Business process reengineering: a survey of international experience

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Abstract Despite the widespread adoption of business process re-engineering (BPR), it has in many cases repeatedly failed to deliver its promised results. The lack of integrated implementation approach to exploiting BPR is seen as one of the important reasons amongst others, behind BPR failures. Yet, a relative void in the literature remains the scarcity of suitable models and frameworks that address the implementation issues surrounding BPR. This motivates the presented study to attempt to provide a “frame of reference” with which current practices can be re-positioned. A survey was therefore designed to collect data from a sample of organizations in the USA and Europe. The survey assesses the level of importance placed on the essential elements of integrated BPR implementation. In doing so, the study was also able to identify the level of maturity of BPR concepts within organisations. Empirical findings are then discussed in the context of other studies.

Introduction
Increases in consumer requirements for both product and service efficiency and effectiveness has resulted in business process reengineering (BPR). The reengineering of business processes is concerned with fundamentally rethinking and redesigning business processes to obtain dramatic and sustaining improvements in quality, cost, service, lead-times, outcomes, flexibility and innovation (Hammer and Champy, 1993).

Watts (1995) calls for the need to establish an integrative and holistic view on BPR. Al-Mashari and Zairi (2000, p. 36) define holistic BPR as:

…a continuum of change initiatives with varying degrees of radicalness supported by IT means, at the heart of which is to deliver superior performance standards through establishing process sustainable capability.

Along similar lines, Andreu et al. (1997) and Watts (1995) believe that holistic BPR should recognize the importance of processes and technology and their integration in business vision, structure and relationships, resources and culture. Yet, research studies that claim to adopt a holistic perspective are still
lacking many critical constructs, as found by Deakins and Makgill (1997, p. 104) who state that:

...there is limited evidence that broad implementation issues are now being addressed to the same extent as the (previously dominant) IT issues

Survey studies like those of Mitchell and Zmud (1995), Doherty and Horsted (1996), Braganza and Myers (1996) and Kohli and Hoadley (1997) do not address BPR implementation factors from a holistic view. Even some large industry surveys (e.g. ProSci, 1997), that have attempted to enhance the understanding of BPR, fail to capture some of the dimensions that the holistic perspective demands. Other work that has addressed BPR success factors, has been largely anecdotal in nature or based on single organisations (e.g. Davenport, 1993; Davidson, 1993). Although, Vakola and Rezgui (2000) go some way to extrapolating key success factors through critiquing development and implementation BPR methodologies. Clearly, an exploratory survey study is necessary to achieve an assessment and generalizability, as well as providing additional richness about some pertinent concepts and issues involved in implementing the BPR holistic perspective.

BPR: definitions and barriers
Much of management’s difficulty in understanding BPR centres around the inherent difficulty in defining the constituents of a “business process” (Nickols, 1998). This presents much difficulty, as it then becomes unclear what is actually being reengineered. Irani et al. (2000) provides a comprehensive review of differing opinions on what constitutes a business process. Similarly, Al-Mashari and Zairi (2000, 1999) review the BPR literature and show that there is no clear and agreed definition of this term. Examples of definitions extrapolated by Irani et al. (2000) include:

- “a set of activities that, taken together, produces a result of value to a customer” (Hammer and Champy, 1993);
- “a set of logically related tasks performed to achieve a defined business outcome” (Davenport and Short, 1990);
- “an ordering of work activities with a beginning, end, and clearly identified inputs and outputs” (Davenport, 1993); and
- “any sequence of pre-defined activities executed to achieve a pre-specified type or range of outcomes” (Talwar, 1993).

Al-Mashari and Zairi (2000) suggest that reengineering of business processes involves changes in people (behaviour and culture), processes and technology. As a result, there are many factors that prevent the effective implementation of BPR and hence, restrict innovation and continuous improvement. These are identified by Irani et al. (2000) to include loss of nerve, focus and stamina; senior management who are comfortable in their “ivory towers”; lack of “holistic” focus and settling for minor improvement gains; human and
organisational issues; organisational culture, attitudes and skills based; and resource restrictions and fear of information technology (IT).

BPR’s promised business benefits, in most cases, remain very elusive and the problems it creates are a bigger distraction than it could have been anticipated. Numerous surveys and reports highlight the problems associated with BPR implementation. Some of the problems associated with the BPR concept include for instance the following areas:

- BPR appeals to senior managers because it promises the quickest short cut to success and business excellence.
- The concept itself has a lot of appeal because it is simple to absorb and its rules are not too complex.
- BPR promises immediate benefits and major leaps in competitive performance. This is very compatible with a culture of “short termism” in the West.
- BPR is promoted as a better alternative to other modern management concepts such as total quality management (TQM), since it is supposed to be less costly to implement and guarantees real benefits much more quickly.
- BPR in most cases refers to the implementation of hard solutions dealing with soft problems, thus suggesting that the use of IT for instance will go a long way to making businesses more effective and securing future competitiveness.

Research methodology and framework
Table I summarizes the themes and findings of six representative empirical studies on a variety of BPR issues. These studies show the importance of this study in eliciting the experience of organisations regarding elements and key factors in holistic BPR implementation (Figure 1). This is clearly targeting the “what” components of research (structural components), and it requires a possible large sample and a wide range of organisations. Given the nature of the topic, and as supported by Eisenhardt (1989) and Yin (1989), this type of inquiry favours the use of an exploratory structured questionnaire survey. This study attempts to unify the available writings and research work, which mostly represent different schools of thought on BPR implementation. As a result, groups and categories are extrapolated from the literature, and represented by a set of structural elements based on which a large-scale mail survey can be designed and used to collect data.

This study begins with a comprehensive review of relevant literature on BPR implementation. The literature review provides a grounding of the research and focus, as well as establishing a basis for developing the research instrument. The identified key components in BPR implementation represented the structural elements that make up the questionnaire survey.

A standardised questionnaire was developed to elicit data from a large sample of organisations in the USA and Europe. The rationale for choosing the
USA and Europe is justified by Deakins and Makgill's (1997) findings that suggest BPR practice has more presence in these parts of the world than others. The survey was an attempt to assess the level of importance of the elements that constitute the holistic approach to BPR implementation. It was also aimed at identifying the level of maturity of BPR concepts and practices. Moreover, it sought to provide assessment of the level of familiarity, experience and comprehension of the essential elements of BPR within the sample organisations.

The organisations that took part in this survey were chosen from three main sources, the *American Society for Quality Directory* (1998), the *European Foundation for Quality Directory* (1997), and the *Strategic Planning Society Directory* (1998) of the UK. These three societies have a long-established history, particularly in relation to business performance improvement through

<table>
<thead>
<tr>
<th>Author</th>
<th>Themes of research</th>
</tr>
</thead>
</table>
| Doherty and Horsted (1996) | Organisations becoming increasingly aware of cost of survivor syndrome during and after BPR  
Managing both leavers and survivors a necessity in managing major change  
Successful BPR must consider people-related issues at three levels: organisational change, personal transition and psychological contract |
| Zairi and Sinclair (1995)  | Organizations that have adopted TQM show greater use of strategic and process management techniques, benchmarking and self-assessment in BPR efforts  
On project basis, BPR appears less successful at TQ organisations |
| ProSci (1997)              | Ensuring sponsorship, creating strategic alignment, building strong teams, establishing business case for change, using proven methodology, and managing change effectively are areas critical to successful BPR projects |
| Hewitt and Yeon (1996)     | Ranking of management philosophies, objectives, and techniques associated with BPR  
BPR practice in terms of duration, initiators, scope, success factors, and drivers |
| Braganza and Myers (1996)  | Degrees of awareness of BPR by different management personnel  
Ranking of key reasons for doing BPR  
BPR is adopted alongside other change initiatives  
Identifying degree of importance and difficulty associated with five essential items |
| Kohli and Hoadley (1997)   | BPR concepts and tools assessed considered useful  
BPR effective approach to improve competitiveness  
BPR not a passing fad  
40 percent of responding organisations are planning for more BPR in future |

Table I. Empirical surveys on various BPR issues
strategic programmes of TQM and BPR-related changes. These directories list the names and addresses of the organisations’ representatives (e.g. directors, quality managers, and process improvement managers). Addressing the questionnaires to these representatives directly (rather than to the organisation anonymously) was thought to enhance the chance of getting back a quick and effective response. Moreover, the membership of all these societies is subscription-based. This gives more confidence in the relevance and quality of the population from which organisations were sampled. Two major BPR newsgroups on the Internet, (BPMI@quality.org) and (BPR-IAC@quality.org), were also used to gain more participation in the survey.

This study planned to obtain responses from different industries, so that generalisation of the findings could be established. However, the selection process was made semi-randomly, as some organisations which are known from the literature for their mature experiences with BPR were intentionally selected. Nonetheless, it is the case that many other organisations were not selected on this basis. As supported by Trochim (1997) and Vaus (1985), this approach can ensure a balance between richness and quality of data obtained.
which helps develop a better understanding of a phenomenon that is research-poor, and random selection which enables generalisation of findings. Initially, a total of 498 questionnaires were mailed to the selected organisations. Of these, 362 were sent to the USA, while 136 were sent to European organisations. Resulting in a final response rate of 10.16 percent. This response rate compares to some mail surveys reported in the BPR literature (e.g. Zairi and Sinclair (1995), with 13 percent response rate). The analysis of the data collected from the questionnaires follows a number of basic statistical techniques to identify and interpret the respondents’ ratings. To meet these needs, frequency distributions and means were calculated. Empirical data from secondary survey questionnaires available from the BPR literature were used to validate externally the findings of this survey, and to offer possible explanations and comparisons that would help build theories from data.

### Survey findings

**Degree of BPR-related organisational change**

As the study takes an integrative perspective and views BPR as a continuum of change initiatives with varying degrees of radicalness, respondents were asked to indicate the amount of effort spent on each level of change, in the form of a percentage. The scale was as follows: 1 = process improvement, 2 = moderate redesign, 3 = process redesign, 4 = moderate reengineering, and 5 = very radical reengineering. Although the response rate to this question was very low, some exciting and interesting results can be drawn from the data. Figure 2 presents a novel contribution through the “BPR progression ladder” that shows that process change efforts tend to decrease as change increases in scope and

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**Figure 2.**

BPR progression ladder

<table>
<thead>
<tr>
<th>Change Degree</th>
<th>Process Improvement</th>
<th>Process Redesign</th>
<th>Radical Reengineering</th>
</tr>
</thead>
<tbody>
<tr>
<td>0</td>
<td>0</td>
<td>0</td>
<td>0</td>
</tr>
<tr>
<td>1-20</td>
<td>0</td>
<td>0</td>
<td>0</td>
</tr>
<tr>
<td>21-40</td>
<td>1</td>
<td>3</td>
<td>9</td>
</tr>
<tr>
<td>41-60</td>
<td>2</td>
<td>2</td>
<td>4</td>
</tr>
<tr>
<td>61-80</td>
<td>1</td>
<td>1</td>
<td>1</td>
</tr>
<tr>
<td>81-100</td>
<td>1</td>
<td>0</td>
<td>2</td>
</tr>
</tbody>
</table>

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<table>
<thead>
<tr>
<th>Scope</th>
</tr>
</thead>
<tbody>
<tr>
<td>US</td>
</tr>
<tr>
<td>Europe</td>
</tr>
</tbody>
</table>

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Business process reengineering

degree of radicalness. One possible explanation for this trend is that when organisations consider business improvement as a never-ending strategic initiative, they keep themselves at the forefront of change by adopting several tools, like continuous benchmarking, which stop them from having to embark on huge, radical reengineering efforts. In such cases, incremental improvement and process redesign efforts may result in big gains and, as a result, the scope for radical and innovative reengineering efforts decreases. This appears to be less evident in organisations that do not have an integration mechanism by which process change is deployed as a strategic programme. In these cases, organisations usually find themselves in a position where there is a great urgency for radical change and where an incremental improvement will not be of sufficient help.

Integration of BPR with other improvement tools
Respondents were asked to rate the level of integration of three major improvement tools with BPR, on a scale ranging from 1 = very low to 5 = very high (Table II). Change management was ranked highest, followed by TQM (both of which are above average), with benchmarking ranking last.

However, there is a variation in rankings between the US and European organisations, in that the US respondents rank TQM highest, whereas the Europeans rank change management highest. This may be due to the US organisations' greater experience in practising BPR, and the priority placed on adopting TQM to sustain the benefits gained from BPR. In contrast, and with their lesser experience in implementing BPR-related change, the European organisations' consideration of change management as a first priority for integration can be put down to its crucial role in implementing BPR. In this sense, benchmarking is logically expected to follow change management in integration in European organisations, as it is essential to uncover areas of change and to prioritise them. In US organisations, change management is a secondary priority of integration, as it is viewed as supporting the continuous improvements resulting from TQM efforts.

Integrating BPR with TQM
Table III shows an overall agreement across all organisations in both the USA and Europe in rating the level (on a scale of 1 = very low to 5 = very high) of attempting six approaches for integrating TQM with BPR. Although ranked

<table>
<thead>
<tr>
<th>Tool</th>
<th>Overall Mean</th>
<th>Overall Rank</th>
<th>USA Mean</th>
<th>USA Rank</th>
<th>Europe Mean</th>
<th>Europe Rank</th>
</tr>
</thead>
<tbody>
<tr>
<td>Change management</td>
<td>3.11</td>
<td>1</td>
<td>2.97</td>
<td>2</td>
<td>3.26</td>
<td>1</td>
</tr>
<tr>
<td>TQM</td>
<td>3.03</td>
<td>2</td>
<td>3.37</td>
<td>1</td>
<td>2.71</td>
<td>3</td>
</tr>
<tr>
<td>Benchmarking</td>
<td>2.85</td>
<td>3</td>
<td>2.73</td>
<td>3</td>
<td>2.97</td>
<td>2</td>
</tr>
</tbody>
</table>

Note: Scale: 1 = very low; 5 = very high
the same by the US and European respondents, the US organisations are somewhat ahead in utilising these approaches of integration. The highest ranked approach among all organisations, however, is combining short-term improvement with long-term innovation. The second approach is making continuous improvement come after radical process change. Using a revolutionary design of change, and an evolutionary implementation is ranked third. Using BPR for a high level design of processes & TQM for a detailed design is ranked fourth. Creating a process portfolio, where processes are classified based on types of changes required whether they are radical or incremental is ranked fifth. Wavering between TQM and BPR is ranked sixth.

Table IV shows overall agreement across all organisations in rating the level of using five approaches of benchmarking in BPR (on a scale of 1 = very low to 5 = very high). Although ranked the same by both the US and European respondents, the European organisations are slightly ahead in using these approaches. This is

<table>
<thead>
<tr>
<th>Use of benchmarking in BPR</th>
<th>Overall Mean</th>
<th>USA Mean</th>
<th>Europe Mean</th>
</tr>
</thead>
<tbody>
<tr>
<td>To identify best practice performance and processes in the future</td>
<td>3.46</td>
<td>3.44</td>
<td>3.48</td>
</tr>
<tr>
<td>To highlight areas of change and prioritise them</td>
<td>3.10</td>
<td>2.91</td>
<td>3.30</td>
</tr>
<tr>
<td>To identify innovative process attributes</td>
<td>2.87</td>
<td>2.81</td>
<td>2.93</td>
</tr>
<tr>
<td>To determine process objectives</td>
<td>2.79</td>
<td>2.69</td>
<td>2.90</td>
</tr>
<tr>
<td>To make a proper decision about type of change whether to be a revolutionary or an evolutionary</td>
<td>2.49</td>
<td>2.50</td>
<td>2.48</td>
</tr>
</tbody>
</table>

Note: Scale: 1 = very low; 5 = very high
compatible with the results shown in Table II, where benchmarking was ranked second in its level of integration with BPR in the European organisations, compared to being ranked third in the US organisations. The highest ranked approach among all the organisations, however, is using benchmarking to identify best practice performance and processes in the future. Using benchmarking to highlight areas of change and prioritise them was ranked second.

**Change management elements in BPR**

Table V shows that there was overall agreement on the rankings for levels of consideration of six elements of change management in BPR. However, the European organisations are slightly ahead in considering these elements of change, which, again, is compatible with the results shown in Table VI where Europe ranked change management top in its level of integration with BPR, whereas the USA ranked it as a second priority. All organisations ranked the approach of changing roles and responsibilities highest. The second element is changing organisational structure.

**BPR methodology**

Table VI shows the average effort spent on each stage of a BPR methodology. The results indicate that organisations put most of their efforts into the “Diagnosis” stage. This is probably because, due to lack of experience of a

<table>
<thead>
<tr>
<th>Dimensions of change</th>
<th>Overall</th>
<th>USA</th>
<th>Europe</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Mean</td>
<td>Rank</td>
<td>Mean</td>
</tr>
<tr>
<td>Roles and responsibilities</td>
<td>3.55</td>
<td>1</td>
<td>3.22</td>
</tr>
<tr>
<td>Organisational structure</td>
<td>3.48</td>
<td>2</td>
<td>3.19</td>
</tr>
<tr>
<td>Management systems</td>
<td>3.24</td>
<td>3</td>
<td>3.06</td>
</tr>
<tr>
<td>Skill requirements</td>
<td>3.19</td>
<td>4</td>
<td>3.03</td>
</tr>
<tr>
<td>Shared values and beliefs</td>
<td>3.16</td>
<td>5</td>
<td>3.03</td>
</tr>
<tr>
<td>Reward and recognition systems</td>
<td>2.55</td>
<td>6</td>
<td>2.81</td>
</tr>
</tbody>
</table>

*Note: Scale: 1 = very low; 5 = very high*

<table>
<thead>
<tr>
<th>Stage</th>
<th>Overall</th>
<th>USA</th>
<th>Europe</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Mean</td>
<td>Rank</td>
<td>Mean</td>
</tr>
<tr>
<td>3. Diagnose</td>
<td>3.61</td>
<td>1</td>
<td>3.59</td>
</tr>
<tr>
<td>2. Initiate</td>
<td>3.32</td>
<td>2</td>
<td>3.15</td>
</tr>
<tr>
<td>1. Envision</td>
<td>3.21</td>
<td>3</td>
<td>3.12</td>
</tr>
<tr>
<td>4. Redesign</td>
<td>3.17</td>
<td>4</td>
<td>3.01</td>
</tr>
<tr>
<td>6. Evaluate</td>
<td>3.14</td>
<td>5</td>
<td>3.16</td>
</tr>
<tr>
<td>5. Reconstruct</td>
<td>2.92</td>
<td>6</td>
<td>2.69</td>
</tr>
</tbody>
</table>

*Note: Scale: 1 = very low; 5 = very high*
systematic approach, organisations may have difficulties in analysing existing processes and this, in turn, may require more attention and effort. The greatest emphasis was placed on the “initiation” stage, followed by the “envision”, “redesign”, “evaluate”, and “reconstruct” stages.

**BPR techniques and tools**

Table VII illustrates usage levels of 11 major groups of techniques and tools in BPR efforts. Overall results show that eight techniques were used moderately, with the levels of using the other three being below average. “Project management” techniques that are used for budgeting and scheduling, such as PERT, CPM and Gantt charts, were ranked highest. This is probably because organisations consider project planning activities as the most critical task in managing a BPR programme. The next most used techniques were “Process capture and modelling”, followed by “Problem solving and diagnosis”. Surprisingly, the results revealed that the organisations made least use of process prototyping and simulation techniques. This can be put down to the complexity frequently associated with them, the prerequisite minimum level of familiarity, the variety of approaches for making use of them, and the conditions that need to be met to ensure feasible use of such techniques. The techniques related to “IS system analysis and design” were also ranked below average. One possible justification for this may be that these techniques are usually used at lower levels, where further stages of the detailed design of the software system are taking place. Also, many organisations choose to outsource the information system (IS) components rather than develop them internally and, therefore, they do not need to go deeply into the detailed design. “Change management” techniques, such as persuasion and assumption surfacing, were not rated highly, possibly because, as Malhotra (1996) noted, there is a lack of software tools and established techniques which can deal effectively with the human side of change.

As demonstrated in Table VII, there is a considerable difference between utilisation levels of BPR techniques between the US and European organisations.

<table>
<thead>
<tr>
<th>Technique</th>
<th>Overall Mean Rank</th>
<th>USA Mean Rank</th>
<th>Europe Mean Rank</th>
</tr>
</thead>
<tbody>
<tr>
<td>Project management budgeting</td>
<td>3.50 1</td>
<td>3.25 4</td>
<td>3.77 1</td>
</tr>
<tr>
<td>Process capture and modelling</td>
<td>3.45 2</td>
<td>3.31 3</td>
<td>3.60 2</td>
</tr>
<tr>
<td>Problem solving &amp; diagnosis</td>
<td>3.27 3</td>
<td>3.38 1</td>
<td>3.16 6</td>
</tr>
<tr>
<td>Organisational analysis &amp; design</td>
<td>3.19 4</td>
<td>3.03 7</td>
<td>3.34 3</td>
</tr>
<tr>
<td>Customer requirement analysis</td>
<td>3.16 5</td>
<td>3.09 5</td>
<td>3.22 4</td>
</tr>
<tr>
<td>Business planning critical</td>
<td>3.13 6</td>
<td>3.06 6</td>
<td>3.20 5</td>
</tr>
<tr>
<td>Process measurement</td>
<td>3.03 7</td>
<td>3.37 2</td>
<td>2.67 8</td>
</tr>
<tr>
<td>Creative thinking</td>
<td>3.00 8</td>
<td>3.03 7</td>
<td>2.97 7</td>
</tr>
<tr>
<td>Change management</td>
<td>2.43 9</td>
<td>2.50 8</td>
<td>2.34 9</td>
</tr>
<tr>
<td>IS systems analysis and design</td>
<td>2.19 10</td>
<td>2.34 9</td>
<td>2.03 10</td>
</tr>
<tr>
<td>Process prototyping and simulation</td>
<td>2.08 11</td>
<td>2.28 10</td>
<td>1.86 11</td>
</tr>
</tbody>
</table>

Table VII. Ranking of usage to techniques and tools in BPR efforts

**Note:** Scale: 1 = very low; 5 = very high
While the European respondents rank “Project management” techniques highest, the US organisations rank “Problem solving and diagnosis” techniques highest. Also, while eight techniques were ranked above average in the US organisations, just six techniques were given the same ranking by the European organisations. Furthermore, the European organisations lag behind the USA in using the “Process prototyping and simulation” techniques, as this group of techniques was the only one that was rated very low.

Respondents were asked to rate the levels of realisation of four major benefits they expected from using software tools in BPR efforts. Contrary to the results highlighted in the literature (Kettinger et al., 1997; Klein, 1994), Table VIII indicates that none of the four benefits were highly achieved, especially in the European organisations. The US organisations, however, rate three of these benefits above average, but the benefit of finishing projects faster was ranked least by both sets of respondents. A similar ranking was also given by both the US and European respondents to the benefit of using BPR software tools to produce higher quality results.

Relationship between IT infrastructure and organisation in BPR

Respondents were asked to indicate the nature of the relationship between IT infrastructure and organisation in implementing their BPR efforts, by selecting one of three statements describing three imperatives in this process.

Results show that 45 percent of the organisations take a socio-technical perspective of this process. From this perspective, both IT infrastructure and organisational infrastructure are viewed as being mutually evolving, thus the information needs of new processes determine the IT infrastructure constituents, and a recognition of IT capabilities provides alternatives for BPR. A further 40 percent of respondents take the organisational perspective. This perspective is based on identifying organisational information needs and then determining IT infrastructure choices. Finally, 11.7 percent of the respondents take the technical perspective, making it the least used approach. The technical perspective entails implementing IT and then determining change opportunities.

Overall, these perspectives were ranked the same by both the US and European respondents. Interestingly, Table IX shows that the European organisations are more inclined to adopt the socio-technical and organisational

<table>
<thead>
<tr>
<th>Benefits</th>
<th>Overall Mean</th>
<th>Rank</th>
<th>USA Mean</th>
<th>Rank</th>
<th>Europe Mean</th>
<th>Rank</th>
</tr>
</thead>
<tbody>
<tr>
<td>Producing higher quality results</td>
<td>2.92</td>
<td>1</td>
<td>3.10</td>
<td>1</td>
<td>2.72</td>
<td>1</td>
</tr>
<tr>
<td>Improving productivity</td>
<td>2.83</td>
<td>2</td>
<td>3.00</td>
<td>3</td>
<td>2.66</td>
<td>2</td>
</tr>
<tr>
<td>Eliminating non-value-added work</td>
<td>2.81</td>
<td>3</td>
<td>3.03</td>
<td>2</td>
<td>2.57</td>
<td>3</td>
</tr>
<tr>
<td>Finishing projects faster</td>
<td>2.63</td>
<td>4</td>
<td>2.77</td>
<td>4</td>
<td>2.46</td>
<td>4</td>
</tr>
</tbody>
</table>

Note: Scale: 1 = very low; 5 = very high

Table VIII. Ranking of benefits of using software tools
perspectives in BPR than the US organisations. However, in taking the technical perspective, the US organisations are ahead of the European organisations.

**BPR success**

Respondents were asked to give a percentage indicating the level of success that their organisations have achieved in BPR implementation. Overall average success percentage was 55.46 percent. This result disconfirms the often-cited 30 percent rate of success (Hammer and Champy, 1993). US organisations, however, are more successful in BPR than European organisations. While US organisations have achieved 61.44 percent level of success, the average success rate in Europe is 49.48 percent. Table X shows percentages of success after they were grouped into five levels: fail, low, moderate, high, and very high. Most success rates were in a high range, followed by success rates in moderate ranges, a very high range, and lastly in a low range.

**Discussion of findings**

The findings from the survey questionnaire presented are discussed in the following sections in the context of other studies and major empirical surveys in the field of BPR.

**General findings**

The overall findings of this study confirm that BPR implementation issues are generic. Clearly, they do not differ in terms of organisation nationality, and that US organisations are generally somewhat ahead in the level of awareness and familiarity with various tools and techniques of BPR, due to the longer experience they have had with it. This is in line with the results of Sockalingam and Doswell’s (1996) empirical study, which shows that US businesses outperform others in terms of levels of awareness, commitment and contemplation regarding BPR.

**Table IX.**

Assessment of IT implementation approaches in BPR

<table>
<thead>
<tr>
<th>Perspective of IT implementation</th>
<th>Overall (%)</th>
<th>USA (%)</th>
<th>Europe (%)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Socio-technical</td>
<td>45</td>
<td>43.3</td>
<td>46.7</td>
</tr>
<tr>
<td>Organisational</td>
<td>40</td>
<td>36.7</td>
<td>43.3</td>
</tr>
<tr>
<td>Technical</td>
<td>11.7</td>
<td>13.3</td>
<td>10</td>
</tr>
<tr>
<td>Other</td>
<td>3.3</td>
<td>6.7</td>
<td>–</td>
</tr>
</tbody>
</table>

**Table X.**

Percentages of levels of BPR success

<table>
<thead>
<tr>
<th>Success level (%)</th>
<th>Frequency</th>
<th>Percentage</th>
</tr>
</thead>
<tbody>
<tr>
<td>Fail (0)</td>
<td>13</td>
<td>20.3</td>
</tr>
<tr>
<td>Low (1-25)</td>
<td>7</td>
<td>10.9</td>
</tr>
<tr>
<td>Moderate (26-50)</td>
<td>17</td>
<td>26.6</td>
</tr>
<tr>
<td>High (51-75)</td>
<td>18</td>
<td>28.1</td>
</tr>
<tr>
<td>Very high (76-100)</td>
<td>9</td>
<td>14.1</td>
</tr>
</tbody>
</table>
Degree of BPR change

It was found in this study that BPR, which adopts a strategic integrated perspective, can be implemented as a continuum of change initiatives that vary in scope and magnitude of improvement. Taking such an approach can ensure a smoother implementation for more radical and wider scope of change. It can also ensure that less radical change will be needed as efforts proceed. Organisations that follow this approach should have the advantage of being more proactive to changes taking place in their business environment. This way, organisations can better perceive their needs early on, and respond to them carefully through more strategic and planned programmes. This is supported by Zairi and Sinclair (1995, p. 15), who state that:

> Organizations which have adopted TQM show greater use of strategic and process management techniques, benchmarking and self-assessment, which place them in an ideal position to make use of re-engineering techniques.

However, more research is still needed to set out the conditions of applying a particular improvement approach for a specific change imperative. Techniques and tools that help link different scales of change into one integrated improvement strategy are also needed. Results of this study, and the study by Kettinger et al. (1997), can provide a good basis for further work in this direction.

Integration with improvement tools

Change management, TQM and benchmarking are important tools for organisations aiming to establish the BPR practice. Change management facilitates the insertion of the newly-designed business processes in the working environment. TQM ensures that reengineering efforts take place when and where they are needed, and secures longer life for the improvements attained. Benchmarking helps shape the strategic direction of the efforts. Yet the findings show that these tools are not highly integrated with BPR. Similar supporting findings can also be drawn from Zairi and Sinclair’s (1995) study, where TQM and benchmarking particularly were rated average. This finding reveals that organisations are still not competent in integration aspects of BPR. This can be put down to a lack of tools, techniques and deployment scenarios that provide assistance and guidance on when and how strategic improvement tools can be linked to BPR implementation. Research is also needed to determine conditions under which a particular strategic approach becomes a priority. The findings of this study show that change management and benchmarking may become priorities for organisations that want to establish BPR as a new program of change. On the other hand, organisations that have already lived with BPR efforts may turn to TQM to sustain the BPR benefits. In line with Kohli and Hoadley’s (1997) findings, organisations with longer experience in BPR are most likely to perceive the benefits of tools related to it. The findings of this study show that while there is a mutual agreement among respondents in ranking various approaches used to integrate each improvement tool with BPR, a variation does
exist in ranking their usage of these tools. This can lead to the argument that these approaches are identical, and the variations in their usage are inherited from the variation in their supergroup tools (e.g. TQM, change management, etc). Though the findings suggest that TQM and BPR success are positively linked, they also reveal that organisational experience in integrating TQM with BPR is still in its infancy, and that more research is needed in this regard. As the findings show, integration of TQM with BPR may take different forms, and serve different strategic themes. Therefore, more research is needed to determine when and how a specific approach of integration can be implemented. As supported by Davenport and Stoddard (1994) and Sockalingam and Doswell (1996), the study asserts that the “clean-slate” approach is impractical. Sockalingam and Doswell (1996) explain that organisations tend to break BPR implementation into several projects in avoidance of the “clean-slate” approach, which results in greater scope of a BPR project with higher level of risk. In a similar way to TQM, though the findings suggest that benchmarking and BPR success are positively linked, they also reveal that organisational experience in integrating them together is still immature, and that more research is needed in this regard. Furthermore, as the findings show, integration of benchmarking with BPR may take different forms, and serve different strategic themes. Therefore, more research is needed to determine when and how a specific approach of benchmarking can be used.

Though the findings suggest that change management and BPR success are positively linked, they also reveal that organisational experience in integrating them together is still in its infancy, and that more research is needed in this regard. In addition, as the findings show, integration of change management with BPR may take different forms, and thus, more research is needed to determine when and how a specific approach of change management can be used.

**BPR methodology, techniques and tools**

The findings of this study show that success of BPR implementation is associated with the use of methodological tools. Yet human resources and change management-related issues are the areas that need to be methodologically addressed by researchers. The study also shows that while diagnosing current processes represents an important stage in BPR, organisations have a difficult task in implementing it. This can be traced directly to the difficulties associated with operationalizing the concept of process orientation and thinking itself, which has been discussed earlier. The study also points to the importance of both ensuring commitment and selecting processes, as two essential initial tasks. It also suggests that both management culture and the degree of formalisation and transparency in management systems can influence the way in which different individual activities may be prioritised. The findings reveal that BPR success is associated with the use of techniques, and that organisations tend to use simple techniques and tools. They show that techniques of project planning and management, and process capturing and modelling are highly important in implementing BPR. The results of this study show that features of simplicity and usability by non-technical people, and the ability to enforce consistency in
analysis and design are important to consider by software tools developers. They also support the findings of El Sawy’s (1997) study, which proved a significant positive relationship between the use of BPR software tools and the quality of the resulting process. At the same time, they contradict the finding that making use of BPR tools would result in finishing a BPR project faster. The results also confirm Manganelli and Klein’s (1994) findings that tool users’ productivity is expected to drop during early use of a new tool. One possible explanation of these results could be, as Davenport (1993) maintains, that using such tools may cause managers to lose sight of the importance of the initiative. This is because, being unaware of the capabilities of such tools and technologies, they reject them, or, at the very least, do not attempt to create an appropriate climate for their successful use by, for example, changing the work and the user support (perceived training, perceived productivity gain and perceived loss of expertise).

**IT infrastructure role in BPR**

As supported by Klempa (1995) and Marchand and Stanford (1995), this study shows that a socio-technical perspective is the most suitable approach to derive a successful BPR. It also shows that taking a technical perspective to BPR implementation is highly associated with failure. However, BPR success is associated with the level of using supporting technologies. As supported by Grover et al. (1995), this study shows that document management, databases, and communication networks are the most widely implemented technologies to enable BPR today, and thus, a continuous development of them is in order.

**BPR success and failure**

Contrary to the 70 percent failure rate claimed by Hammer and Champy’s (1993), and the results of the CSC Index (1994) survey, this study shows that the success rate of BPR is higher (55.46 percent). This is supported by the study of Sockalingam and Doswell (1996), which shows that in Scotland only 6 percent of the BPR projects result in failure, and in the USA it is 78 percent. However, variation between studies in this respect refers to the subjectivity in measuring BPR success and the lack of a common understanding of BPR measures and their application levels. Sockalingam and Doswell (1996, p. 43) state that:

> ...it would be dangerous to conclude that BPR is a global success phenomenon. BPR performance evaluation is inherently subjective, and goals and targets set vary between organizations.

This, in turn, suggests that more research is still needed in the area of BPR measurement, and that a generic measurement framework might be worth developing to suit various levels of BPR application in terms of business position and level of competition, strategic targets, cultural and organisational beliefs and values, and levels of change required.

**Conclusions and implications for future research**

The advent of BPR remains the subject of great interest and yet, of great controversy. Although, the term BPR might have lost favour, most
organisations knowingly or not are involved in BPR. It is the pressure of survival and the need to prevent complacency that prompt BPR. Further motivation comes from the desire to close competitive gaps and achieving superior performance standards, which prompt many organisations to embark on huge BPR projects. In doing so, “wiping out” the past and looking forward to the new thinking, the new ways and the more enlightened approach. Indeed, many of the reported failures are thought to be due to the primary focus of BPR on “technical aspects” and that contemporary strategic thinking takes a competence view of an organisation. The findings presented in this paper make a distinctive contribution to the normative literature by pointing to important elements associated with the BPR implementation process, which adopts a holistic approach:

- Establishing a sound case for change through a comprehensive realisation of internal and external threats and opportunities, benchmarking internal and external practices, identifying the business visions in the targeted areas, and consolidating all that in a well-planned strategy is commonly ascertained by both quantitative and qualitative findings.
- Facilitate the establishment of a “sound knowledge base” through developing a culture based on “knowledge creation” and sharing, where success is awarded/rewarded and yet, failure not stigmatised.
- Taking an integrative approach to BPR implementation through combining different change efforts in one strategic improvement programme is another important element of the holistic BPR. This involves determining improvement areas and developing synchronised strategies to achieve them at different levels and scopes.
- Making use of sound methodologies, tools and techniques ensures a systematic and a well-disciplined process of BPR implementation.
- Assess the “fit” between the most appropriate BPR implementation path and the organisations commitment to change and learning.
- Making use of IT enablers and support for both analysing and modelling processes, as well as to support the new process configuration. In doing so, assessing the human and organisational impact of new technology.
- Change management that includes cultural and structural changes is also asserted by both sets of findings as a core element of BPR implementation. Support and commitment from top management are also an important facilitating factor.
- A variety of socio-technical factors often prevent management from embarking on process improvement initiatives together with a misunderstanding of what type of change may be required (continuous change of major step-change).

This study has a number of limitations that need to be discussed. These limitations are mainly related to the broadness of the topic under investigation,
representativeness and generalizability issues, lack of homogeneous organisational experiences, time constraints, and the limited access to information. However, the findings of the study point to several areas that are worthy for future research. As this study covers a broad area of research, there are many directions in which future research is needed. Through the review of the literature, and from the data collection process, it has been found that there is a lack of common and standardised terms and definitions for BPR, and other types of improvements related to it. This has been reflected negatively in organisational perceptions of BPR concepts and practices. Even the concept of “process” itself has not yet been fully comprehended by organisations. Therefore, there is a great need for more research which solicits opinions and perceptions of both academics and practitioners of BPR definitions and terms, and develops a clearer and common use of the BPR terms. This study can be considered as a good starting point in this area of research, since it embraces a holistic perspective that unifies different focuses and definitions.

There is a lack of methodological research constructs and variables suitable for conducting BPR research. In the measurement area, for instance, research has difficulties in measuring the success of projects that are semi-completed. In BPR practice, it is not unusual to see several projects that have not been completely rolled out. Therefore there is a pressing need to develop multi-level measures that could more accurately provide assessment of the efforts.

As BPR is a long-term programme of change, especially when embraced as a strategic improvement effort, it is more likely that a longitudinal type of research will be most suitable for studying such a phenomenon. This approach allows for more data to be collected, and enables more complete assessment to be made, and more rigorous evidence to emerge.

Research that designs its quantitative and qualitative samples to be heterogeneous, representing different sectors, cultures, approaches and management configurations, should enable the emergence of more research findings, and facilitates comparative kinds of studies.

In view of the assessment related to the future of BPR concepts and practice, it would be interesting for researchers to explore how the concepts and practice of BPR are being integrated with other recently-emerging management approaches, like enterprise resource planning, business process management, learning organisation, and knowledge management. It is expected that organisations will begin to face the challenge of embracing different management tools in a complementary manner.

Finally, the area of electronic commerce (EC) is emerging very rapidly. EC applications will undoubtedly call for some type of business process change. Therefore, it would be interesting for researchers to explore how the application of EC technologies, such as the Internet, will integrate with the principles of BPR. In addition, researchers and practitioners alike will need to develop suitable frame of references to support the navigation through evaluating the scope and impact of BPR-IT related change initiatives.


