Pergamon
PII: S0268-4012(98)00030-9

International Journal of Information Management, Vol. 18, No. 6, pp. 381–392, 1998

Printed in Great Britain
0268-4012/98 $19.00 + 0.00

Business Process Reengineering and Organizational Performance: An Exploration of Issues

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It has been nearly seven years since the term BPR came into existence. Its innovative approach to change management and resulting successes and its overextension and misuse and the resulting dissatisfaction have raised many questions. This paper provides an empirical validation of some of the suggestions and prescriptions in the BPR 'critical success factors/pitfall' literature, through a content analysis of the annual reports of many companies that have reported successful reengineering projects. The results of this analysis suggest that many companies were not implementing BPR alone, but as one of the component of a set of change approaches that include strategic rethinking of business direction and less radical process improvement. This suggests that, at the organizational level, BPR should not be evaluated alone but as a part of a 'strategic change set'. This paper also presents an exploratory longitudinal analysis of firm performance measures to see the value created by BPR to organizations. The main idea was to see the effect of process change on productivity measures like sales by employees and financial performance measures like revenue growth. The findings from this analysis show that process change seems to be correlated with the productivity measure sales by employees, but its effect on the other financial performance measures is not evident. This suggests the need for organizations to focus more deliberately on the effect of process change on these measures, and integrate BPR with other change approaches and move towards a continuous change paradigm. © **1998 Elsevier Science Ltd. All rights reserved**

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Introduction

Since the late eighties BPR has established itself as one of the most attractive change management options for coping and adapting to the new competitive environment. Reengineering is the *fundamental* rethinking and *radical* redesign of business *processes to* achieve *dramatic* improvements in critical measures of performance such as cost, quality, service, job satisfaction and speed.[1] BPR utilizes components of several other tools and concepts such as systems engineering, benchmarking, Activity Based Costing (ABC), scientific management, customer satisfaction measurement and cross functional team building, in addition to Total Quality Management (TQM) of the quality movement. In addition to these borrowed concepts BPR prescribes looking for dramatic returns through discontinuous change. BPR without the radical change/dramatic returns is business process improvement (BPI).

While the differences between the radical (BPR) and incremental (BPI/TQM) approaches are clear in theory, the dividing line between them

become blurred in practice. For instance, Motorola's famous quality program aims to increase quality tenfold every few years, while many supposedly reengineering programs are little more than incremental tinkering.[2] Further practitioners see a lot less difference between BPR and TQM, than academicians. In a survey of practitioners and academicians, practitioners saw only two significant differences between BPR and TQM namely length of the project and amount of change attempted. In contrast academicians saw ten major differences between BPR and TQM.[3] In addition to the length and amount of change attempted, academicians considered the importance of starting from a blank slate, role of top management in identifying changes, role of management in project management, pace of results during implementation, employee participation, impact of the change program on employee morale, need for empowerment and the importance of being able to see when a certain process or division needs to be changed as significant differences between TQM and BPR. Organizations learnt the need to integrate these two approaches to prevent conflict between champions of different change programs. Some were able to achieve seamless integration between the two approaches, while others either did not feel such a need or achieved some adhoc integration. This can be inferred from a content analysis of company annual reports presented in the next section. Integrating BPR with other continuous process improvement programs (like TQM) can be done in several ways. Continuous improvement can be sequenced after a BPR effort.[4] Alternatively organizations could create a portfolio of processes and choose different process change programs for different processes, based on the criticality and pay-off potential of each process.[4] The next Section describes a content analysis of the annual reports of many companies that have reported successful reengineering projects. The results of this analysis suggest that many companies were not implementing BPR alone, but as one of the components of a set of change approaches that included less radical process improvement. This suggests that, at the organizational level, BPR should not be evaluated alone but as part a 'strategic change set'.

Since the early nineties, BPR has been receiving tremendous attention from practitioners and researchers. A 1994 survey of 400 CIOs by Deloitte and Touche reported that 80% of the responding companies had at least one BPR project under way, and 81% expect the number of initiatives to increase in the next two years. Many early implementations did not have a clear idea of what BPR was. Many implementations did not pay attention to numerous issues any large scale change project should consider. All the early implementations resulted in a huge list of books, papers and research findings, with their lists of critical success factors, barriers, risk factors and intervention strategies for successful BPR implementation.[5–11]. Most of them address the need for aligning project goals with corporate strategy, ensuring the commitment of top management (someone who has authority over the entire process, and the authority to change organizational structure and the measurement and reward systems), need to move away from an exclusive cost cutting focus to a balanced cost-cutting–revenue-growth focus, good methodological support, need for integrating with other change approaches, pilot testing and obtaining early wins, defining expectations, appreciation of risk factors, interventions for overcoming organizational resistance and political pressures, interventions for culture change and dealing with the 'survivor syndrome' of the change recipients. To sum up the lessons learned, BPR is not just

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[8] Hall, G., Rosenthal, J. and Wade, J., How to make reengineering really work. *Harvard Business Review*, 1993, 119–131.

[9] Kotter, J. P., Leading change: why transformation efforts fail. *Harvard Business Review*, 1995, 59–67.

[10] Schumacher, W. D., Managing barriers to bus. reengineering success. DBA Thesis, 1997.

[11] Vanhoenacker, J., Bryant, A. and Dedene G., Rethinking BPR methodologies; an alternative framework. Working Paper, 1997.

another IT implementation; it is a major change management exercise and should be treated as such. Most of the failures of BPR projects can be attributed to overextension, methodological flaws, ignoring people issues and improper implementation rather than to any flaw in the concept itself. With the lessons learned in the early years BPR has become a truly tested strategy for radical change. BPR's focus on radically changing strategically important cross functional processes and organizational structures, captures the essence of numerous change management theories and methodologies.

The BPR concept and these mistakes of early implementations underscores the need for a closer industry–academics interaction. While many academics were producing large number of research papers on evaluating the business value of IT and the productivity paradox, none of them stumbled on the now obvious insight that work practices have to be changed to harness the true value of IT. While many IT consultancies stumbled on the idea as its credited originators concede,[12,13] none of them had the incentive or skills to do the model building and concept synthesis to make it a coherent model for radical change. The BPR concept had to wait for a practitioner–academics collaboration involving CSC index which included an in-house academician (Thomas Davenport) and a full time academician (Michael Hammer). Once the concept originated, it saw enormous overselling and overextension by every IT/Quality consultancy in the market. The high popularity and the lack of skilled practitioners with a thorough theoretical and methodological understanding of the concept resulted in many bad implementations. Many of the early mistakes could have been avoided if the concept was further refined to include concepts from change management and organizational strategy. This refinement would have only been possible with more academic input.

But as mentioned earlier, the BPR concept has been overextended. This has resulted in a number of BPR implementation failures, while many have reported dramatic successes. BPR has reached the derision stage of the '*discovery–euphoria–overextension–derision–abandonment*' cycle that many management concepts go through. The magnitude of the euphoria and overextension has also contributed to the quickness of the onset of this stage. While some surveys report a high success rate, others have reported a very high dissatisfaction rate. An early Arthur D. Little survey of 350 executives in 14 industries, showed that nearly 85% of executives who have reengineered their operations are dissatisfied with the results of their efforts.[5] On the other hand, another survey by Mercer Management report that 75% of all large North American and European companies had reengineered at least one key business process, and 80% of them were satisfied with BPR. Most of these surveys are done by consultancies, as marketing aids. The objectivity of these surveys is highly questionable. Depending on the wording of the questionnaires, very different responses can be obtained. There is significant anecdotal evidence in the literature to suggest that many projects with a BPR label are not really BPR projects. The survey results seem to match the marketing direction of the consulting firm conducting the survey. What can be inferred from these surveys is the enormous popularity, significant satisfaction with the concept and significant dissatisfaction with implementation and results. Even if the BPR project fails to meet initial expectations, the results will provide valuable input for future BPR refinements. Companies like Amoco, American Express, and GTE, have viewed initial failure as a learning experience, tried again with the new understanding and succeeded.[5] As one expert

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points out, success and failure in reengineering is like success and failure in strategic planning.[14] When a reengineered process design is viewed as a strategic plan, it should be expected that many such plans will not be implemented as designed. There are other benefits to planning that may accrue even if the plan is not implemented, that include among other things learning, providing motivation for change, and communicating intentions.

Before analyzing the effect of BPR, we felt the need to look for evidence that organizations cannot really separate BPR, BPI and other change activities like focusing on core competencies and rethinking strategy. Among the BPR exercises showcased in the early literature are Ford's procurement process, Mutual Benefit Life's credit authorization process. Among these, some companies like Ford have achieved long-term success. Ford, in addition to redesigning its procurement process in the late eighties, has been continuously reengineering ever since, most notably its product development, and has gone as far as replacing its CIO position with a 'Director of Reengineering' position, to better lead its projected reengineering plans until 1999. Some are still struggling with dwindling market shares and a variety of problems.[12] Some like MBL have failed completely.[12] This suggests that organizations have to go beyond BPR and BPI to other fundamental activities. Different change approaches, like strategic investment decisions add value by virtue of being a set of projects, the 'strategic project set', rather than individually.[15] Since interdependencies of different change approaches are complex and indivisible it only makes sense to evaluate the 'strategic change set' together. Before evaluating process change, we wanted to explore the components of the 'strategic change set' of companies. We also wanted to make sure of what organizations were hoping to achieve with their 'strategic change set'. The main criteria organizations use for measuring successes is cost, cycle time or head count reduction. Financial measures like growth in revenue are rarely considered. The next Section examines what successful BPR implementers reported in the literature are telling their shareholders in annual reports to gain an idea of what they are really doing, and what they are aiming to achieve.

Content analysis of annual reports

Content analysis is an accepted research method in behavioral science. It is a method of studying and analyzing communication in a systematic, objective and quantitative manner to measure variables. Instead of observing behavior directly or asking people to respond to scales or interviews, the investigator takes communication that people have produced and asks questions of the communications. This puts content analysis in the same class as interviews, scales and other methods of observation. Annual reports are important communication vehicles produced by top managements to communicate with important stakeholders. Content analysis of annual reports has been used in information systems research by Altinkemer et al.,[16] among others. Their study used content analysis to identify the value of outsourcing to companies. Like their study, the unit of analysis for this study was the *theme* as opposed to the *word*, *character*, *item* or *space/time* measure. To see the expected and perceived benefits of business change to organizations and hence find out if the approach they valued in attaining those benefits was to improve existing processes, reengineer existing processes or rethink their strategy and reengineer their

[14] Davenport, T. H., Business process reengineering: where it's been, where it's going. In *Business Process Change: Concepts, Methods and Technologies*. Ed. V. Grover and W. J. Kettinger. IDEA Group Publishing, Harrisburg, PA, 1995.

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[16] Altinkemer, K., Chaturvedi, A. and Gulati, R., Information systems outsourcing: issues and evidence. *International Journal of Information Management*, 1994, **14**, 252–268.

organizations, many of the companies that have reengineered and reported successes have been identified. These companies have been identified after a thorough search of the BPR literature and searches with ABI, business periodicals index, WSJ Online and other library databases. Every company that has been reported as having done significant BPR in the last few years was identified. Only two of the seventy report failures. The other sixty eight can be considered a representative sample of successful BPR projects. Among them, the annual reports of 35 public companies for all the years from start to roll-out were analyzed for content; *Table 1* shows the main characteristics of their process change efforts and intended benefits. *Table 2* explains these characteristics. *Table 3* summarizes the findings in *Table 1*.

Table 1 *Content analysis: Objectives and means of change summarized in Table 3*

Company	Years	Scope	Ref	1	2	3	4	5	6	7	8	9	0
1 Aetna	1991–94	All Core Processes	19	✓		✓	✓	✓		✓			✓
2 Alpha Industries	1993–96	Enterprise	32	✓				✓				✓	✓
3 Allied-Signal Inc	1992–94	Enterprise TQM/BPR	6	✓	✓	✓	✓	✓				✓	✓
4 Ameritec	1993	Customer Service	23	✓				✓		✓			
5 Amoco	1992–94	Enterprise	5	✓	✓	✓	✓	✓	✓	✓		✓	
6 Baxter International	1989–93	Extended Enterprise	28	✓	✓		✓	✓	✓	✓		✓	✓
7 Bell Atlantic	1991–92	All core processes	1	✓		✓	✓	✓					
8 Bell South Corp.	1993–96	Enterprise	25	✓	✓	✓		✓				✓	
9 Carolina P & L	1990–94	Enterprise	6	✓			✓	✓			✓	✓	
10 Caterpillar	1988–92	Manufacturing Processes	37	✓	✓		✓	✓		✓			
11 Chemical Bank	1994–99	Enterprise	34				✓	✓					
12 Chevron Corp	1992–94	Enterprise, supply ch.	6	✓		✓✓				✓	✓	✓	
13 CIGNA	1989–93	Enterprise	24	✓		✓							
14 Compaq	1991–93	Enterprise	21		✓			✓		✓		✓	
	1995–	Enterprise		✓		✓		✓		✓	✓		
15 Connecticut ML	1991–92	Enterprise	15			✓		✓		✓			
16 CoreStates	1994–96	Enterprise	42		✓	✓	✓	✓				✓	✓
17 Delta Air Lines	1994–97	Technical Operations	29			✓				✓		✓	
18 Federal Mogul	1995–	Key processes	41			✓	✓	✓			✓		
19 First Chicago	1988–91	Commercial Loan	38				✓	✓					
20 GTE	1991–94	Enterprise	18	✓		✓	✓	✓	✓	✓		✓	
21 Hewlett Packard	1992–95	Enterprise	37	✓		✓		✓		✓			✓
22 IBM Corp	1993–96	Enterprise	20	✓	✓	✓	✓	✓		✓			
23 Marion Merrell	1992–94	Enterprise	6	✓		✓	✓	✓	✓	✓		✓	
24 Merrill Lynch	1995–99	Core Processes	22										
25 Monsanto	1993–96	All Major Processes	40			✓		✓				✓	✓
26 Nynex	1991–96	Service provisioning	27			✓		✓					
27 Owens Corning	1994-96	Financial Reporting	39			✓	✓	✓		✓			
28 Siemens*	1991–93	Servicing Process, IS	8	✓	✓		✓			✓		✓	
	1993–97					✓	✓	✓					
29 Sprint	1990–93	Customer Service	36	✓			✓	✓		✓			
30 Tandem Computers	1993–94	Marketing Processes	31			✓				✓		✓	
31 Texas Instruments	1990–95	35 Major Processes	35	✓				✓		✓			
32 Textron Systems	1993–96	Enterprise	33	✓	✓		✓			✓			
33 Union Carbide	1988–93	Enterprise	26	✓	✓		✓	✓		✓		✓	✓
34 US Bancorp	1993–96	Enterprise	43		✓	✓		✓	✓	✓		✓	✓
35 WalMart	1987–92	Enterprise	30	✓			✓	✓	✓	✓			

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[33] IIE, BPR and ERP create commercial success. *IIE Solutions*, 1996b, 54–56.

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[39] Sprinsteel, I. Under control at Owens Corning. *CFO: The Magazine for Senior Financial Executives*, 1996, **12**(11), 51–52.

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Table 2 *Description of characteristics in Table 1*

1 = TQ	Continuous total quality improvements
2 = RS	Restructuring. Divesting of non-core activities and businesses
3 = BPR	Radical change of processes
4 = EE	Employee empowerment
5 = CF	Sharp focus on customer needs and how to meet them
6 = CIT	Creative use of IT
7 = SR	Strategic rethinking of business, including reorganization and divestiture to focus on core competencies
8 = ND	No destination to the change journey. New goals and new strategy after present efforts end
9 = CC	Use process change for cost cutting
0 = RG	Use process change for revenue growth

Table 3 *Summary of content analysis in Table 1 (Out of 35 companies)*

TQ	RS	BPR	EE	CF	CIT	SR	ND	CC	RG
23	12	22	22	30	6	24	4	18	9

The primary reasons companies go through process change are cost cutting and customer satisfaction. Of the 35 companies eighteen were expecting to cut costs. 30 companies were aiming for customer satisfaction. Of these only nine considered their cost cutting or customer focus as part of a cost leadership or customer intimacy strategy for revenue growth. This seems to concur with one of the key points in the BPR 'critical success factors/pitfall' literature, which claims that revenue growth is not being considered an objective of BPR efforts. The most striking observation from the above content analysis is the number of companies that have significant Quality programs. Except for WalMart and Union Carbide, the other 33 are companies that have been reported in the literature as implementing reengineering programs successfully during the years the annual reports were analyzed; only some of them were reported as undergoing BPR and other change approaches (TQM or restructuring) simultaneously. (WalMart and Union Carbide were reported as successfully using deliberate strategy and some process improvements, to achieve dramatic turn around in UC's case and market dominance in WalMart's case.) But nearly as many company annual reports reported having quality programs (23) as BPR (22). This seems to suggest the validity of the trade press reports that BPR and TQM are viewed as two sides of the same coin, and Krieter's survey finding that practitioners see a lot less difference between BPR and TQM.

Some companies that were reported as having implemented significant BPR projects did not even mention them in their annual reports, but were glowing about their quality programs. Companies that already had quality programs (like Allied Signal) were not too eager to use newer terminology, probably to head off resistance that comes when employees feel that top management is engaging in 'change program of the month' and make them feel that there is commitment from the top to set a course and stick

with it. In many cases where the authors inferred a report as mentioning BPR, neither the word BPR nor reengineering were used. For example, Bell South talks about radically shortened delivery times, Chevron talks about 'breakthrough teams looking for large, rapid and permanent ways to improve performance', AlliedSignal talks about total quality speed (TQS)' and Siemens mentions 'simplifying and accelerating processes'.

Even companies that did mention BPR, like Amoco, usually did so in the year of successful implementation, while companies that mentioned TQM talked about 'total quality' throughout the implementation period. This could be probably due to BPR's negative connotations to certain stakeholders, mainly employees and in some cases customers (for example, many local telephone company's BPR efforts got bad publicity as they were seen as reducing head count at the expense of customer satisfaction). They seem to be following one of the suggestions for successful implementations in the 'critical success factors/pitfall' literature: not to call their projects reengineering projects to avoid needless resistance from employees. 12 companies were also going through restructuring at the same time, to weed off non-core businesses and focus on core competencies. Quite a few (24) companies were also significantly rethinking their strategy and some of their process change efforts seem to be wedded to strategy. Some companies were benchmarking industry best practices after their change efforts were over, for comparison with their internal measurements and possible future changes. And only two companies (Chevron and Compaq) believed that there was no end to their process change efforts as they had to constantly rethink their organizations to retain their leaderships. Recent thinking on change suggests both these characteristics as desirable.

The main lesson from the above analysis is that organizations rarely use BPR as a standalone solution. It is used more as a component of a wide range of efforts to change. This is in line with the view that different change approaches, like strategic investment decisions provide value by being a set of projects — the 'strategic project set'. Some normative implications follow from this lesson. The first implication is that, to seamlessly integrate them to attain successful, strategic and sustainable change, organizations should understand the interdependencies of the various change approaches: reengineering of core processes (guided by strategy), culture and structure change, process improvements across the organization, a shift towards more effective team-working, empowerment and customer intimacy. Second, if BPR is so intertwined with so many other change approaches, then it should share some of its fame with the other approaches; and the other approaches (or their absence) should share some of BPR's blame. Third, while some companies have mastered this insight, others have not realized that BPR has to be part of the 'strategic change set'. There is need for a comprehensive but open ended change framework to aid organizations cope with the rapid change in their environments. Such an open ended framework would incorporate various approaches to change and self-renewal and avoid the impression that management is indulging in fad-of-the-month activities.

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[42] Zack, J., Core states painstakingly puts its ideas to work. *American Banker*, 1995, 4A–6A.

[43] Zack, J., Cutting fat allows Oregon's U.S. Bancorp to beef up technology. *American Banker*, 1994, 1A.

Valuing business change

We start with the assumption that a strategic change set that includes BPR will result in productivity gains measured by sales per employee. This

exploratory analysis will test this assumption. Further, since the main criteria organizations use for measuring successes is cost, cycle time or head count reduction and not financial measures like growth in revenue, BPR's effect on organizational strategic performance is unproven. So this study also explores the effect of a BPR-centered strategic change set on organizational strategic performance. As companies struggle to make sense out of reports of high failure rates on the one hand and dramatic successes on the other hand and struggle to extract value out of BPR, such a study is relevant. The objective is to lay the foundation for full fledged empirical analysis of the effect of business change on strategic performance. After a decade of IT Business Value Research (ITBVR) and struggling with answers to the productivity paradox, BPR was considered an answer to the problem of justifying the value of IT. BPR justifies processes and shows clear improvements in some desired performance measures. For the first five years, this eliminated the need for valuing any IT implemented. As BPR approaches the abandonment phase of the '*discovery–euphoria–overextension–derision–abandonment*' cycle, valuing BPR/BPI itself is needed at this juncture. Abandoning BPR, which is a really insightful approach to change and dramatic process improvements, would be tragic.

Organizational strategic performance is concerned with long-term profits, which can be achieved through either superior revenues or superior cost performance. Valuing BPR can be defined as the process of determining if a BPR centered change strategy contributes to organizational strategic performance. If it does, why and how BPR contributes are not critical questions. But if it does not, why it does not would also be part of valuing BPR. An implication of this definition is that evaluation is a post implementation activity, and is different from a priori justification of a BPR project.

Performance measures

Defining appropriate measures is a critical step in performance measurements. In IT business value research, most studies suggested that IT measurements must be made at enterprise level using measures currently used by top management. Since BPR results in major operational improvements, there is no need for intermediate operational measures, and its impact on global financial measures is being evaluated. While the process centric approach greatly aids in improving and measuring non-financial measures, their contribution to improving measures in the financial category is under question. Hence this exploratory study will look at the impact of BPR on the financial performance of an organization, over a period of time.

Selecting the right set of financial measures is also an important decision. One view is to establish a single global measure of performance, like revenue. Many studies suggest that a single measure of performance is not sufficient to capture all factors contributing to an organization's strategic performance, but a system of measures must be employed. Based on an extensive review of this literature not presented here, this study decided to track pretax income to total assets—a proxy for ROI, return on sales, revenue growth, sales by employee and sales to assets.

The justification for this selection is that, more than one productivity or financial performance measures are needed to accurately judge a firm's performance rather than a single productivity or financial measure. The objective of business change should be long-term strategic performance,

which is best captured by a system of measures. One of the criticisms of business change initiatives is that they are driven by the sales by employee metric, which creates a bias towards reducing headcount, at the expense of other measures that are important for long-term growth. Unlike IT implementation, people leading process change initiatives have greater influence on reducing headcount and so influence the sales by employee measure. As pointed out in the BPR literature, in the extreme case organizations could fire all their employees and achieve infinite productivity. One of the premises of BPR is that measures of performance have a powerful influence on people's behavior, and changing measurement and reward systems is essential for successful process change. Similarly measures used to evaluate business change could influence the behavior of those leading business change.

Business change measures

Unlike ITBVR, while valuing business change the dollar amounts of IT investment variables cannot be used because, unlike IT investment which is costed clearly and reported, BPR investments are not being costed and reported. While a few companies do report the cost of IT involved in a BPR project, most do not; but some of these companies do take a charge to cover expenses related to reengineering and other restructuring expenses. These charges can be extracted by combing the annual reports of the companies for all the years during which BPR was carried out. One serious drawback of using these figures is that they usually also include charges for other restructuring or right sizing activities. Another drawback is that they do not include the cost of the time and effort of top management, and other BPR team members; nor do they include the pain, uncertainty, fear and other psychological costs to organizations undergoing BPR. Using such numbers would amount to nothing more than speculating the value of IT (not BPR) used, ignoring the primary lesson of the BPR concept: IT provides value only if it is used to do work better and differently. So this study decided not to use any measure of BPR. The companies being observed are those that have successfully improved or reengineered its processes. Future studies could devise new measures of business change, based on the scope of change (percentage of total processes), magnitude of change (percent improvement achieved in each process), changes in measurement and reward systems, changes in organizational structure, changes in culture and initiatives for creating a learning organization.

Data analysis

One of the limitations of many ITBVR studies was that most of them used cross-sectional data which provides a snapshot at one point in time, but the process through which an IT implementation or any change initiative affects performance takes time. Longitudinal analysis is especially critical in valuing business change, because the subsequent performance of initial BPR successes like Mutual Benefit Life has created the need for evaluating the long-term performance of business change.

Of the 70 companies in the larger sample, 10 companies were planning to roll-out their process change projects in 1997 or later; since this study aims to explore financial performance for at least until the year of implementation, they were not considered. Of the remaining 60, 4 were

international companies such as Air Liquide, Banca di America e di, British Aerospace Airbus, British Gas for which data could not be obtained. The 11 companies that rolled out BPR before 1993 were also ignored, since this analysis aims to look at financial performance over a five-year period, leaving 45 qualified candidate companies. Data for 25 of these 45 companies was available either through Compact D/SEC or the Fortune Global 500. Financial performance data was collected for these 25 companies for the five years 1992–96, starting with the year before BPR roll out. The data can be considered reasonably representative. This study aims to find out if it is possible for companies to gain dramatic improvements in processes through BPR, but still not gain significantly at the enterprise level. The authors have company data about sales and other economic activities between 1992 and 1996. Interested parties can contact the authors directly to obtain this data.

Discussion. The data shows that very few companies sustained improvements in all measures with process change. While sales by employees improved for all companies during the year of BPR rollout, all other measures did not show uniform improvements across the companies. Improvements in Sales by Employees were by the far the most sustainable. But 10 companies saw a net decline in Sales to Assets, while only seven saw sustained improvements and three showed fluctuating improvement and decline resulting in no net gains. Even during the year of BPR rollout, several companies saw decrease in Sales by Assets. Critics could say that some companies were firing people and acquiring machinery to improve one productivity measure by sacrificing another. While productivity improvement is a worthwhile goal for process change efforts, the case of companies like Mutual Benefit shows that it cannot be an end in itself. BPR's effect on financial measures are of greater interest to those interested in improved strategic performance. Very few companies showed sustained improvements in all the financial measures, and many companies did not show improvements even during the year of BPR rollout. Since most companies have been using this as a cost cutting (and headcount reduction) strategy instead of being viewed as vehicles for enhancing growth, such unresponsiveness is to be expected. As pointed out in the literature, in addition to being better suited to growing economies like the current US economy, such an approach would be more appealing to employees. Only three companies, Compaq, Amoco and Ameritech, showed sustained improvements in almost all the five measures. Ameritech and Compaq's philosophy of strategy guided process improvement could explain their sustained performance.

Most of the companies show improvements in the year reengineering was completed, but very few could sustain these gains. Moreover, very few companies showed sustained improvements, as mentioned earlier. This suggests a longer-term approach to process change, ideally one with an infinite planning horizon.

BPR: What should be done with it? These findings suggest that the business change efforts of the last several years seem to have had a significant effect on sales by employee, but no such effect on other financial performance measures was apparent. Few companies showed sustainable improvements in all measures. To achieve such performance gains companies should use deliberate strategy to guide process change efforts to build revenue, and should move away from one-time single process change

approaches to an organization-wide continuous model like Compaq's. Organizations should try to use BPR and BPI as two components of a continuous approach to change to succeed in the turbulent environments they are in. With changing customer preferences and rapid technological obsolescence in two to three years as opposed to two to three decades in the industrial age, organizations should view change as a continuous activity, as a journey-not-a-destination activity. As the information age gradually turns into the age of chaos and complexity, neither a one-time radical innovation of a single process nor an organization-wide marginal improvement look sufficient to ensure corporate survival. In other words, business change should move away from one-time mechanistic change model to a continuous biological model, with a significant role for BPR. This conclusion is also supported by recent thinking in strategy and process change approaches.[17] The Integrated Process Management concept suggested in the literature, could be extended to be such a biological model. Integrated process management should integrate all the change and strategy concepts like BPR, BPI, Activity Based Management (ABM), a Balanced Score Card approach to performance measurement, creating a learning organization through organization development and a strategic IT development process into a comprehensive approach. Components from this comprehensive approach have to be appropriately and constantly used to adapt to changing environments, changing technologies and changing customer preferences. The tools used for BPR or BPI should also be leveraged and enhanced to support other change and strategy approaches. While a part of this study is basically a data exploration, and no definitive conclusions can be drawn from it, these preliminary results show the limitation of process change efforts in providing sustained strategic performance, when not guided by good old fashioned strategic thinking and managed by an integrated and continuous change management approach.

Conclusions

The first section gave a brief introduction to BPR, its role in typical organizational change strategies and the lessons learned from early failures of indiscriminate BPR projects. Next, we provided an empirical validation of some of the suggestions and observations in the BPR 'critical success factors/pitfall' literature. This paper explored the components of the strategic change set of companies reported as reengineering success stories, through the content analysis of their annual reports. This analysis showed that few companies were using reengineering as a stand-alone change strategy to cope with changing environments. Companies that had successfully reengineered were following most of the prescriptions for successful reengineering in the 'critical success factors/pitfall' literature, except moving away from cost cutting to revenue building. The next section of this paper also described an exploratory longitudinal analysis of the financial performance measures of these successfully reengineered firms. This study confirmed the positive effect of reengineering on sales by employee, but no such effect on other financial performance measures was apparent. If the objective of a process-change-centered strategic change set is the long-term competitive performance of the firm, then that objective is not being achieved. To achieve such performance gains companies should use deliberate strategy to guide process change efforts to build revenue,

and should move away from one-time change approaches to a more continuous approach. There is need for a more comprehensive analysis to come to more definite conclusions. Such an analysis should try to survey practitioners directly, as getting data from the literature is not very fruitful. Such a direct survey could also design and use measures of business change.