SWP 13/94 CLASSFYING AND PLANNING BPR INITIATIVES: THE BPR WEB

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Classifying and planning BPR initiatives: The BPR Web

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The purpose of this paper is to propose a framework for classifying Business Process Redesign (BPR) initiatives, and to share its initial application in organisations undertaking BPR. There is a growing necessity for such a framework as BPR is being reduced to a cliché, which today includes almost any change initiative. Such a generalising of BPR would be a great pity as it effectively debars one organisation from learning from the experience of others. Possibly the most significant benefit from the framework is that it will provide a language to facilitate communication between organisations to share experiences of BPR. Additionally the Web is a management tool as it facilitates selection of appropriate management styles for various classes of BPR.

Research work at Cranfield continues to expand experiences of usage of the Web. However, even at this stage it is proving a useful framework to which practising managers are able to relate.

1. Why is a BPR framework necessary?

Much of the BPR research effort to date has focused primarily upon the development of methodologies for process redesign. For example, the work of Morris and Brandon (1993). Davenport and Short (1990), Kaplan and Murdock (1991), Harrington (1991), Nolan Norton & Co. (Eckerson) (1992), and the Butler Cox Foundation report (1991) are essentially methodology formulation. The methodologies proposed usually have between five and nine steps. These steps usually require the organisation to develop a vision of the business; then identify important processes; redesign the processes; develop a prototype to test ideas; implement throughout the business and measure the effect of the change. The methodologies proposed are akin to a set of directions: if an organisation follows a series of steps (some of which are iterative or need to be carried out concurrently), then the methodology will lead to redesigned processes, and hence, supposedly, benefits. However, the breadth of what is defined as BPR (see Belmont and Murray (1993), Hammer (1990), and Harrington (1991) for a range of views) makes it very difficult to imagine any one methodology being appropriate. What is required is a classification of BPR initiatives such that a suitable methodology can be chosen in relation to the aims of the change. Once the management team has agreed the class of redesign that it proposes the organisation to undergo, it could then select an appropriate methodology. This would be based on the features of the proposed redesign initiative rather than applying a single methodology in the same way for all organisations.

In November 1992, Cranfield held a two day symposium titled Business Process Redesign - Developing Strategies and Reaping Benefits. Directors and senior managers from a diverse range of multinational organisations, such as Grand Metropolitan (spirits and fast foods), Asea Brown Boveri (turnkey and large construction), British Telecommunications (world-wide telecommunications), Prudential Life Assurance, British Aerospace (aircraft manufacturers) and First Direct (personal banking) spoke about process redesign initiatives in their organisations. A number of issues were found to be common. For example, the need to introduce process measures, problems encountered when changing reward structures, and the politics of gaining senior management commitment, recurred in several presentations. However, by the end of the two days it became difficult to hold an intelligent discussion based on the speaker's experiences. This occurred because no classification was available against which delegates could compare BPR activities and experiences. This made learning from the speaker's experiences very difficult. For example, one organisation used a detailed process redesign methodology to change the

interactions between two functions; whilst another used a series of senior management workshops with no detailed process redesign methodology to make fundamental changes to the organisation, yet both were reported as highly successful. Should one draw the conclusion that either method is appropriate or that the two initiatives were significantly different and each was appropriate in its situation?

Further, delegates at the symposium expressed a strong view that the IT department should be distanced from BPR activities. Yet a large number, if not the majority, of examples in the literature point to IT playing a key part in BPR Hammer and Champy (1993). Davenport and Short (1990) cite several examples, including American Express, US Sprint and Baxter Healthcare, where IT played a major role in the redesign initiative. For example, Baxter Healthcare's IT function (rather than a BPR team) identified the organisation's twenty nine processes. Benjamin and Levinson (1993) assert that IT has a central role when moving towards a process orientation and even propose a set of principles to achieve such changes. Once again inconsistency, with the result of difficulty in learning from others experiences.

There are differing views in the area of financial justification and measurement of a BPR initiative. Butler Cox (1991) contend that financial payback calculations are not appropriate to BPR initiatives. Yet Morris and Brandon (1993) advocate a cost benefit analysis as a core part of their methodology. Based on the work of Stalk (1988), cycle time reduction and time based competitive advantage is often used as the key measure of benefits. Whereas Kaplan and Norton (1993) claim that a balanced scorecard approach could be used, in which time is only one small element of the scorecard.

All of this conflicting advice suggests that a framework is required which can reconcile examples of success with quite different, if not opposing, methods of proceeding.

2. The framework

It is proposed that two critical elements govern the selection of the method to be employed: the degree of change desired from the redesign, and the scope of integration in terms of organisational boundaries being affected by the change. These are presented in diagram 1 as the BPR Web, with the degree of change continuum beginning at the 15 minute mark and increasing through 90^{o} anti-clockwise. The scope of integration

dimension progresses from 1 to 4, moving from the centre of the Web to the circumference. Each larger concentric circle implies a larger scope for the redesign.

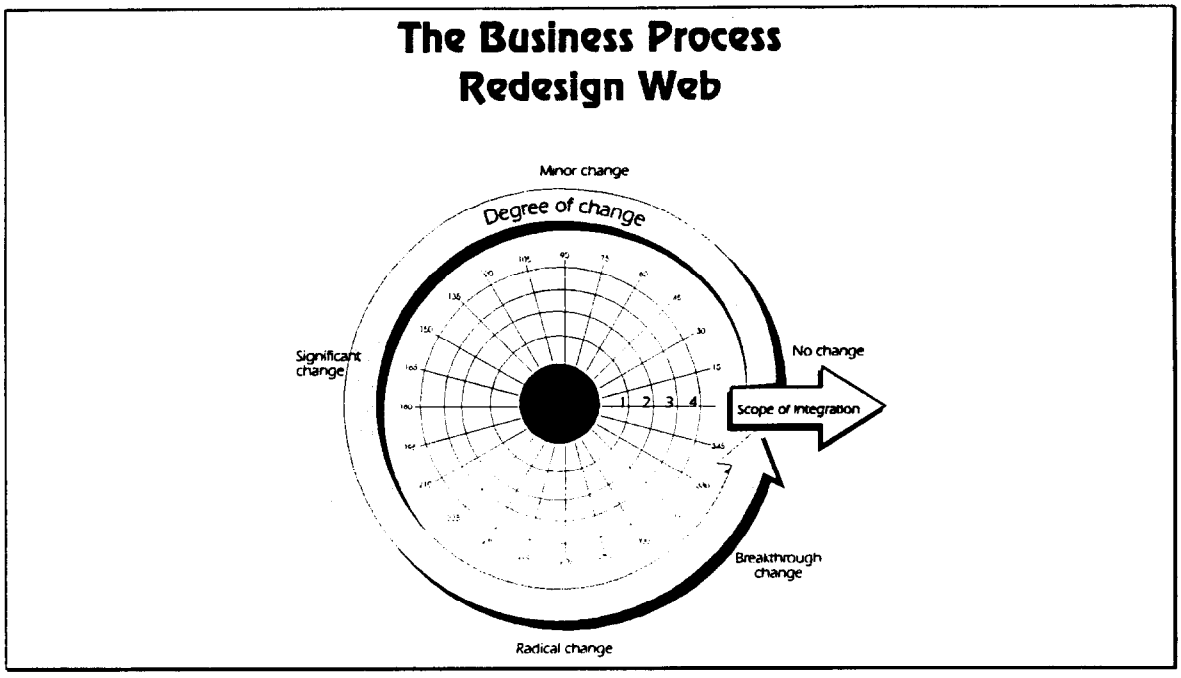

Diagram 1

Degree of change is a well established dimension when examining BPR (Hammer (1990), Davenport (1993), Hall et. al. (1993) Hammer and Champy (1993), Harrington (1991), Duck (1993). It was selected as a determinant of a BPR method after the analysis of many quoted BPR examples, and attempting to position proposed BPR initiatives with the managers involved. This paper builds on the earlier work by proposing a semi-structured method for measuring degree of change.

In the literature, degree of change is usually scaled as either:

- minor / incremental

  or

- radical / large scale.

This classification of change, at two opposite points, has been part of the problem when dealing with BPR because there is no explanation about what makes a BPR initiative radical. For example, Barczak et al. (1987) classify change on the basis of incremental and large scale. They describe incremental change as slow, adaptive and leading to inefficiencies over a period of time. Large scale change, on the other hand, is an overall

reorganisation of parts of the business into a harmonious whole. This classification is too high level and open to much subjectivity if it is to be used in method selection. Heygate (1993) recognises the need for measuring the radical BPR. He argues that without some sense of how radical the change is, management will not have a common understanding of what they are trying to achieve. His view is that this lack of shared understanding will result in disappointment and confusion. Hagle (1993) suggests the most common reason for BPR initiatives failing is that management does not understand the scale of change involved. He argues that all BPR initiatives should be treated therefore as large scale change initiatives. This seems to add to, rather than clarify, the confusion, if all change initiatives are called radical BPR. Yet one can sympathise with his view: without a definition it is perhaps safer, *prima facie*, to treat all BPR initiatives as equally radical.

Further evidence for a definition of degree of change is that radical BPR is traditionally seen as providing radical benefits (Ford and accounts payable, Hammer (1990), Mutual Benefit Life, Davenport and Short, (1991). More recently, Hall et. al. (1993) analysed twenty BPR initiatives to show a strong link between radical or large scale change and benefits in terms of cost savings. This link between radical BPR and significant benefits is a recurring theme in the literature. However, although many organisations plan radical BPR initiatives to gain big benefits, what actually occurs is often at odds with the plan. For example, Beer et al. (1990) worked with six large organisations whose top management team aimed to change the way in which the organisation *as a whole* was being managed, i.e. move toward cross functional working. They discovered that the actual changes were made at the level of one function, or more often at an even lower level, such as a particular manufacturing plant or a branch office (of a financial institution). They also found that specific areas such as head office, R&D divisions and the top management team itself were treated as separate entities for change purposes. The key point is that radical change is planned but either incremental change or radical change to a small part of the organisation is implemented. At the same time, expectations of significant benefits to be gained from the 'radical' change tend to remain the same. When ultimately the large benefits are not realised, managers will be seen to have failed and BPR will be discarded like other overblown change concepts of the past.

The classification of change into incremental and radical also neglects *breakthrough change*. BPR enables organisations to develop processes outside the existing organisation. An example of this is FirstDirect, which redesigned the delivery mechanism

of personal banking services in the UK. The degree of change dimension used in the framework explicitly allows for such innovative and original changes.

The scope of integration dimension was chosen because it reflects the one area where there is agreement in BPR. Virtually all the literature on BPR state that processes cross functional boundaries. The scope of integration dimension measures the extent to which functions are integrated.

The concept of integration is again a well established dimension for change. Lawrence and Lorch (1967) describe integration as the quality of the level of collaboration prevalent among departments required to achieve a common goal. This is a useful starting point when examining integration. However, some commentators assert that organisations need to go further than simply getting departments to collaborate more closely. Sadler (1991) argues that management need to disband functional boundaries so that people can work together in cross-functional teams. The concept of integration is also well explained in the total quality arena. Imai (1986) suggests that an essential element of implementing total quality is to bring together functions and departments that were previously separated. Rockart and Short (1989) argue that increasingly an organisation's ability to compete effectively will depend on its ability to collapse the value chain into integrated groups made up of several functions and manage the interdependence between groups. Hence, the scope of integration variable is an accepted variable in the change literature.

2.1 Unit of analysis

An important consideration in measuring both dimensions: degree of change and scope of integration, is the definition of the unit of analysis to which the BPR initiative relates. It is important that the unit of analysis is defined clearly prior to attempting to measure the dimensions. For example, consider a vertically integrated oil exploration, refining and retail operation. The extent of change when redesigning processes across the geology unit and the geophysics unit may be significant if considering just the oil exploration business as the unit of analysis, whereas it would be less so if considering the whole of the business. Degree of change and scope of integration is always measured in relation to a predetermined unit of analysis.

2.2 Disintegrating the degree of change

Five reference points of change are proposed on the degree of change continuum, as they subsume all the BPR situations found in the literature:

No change to the process

Minor change to the process

Significant change to the process

Radical change to the process

Breakthrough change to the process.

The degree of change continuum has two reference points. The first is the 'no change' point (0°). This cannot exist as if no change were expected, BPR by most definitions would not be occurring. The second is the 360° mark. This would occur where a new organisation is created. These are included because they are identifiable and understandable reference points to which other degrees of change can be related.

In order to metricise the degree of change of the remaining points, three key issues were identified from the literature and a positioning method was developed. The issues acknowledge that BPR related changes would affect individuals, structure, and systems in the organisation Venkatraman (1991), Duck (1993), Hall et. al(1993), Hammer and Champy (1993). It is unlikely that one issue can change in isolation. For example, a change in reporting lines and hierarchy would impact individuals, and could merit a change in information systems. It should be borne in mind that the purpose of identifying and gaining views on these three issues is merely to summate them to gain a single agreed measure of the degree of change. Experiences prior to devising this method of positioning encouraged most managers to suggest their BPR programme would lead to radical change and large scale benefit. Such managers had no reference point of other BPR programmes and so all change was classified as radical or breakthrough. The disintegration into the three issues has tended to encourage managers to take a more realistic view of the degree

of change. The three issues enable the positioning of a BPR initiative and should not be interpreted as anything more.
The three key issues are:

Changes to individuals

This is the amount by which peoples roles and responsibilities, skills, assessment criteria, reward structures, and the number of people joining or leaving, can be expected to change as a result of the BPR initiative. In functional organisations' roles, responsibilities and skills are usually defined narrowly. There is a high degree of specialisation with many stages as work moves from one specialism to another. In a process environment, people would be expected to have a broader range of skills. Moreover, most organisations currently remunerate employees with a mix of performance related pay, perks and an organisation profit related element. With a process perspective several new options may be possible. For example, moving to a process profit related basis, team based payments or a combination of these. Some organisations such as Royal Trust, AT&T and Xerox are starting to consider some of these options when implementing BPR Davenport(1993).

The magnitude of change should be based on the number of employees affected by the changes in terms of roles and responsibilities, skills, assessment criteria, reward structures, and the number of people joining or leaving, as a percentage of the total number in the unit being considered. This issue should be scaled thus:

0 No change
30 A minor change in this issue
60 A significant change in this issue
90 A radical change in this issue
120 A breakthrough change in this issue

Intermediate points can be employed; these are merely reference points.

Changes to structure

This is the amount by which reporting lines, the organisation's hierarchy, process ownership, process teams and power bases can be expected to change due to the BPR initiative. This would include the number of employees who move to a cross functional team orientation. In a process organisation power invariably shifts from functional heads

to process owners. Often, moving to a process orientation enables management to create a flatter structure. One organisation in the financial services sector on whom we are currently writing a BPR case study, more than halved the number of management levels.

This change is based on the number of employees that are affected in terms of changes to reporting lines, the organisation's hierarchy, process ownership, process teams and power bases, as a percentage of the total number of employees in the unit being considered. This should than be factored by the seniority of those affected by the change. This is predicated on the proposition that senior positions are of greater importance than the same number of relatively junior changes. After considering the proportion of people affected, and the organisational level of these people, the issue should again be scaled as:

0 No change
30 A minor change in this issue
60 A significant change in this issue
90 A radical change in this issue
120 A breakthrough change in this issue

Intermediate points can again be employed.

Changes to systems

This reflects the number of information systems, planning procedures, service level agreements, information flows, and budgeting procedures, that can expect to change due to the BPR initiative. Sadler, who argued that organisations should eliminate functions, claims that changes, whether incremental or radical, involve either bringing in new systems and procedures, or altering or abandoning existing ones. This is estimated as a proportion of the total number of procedures and systems in the unit of analysis. It is not expected that a complete list of such expected changes are compiled: merely that an indication of change to systems is gained.

After considering the number of changed systems and procedures, the extent of the change and the number of people impacted by such changes, this element is scaled as before from 0 to 120.

2.3 Combining the separate measures

As each of these issues, individual, structure and systems, were measured on a scale of 0 through 120, they can be summed to give a total change of 0 through 360, reflecting the desired degree of change as a result of the BPR initiative.

The above metrication method provides a semi-structured approach to locating BPR initiatives on the degree of change continuum. Without this measure there is a temptation, as discussed earlier, to always treat BPR initiatives as 'radical' and 'revolutionary'.

It is recognised that further structure can be added to measure in greater detail. Having worked with managers on BPR courses at Cranfield, and through discussions, experience suggests they are able to use the scales mentioned even though arbitrary issues are involved. One of the purposes of the Web is to encourage managers to discuss their perception of the degree of change desired from the BPR initiative. Any significant differences in the scoring should lead to discussion, which is itself a good thing.

Examples, taken from the BPR literature, are discussed below to illustrate further each degree of change. However, the examples have not been metricised in this way previously. Hence, some assumptions have been made in order to make the example meaningful. This is not a critical issue as the examples are meant to be illustrative.

2.4 Extreme examples of using the degree of change

Minor change to the process

An example of this type of change would include the implementation of Electronic Data Interchange (EDI) to exchange transaction documents such as orders, invoices and delivery information. The Information Systems Group at Cranfield carried out a major two year EDI research project. It examined the longer term managerial and business issues when organisations implement EDI. One finding from the work was that often organisations use EDI as little more than a glorified e-mail system or a fax machine, and in such cases the degree of change was close to *no change*.

However, in the case of a major UK retailer where EDI was introduced in the order and invoice processing areas the following was apparent. The unit of analysis is the retail store operations.

Changes to individuals -- the number of people affected by this initiative was very small, less than 5%, and the roles and responsibilities, skills, assessment criteria, reward structures, and the number of people joining or leaving were virtually unchanged. Hence a score of 10 out of 120 is arbitrarily allocated.

Changes to structure -- The initiative had a small affect on reporting lines in the areas mentioned, but otherwise did not change the organisation's hierarchy or power structure, neither were process owners and process teams created. Let's say that in the context of the overall organisation the number affected amounted to less than 5% of the unit. The score of 10 out of 120 is arbitrarily allocated.

Changes to systems -- Several systems and procedures in the order and invoicing areas were affected and the extent of change could be significant. Let us assume that these changes amounted to 30% of all systems and procedures, and that change to each system was substantial; a score of 45 out of 120 is arbitrarily allocated.

The total score for the EDI related process redesign initiative would be 65, which is approaching a minor change.

Significant change to the process

An illustration of this is Bell Atlantic's Carrier Access Service organisation that has an annual turnover of US$2.5 billion (Craumer) and Hammer and Champy. The organisation had a traditional hierarchical structure and operated as a monopoly until 1989. In 1991, the CEO initiated a redesign project that had a profound impact on the organisation.

Taking each degree of change measurement in turn the following picture emerges:

Changes to individuals -- each function within the organisation had its own guidelines on which an individual's performance was measured. This was based on how long orders were held and when they were passed on. Quality was not measured and there was little personal accountability. After the redesign initiative, individuals were assessed on the

performance of the team to which they belonged. The team's performance was based on the level of customer service, zero product defects and continuous cost reduction. Roles and responsibilities also changed as the team members were responsible for customer satisfaction. We assume that about 80% of the employees throughout the organisation were affected, but that the magnitude of the change per employee was not very high. A score of 45 was allocated.

Changes to structure -- Half the organisation have moved to a case team structure and the other half will follow. This had an impact on the organisation's hierarchy, reporting lines and power bases. Thus we assume about 90% of the organisation will be affected. A score of 70 was allocated.

Changes to systems -- They are also going to be changed substantially, although these tend to follow chronologically the other changes. Orders were passed on 13 times, through 27 different computer systems. They are now handled by one team using one integrated system. We allocate a score of 60.

This gives a total score of 175 - very nearly a significant change.

These two examples have attempted to demonstrate the application of the scoring to particular examples. To repeat, these should be perceptions of individual managers; to pin-point differences in scoring is positive as it facilitates further discussion and hence begins to provide the clarification Heygate called for. Minor differences in scoring are unimportant as the whole method is imprecise.

2.5. Measuring the scope of integration

The scope of integration progresses from 1 to 4 moving from the centre of the Web to the circumference. Larger concentric circles imply a wider scope of redesign. Earlier we suggested that the scope of integration and degree of change should be measured in relation to the unit of analysis. Many organisations have extremely large functions that consist of several sub-functions. For example, we recently assisted the IT support division of a multinational organisation with its BPR initiative. We defined their unit of analysis as the 'division' in the first instance, which consisted of several functions. This enabled the BPR initiative and the implementation plan to be positioned accordingly.

Totally within one function

This is included as a reference point. Clearly a process should cross functional boundaries to be classified as BPR. However, some examples quoted in the BPR literature fit into this scope Davenport and Short (1990). Where the change is totally within one function then the scope is narrow as the impact of the change will be felt by that area only. Many of the changes that are in one function only tend to be examples of functional automation such as the introduction of a marketing database or accounts payable package.

Between two or more functions

These are situations in which a process or processes existing between functions are redesigned. Examples of this include Mutual Benefit Life in the US where issuing a life insurance policy took some "40 steps with over 100 people in 12 functional areas and 80 separate jobs." Davenport and Short: (1990: p.17.) This was reduced significantly with the integration of functions. The change was not organisation wide but focused several functions.

All functions in the organisation

In this situation end-to-end processes are redesigned. Interfaces to external stakeholders such as customers, suppliers and intermediary organisations, such as banks, would be considered. This would imply that the external organisations will be affected as a result of the initial change. However, these organisations are reactive rather than proactively involved in the BPR initiative. BT, for example, went through a major transformation across the whole organisation by establishing three customer facing divisions. They established processes that started with the customer and cut across the entire organisation.

Between the organisation and external stakeholders

This scope would include two organisations attempting to redesign processes jointly to yield synergy. An example is of Westinghouse and its customer Portland General Electric (PGE) working together to redesign the latters' purchasing process. This whole process was designed totally across both organisations Davenport and Short (1990).

Changing a process across two or more organisations requires a high degree of cooperation. In most Western industries the nature of business is highly competitive, and hence opportunities for cross industry redesign are rarely exploited, as customers see suppliers as 'competitors'. On the other hand, many Japanese industries are organised with a high degree of vertical integration. Ferguson (1990) suggests that this integration allows

Japanese companies to make longer term decisions, provides them with on-going sources of capital and enables them to develop processes throughout the industry supply chain.

2.6. The Web as a framework for BPR

Bringing the two dimensions together: Degree of Change and Scope of Integration, results in a multidimensional framework on which to locate all process redesign initiatives. The Web allows managers to separate different types of initiatives and manage each in the most appropriate way. Intuitively it suggests that different management issues should be relevant for specific clusters of BPR initiatives. Clearly chief executive commitment is less important for an initiative, with a degree of change score of 30 and within one function, than for an initiative, with a degree of change score of 250 and a scope of the whole organisation. The next step therefore, is to fit specific management issues, and hence BPR methods, to clusters of initiatives. One of the key results from ongoing development of the Web is to identify critical success factors for managing BPR initiatives in different locations on the Web.

3. Applying the BPR Web

It is all too easy to give initiatives well thought out titles and label them as radical or absolute change. While this enables managers to feel important in managing such change, it does not mean that the initiative will achieve its results Schaffer and Thompson (1992). Even at this stage of the Web's evolution, it is being used, in both training and consultancy situations, as an effective management tool in several ways. Although simply classifying BPR initiatives does not guarantee success.

A manager undertaking a BPR initiative faces a difficult task: agreeing the classification of the initiative. Often such agreement never emerges with a resultant risk to the change. Now each manager involved in the initiative could be asked to locate the change he or she desires on the Web. If say, four out of five managers desire, a degree of change between 45 and 50 with a scope of 1, and the fifth wants a degree of change of 225 with a scope of 3, then some work needs to be undertaken to achieve consensus before the initiative proceeds. The Web is being used to facilitate discussion to reach a consensus view. For example, a telecommunications organisation developed a product that they felt would enable their customers to undertake radical process redesign. When the proposed process

changes were examined on the Web, it became clear that the product would allow minor changes to the customer's processes and mainly within one function.

In the case of a utility organisation, the senior managers had spent three months researching and discussing BPR. However, at a workshop to create a plan for taking BPR forward, the Web surfaced fundamental differences in the type of initiative each had in mind. This surprised the managers because they expected to have a high degree of commonalty. However, one wanted radical change within a limited number of functions whereas another wanted less radical change but across the entire organisation and its customers. A lively discussion ensued, during which previously unspoken assumptions and beliefs about the organisation's products, people, processes and systems emerged. This allowed a depth of common understanding not previously experienced. Although it took considerable time, a consensus was achieved with a clear understanding that this would be reviewed as the initiative progressed.

The Web was used with the IT division of the multinational organisation mentioned earlier. The management team recognised that their BPR initiative could not be sustained nor provide significant external customer service level benefits, without the marketing and finance divisions being part of the redesign initiative. The management team then focused their effort in gaining the support of the other divisions before continuing.

The Web also forces issues which usually get shrouded to be brought out into the open. Issues such as which areas are going to be affected and in what ways are discussed. Once identified and agreed the issues can be managed more effectively. The Web was used with the senior management team of a subsidiary of a large telecommunications company. During the discussion, prior to the Web being introduced, there was strong support for radical change: 'either we change radically or hit the wall in twelve to eighteen months'. However, analysis from the Web showed that certain key individuals wanted virtually no change in two areas: reporting lines and power. Clearly identifying this as an issue gave the director appointed to implement the BPR initiative an important insight. The Web also helps a common BPR language to emerge in the business.

Another application of the Web involves identifying critical success factors (CSFs) to be managed when undertaking BPR. We undertook significant research using the Web in an organisation (which we will call Alpha Corp.) that has completed a BPR initiative. The method is described briefly. An in-depth case study was carried out. A protocol

containing a mix of open and close-ended questions, respondents' profile and objectives was developed. Focused interviews were held with managers drawn from a cross-section of the business. Transcripts of the interviews were analysed using the content analysis technique. The results were verified with the respondents.

Alpha is a £250 million per annum turnover organisation with about 1100 employees. In 1990, the company faced two major issues. Firstly, it took between six weeks and six months to deliver simple products to customers (complex products could take up to one year). Secondly, although the organisation was profitable, cash was an issue because several customers had stopped paying invoices due to inaccuracies. A new managing director and deputy managing director were sent in by the parent company. The new management team reviewed their options. The organisation already had a TQ department but the management team decided not to pursue TQ methods. Rather than improve on what they had, the management team decided that the organisation needed to take a customer focused orientation. The initiative took three years to complete, although many of the changes were accomplished in the first twelve to eighteen months. Our research into the degree of change to individuals, structure and systems shows that the initiative is positioned between near radical and across several functions of the organisation (scope of integration level 2). The CSF's that emerged are displayed in diagram 2 and are expanded upon briefly below:

> *Identify the customer's view of the organisation's service level*: Alpha commissioned a customer survey from an independent marketing organisation. This was followed up by focus group discussions between major customers and mangers from across the organisation. A customer satisfaction survey is conducted annually.
>
> *Market the BPR change internally*: The managing director hired a West End theatre to announce the changes he and the management team planned. This ensured that everyone in the organisation heard the same message. This was followed up by presentations to smaller groups by the MD and deputy MD. Even today, the staff meet every six month to review the organisation's progress.

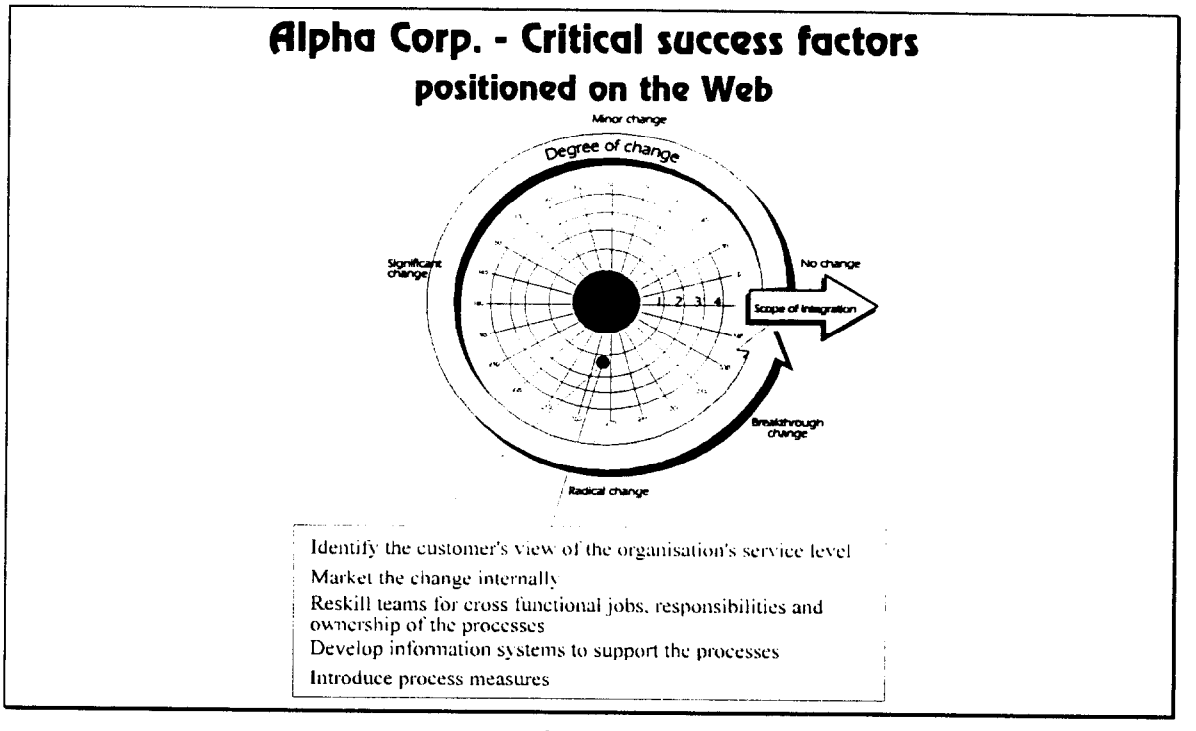

Diagram 2

Reskill teams for cross functional jobs, responsibilities and ownership of the processes: Eight hundred out of eleven hundred people were put through extensive training programmes to help them cope with the new systems and processes. Teams consist of people with the requisite skills to provide customers with an end-to-end service. In the old organisation different functional skills were located in different buildings. Now the process team members sit across the same desk.

Develop information systems to support the processes: A new system that supports the process was developed. In the early stages of the change the old systems were used but these were simply not able to cope with the service delivery targets set by the process teams.

Introduce process measures: Clear measures were set for what service levels' customers should get. The initial targets were to reduce the delivery times from six - twenty four weeks to ten days. This was achieved and new goals are now set to reduce ten days to three days.

This example is provided to illustrate how CSF's can exist for all areas of the Web but experience suggests they vary in content and ranking according to position. Think how

useful it will be when an organisation's management team having agreed its position on the Web, can consult the literature to locate the most critical factors for *their* change.

4. Summary

This paper began by demonstrating the need for a framework for BPR initiatives. There continues to be legitimate areas of disagreement in how best to proceed with BPR and a framework that would bring together existing methodologies could assist in minimising these.

The paper then introduced the BPR Web. The dimensions of the Web, namely the degree of change and the scope of integration, were examined in detail. A simple metrication system was proposed so that initiatives are not arbitrarily called revolutionary and radical when in reality they cause minor change. A set of key management issues in the form of critical success factors was proposed based on research undertaken at Cranfield. Work on the Web is continuing at Cranfield within the BPR research project.

References

Barczak, G. Smith, C. and Wilemon, D., (1987) Managing large-scale organizational change. *Organisational Dynamics*, **16**, 2, pp. 23-35.

Beer, M. Eisenstat, R. and Spector, B, (1990) *The critical path to corporate renewal.* Harvard Business School Press, Boston.

Belmonte, R.W. and Murray, R.J., (1993) Getting ready for stragegic change. *Information Systems Management*, Summer, pp. 23-29.

Benjamin, R.I. and Levinson, E., (1993) A Framework for Managing IT-enabled Change. *Sloan Managment Review*, Summer, pp. 23-33.

Butler Cox Foundation, (1991) The role of Information Technology in transforming the business. *Research Report 79*, January.

Craumer, M., (1992) Bell Atlantic gains the inside track. *Insights Quarterly*, Winter, pp. 40-45.

Davenport, T.H. and Short, J.E., (1990) The New Industrial Engineering: Information Technology and Business Process Redesign. *Sloan Management Review*, Summer, pp. 11-27.

Davenport, T., (1993) *Process Innovation: reengineering work through information technology.* Harvard Business School Press, Boston.

Duck, J.D., (1993) Managing Change: The art of balancing. *Harvard Business Review, November-December*, pp. 109-118.

Eckerson, W., (1992) Process redesign increases return on net investments. *Network World*, April 22 , **8**, 16, pp 3,62.

Ferguson, C.H., (1990) Computers and the coming of the U.S. Keiretsu. *Harvard Business Review*, July-August, pp. 55-70.

Hagle III, J., (1993) Keeping CPR on track. *The McKinsey Quarterly*, No. 1, pp.59-72.

Hall, G. Rosenthal, J. and Wade, J., (1993) How to Make Reengineering Really Work. *Harvard Business Review*, November-December, pp. 119-131.

Hammer, M., (1990) Reengineering work: don't automate, obliterate. *Harvard Business Review*, July- August, pp. 104-112.

Hammer, M. and Champy, J., (1993) *Reengineering the Corporation: A Manifesto For Business Reengineering.* Nicholas Brealey Publishing Limited, London.

Harrington, H.J., (1991) *Business Process Improvement.* McGraw-Hill, Inc., New York.

Heygate, R., (1993) Immoderate redesign. *The McKinsey Quarterly*, No. 1, pp.73-87.

Imai, M., (1986) *Kaizen, the key to Japan's competitive success.* McGraw-Hill Publishing Company, New York.

Kaplan, R.B. and Murdock, L., (1991) Rethinking the corporation: Core process redesign. *The McKinsey Quarterly*, No.2, pp. 27-43.

Kaplan, R.S. and Norton, D.P., (1993) Putting the Balanced Scorecard to Work. *Harvard Business Review*, September-October, pp. 134-142.

Lawrence, P. and Lorch, J., (1967) *Organisation and Environment.* Harvard University Press, Cambridge, Massachusetts.

Morris, D. and Brandon, J., (1993) *Re-engineering your business.* McGraw-Hill, Inc., New York.

Rockart, J.F. and Short, J.E., (1989) IT in the 1990's: Managing Organizational Interdependence. *Sloan Management Review*, Winter, pp. 7-17.
Sadler, P., (1991) *Designing Organisations*. Mercury Books, London.
Schaffer, R.H. and Thompson, H.A., (1992) Successful change programs begin with results. *Harvard Business Review*, January-February, pp. 80-89.
Stalk Jr., G., (1988) Time - The Next Source of Competitive Advantage. *Harvard Business Review*, July-August, pp 41-51.
Venkatraman, N., (1991) IT-induced Business Reconfiguration. *The Corporation of the 1990's: information technology and organizational transformation*, ed. M S Scott Morton, Oxford University Press, Inc., New York.

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