidate processes not based on strategic planning; etc.	**High**	**Weak**
Time Frame	Problems related to the time taken to conduct the project	BPR effort took too much time; Uncertainty about time frame; Failure to monitor project as per schedule; etc.	**High**	**Weak**
Management Support	consist of potential problems related to management's active understanding and support for reengineering.	Lack of senior management leadership; Top Management's insufficient understanding of BPR; Lack of top management support in BPR efforts; etc.	**High**	**Weak**
Human Resource	problems related to the ability of people to adjust to the new process	Inadequate training for personnel affected by the redesigned process; Absence of management systems to cultivate required values; etc.	**Low**	**Strong**
Process Delineation	problems are potential problems with identification of the appropriate parameters for the process involved	Difficulty in establishing process improvement goals for the redesigned process; Scope of the reengineered process defined inappropriately; difficult to forecast human resources, financial and other resource requirements; etc.	**Low**	**Strong**
Project Management	Problems in the conduct and evaluation of the project	Lack of appropriate BPR methodology; Difficulty in measuring reengineering performance; Poor communication between reengineering team and organizational members; etc.	**Low**	**Strong**
Tactical Planning	Resource planning and allocation problems	Failure to commit required resources to BPR efforts; Absence of appropriate training for BPR team members; Lack of external consultant support;etc.	**Low**	**Strong**

[4] This score is based on the average percentage of respondents considering these problems as major or significant.
[5] This relationship is evaluated by the strength of the correlation.

A. The Impact of Reengineering Projects

To evaluate the impact of reengineering in the organizations surveyed, three categories were used. The first, project outcomes, represents classical reengineering objectives such as improved customer service, improved cycle times, reduced cost, improved quality of products/services, and improved organizational responsiveness [7]. Each one of these dimensions was captured using seven-point Likert-type scales ranging from "not at all" as one anchor "to a considerable extent" as the other. An overall summative scale requesting overall evaluation of these projects (ranging from "unsuccessful" to "successful") was also used to validate these dimensions.[2]

[2] All dimensions were strongly related to the summative measure ($p < 0.001$) with the exception of "reduced cost." This might indicate the reactive nature of cost measures which are usually in response to environmental pressures and may not be an integral component of perceived, proactive reengineering success.

TABLE III
RESULTS FROM STUDY 2—IMPACT OF REENGINEERING PROJECTS

	Mean Score (Std. Deviation)	involved representative functional managers	used external consultant support	used formal methodologies	used team based approaches
Mean Score (Std. Deviation)		5.36 (1.54)	4.48 (2.25)	5.12 (1.80)	5.39 (1.62)
Projects' Outcomes					
improved customer service	4.61 (1.56)	significant relationship 0.322; p<0.10	No relationship	No relationship	No relationship
improved cycle time	4.72 (1.57)	significant relationship 0.319; p<0.10	No relationship	No relationship	significant relationship 0.382; p<0.05
reduced cost	4.42 (1.79)	No relationship	No relationship	No relationship	No relationship
improved quality of products/services	4.12 (1.73)	significant relationship 0.324; p<0.10	No relationship	No relationship	significant relationship 0.385; p<0.05
improved organizational responsiveness	4.73 (1.68)	significant relationship (0.366; p<0.05)	No relationship	No relationship	No relationship
People Outcomes					
improved employee morale	3.85 (1.52)	No relationship	No relationship	No relationship	significant relationship 0.431; <0.05
resulted in layoffs	2.94 (2.37)	No relationship	No relationship	No relationship	No relationship
Structural Outcomes					
changed organizational structures	4.58 (1.84)	No relationship	No relationship	No relationship	No relationship

The second category, people outcomes, was evaluated using similar scales for improved employee morale and the extent to which the projects resulted in layoffs. Both these factors have been discussed as serious problems with major process change endeavors [21], [22]. Finally, structural outcomes were captured by an item that examined the extent of change in organizational structures. Collectively, projects, people, and structural outcomes provided an indication of the impact of major process change initiatives to date in the respective organizations.

The second column of Table III provides the mean score and standard deviations for each of these scales. Clearly, project outcomes tend to emphasize all dimensions, but customer service, cycle time, and organizational responsiveness, which are all integrally related, tend to be emphasized somewhat more. Among people outcomes, improved employee morale had a distinctly lower score, reaffirming the threatening aspects of reengineering. While layoffs were on the lower side, the high variance in this measure indicates that this may be far from true across firms. This could be partially reflected in the higher score on organizational structural change.

B. Conduct and Impact of Reengineering

Corporations use a variety of methods to conduct reengineering projects. Among the more common ones are the involvement of functional managers in reengineering policy committees, the use of external consultants (particularly from large consulting groups that now emphasize process change) [1], the use of formal methodologies espoused by consultants and academics for documenting and implementing process change [26], and the use of team-based approaches for reengineering projects [7]. The extent of use of these various methods was captured using a seven-point Likert scale (1: not at all and 7: to a considerable extent). The effectiveness of these methods was examined by computing the Pearson's correlation between the method and outcome variables. The results are presented in Table III.

The results are very interesting. Involvement of functional managers and team-based approaches were more popular. Use of consultants had a lower score and higher variance. However, one pattern clearly emerges from the correlational analysis. The use of external consultants and formal methodologies did not have any relationship with project, people, and structural outcomes. In contrast, approaches that emphasize broader organizational involvement have significant relationships with many of the project outcome variables. In addition, the use of team-based approaches seems to exhibit a strong relationship with improved employee morale. This further reemphasizes one of the key findings in study 1; people and change management issues are very important for the successful conduct of these projects. Methods that have organizational representation seem to positively impact outcomes.

C. Facets of Process Change Management

Five aspects of the management of major process change were captured in a discrepancy format. These aspects reflect the results of Study 1 and include the following:

1) change management—i.e., communication of change, rewarding employees, encouraging involvement and creativity;
2) project management—i.e., using project management tools, organizing the project teams, monitoring progress, costs, etc.;
3) continuous process management—i.e., ongoing evaluation and monitoring of processes;
4) strategic planning—i.e., setting goals for the organization regarding change, planning for change, setting strategic direction from the top;
5) technology management—i.e., selecting technologies, developing information architectures, obtaining expertise.

TABLE IV
RESULTS FROM STUDY 2—SIGNIFICANCE OF DISCREPANCY IN FACETS OF PROCESS CHANGE MANAGEMENT

	Mean Level of Attention Given (1: None; 3: Moderate; 7: Significant) (Std. Deviation)	Mean Level of Attention That Should Have Been Given (1: None; 3: Moderate; 7: Significant) (Std. Deviation)	T-Value for Difference in Means (significance level)
Change Management (i.e., communication of change, rewarding employees, encouraging involvement and creativity)	4.39 (1.46)	6.21 (0.86)	6.26 ($p<0.001$)
Project Management (i.e., using project management tools, organizing the project teams, monitoring progress, costs, etc.)	5.18 (1.42)	5.70 (1.13)	3.04 ($p<0.05$)
Continuous Process Management (i.e., ongoing evaluation and monitoring of processes)	4.58 (1.32)	5.91 (0.95)	4.34 ($p<0.001$)
Strategic Planning (i.e., setting goals for the organization regarding change, planning for change, setting strategic direction from the top)	4.33 (1.74)	6.15 (0.97)	5.20 ($p<0.001$)
Technology Management (i.e., selecting technologies, developing information architectures, obtaining expertise)	5.00 (1.48)	5.52 (1.30)	2.58 ($p<0.05$)

The instrument listed each of these (as above) and asked respondents to indicate the level of attention given and the level of attention that should have been given to these elements in conducting these (i.e., major business process change) projects. Such discrepancy measures are not uncommon and have been used in a number of well-established instruments [8], [27]. Seven-point Likert scales were used (1: none, 4: moderate attention, 7: significant attention). The difference between the two scales for each aspect indicates a *post hoc* assessment of the desirability of more emphasis on this aspect.

Table IV provides the mean scores and standard deviations for each scale. Clearly, higher emphasis was given to project management and technology management with relatively lower emphasis on strategic planning and change management. A paired t-test was conducted in order to evaluate the difference between means. Interestingly, the difference between the two scales was highest for the two management aspects that had been given the least attention. The standard deviation also indicates that there was a higher consistency among respondents on the desired level of attention to change management. While all mean differences were significant, indicating perhaps that some degree of learning was taking place, respondents clearly felt the need to emphasize change management and strategic planning more than they had.

D. Facets of Process Change Management and Impact

The difference scores for each aspect of process change management were correlated with the project, people, and structural outcome measures. Table V illustrates the results. A negative correlation indicates that impact of narrowing the gap between actual and desired attention to the management aspect will result in a positive impact on the outcomes. Stronger negative correlations indicate the desirability of narrowing the gap.

The results indicate that, in general, corporations with narrower gaps in change, project, continuous process management, and strategic planning had more favorable project outcomes. In other words, it is desirable for project outcomes to narrow the gaps in these areas. More significantly, however, some noteworthy patterns can be seen from Table V.

There is a complete lack of correlation between technology management gaps and any of the outcome measures. This is in contrast to all other management aspects. While the reasons for this could be manifold, we would like to speculate on two. First, it is possible that the impact of technology management insofar as technology selection and architecture and expertise development has reached the point of diminishing returns in reengineering projects. While more attention to this facet is desirable (as indicated by the gap difference) it does not seem to lead to commensurate results. In other words, technology management is highly emphasized and is mature in its application to reengineering projects. The myriad of information technologies and their tremendous flexibility, the emergence of universal personal computer platforms, Internet and Intranet connectivity, and the availability of a wide variety of vendors for outsourcing technological development are factors contributing to this maturity. Second, it is possible that information technologies play a very supportive role

TABLE V
RESULTS FROM STUDY 2—FACETS OF PROCESS CHANGE MANAGEMENT AND IMPACT

	Gap in Change Management (i.e., communication of change, rewarding employees, encouraging involvement and creativity)	Gap in Project Management (i.e., using project management tools, organizing the project teams, monitoring progress, costs, etc.)	Gap in Continuous Process Management (i.e., ongoing evaluation and monitoring of processes)	Gap in Strategic Planning (i.e., setting goals for the organization regarding change, planning for change, setting strategic direction from the top)	Gap in Technology Management (i.e., selecting technologies, developing information architectures, obtaining expertise)
Overall Success	-.506 (p<0.01)	-.527 (p<0.01)	-.369 (p<0.05)	-.497 (p<0.01)	.164 (ns)
Projects' Outcomes					
improved customer service	-.461 (p<0.01)	-.336 (p<0.10)	-.496 (p<0.01)	-.563 (p<0.001)	.099 (ns)
improved cycle time	-.379 (p<0.05)	-.198 (ns)	-.471 (p<0.01)	-.395 (p<0.05)	.067 (ns)
reduced cost	-.110 (ns)	-.220 (ns)	-.275 (ns)	-.309 (p<0.10)	.149 (ns)
improved quality of products/services	-.415 (p<0.05)	-.373 (p<0.05)	-.414 (p<0.05)	-.615 (p<0.001)	-.190 (ns)
improved organizational responsiveness	-.297 (p<0.10)	-.217 (ns)	-.380 (p<0.05)	-.487 (p<0.01)	.010 (ns)
People Outcomes					
improved employee morale	-.627 (p<0.001)	-.473 (p<0.01)	-.307 (p<0.10)	-.347 (p<0.05)	-.043 (ns)
resulted in layoffs	.060	-.054 (ns)	.140 (ns)	-.134 (ns)	-.126 (ns)
Structural Outcomes					
changed organizational structures	-.250 (ns)	-.171 (ns)	-.023 (ns)	-.327 (p<0.10)	.166 (ns)

in the aggregate reengineering initiatives of an organization, and, in some cases, might not be involved in the actual conduct of process change.[3] Other aspects of management, such as appropriate planning, process evaluation, project, and change management tend to override the importance of technology management. Both explanations are not mutually exclusive. In either case, the results suggest the importance of a multifaceted approach to managing major process change that goes beyond the management of hardware and software. These results are remarkably consistent with those of Study 1, which found similar results with the management of technology problems.

The importance of change management emerges as critical in this study. Organizations that had narrower change management gaps clearly found greater success in their projects. Perhaps more important is the high relationship between this gap and improved employee morale, suggesting that effective communication of change, encouraging employee involvement, rewarding creativity, and other such practices are key to keeping employee morale up during reengineering. We suspect that employee morale might mediate the relationship between change management and project outcomes. Similar results were found for strategic planning or planning for change from the top. In other words, clearly articulated goals for the organization regarding change, strategic direction from the top, and well-implemented change management practices are critical for success. Also, as in Study 1, the more immediate need for project management augers well for these endeavors.

Among the project outcomes, cost reduction was not strongly related to any of the gap measures. This seems to indicate the "reactive" nature of the cost objective of reengineering projects. While all other outcome measures (cycle time, responsiveness, customer service, and quality) reflect proactive outcomes that can enhance revenue, cost reduction seems to be a denominator-focused measure, influenced to some extent by narrowing the strategic planning gap, but independent of the other management aspects. The same argument can be extended to the extent of layoffs, which again seems to be a reactive outcome, regardless of greater attention to management practices.

Another aspect of management that is reflective of process change management is the continuous evaluation of processes. This practice, once deviated from classical reengineering approaches of one time radical change, now seems to be perceived positively in terms of its positive impact on outcomes. In other words, reengineering and continuous process management can complement each other in order to yield the most positive outcome.

[3]We do know that in all organizations surveyed there was at least one project where IT played a significant role. This, however, may not be true for all projects being analyzed here.

TABLE VI
RESULTS FROM STUDY 2—CONTINUOUS PROCESS MANAGEMENT PRACTICES

Strategic Evaluation of:	Mean Score	Std. Deviation
the degree to which the process meets the real needs of customers	5.22	1.11
the performance objectives that should be achieved	5.17	1.04
the real purpose of the process	4.94	1.59
opportunities for additional reengineering	4.67	1.33
how the process supports strategy	4.61	1.61
Operational Evaluation of:	**Percentage of Respondents that Continuously Monitor Processes**	**Typical Measures Used**
Cost of the Process	79%	against budget
Customer Satisfaction Levels	90%	complaints, customer surveys
Time	79%	cycle time
Productivity	74%	output per employee
Output Quality	84%	number of defects

E. Continuous Process Management

In order to get greater descriptive insight into continuous process management practices, respondents were asked a number of questions on the "strategic" and "operational" aspects of evaluation. First, respondents were asked to indicate whether they have a process in place for continuous assessment of business processes. Fifty-six percent of the respondents indicated that they did. These respondents were then asked (on a seven-point scale) to indicate the extent to which activities were emphasized in this evaluation. The second column in the upper half of Table VI illustrates the mean score for these items. All items were rated highly, particularly assessment of customer-oriented measures and performance objectives of the process. Relatively lower was the emphasis on how the process supports strategy, which we suspect is just beginning to enter the strategic milieu of the organization. Respondents also checked on a dichotomous scale whether or not they continuously evaluated cost, customer satisfaction, etc. The lower half of Table VI indicates that customer satisfaction was continuously assessed by 90% of the respondents followed closely by other measures. The table also illustrates some of the key measures used for these assessments.

To summarize, it seems that continuous process management is being recognized as important, seems to have a positive impact on project outcomes, is being formally implemented by a majority of companies engaged in reengineering, and tends to emphasize customer oriented measures.

V. SUMMARY

This paper presents the results of two studies conducted at different points in time in an attempt to explore various facets of the important phenomenon of reengineering. Although any claims of generality should be interpreted with caution, the results of the two studies show remarkable consistency and point to the need for managing reengineering projects from a multifaceted perspective. Five key results of these studies can be listed as follows.

1) Reengineering requires greater attention to change management. Failure to do so could inhibit success in both project- and people-related outcomes.
2) Reengineering outcomes are positively influenced by broader organizational involvement and team structures and not by the use of consultants or formal methodologies.
3) Organizations are undergoing learning through their process change efforts, as reflected by the greater need to emphasize all facets of process change management, particularly change management.
4) Greater attention to technology management seems to have little or no effect on reengineering outcomes.
5) Continuous process management practices are important in terms of their effect and are being implemented by a number of organizations.

Further study building on these concepts is critical if we are to understand how to manage this multifaceted phenomenon. Clearly, too much focus on technology-driven change, without considering repercussions to people, strategy, and continuous evaluation of processes, can be detrimental to success. Case studies of successful and unsuccessful reengineering efforts can be crucial in providing the contextual richness required to interpret the various management thrusts and their consequences. Also, broader samples with improved operationalizations can capitalize on the experiences of the growing number of companies with concluded reengineering projects in order to expand our knowledge base.

VI. Conclusion

The fundamental shift in managerial philosophy is behind the waves of delayering, reengineering, and empowerment sweeping across today's organization. Rather than managing through abstractions of plans and controls, top-level managers are recognizing that their key task is to create a work environment that stimulates the company's valuable human resource to be more motivated, creative, and entrepreneurial than its competitors' employees. Only when they liberate and motivate their people to develop and leverage their knowledge and expertise will they have created a dynamic, self-renewing corporation [2].

The future of reengineering, or process change as the concept evolves, is difficult to evaluate without considering the current business trends. Global economy has mandated greater operational effectiveness and efficiency, and imposed tremendous pressures for cost reductions. These pressures have cut across different segments of the economy and greatly impacted the operations of service and manufacturing firms. Unfortunately, many corporations have responded by performing major work-force reductions under the aegis of reengineering. Such efforts are not strategically driven and possess the danger of "throwing out the baby with the bath water" as firms lose vital components of the work force that will make them creative and productive in the long run. Such a response compromises future competitiveness and is doomed to fail, as is also being documented for a large proportion of unsuccessful "reengineering" projects.

In light of this discussion, perhaps the biggest challenge associated with the success of the reengineering phenomenon may be that of selling such a major change to the employees of the organization, and getting them to "buy into" the strategic changes that must be undertaken for the firm to survive and prosper. For example, outsourcing of those activities that do not contribute to core competencies or technologies to other firms who can perform them better may be a legitimate outcome of a good reengineering effort. It would lead to work-force reduction, but only with the purpose of making the firm leaner and more responsive. Time-based competition and the creation of "agile" corporations may not even be possible without such changes in work-force size and composition. As emphasis shifts toward greater knowledge component in value creation, a broader focus on process change management may perhaps be the only way to avoid skill obsolescence of employees and encourage horizontal career paths. The extent to which top-level management can sell such a vision of change and its impact on the employees will determine whether the reengineering phenomenon fulfills its true potential or is merely relegated to the sidelines as another panacea and buzz word of the 1990's.

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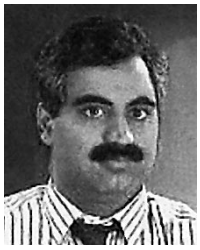

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