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IMPORTANT FACTORS FOR BPR SUCCESS IN MANUFACTURING FIRMS

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Abstract

Business Process Reengineering has been touted by many as dramatic improvements necessary for organization competitiveness, but in practice there are many unsuccessful cases. Thus, there is need for a more systematic and rigorous assessment of the factors deemed important to project success. That is the main objective of this study. In this case, success has been defined in three different ways: goals and objectives accomplished by the project, benefits derived from the project, and its impact on company performance. Based on the results, recommendations are made for managers to focus attention and resources on factors important to success, and to proceed in a fashion which minimizes the risk of failure. The point of entry into the companies participating in this study were internal auditing directors and comptrollers (IA's). Questionnaires were mailed to the IA's of 586 randomly selected manufacturing organizations. The usable sample of 135 questionnaires represent a 22 percent response rate. In general, organizations are not emphasizing some of the most important activities and tasks recommended in the BPR literature, such as changes to customer/market related business processes, the value-added element of every business activity, and applying the right innovative technology. Based on the findings as a whole, it behooves top managers not to engage in BPR before ensuring the presence of the success factors found to be important. While the findings are based on manufacturing companies, the results may be generalizable to other industrial sectors.

Key words: business process reengineering, success factors, implementation, BPR success.

1. Background

The manufacturing sector has been called "the locomotive that pulls the other sectors of the economy along" (FALTERMAYER, 1993). Regardless of the great importance of manufacturing, its success or failure is far from assured. In spite of having substantial mechanization and automation, the most productive workers in the world, and greater access to natural resources than perhaps any other nation, in the past U.S. manufacturing has fallen behind (MISKE, 1992). More recently the manufacturing sector is thought to be regaining its ability to become more productive (HOWARD, 1994), and the importance of manufacturing as a competitive weapon has been recognized by many authors (WARD, BICKFORD & LEONG, 1996; MARCUM, 1996). From 1982 to 1990, the productivity of U.S. manufacturing workers increased 4.5 percent per year, a record for any period since the end of World War II (HOWARD, 1994). Many U.S. firms have redefined the nature of their businesses while exploring the basic differences between Japanese and American manufacturing management approaches and applying a host of new methods and techniques, including the widely discussed Business Process Reengineering (BPR) (PATTERSON & HARMEL, 1992).

Essentially, BPR amounts to making radical changes to one or more business processes affecting the whole organization. It also requires a cross-functional effort usually involving innovative applications of technology. Reengineering is an attempt to change the way work is performed by simultaneously addressing all the aspects of work that impact performance, including the process activities, the people's jobs and their reward system, the organization structure and the roles of process performers and managers, the management system and the underlying corporate culture which holds the beliefs and values that influence everyone's behavior and expectations (CYPRESS, 1994). With BPR, rather than simply eliminating steps or tasks in a process, the value of the whole process itself is questioned (GOTLIEB, 1993). Reengineering makes a significant break with previous performance improvement approaches by requiring a high level of state-of-the-art information technology awareness among the entire reengineering team prior to, rather than after, the definition of process changes or improvements (CYPRESS, 1994). Some technologies (i.e. imaging systems and expert systems) can provide substantial opportunities for the redesign of business processes (GUIMARAES, 1993). Again, for each technology application, success is far from guaranteed. Indeed, a thorough understanding of a particular technology's success factors is critical to reduce the risk of project failure, particularly in the fast pace, high pressure usually associated with BPR projects (YOON, GUIMARAES & O'NEAL, 1995; YOON, GUIMARAES & CLEVENSON, 1996).

Many organizations that have undertaken reengineering projects reported significant benefits from their BPR experience (CAFASSO, 1993b) in several areas such as: customer satisfaction, productivity and profitability (THE ECONOMIST, 1993; GOLL & CORDOVANO, 1993). The expected improvements vary dramatically by company: productivity, quality, profits and customer satisfaction are expected to improve from 7 percent to 100 percent, depending on where the company is starting from and the extent of its efforts. Improvements forecast in costs, inventory, cycle time and response time range from 10 percent to as much as 400 percent. Other benefits include reduced floor space requirements; reduced labor requirements, particularly indirect labor; reduced material handling; improved employee empowerment and morale; improved communications between operations; and improved quality (FARMER, 1993). An extensive list of BPR benefits has been compiled and empirically rated by the author elsewhere (GUIMARAES, 1996).

While the promises from BPR implementation seem impressive, the problems are also numerous. Although many firms have implemented a variety of reengineering programs over the past years, relatively few have reaped the benefits they expected (CUMMINGS, 1993; GUIMARAES, 1996). According to CSC Index, approximately one fourth of 300 reengineering projects in North America are not meeting their goals and the authors speculated that the figure may be closer to 70 percent (CAFASSO, 1993a). Many CIOs say that the actual benefits of the projects fall short of their expectations along the dimensions of customer service, process timeliness, quality, cost reduction, competitiveness, new/improved technology and sales/ revenues (HAYLEY, PLEWA & WATTS, 1993). A Deloitte & Touche survey showed reengineering projects consistently fall short of their expected benefits (MOAD, 1993). The up-front costs are high, particularly in the areas of training and consultant fees, with a time consuming learning curve (BOZMAN, 1992). For some companies, creating an environment in which reengineering will succeed may be exceedingly difficult (GROVER, TENG & FIEDLER, 1993). Some argue in favor of more gradual departures from traditional practices since managerial innovations take time and induce substantial strain on the organization (BROWN, 1993). As discussed by GUIMARAES, BELL & MARSTON (1993) in the context of organizational change in general, there is much business organizations can do to reorganize for fast changing environments. The changes often fail because worker habits are not addressed during implementation (GROVER, *et al.*, 1993). Succumbing to the pressure to produce quick results, many managers implementing BPR tend to ignore the massive changes in organizational structure, have alienated middle managers and lower level employees, sold off solid businesses, neglected important research and development, and hindered the necessary modernization of their plants (CASCIO, 1993). An extensive collection of implementation problems encountered in practice has been tested by this author elsewhere (GUIMARAES, 1996).

As these studies indicate, all is not well with the BPR bandwagon; success is far from assured. There is need for a better understanding of the important factors affecting the likelihood of BPR project success, perhaps by empirically testing on a broader basis the case-based anecdotal evidence and statements of personal opinion in the literature. To that effect, this survey based field test targeted manufacturing companies with the major objective of empirically testing the extent to which the BPR success factors proposed in the literature are indeed related to BPR project success. A second set of objectives for the survey was to rate the importance of the BPR success factors, the extent to which BPR project goals and objectives are being accomplished, and the impact of BPR projects on company performance. The point of entry into the companies participating in this study were internal auditing directors and comptrollers (IA's). Questionnaires were mailed to the IA's of 586 randomly selected manufacturing organizations. The 135 usable questionnaires were returned in time for analysis. Based on the results, recommendations are made for managers to focus attention and resources on factors important to success, and to proceed in a fashion which minimizes the risk of failure. The next section describes the literature sources from which the three major constructs addressed in this study were derived.

2. The Conceptual Framework

2.1 The Major Constructs

BPR Success Factors. A list of success factors were collected from the literature and grouped intuitively by the author are shown in Table 1 with individual items ratings by BPR project managers. The literature contains an abundance of personal opinions on what are important factors to BPR success. Some of

Table 1 – Classification For BPR Success Factors (m=135)

Classification For BPR Success Factors (m=135)	Mean	St. D.
EXTERNAL:		
1. Use industry specialists and outside assistance	2.84	.92
2. BPR motivated by customer demands and competitive pressures	3.48	1.13
EMPLOYEE EMPOWERMENT:		
1. Reeducate and retrain workers on what BPR actually is	3.21	1.17
2. Empower workers so that doers are decision makers	2.96	1.04
OPERATIONAL:		
1. Use resources effectively	4.18	.71
2. Implement new processes as planned and on schedule	3.54	1.01
3. Develop a defined project organization	4.12	.75
4. Target only a few critical (though cross-functional) business processes	3.66	1.05
5. View technology as an enabler, not as a solution	3.49	.74
6. Reduce cost and response times by automation	3.64	.97
7. Desire for continuous performance improvement	3.18	1.14
8. Adopt an integrated approach to IT and business planning	3.13	1.15
COMMUNICATION:		
1. Share and exchange information willingly	4.00	.84
2. Schedule meetings between project manager and each level of project structure regularly	4.10	.76
3. Develop and communicate clear written mission and vision statements	3.69	1.05
4. Create an enabling charter that describes the BPR program and support of management	3.37	.74
5. Use surveys to determine what's working and what's not	3.44	.81
METHODS AND TOOLS:		
1. Utilize hands-on experience in reengineering diverse processes	3.42	.81
2. Use concept design phase to develop a rough-cut design and to identify major issues	2.84	.94
3. Determine all setup details, tooling, scheduling, maintenance, storage, replenishment, quality, etc. before implementation	3.53	1.01
4. Simplify material flow, logistics, planning, and other distinct operations by using group technology	3.47	.85
5. Use process mapping to distinguish productive activities from non-value-added activities	2.97	.86
6. Revise procedures that focus on satisfying internal demands rather than the marketplace	4.21	.66
7. Focus on the outcome rather than task	4.14	.84
LEADERSHIP:		
1. BPR initiated and led from the top-down by senior-level management	4.24	.72
2. BPR motivated by chief executive willing to be held accountable for project success	3.97	.79

Scale: 1=Not Important, 2=Somewhat Important, 3=Moderately Important, 4=Very Important, 5=Extremely Important

which sound like self-serving statements, such as the need to bring in specialists for the particular industry. Most of the factors discussed make common sense, such as the need for the BPR project to be driven by customer demand, competitive pressures, and the need to improve

financial performance (GOLL & CORDOVANO, 1993), and/or relationships with suppliers (O'LEARY, 1993). The need for education and re-education is also widely recognized. Employees must be taught what the reengineering process actually is, how it differs from known work patterns and what role they will play in it (GOLL & CORDOVANO, 1993). Managers are also encouraged to reconsider mechanisms for reward and recognition to keep the reengineered organization moving forward, to instill in people the willingness to share information, and to use hands-on experience in redesigning new processes (GOLL & CORDOVANO, 1993). FARMER (1993) proposes several important factors: the use of project champions; having an organized and well-disciplined plan of attack; employing a rigorous and detailed analysis process to develop a rough-cut design and identify major issues; avoiding the selection of traditional thinkers as team members; carefully setting up details, tooling, scheduling, maintenance, storage, etc. before implementation; having a defined project organization structure and regularly scheduled meetings of the project manager with every level of this structure to focus attention; using process mapping to distinguish productive activities from those that are non-value-added (CURTIS, KELLNER & OVER, 1992); and clearly defining and communicating the mission and vision of the project.

GULDEN & RECK (1992) also have a list of important factors: because reengineering results in large-scale changes to a business process, organizational structures, management systems, and values, executives must carefully target only a few critical (though cross-functional) business processes; they should correct organizational procedures that are focused on satisfying internal demands rather than the marketplace; and focus on outcome rather than task. Other factors which have been proposed are that: the technology be viewed as an enabler, not a solution (HUFF, 1992); let doers be the decision makers (HAMMER, 1990); use automation to reduce costs and response times (GREEN, 1992); do not neglect the need for continuous quality improvements (FAIER & SHEN, 1992; KNORR, 1991); projects initiated and led top-down by company top management willing to be accountable for project success (KNORR, 1991; FREISER, 1992); use surveys to find out what's working and what's not; be completely open about what you're doing, when and why (RASMUS, 1992; MARGOLIS, 1992); and adopt an integrated approach to IT and business planning (GROVER *et al.*, 1993).

Many authors discuss BPR success factors without first carefully or explicitly defining BPR success. In this study BPR success has been defined in two different ways: the extent to which the project accomplished a list of desirable goals and objectives and helped improve specific dimensions of company performance.

BPR Goals and Objectives Accomplished. The primary objective of BPR is to make business organizations more competitive by improving quality, reducing costs and shortening product development cycles (DAGRES, 1993; GROVER *et al.*, 1993). According to Tsang, BPR's distinguishing characteristics are radical change, cross-functionality, operating across organizational units, breaking outdated paradigms, and involves innovative application of technology (TSANG, 1993). The change process itself should emphasize the value-added element for every activity, recognizing time as a competitive weapon, focusing on end results and objectives, ensuring quality at the source, planning for an end-to-end solution, challenging the old ways and proposed new ways, using the right technology, empowering people and building consensus on making changes, and setting aggressive goals for the new process (STADLER, 1992). The right idea for BPR is to look at the end-to-end processes that are really important to a company's success, then rapidly redesign who does what and give workers new tools to get more done (MOAD, 1993). It is a new way to think about information technology, in terms of how it supports new or redesigned

Table 2 – Extent BPR project goals and objectives were accomplished (m=135)

Extent BPR project goals and objectives were accomplished (m=135)	Mean	St. D.
1. Increased own competitiveness by improving quality	2.84	.61
2. Increased own competitiveness by reducing costs	2.90	.75
3. Emphasized the value-added element at every activity	2.81	.73
4. Used time as a competitive weapon (decreased cycle time)	3.11	.79
5. Focused on end results and objectives	3.22	.84
6. Applied the right innovative technology	2.87	.72
7. Built consensus on making changes	3.23	.88
8. Met aggressive business process goals	2.29	.82
9. Redesigned end-to-end processes important to the company's success	3.15	.74
10. The process improvements are based on the capabilities of information technology	3.13	.91
11. Operating effectively across organizational units	3.49	.97

Scale: 1=Not at all, 2=Minor Extent, 3=Moderate Extent, 4=Major Extent, 5=Great Extent

business processes, rather than business functions or other organizational entities (DAVENPORT & SHORT, 1990). Based on this literature survey, a list of potential BPR projects goals and objectives were collected. Table 2 indicates the extent to which such desirable goals and objectives were actually accomplished by the projects in the sample.

Organization Performance. As discussed earlier, there are many possible business benefits from reengineering. When actually encountered in practice, these benefits hopefully will translate into improved company performance. Therefore, the later should be considered the ultimate measure and dependent variable for studies assessing the overall benefits from substantial reengineering projects. Company performance can be measured in a wide variety of ways (STEERS, 1977; VENKATRAMAN & RAMANUJAM, 1986; SNOW & HREBNIAK, 1980). Many authors have used one item to measure company performance, such as company profitability (return on total assets) (SNOW & HREBNIAK, 1980). Given the wide diversity of possible benefits from company innovativeness and the need for content validity, studies assessing the impact of innovation on company performance should use multi-dimensional scales. In this study, the 12 company performance dimensions shown in Table 3, which were previously validated by GUPTA & GOVINDARAJAN (1984) have been used to measure the payoffs from company innovativeness.

3. Methodology

3.1 Sampling Method

The point of entry into the companies participating in this study were through their internal auditing directors/comptrollers (IA's). Questionnaires were mailed to the IA's of 586 manufacturing organizations. These were selected from a list of 2669 members of a professional association. Each member was numbered and 600 were randomly selected. Because some companies had more than one

Table 3 – BPR's impact on company performance (m=135)

BPR's impact on company performance (m=135)	Mean	St. D.
1. Sales growth rate	2.43	.64
2. Market share	2.64	.71
3. Operating profits	2.88	.94
4. Rates of profits to sales	2.59	.80
5. Cash flow from operation	2.84	.72
6. Return on investment	2.67	.72
7. New product development	2.90	1.06
8. New market development	2.47	.72
9. R & D activities	2.47	1.19
10. Cost reduction program	2.97	.97
11. Personnel development	3.02	.71
12. Political/public affairs	2.68	.80

Scale: 1=Not at all, 2=Minor Extent, 3=Moderate Extent, 4=Major Extent, 5=Great Extent

representative in the mailing list, 14 duplicates were eliminated. A total of 152 responses were received within the specified time, however 17 had to be discarded due to missing data (12), invalid responses (2), and responses based on BPR projects which did not meet specified qualifications (3). The usable sample of 135 questionnaires represent a 22 percent response rate which is considered satisfactory for exploratory studies of this type. BPR was defined as dramatic changes (paradigm shifts) to business processes, in contrast with incremental improvements. The IA's were explicitly asked, unless otherwise indicated, to address the most recent BPR project which has been in operation for at least one year. Further, the IA's were instructed to have the BPR project managers rate the importance of each factor in general, and to specify the extent to which each success factor was satisfied in the context of the specific BPR project implementation. To protect the respondents, they were promised complete anonymity and that only aggregate information on participants would be made public. A self-addressed, stamped envelope was provided for questionnaire return directly to the author.

3.2 Sample Description

The respondents represent companies at several levels of gross revenue, with few (1.5 percent) having revenues below $50 million, and most (74.8 percent) having revenues above $300 million. A test of the difference between means, comparing the companies in the sample against the general population in terms of gross revenue, reveals a sample bias toward larger organizations at a .01 significance level. Many of the firms operate globally thus enabling the results to be generalized to the same scale. The list of general business processes areas addressed in this study are shown in Table 4. On the average, sales/order entry, production scheduling/ planning, and product design/development were the business processes changed to the greatest extent. The BPR project managers rated the extent of change made to each of these processes. Surprisingly, given the widespread attention to customer satisfaction shown in the

Table 4 – Degree of operational change to business processes (m=135)

Degree of operational change to business processes (m=135)	Mean	St. D.
1. Customer service (after sale services)	2.71	.85
2. Sales/order entry (selling and entering orders)	3.50	.87
3. Invoicing/billing (generation and mailing of invoices/bills)	2.80	.64
4. Purchasing (ordering from suppliers)	2.92	.61
5. Advertising/promotion	2.78	.64
6. Pricing	2.68	.96
7. Marketing research	2.70	.81
8. Product design/development	3.40	.95
9. Distribution (transporting goods to market)	3.36	.83
10. Business planning	2.76	1.03
11. Inventory management (keeping inventories at planned levels)	3.38	.88
12. Quality management (measuring, monitoring and taking action to maintain quality)	2.72	.65
13. Production scheduling/planning (for manufacturing requirements)	3.42	1.05
14. Personnel management	2.88	.67

Scale: 1=Not at all, 2=Minor Extent, 3=Moderate Extent, 4=Major Extent, 5=Great Extent

press, on the average the customer service process, marketing research, and pricing have been changed to the lowest extent.

3.3 Data Analysis

The statistical computations for this study are fairly simple and straight forward. Arithmetic means and standard deviations were computed for the success factors, the demographic variables (whenever applicable), and for the items in the two major constructs. Pearson's correlation coefficients were computed to measure the strength and direction of the relationships between each success factor and the two measures for BPR success (BPR project goals and objectives accomplished, and impact on organization performance.) For the two multi-item constructs, factor analysis was undertaken as a prerequisite for computing Cronbach's Alpha coefficients of internal reliability and to test their convergent and discriminant validity.

3.4 Construct Measurement

Respondents rated all items comprising the constructs below using the scale 1 (not at all), 2 (to a minor extent), 3 (to a moderate extent), 4 (to a large extent), and 5 (to a great extent). The average rating for the respective sub-items represents the overall measure for each construct.

Success Factors. As discussed earlier, given the study's objective of empirically testing specific BPR success factors proposed in the literature, the items were not combined into a major success factor construct. Further, statistical factor analyses produced nonsensical factor subgroups with no recognizable meaning. Therefore, subsequent analyses use the items individually. BPR project managers were asked to rate the importance (in general) of each

success factor. Table 1 contains the average importance rating and standard deviation for each item across the sample, sub-grouped intuitively by the author. Project managers were also asked to rate the extent to which each success factor was satisfied in the context of implementing the specific BPR project. This was used to assess the relationship between each success factor and the two measures of BPR success reported in Table 5.

Goals and Objectives Accomplished. The project managers were asked to rate the extent to which the eleven desirable (based on the literature) project goals and objectives were actually accomplished. The average ratings and the standard deviation for each item across the sample are shown in Table 2. For each respondent, these items were averaged to produce a measure for the extent to which the BPR project goals and objectives were accomplished. The Cronbach's Alpha coefficient of internal reliability for this scale was .82. As a prerequisite for validly computing the Alpha coefficient, factor analysis on the eleven items produced a single factor solution accounting for 59 percent of the average extracted variance.

Impact on Organization Performance. This was measured along the 12 items proposed by GUPTA & GOVINDARAJAN (1984). IA's were asked to rate the extent to which the BPR project had affected each of the items. The average ratings and the standard deviation for each item across the sample are shown in Table 3. For each respondent, these items were averaged to produce a measure for the extent to which the BPR project affected the company's business performance. The Cronbach's Alpha coefficient of internal reliability for this scale was .82. As a prerequisite for validly computing the Alpha coefficient, factor analysis on the twelve items produced a single factor solution accounting for 66 percent of the average extracted variance.

3.5 Validity and Reliability of the Measures

Despite the exploratory nature of this study, several precautions were taken to ensure the validity of the measures used. Many of the recommendations by CARMINES & ZELLER (1979) were followed. To ensure content validity, a thorough survey of the relevant literature was undertaken to understand the important aspects of each major construct and its components, and not to neglect any important dimension. To further reduce the possibility of non-random error, the main source of invalidity, a group of six practitioners with substantial experience managing major business organization changes, reviewed the questionnaire for validity (measuring the phenomena intended), completeness (including all relevant items), and readability (making it unlikely that subjects will misinterpret a particular question). Some questions were reworded to improve readability; otherwise, the questionnaire items remained as collected from the literature. Given the lack of a theoretical basis for the BPR phenomenon, only one of the measures (organization performance) has been previously used and its psychometric properties are relatively well known. Three guidelines were followed to ensure convergent validity for the two major constructs: NUNALLY's requirement for Cronbach's alpha coefficients above .70 (1978), HAIR, AMDERSON, RATHAM & BLACK's factor loadings above .50 (1992), and FORNELl & LARCKER's average extracted variances above .50 (1981).

The internal consistency reliability coefficients (Cronbach's alpha) for the two dependent variables (organization performance and project objectives/goals accomplished) are all well above the level of the .70 guideline. As reported earlier, factor analyses (a prerequisite for computing Cronbach's Alpha coefficients of reliability) produced single factor solutions for both constructs with all factor loadings above .50, and the average extracted variance for both measures were also above the .50 guideline.

Table 5 – Factors important to BPR success (m=135)

Factors important to BPR success (m=135)	Object. Accompl.	Org. Perfor.
EXTERNAL:		
1. Use industry specialists and outside assistance	.26*	NS
2. BPR motivated by customer demands and competitive pressures	NS	.35**
EMPLOYEE EMPOWERMENT:		
1. Reeducate and retrain workers on what BPR actually is	.29*	NS
2. Empower workers so that doers are decision makers	.39**	NS
OPERATIONAL:		
1. Use resources effectively	NS	NS
2. Implement new processes as planned and on schedule	.44**	NS
3. Develop a defined project organization	.37**	NS
4. Target only a few critical (though cross-functional) business processes	.42**	.28*
5. View technology as an enabler, not as a solution	NS	NS
6. Reduce cost and response times by automation	NS	.28*
7. Desire for continuous performance improvement	NS	NS
8. Adopt an integrated approach to IT and business planning	.27*	NS
COMMUNICATION:		
1. Share and exchange information willingly	.37**	NS
2. Schedule meetings between project manager and each level of project structure regularly	.38*	NS
3. Develop and communicate clear written mission and vision statements	.29*	NS
4. Create an enabling charter that describes the BPR program and support of management	.25*	NS
5. Use surveys to determine what's working and what's not	.44**	NS
METHODS AND TOOLS:		
1. Utilize hands-on experience in reengineering diverse processes	NS	.27*
2. Use concept design phase to develop a rough-cut design and to identify major issues	.34*	NS
3. Determine all setup details, tooling, scheduling, maintenance, storage, replenishment, quality, etc. before implementation	.45**	NS
4. Simplify material flow, logistics, planning, and other distinct operations by using group technology	NS	NS
5. Use process mapping to distinguish productive activities from non-value-added activities	NS	.22*
6. Revise procedures that focus on satisfying internal demands rather than the marketplace	.45**	.31*
7. Focus on the outcome rather than task	.24*	NS
LEADERSHIP:		
1. BPR initiated and led from the top-down by senior-level management	.26*	NS
2. BPR motivated by chief executive willing to be held accountable for project success	.48**	NS

Table cells contain Pearson's Correlation Coefficients.
**** = Significant at the .01 level or better.**
*** = Significant at the .05 level or better.**

Correlational analysis was used to test discriminant validity: the squared correlations (the variance shared between the two construct measures) should be lower than the average variance extracted by the items in each measure. In other words, a construct measure should have

higher correlations with its own items than with other construct measures (GRANT, 1989; LOHMOLLER, 1989). The Pearson's correlation coefficient between the two constructs is .24, indicating a shared variance considerably lower than the average extracted variances reported earlier for each variable.

4. Results

In this section the results from statistical analysis of the sample data are presented in the Tables and briefly discussed. The following section presents a short summary of the study, the main conclusions, and the managerial implications.

4.1 The Ratings For Success Factors Importance

As discussed earlier and shown in Table 1, the success factors have been intuitively classified by the author into six categories: external, employee empowerment, operational, communication, methods and tools, and leadership factors. However, given that the primary objective of this study was to empirically test specific BPR success factors proposed in the literature, these factors were not grouped for analysis.

According to the results, having the BPR project motivated by customer demand and competitive pressure, on the average, is considered to be more important for project success than the use of industry specialists or other outsiders. Similarly, reeducating and retraining workers on what BPR actually is, is deemed more important than empowering the workers performing the required tasks as decision makers. In terms of operational factors, developing a defined project organization and using resources effectively are considered to be very important. The relatively lower standard deviations for these two items indicate that individual respondents are in closer agreement on their ratings. In the communication area, scheduling regular meetings for project managers and each level of the project structure, and sharing and exchanging information willingly (the primary reason for having such meetings) are deemed very important. Methods and tools considered to be very important are the revision of procedures that focus on internal demands rather than the marketplace, a BPR project focus on outcomes rather than tasks, and regular meetings between project managers and all levels of the project organization. Both items under Leadership were rated as very important on the average.

4.2 Rating Project Goals and Objectives, and Antecedent Success Factors

Contrary to the opinion of many BPR critics, Table 2 suggests that on the average, companies who have implemented BPR projects have accomplished, at least to a moderate extent, some important project goals and objectives, including: operating effectively across organizational units, built consensus on changes made, and redesigned end-to-end processes important to the company success. While some of the items show relatively large standard deviations indicating considerable company to company variance around the arithmetic mean, on the average companies are accomplishing all the enumerated goals and objectives somewhere between "to a minor extent" and "to a major extent." According to Table 5, the significant success factors for accomplishing BPR project goals and objectives are empowering worker as decision makers, implementing new processes as planned and on schedule, targeting a few critical business processes, sharing information willingly, using surveys to determine what is working, determining all set up details before project implementation, revising procedures dealing with internal demands, and ensuring that the chief executive in charge is willing to take responsible for project success.

4.3 Rating BPR Impact on Company Performance, and Antecedent Success Factors

Based on Table 3, on the average BPR has had less than an impressive impact on company performance. On the other hand, despite all the turmoil it many times creates within organizations, the downsizing often associated with it, and pressures it imposes on company personnel, BPR on the average seems to perform as a mild tonic for personnel development. Similarly, on the average it has helped to a moderate extent company operating profits, cost reduction programs, and cash flow from operations. Again, the relatively large standard deviations tell us that the impact varies considerably from company to company suggesting that its implementation can be quite risky depending on company, application, and project management circumstances. According to Table 5, the important success factors for increasing the likelihood of positive BPR impact on company performance are having the project motivated by customer demands and competitive pressure, targeting only a few critical business processes, reducing costs and response times by automation, using hands-on experience for reengineering processes, using process mapping to identify value added activities, and revising procedures which satisfy internal requirements rather than the marketplace.

5. Summary, Conclusions, and Managerial Implications

The main objective of this study was to empirically test the extent to which the BPR success factors proposed in the literature are indeed related to BPR project success. A second set of objetives were to rate the importance of the BPR success factors, the extent to which BPR project goals and objectives are being accomplished, and the impact of BPR projects on company performance. These objectives have been fully met. Given the sample broad representation of company sizes, and that most of them have global operations, and that the BPR projects dealt with changes to a wide variety of business processes, the generalizability of the results among manufacturing companies is fairly strong. While the results are based solely on manufacturing companies, they may be applicable to organizations in other industrial sectors. In general, the results indicate that organizations are not emphasizing some of the most important goals and objectives recommended in the BPR literature, such as ensuring the value-added element of every business activity, and applying the right innovative technology. While many individual organizations have reported significant favorable impact on organization performance, on the average, company impact from BPR seem rather disappointing compared against all the turmoil it seems to generate.

Before embarking on a BPR adventure, executives should ensure that at least some of the success factors deemed very important by the respondents are operational: the project is initiated and led from the down by senior level managers, revise procedures addressing internal demands instead of the company's markets/ customers, develop a defined project organization, use resources effectively, focus on outcomes rather than tasks, have regularly scheduled meetings between the project manager and each level of the project structure, share and exchange information willingly, and ensure that chief executive is willing to take responsibility for the project success. While on the average some of the success factors have received lower ratings, those with large standard deviations should be further considered since at least some of the respondents perceive them as very or extremely important based on their personal experience.

The results show that reeducating and retraining workers on what BPR actually is, on the average is deemed more important than empowering the workers performing the required tasks as decision makers. Superficially this contradicts one of the major tenets of

organizational learning and TQM. A possible explanation for this apparent contradiction is that under the time pressure of a BPR project workers very likely had no time for acquiring the knowledge and skills necessary to assume decision making responsibilities at the time of the project. This area deserves more managerial attention since worker empowerment seems to be a stronger determinant of BPR success, measured in terms of objectives accomplished.

Some of the BPR success factors proposed in the literature show no significant relationships with either measure of success. A success factor such as “using resources effectively” is likely to be so general as to be useless. Similarly, the widely held aphorism “view technology as an enabler, not a solution” shows no relationship to accomplishing BPR project goals and objectives, or to producing significant improvements in company performance. The same can be said about the major underpinning of Total Quality Management, “a desire for continuous performance improvement.” All three of these BPR success factors proposed in the literature can not be discounted on a conceptual basis. On the average, they have been rated by BPR project managers as generally very important or at least moderately important. However, all three seem to be meaningless in practice. A likely explanation is that they are useless success factors because they can not be operationalized. Another proposed success factor which has shown no relationship to either measure of BPR success is to “simplify material flow, logistics, planning, and other distinct operations by using group technology.” On the average, project managers have rated this success factor moderately to very important in general, however group technology was used for a small percentage of BPR projects, thus this success factor was not properly tested.

Many authors discuss BPR success factors without carefully and explicitly defining BPR success. The results speak loudly about the need for clearly defining success before enumerating any list of factors considered important for successful implementation. Clearly, some of the factors studied here, such as the need for targeting only a few critical business processes per project and for revising procedures which cater to internal requirements rather than the marketplace, seem important to both measures of BPR success used in this study: extent to which project goal and objectives were accomplished and project impact on company performance. However, most of the factors are important to only one of the success measures. This indicates that, while both success measures are important, they have dramatically different natures. In other words, its is possible that a particular BPR project has completely met its goals and objectives while it also failed to produce a significant impact on company performance. Based on Table 5, most success factors are associated with accomplishing BPR project goals and objectives without significant impact on company performance. These success factors are: using industry specialists and outside assistance in general, reeducating/training employees on the nature of BPR, empowering employees in decision making, implementing new processes as planned, developing a defined project organization, and adopting an integrated approach to IT and business planning, all five factors under the Communication label, developing a rough-cut design to identify major issues early, determining all set up details before implementation, focusing on outcomes rather than tasks, having senior managers initiate, motivate, and assume responsibility for project success. Managers should consider the possibility that a project’s operational goals may be mutually exclusive with results in terms of company financial performance, where the former would have a more short term nature and the latter would be more long term and dependent upon a wider variety of factors.

One may question the importance of accomplishing project goals and objectives if that does not result in significant impact on company performance. Managers must carefully consider the potential strategic benefits for a BPR project before initiating the “dramatic

changes" usually associated with such efforts. Perhaps some of the projects in the sample were poorly executed (from a strategic business perspective), perhaps the business processes selected for redesign and reengineering were not important enough to affect overall company performance, or the processes were poorly redesigned and/or implemented. The success factors significantly related to accomplishing BPR project targets may be considered necessary but not necessarily sufficient for BPR success. These success factors may lead to an operational definition of success, without necessarily leading to competitive advantages or improvement in company performance. Perhaps one can assume a hierarchy of success measures with the accomplishment of project goals and objectives being at the lowest level: critical to project managers but relatively unimportant from a strategic perspective, thus not enough to significantly affect overall company performance, the highest level. Some of the goals and objectives seem strategically important, such as increasing competitiveness by reducing costs, but market dynamics and other factors may dilute the impact on company performance while accomplishing this objective. The benefits from the BPR project may be considerable, but can also be diluted over time by a host of other variables. Thus, it behooves top managers to identify these variables affecting specific BPR projects, and include as part of the project goals and objectives preemptive measures. For example, if competitors are expected to react to a BPR project with a similar project, one of the goals should be to preempt such move and make things more difficult for the competitor. Most if not all the BPR projects described in the literature neglected to consider the extended market reaction to the project. Most carefully considered only the immediate reaction of direct beneficiaries (i.e. customers, suppliers or partners) or guessed at the results.

Perhaps far more important are the few success factors significantly related to company performance: starting the project based on customer demands and competitive requirements, targeting few critical cross functional business processes, reducing costs and cycle times with automation, using hands on company experience to reengineer diverse processes instead of making changes based solely on conceptual recommendations from outsiders, clearly distinguishing between productive activities from the ones providing no added value, and revising procedures which do not address market requirements. It behooves project managers and top managers alike to ensure that their BPR projects are in compliance with these relatively more strategically important BPR success factors.

5.1 Study Limitations and Future Research Requirements

While this study's major objectives were accomplished, it has some limitations which should be viewed as opportunities for future research. The absence of any established BPR theory capable of producing results significant for business practice has forced the author to develop a conceptual framework mostly based on industry experience and publications. While the measures were considered valid by practitioners test-piloting the questionnaire, and constructs internal reliability were found to be satisfactory, further statistical analysis should be undertaken to identify sub-constructs and, in turn, assess their psychometric qualities.

As organizations change over time to improve competitiveness by implementing substantial structural changes, flattening hierarchies, forming self-directing teams, adopting distributed configurations for their information systems resources, new BPR success factors are likely to arise and the relevance of old ones should be questioned. Periodically, this study should be replicated. Also there is need for longitudinal studies to consider the extended market reaction to BPR projects. Most published material have considered only the immediate reaction of direct beneficiaries from the BPR

projects (i.e. customers, suppliers or partners), while some of the authors merely guessed at the longterm results.

Last, multivariate statistical analysis should be conducted to explore possible relationships among the independent variables and clearly identify their mediating and moderating effects. The more important success factors, those with significant strategic impact, should be looked at more closely. Instead of a single item measure, these success factors should be explored for any construct multidimensionality, to be measured with multi-item scales with greater reliability. Despite these limitations, this study makes a significant contribution as a first attempt at empirically testing the antecedents of BPR success.

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FATORES RELEVANTES PARA O ÊXITO DE REENGENHARIA DE PROCESSOS EM EMPRESAS DE MANUFATURA

Resumo

Reengenharia de processos de negócios tem sido considerada como uma melhoria radical necessária para a competitividade da organização, entretanto na prática são muitos os casos de insucesso. Assim, torna-se necessário uma avaliação sistemática e rigorosa dos fatores considerados importantes para o êxito desse tipo de projeto. Este é o objetivo principal do trabalho apresentado. O êxito é aqui definido em três diferentes aspectos: metas e objetivos do projeto, benefícios obtidos do projeto, e o impacto no desempenho da empresa. A partir dos resultados da pesquisa, são apresentadas recomendações para que os gerentes foquem sua atenção e recursos nos fatores relevantes ao êxito e procedam de forma a minimizar o risco de fracasso. Questionários foram enviados pelo correio a gerentes e diretores de auditoria interna de 586 empresas de manufatura selecionadas aleatoriamente. Obteve-se uma amostra de 135 questionários, representando uma taxa de resposta de 22 por cento. De modo geral, as empresas não estão enfatizando algumas das mais importantes atividades e tarefas recomendadas na literatura de reengenharia, tais como mudança para processos de negócio orientados para o mercado, o elemento que adiciona valor a cada atividade de negócios e aplicação da inovação tecnológica adequada. Baseado nos resultados, recomenda-se à alta administração que não se engaje em projetos de reengenharia antes de ter assegurado a presença dos fatores de êxito considerados relevantes na pesquisa. Embora os resultados sejam baseados em empresas de manufatura, os mesmos podem ser generalizados para outros setores.

Palavras-chave: reengenharia de processos, fatores de êxito, implementação, êxito de projetos de reengenharia.