



Business process reengineering: critical success factors in higher education

Business process
reengineering

451

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Abstract

Purpose – The purpose of this paper is to examine the critical success factors of business process reengineering (BPR) in higher education (HE).

Design/methodology/approach – Empirical case studies collected from three private higher education institutions in Malaysia, which have embarked on BPR successfully.

Findings – Seven factors were found to be critical to BPR implementation success. The factors are teamwork and quality culture, quality management system and satisfactory rewards, effective change management, less bureaucratic and participative, information technology/information system, effective project management and adequate financial resources.

Research limitations/implications – The paper provides a framework for future research to explore organisational development in making BPR happen successfully.

Originality/value – This research contributes to studies of BPR in HE context, by considering the soft issues in its implementation.

Keywords Critical success factors, Business process reengineering, Higher education

Paper type Research paper

Introduction

Hall *et al.* (1993) claimed that 50-70 per cent of business process reengineering (BPR) initiatives fail to deliver the expected results. This is because, although there is an improvement in particular areas, for example, a 20 per cent cost reduction, a 50 per cent process-time reduction, and a 25 per cent quality improvement, at the same time business-unit cost increases and profits decline. However, Smith (2003) noticed among other organisational change attempts, the success rate for reengineering was second highest (23 per cent) next to technology change (28 per cent), and compared with culture change (19 per cent), mergers and acquisitions (14 per cent) and restructuring and downsizing (10 per cent). Much effort is needed in developing a model for BPR, a radical process change, since many critical success factors (CSFs) should be considered for it, whether for private organisations or for public organisations. Many studies have dealt with the CSFs of BPR, including Peppard and Fitzgerald (1997), Zinser *et al.* (1998) and Al-Mashari and Zairi (1999). By considering a few definitions given by previous authors (for example, Pearce and Robinson, 1997; in this research context,



CSFs defined as the few things which must go right for the BPR to happen successfully). This paper discusses the CSFs of BPR in HE in order to ensure the successful model implementation of BPR. The determination of the CSFs of BPR could aid HEIs to plan their approach and to make their action plan.

Related literature

Study background

Many studies focused on the CSFs of implementing BPR in the private sector, such as at the Porsche Research and Development Centre (Zinser *et al.*, 1998), but less focus was given to public organisations. In this study, although some literature highlighted the importance of leadership and top management support for the BPR, this factor is viewed as driver for BPR (Ahmad, 2004), therefore this paper describes the CSFs for BPR which consisted top management as interrelated and necessary in all factors. As Davenport (1993a) stated that a successful change leader has a realistic and positive expectation about the outcome.

Success factors of BPR

Among the main success factors are ambitious objectives, the deployment of a creative team in problem solving, and a process approach and integration of electronic data processing (EDP) (Peppard and Fitzgerald, 1997). Ascari *et al.* (1995) have discussed four other elements leading to successful BPR:

- (1) culture (which is similar to Hall *et al.*, 1993; Peppard and Fitzgerald, 1997);
- (2) processes;
- (3) structure; and
- (4) technology.

Ascari's study found that the companies that implemented BPR agreed that its impact on the change of their culture was related to the organisation's rethinking of its fundamental business process. The focus was also on identifying and improving core processes. However, the scope and maturity of the business process architectures and the nature of changes within processes vary within organisation. In addition, there must be significant changes in structure, especially with emphasis on cross-functional work teams. The scope of the business process architectures is related to the study done by Maull *et al.* (1995, p. 42) which showed the significant importance of this subject. He defined business process architectures as "the definition of an integrated set of business processes".

Another research, carried out by Ranganathan and Dhaliwal (2001), showed the result of BPR practices in Singapore. The study used a survey based on questionnaires that were mailed to respondents using a mailing list from the data processing management association. One interesting finding highlighted was that an increasing number of manufacturing firms in Singapore had started implementing BPR projects (approximately 50 per cent) and were also likely to take up BPR projects in the next three years (approximately 30 per cent). They concluded that BPR was becoming important in Singapore for the future in order to survive in the tight competition and changing environment. It is interesting to note and remember that human factors could become one of the obstacles for the change to happen. The results in Stoddard *et al.* (1996)

and Peppard and Fitzgerald (1997) highlighted that human resistance to BPR could lead to unsuccessful BPR projects. If the change has not been handled and managed carefully, people would resist it, even it is a top-down approach, i.e. driven from the top.

The various dimensions of the CSFs for BPR have been highlighted by Al-Mashari and Zairi (1999), including change management, management competency and support, system structure, project planning and management, and information technology infrastructure. The CSFs highlighted in this study cover other aspects of CSFs, as mentioned by previous literature such as Ascari *et al.* (1995), Stoddard *et al.* (1996) and Peppard and Fitzgerald (1997). Smith (2003) highlighted that BPR aims to achieve performance breakthroughs by applying innovative ways of doing business. Among few things, he mentioned to manage radical change effectively includes communication is crucial to show support to the process change project and effective leadership to coordinate deployment of the resources to accomplish the strategic objectives.

Further, to identify the CSFs of BPR in an organisation, it is necessary to understand the organisation itself, since the factors may differ regarding the type of organisation, including private or public. As listed in Hutton (1996), several factors are to be considered in the public sector in order to implement radical change or BPR. These include rigid hierarchies, culture, multiple stakeholders, swift and dramatic changes in policy direction, overlap of initiatives, wide scope of activities, and staff resistance, which are crucial parts of public sector organisations. However, he suggested that human issues should be considered for BPR to be performed in the public sector. This is supported by Smith (2003) who stress that communication at all levels becomes one of the critical elements here. From the research by Berrington and Oblich (1995), it could be summarised that in order to implement reengineering, an organisation needs to understand its structure first and to ensure the vision was accomplished. One of the important points here is that commitment needs to be maintained and enhanced through communication. The people issue rather than the technology issue is seen as important to be dealt with and managed in order to make the change effort a success. Also, McAdam and Donaghy (1999) pointed out that they believed that the most important factor for the successful implementation of BPR in public sector organisations was enlisting customers.

The issue of culture becomes an important factor for BPR, which was further emphasised by Peppard and Fitzgerald (1997) who examined the transfer of culturally grounded management techniques, namely BPR, making specific reference to the German business and cultural context. They analysed BPR applicability to the German business environment, a business culture which is sufficiently different from the American, in order to justify this undertaking. They explored how this American concept can be best transferred to the German business environment. Their study concluded that managers and employees as well should give their commitment for change. The conflict-free situation will reflect on the success of BPR in the long term. Germany stressed process and customer-focus. Other factors like self-autonomy, empowerment, culture and organisational circumstances seemed to be important for BPR to be successfully implemented in Germany. This study related to Hall *et al.* (1993) who stressed the “depth” factor which is concerned with shared values or culture in pursuing BPR. This study identified six depth levers – roles and responsibilities, measurements and incentives, organisational structure, IT, shared values and skills,

which require change to enable successful reengineering. Interestingly, they concluded this study by highlighted beside “depth” a “breadth” factor also crucial for BPR to succeed in the long term, which the breadth factors focus on the process that to be designed must be broadly defined in terms of cost or customer value in order to improve performance across the entire business unit.

In an extension of methodology from the Hall *et al.* (1993) work, Maull *et al.* (1995) determined what the issues are which underpin a BPR programme, by research undertaken into a range of companies both large and small, located solely within the USA, including in-depth study of four companies. Unstructured interviews took place with selected leading practitioners who had undertaken successful BPR projects and who were asked to share their experiences. The study was conducted with an individual or, more commonly with a team, which had overall responsibility for the BPR project within the organisation. There were five key issues in this study: scope of change, performance measures, information technology, human factors, and business process architecture.

Failure factors of BPR

Beside the success factors, many authors also highlighted some failure factors in implementing BPR. Aggarwal (1998) highlighted failures of BPR implementation, which were related to managers’ arrogance, resistance, crisis, cost, vision, etc. Hammer and Champy (1993) highlighted some failure factors like failure to have a process perspective, a fixed process which is not flexible enough to be responsive to the needs and requirements, not involving employees (i.e. bottom-up) in decision making, assigning someone who does not understand BPR, technology limitations, designing a project but with focus on cost reduction and downsizing, having a weak team, and problems with communication.

Therefore, this study stressed that reengineering is supposed to start with a new vision, new mission and new customers. Furthermore, Singapore businesses reported that the lack of financial and human resources, and inadequate IT capabilities and expertise posed the main problems in carrying out their programmes. Other factors were the lack of support from organisation members, lack of strategic vision, inflexible organisational structure, and lack of champion for BPR efforts (Aggarwal, 1998; Ranganathan and Dhaliwal, 2001).

It is interesting to note that, among other failure factors are lack of top management support and financial resources (Aggarwal, 1998; Al-Mashari and Zairi, 1999), people resistance (Stoddard *et al.*, 1996; Peppard and Fitzgerald, 1997; Mumford, 1999; Ranganathan and Dhaliwal, 2001), IT related problems (Al-Mashari and Zairi, 1999; Ranganathan and Dhaliwal, 2001; Smith, 2003), and ineffective BPR teams, lack of project management, and problems in communication (Al-Mashari and Zairi, 1999; Smith, 2003).

Research methods

Case study approach

Existing literature, for example, Hall *et al.* (1993), Ascari *et al.* (1995) and Altman and Iles (1998), suggests that the assessment of BPR in organisations, also in higher education institutions (HEIs), would benefit more by investigating in-depth the real experience of implemented BPR. Therefore, the research used identified established private higher education institutions (PHEIs) which had embarked on BPR for its

detailed case study approach. The selection of the case study PHEIs based on some decisive factors:

- implementation of BPR/nature of “radicalness” in process change implementation; and
- successful BPR project over the last five years.

Therefore, we have chosen case 1: HEI-A, case 2: HEI-B and case 3: HEI-C.

Actual case study fieldwork was done through a triangulation approach to get both breadth and depth information, and which is in line with suggestions in Miles and Huberman (1994) and Yin (1994), with an open-ended interview involving top management (for example, chief executive officers, directors, deans, and managers). They were asked to identify the leadership factors, particularly from the strategic BPR practices, in terms of mission and vision, and also other elements such as commitment, support, and communication (Davenport, 1993b; Altman and Iles, 1998).

Open-ended interviews

Specifically, this study had developed a set of interview questions on the CSFs factors, were put to the top management and BPR team of the case organisations. Examples of the questions are as follows:

- Please explain the factors that make the BPR or radical process change project succeed from your experience?
- Please give your comments on how critical they were to your BPR or radical process change project success?

The instruments for open-ended interviews were developed based on the literature review, most of them being adapted from Al-Mashari and Zairi (1999) and Guimaraes, 1999). In addition, the instruments were also based on the literature review which suggested several points regarding the different context and different country, which stressed the cultural background more (Peppard and Fitzgerald, 1997).

Data analysis

Decision explorer for idea mapping

In this study, the main software for the data analysis was Decision Explorer, since this research is focused on the case study which relies much on the qualitative approach, and a linkage diagram of participants' ideas using the Decision Explorer software was developed, based on suggestions in Ahmad and Spicer (2002) and Ahmad (2003). The selection of this software was based on the suitability of its application for this kind of qualitative data. The authors identified the capability of this software to analyse the cognitive maps of research subjects, such as in terms of the amount of concepts involved, and their relationships. More importantly, this research has to emphasise the qualitative data analysis to answer most of the research questions and to meet the research objectives. Using this software enabled the research objectives to be met. Data in interview questions, as mentioned earlier, were transferred onto Decision Explorer software prior to further analysis. In doing this, we referred to the notes taken and identified all the relevant factors discussed by interviewees, and after that keyed-in to

the software to explain and interpret the meaning of actual practices in case studies (see Appendix (Figure A1), for example, of Decision Explorer output for case 1: HEI-A).

Cross comparisons of three case studies

We did a cross-analysis which focused on the similarities and differences of all the CSFs obtained through the analysis. Additionally, we have compared results from the three case studies with a best practice example or benchmark. The benchmark taken is that of University of Wisconsin-Stout (UW-Stout), the winner of the Malcolm Baldrige National Quality Award (MBNQA) in the education category in the Year 2001. This is thought to be appropriate because MBNQA is the standard for performance excellence. In fact, MBNQA was envisioned as a standard of excellence that would help organisations to achieve world-class quality (Figure 1). From the analysis of findings, it was found that many interesting issues came out from the factors highlighted by the cases. Although the factors derived from the interview sessions vary in terms of numbers and terms used, the coverage of all factors seems very similar across all three cases. These CSFs include teamwork and quality culture, quality management system and satisfactory reward, change management, less bureaucratic and participative, IT/information systems, project management, and adequate financial resources.

Findings and discussions

We highlight the CSFs and these factors should be applied in organisational setting, as follows.

Teamwork and quality culture

The evidence here and elsewhere is that a strong appropriate culture should be developed in the organisation, and should start from the adoption of organisational

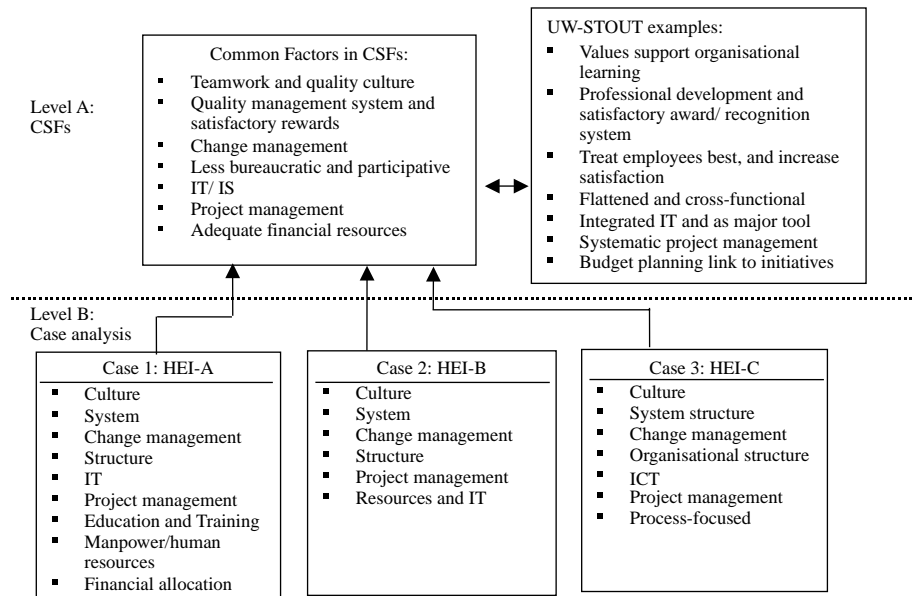


Figure 1.
Common factors across case PHEIs

core values, which should be done through various innovative activities. This is because culture plays an important role to enable successful change implementation and avoid stress and resistance to change among employees which is acknowledged as being a fundamental block to change (Mabin *et al.*, 2001). It is clear from the findings, that it was stressed how organisational culture – teamwork and quality influences BPR. Authors like Alavi and Yoo (1995) and Lee and Asllani (1997) stressed the importance of organisational culture to ensure success in incremental or radical process change. We found slightly different circumstances of organisational culture in all case studies, however, all stressed on teamwork. This is in line with UW-Stout’s vision and values which typify this collaborative process and innovativeness. We have the same opinion as Murray and Lynn (1997) who highlighted that innovativeness is vital for a large-scale process change, which is BPR in this context. We agree that a well-established culture of teamwork would make it easier for the organisation to achieve its goals. Therefore, culture should become a top priority in this BPR to move the whole organisation to desirable ends.

It was suggested that, in some situations, it is necessary to change the organisational culture to ensure successful fundamental change and to become competitive (LaMarsh, 1997; Peppard and Fitzgerald, 1997). Specifically, Grieves (2000) stressed the need to change “cultural norms”. Therefore, parallel to what has been done in the case studies, we believe that this is the right way to adapt and adopt the right culture into BPR to ensure its success, which is in line with the work of Peppard and Fitzgerald (1997).

Quality management system and satisfactory rewards

Furthermore, organisational systems should tally with organisational direction, for example, the adoption of quality management system (QMS) in organisational work activities enables the organisation to meet its BPR objectives. Because QMS itself is process-focus, it therefore aids the organisation to detect any improvement or changes needed in the process. Another important element is that the compensation systems practice in the organisation should be suitable for the organisational environment and appropriate for the kind of individuals so that it would satisfy the employees (Rowley, 1996; Mumford, 1999).

We highlight two kinds of systems which found important as identified from the case studies:

- (1) QMS; and
- (2) incentives and rewards.

It was noticeable that all three case PHEIs, reported that the QMS, namely MS ISO 9001, pursued by them was important for the success of BPR. Generally, this is because QMS makes the organisational process more manageable and they could simply streamline their process to meet objectives. Quality is important in HE, and also an UW-Stout major system was the “performance improvement system” which introduced quality management practices in 1992, with extensive awareness training in facilitation, performance measurement, and benchmarking. This system enabled the organisation to create a continuous improvement environment.

We found that a proper organisational system is important for the success of BPR. Systems should include elements such as common interests, values, and decision

making, which showed linkages to culture and structure in case studies findings. This view was parallel to Mumford (1999) and Rowley (1996), who discussed the strategies for motivation, including appropriate rewards such as performance-related pay and promotion, which relate to culture. Particularly, Rowley (1996) stressed the academic staff as a key resource to HEIs, therefore it is important to recognise their different motivation factors which depend on things such as length of service, work experience, age, aspirations with respect to career development, and personal life.

These three cases shared the belief that extrinsic rewards such as performance appraisal, promotion and increased salary are closely tied to employee performance (particularly in HEI-C). In addition, UW-Stout designed its compensation and recognition to reward high performance, to be equitable, and to recognise longevity and loyalty to the institution. The compensation systems provide merit rewards, adjustments for promotion and educational preparation changes, and addresses longevity and salary equity issues. The promotions include “title” change process, for example, a teaching academic staff member may move from a “lecturer” title to a “senior lecturer” title (UW-Stout, 2003).

Change management

Moreover, the organisation should know very well about how to manage the impact of change in the organisation. Particularly, in the HE sector, academic staff are the key personnel and important assets (Rowley, 1996; Lundquist, 1998), therefore management should have the “art” of dealing with people in its particular environment. Effective change management should consider soft issues around the human, and would avoid resistance to change among employees (Mumford, 1999; Moran and Brightman, 2000; Mabin *et al.*, 2001).

Change management relates to how a manager or leader manages the potential impact of change to make people accept it in order to implement change. This definition is in line with Moran and Brightman (2000) who defined change management as “... the process of continually renewing an organization’s direction, structure, and capabilities to serve the ever-changing needs of external and internal customers.” The authors stated that change management “... is really about managing (either well or poorly) the impact of some particular environment and/or organizational change on these core activators of workplace performance.” This is different from the management of change, on which they stated that managing change is about:

... managing people, which is fortunately something we know a great deal about (though we do not always apply what we know!) Managing change draws on our knowledge on human motivation, groups and leadership.

Therefore, change management is not about managing change. In Mabin *et al.* (2001) on the basis of the theory of constraints, they stated that this theory may well provide a management model that incorporates the utility of resistance actively, directly and positively. To make radical process change a success, the concern for people is important, and that is what management should do. For example, Mumford (1999) highlighted that lack of concern for people will make BPR not succeed.

In addition, Mabin *et al.* (2001) discussed the importance of training and development in change management to make people well equipped with all sorts of knowledge and skills, which therefore would reduce the fear of uncertainty. We found

that change management is vital for radical BPR, which is also proved by authors such as Ascari *et al.* (1995), Peppard and Fitzgerald (1997), and Al-Mashari and Zairi (1999). Additionally, in organisational development (OD) research which really concerns soft issues, Grieves (2000) interestingly pointed out that the right way of managing people for adapting to and adopting change will make change successful and a benefit in the long-run.

Most of case PHEIs participants believed that resources like money and people are important for the success of BPR. More truly is that almost all of them perceived people as the most important aspect of BPR effort. In a comparison with UW-Stout, emphasis there is on the employees' satisfaction and treating them best, and for instance, it employs a number of proactive methods to ensure employees develop their full potential, such as identification of training and development needs, encouraging grants and research, sabbaticals, fellowships, and professorships. Thus, to make BPR work successfully, it must be executed by people within the organisation (Maull *et al.*, 1995; Campbell and Kleiner, 2001), and more importantly, knowing the art of managing possible impact of change, not only managing people to work together for making BPRs.

Less bureaucratic and participative

Besides, organisational structure should enable BPR in terms of its encouraging creativity and innovativeness in the organisation, therefore the need for less bureaucracy, and more participation and empowerment in the organisation. Also, it should be borne in mind that the practice also depends on situation and decision-making type, as found in the case studies. A cross-functional integration, especially through teamwork, should be implemented in the organisation to promote successful process change (LaMarsh, 1997; Peppard and Fitzgerald, 1997; McAdam, 2003).

The general view is that BPR means flatter, cross-functional and less bureaucratic structure. Although the organisational chart would appear to be more on rigid bureaucracy, all cases stressed that less bureaucracy was practised in their organisation. Case PHEIs also said that this teamwork enabled the organisation to implement a cross-functional integration, which is in line with Peppard and Fitzgerald (1997), who identified the efficiencies of doing tasks across functional boundaries through teamwork.

However, since "innovativeness" is essential for BPR to happen successfully, McAdam (2003) suggested that organisations should implement less bureaucracy to encourage innovativeness. Therefore, organisational structure should be flexible in order to avoid failures of BPR implementation, as discussed in Aggarwal (1998) and Ranganathan and Dhaliwal (2001). Additionally, several authors who worked on BPR research, such as Davenport and Short (1990) and LaMarsh (1997), stressed the importance of process integration in organisational structure in order to achieve desirable business outcomes. Therefore, in a rigid organisational structure, Hall *et al.* (1993) and Peppard and Fitzgerald (1997) mentioned one of the ways to achieve successful results in BPR implementation is by changing that organisation's structure significantly, especially with emphasis on cross-functional work teams. This evidence seems to suggest that the top management should re-evaluate their organisational structure as to whether it is appropriate for today's situation, with a rapid changing environment, tight competition in the market, and the emerging of new HEIs and new technology. It was found that less bureaucracy would encourage

innovativeness in an organisation to move ahead and to implement BPR successfully. For example, the practice of cross-functional teams will open up widely the opportunity to have a more process perspective, which is parallel to the BPR concept.

UW-Stout has flattened the organisational structure through the broad involvement of all governance bodies to offer equal representation in the decision-making process. Furthermore, the university has *ad hoc* committees and teams, cross-departmental and college, to deploy university-wide initiatives. Furthermore, departments are empowered to operate within their budget allocation or to request additional resources or reallocation of funds. This kind of organisational structure eliminates delay in decision making and enables the university to be more responsive to its stakeholders and customers. This idea was parallel to Thomas (1994) and Peppard and Fitzgerald (1997), who indicated that if empowerment was practised it would make the organisation faster to respond to customer needs, and therefore the organisation will get benefits from it.

Information technology/information system

Moreover, previous researchers stated that IT/IS is needed to achieve the best results in BPR implementation, and particularly its integration in processes could aid in redesign activities (Bhatt, 2000; Vakola *et al.*, 2000). We agree that IT/IS could be of tremendous value for an organisation in embarking on BPR; however, it should be apparent how to make IT/IS contribute to its success. This is in line with Newman (1997) who claimed that "there exists little in the form of a framework for providing an integrated view of the information systems' impact on decision making, departmental performance, and organisation-wide performance." Therefore, the organisation should have a specific framework to see connection or integration of IT/IS with other departments in order to benefit them so as to enable BPR implementation.

According to all the PHEI case studies' extensive experience in their BPR projects, IT helps a lot in putting all the systems together and in place. IT plays an important and central role in the BPR. As Khalil (1997) indicated, most of the initiative of BPR came from the IT department, which is true (particularly in HEI-A) in which BPR started from the IT department which tried to find a new way of doing things effectively and efficiently. This is parallel with Mumford's (1999) statement that new IT technologies are rapidly bringing new capabilities to businesses, thereby raising the need to improve the business process dramatically. Most discussions, for example, Vakola *et al.* (2000) and Guimaraes and Bond (1996), agreed that by using IT in a radical process change or reengineering, this could speed up the process to be carried out and minimise errors, thus increasing in productivity.

All three cases believe in the need for IT in BPR, which is in line with most analysts, who viewed reengineering and IT as complementary (Kettinger *et al.*, 1996; Bhatt, 2000). The researcher agrees that it is important how IT is used, because it is not just a matter of doing work using computers instead of doing it manually. This point was also emphasised in other researches, such as Davenport and Short (1990) and Davenport (1993b). Davenport and Short (1990) suggested the use of IT should be optimised, as it was found a powerful tool in BPR, which would enable cross-functional integration, improve cost and time reduction, and improve the quality of output.

This view is similar to Khalil (1997) who identified IT as an enabler for radical BPR, but it needed proper management. Using UW-Stout as a benchmark, its report clearly

stated that IT was highly utilised in processes and was becoming a major tool to improve them. For example, “virtual library” and “online” registration were used for fast response to distance learners’ comments. Integrated IT was also used to collect and integrate data and information for performance improvements. A specific example is that the university uses an integrated relational database (DATATEL ERP system) to consolidate and retrieve university-wide academic and administrative, operational and strategic information. Therefore, considering IT as necessary for BPR to happen, as found in the case studies, we agree that IT is an enabler, beside being a driver and also a major component of radical change. Al-Mashari and Zairi (1999) and McAdam (2003) supported this view in their work which discussed that IT (enabling) and IT (component) support the radical change project directly.

Project management

Project management is important in order to plan and manage the BPR to be implemented (Al-Mashari and Zairi, 1999; Burlton, 2001). Previous discussions reveal how employees should have adequate skills in making changes and doing tasks assigned to them, which could be gained through a proper training and education being given to them. Consequently, personal commitment from both leaders and managers, and employees and team members is needed to make BPR projects attain their targets. Most of the employees in the case PHEIs reported considerable experience of project management techniques. Therefore, the employees in this organisation normally were sent for training in order to get project management skills from outside consultants. In the OD perspective, researchers such as Huber and Glick (1995), Bechtel and Squires (2001) and Senior (2002) highlighted that training and education was important for long-term benefit, and it becomes crucial when radical BPR is involved. We agree with this statement, which is absolutely true as the factor for long-term benefits, however, an organisational learning approach is also needed to share the knowledge; if not, it will be meaningless.

Similarly, UW-Stout has implemented systematic project management with adequate resources and emphasised the planning process. For example, in its new degree programme design, a comprehensive implementation plan was embraced, including such as programme goals and objectives, curriculum, faculty and staff expertise, and resource/budget information.

From the discussions above, we realised the importance of project management in BPR, therefore, which needs personnel skills, since without it the project might fail and cannot be accomplished, and will waste money, efforts and other resources. Other than that, in all three cases, the participants experienced that beside skill, full commitment and support from those involved in projects, whether directly or indirectly, were also important to deliver expected results, which is similar to Al-Mashari and Zairi (1999).

Adequate financial resources

Financial resources are obviously important to move the initiatives, since without enough funding any efforts would end meaningless and stagnant. Therefore, budget allocations to BPR should be viewed as a long-term investment to get favourable results which would give profit to the organisation (Kotnour, 2001).

The benchmark university, UW-Stout, implements effective capital and budget planning processes and innovative methods of funding new technology plans to

continually improve its physical facilities. This organisation was recognised as an “innovative organization in institutional budgeting and resource allocation” and has a strong link between budget and academic programme planning (UW-Stout, 2003, p. 8).

BPR involved a huge amount of money (Davenport, 1993b; Maull *et al.*, 1995). Parallel to this, it was realised from the discussions that, in order for BPR to happen successfully, the organisation needs to have an adequate amount of funding therefore, sufficient to implement change and to back up unpredictable circumstances or uncertainty. Therefore, it is important to have proper budget planning for any improvement initiatives.

Conclusions

In general, this research provides important lessons as a condition for success that is drawn from the findings of the case studies. The findings of this research offer a number of strong lessons for organisations anxious to improve their key processes. Therefore, readers on the way to find appropriate actions and practices of CSFs in an organisation could benefit from the findings. We also highlight that OD perspective should be taken into consideration on how to make successful management of change. We believe that the OD approach is appropriate in order for the organisation to manage change, thus it concerns a soft systems model for change and by allowing employees access to acquire knowledge (Laiken, 2003). This is also in line with studies for instance by Burke and Peppard (1995) and Hayes (2000) who identified certain criteria in this approach, such as the emphasis on process, involving the whole organisation as well as its parts, being participative, and having top management support and involvement.

References

- Aggarwal, S. (1998), “Re-engineering: a breakthrough or little new?”, *Journal of Socio-Economic Planning Science*, Vol. 32 No. 2, pp. 155-67.
- Ahmad, R. (2003), “Cognitive processing in performance appraisal”, PhD thesis, Bradford School of Management, University of Bradford, Bradford.
- Ahmad, H. (2004), “Process change in Higher Education Institutions (HEIs): a case study approach proposing a model of successful implementation”, PhD thesis, Bradford School of Management, University of Bradford, Bradford.
- Ahmad, R. and Spicer, D. (2002), “A study of the cognitive processing models used in the appraisal system: the Malaysian public service”, *ASIAN Academy of Management Journal*, Vol. 7 No. 2, pp. 1-16.
- Alavi, M. and Yoo, Y. (1995), “Productivity gains of BPR: achieving success where others have failed”, *Information Systems Management*, Vol. 12 No. 4, pp. 43-7.
- Al-Mashari, M. and Zairi, M. (1999), “BPR implementation process: an analysis of key success and failure factors”, *Journal of Business Process Management*, Vol. 5 No. 1, pp. 87-112.
- Altman, Y. and Iles, P. (1998), “Learning, leadership, teams: corporate learning and organisational change”, *Journal of Management Development*, Vol. 17 No. 1, pp. 44-55.
- Ascari, A., Rock, M. and Dutta, S. (1995), “Reengineering and organisational change: lessons from a comparative analysis of company experience”, *European Management Journal*, Vol. 13 No. 1, pp. 1-30.
- Bechtel, R.L. and Squires, J.K. (2001), “Tools and techniques to facilitate change”, *Industrial & Commercial Training*, Vol. 33 No. 7, pp. 249-54.

-
- Berrington, C.L. and Oblich, R.L. (1995), "Translating business reengineering into bottom-line results", *Industrial Engineering*, Vol. 27 No. 1, pp. 24-7.
- Bhatt, G.D. (2000), "Exploring the relationship between information technology, infrastructure and business process re-engineering", *Business Process Management*, Vol. 6 No. 2, pp. 139-63.
- Burke, G. and Peppard, J. (Eds) (1995), *Examining Business Process Re-engineering. Current Perspectives and Research Directions*, Kogan Page, London.
- Burlton, R.T. (2001), *Business Process Management: Profiting from Process*, Sams Publishing, Indiana.
- Campbell, S. and Kleiner, B.H. (2001), "New developments in re-engineering organisations", *Management Research News*, Vol. 24 Nos 3/4, pp. 5-8.
- Davenport, T. (1993a), "Need radical innovation and continuous improvement? Integrate process reengineering and TQM", *Planning Review*, Vol. 21 No. 3, pp. 6-12.
- Davenport, T. (1993b), *Process Innovation: Reengineering Work Through Information Technology*, Ernst & Young, New York, NY.
- Davenport, T.H. and Short, J.E. (1990), "The new industrial engineering: information technology and business process redesign", *Sloan Management Review*, Vol. 31 No. 4, pp. 11-27.
- Grieses, J. (2000), "Introductions: the origins of organisational development", *Journal of Management Development*, Vol. 19 No. 5, pp. 345-447.
- Guimaraes, T. (1999), "Field testing of the proposed predictors of BPR success in manufacturing firms", *Journal of Manufacturing Systems*, Vol. 18 No. 1, pp. 53-65.
- Guimaraes, T. and Bond, W. (1996), "Empirically assessing the impact of BPR on manufacturing firms", *International Journal of Operations and Production Management*, Vol. 16 No. 8, pp. 5-28.
- Hall, G., Rosenthal, J. and Wade, J. (1993), "How to make reengineering really work", *Harvard Business Review*, Vol. 71 No. 6, pp. 119-31.
- Hammer, M. and Champy, J. (1993), *Reengineering the Corporation*, Harper Business, New York, NY.
- Hayes, J. (2000), *The Theory and Practice of Change Management*, Palgrave, New York, NY.
- Huber, G.P. and Glick, W.H. (1995), *Organizational Change and Redesign*, Oxford University Press, New York, NY.
- Hutton, G. (1996), "BPR-overcoming impediments to change in the public sector", *New Technology Work and Employment*, Vol. 10 No. 2, pp. 147-51.
- Kettinger, W.J., Teng, J.T.C. and Guha, S. (1996), "Information architectural design in business process reengineering", *Journal of Information Technology*, Vol. 11, pp. 27-37.
- Khalil, O.E.M. (1997), "Implications for the role of information systems in a business process reengineering environment", *Information Resources Management Journal*, Vol. 10 No. 1, pp. 36-42.
- Kotnour, T. (2001), "Building knowledge for and about large-scale organizational transformations", *International Journal of Operations & Production Management*, Vol. 21 No. 8, pp. 1053-75.
- Laiken, M.E. (2003), "Models of organizational learning: paradoxes and best practices in the post industrial workplace", *Organizational Development Journal*, Vol. 21 No. 1, pp. 8-19.
- LaMarsh, J. (1997), "The resilient worker: employees who can cope with change", *Hospital Material Management Quarterly*, Vol. 19 No. 2, pp. 54-8.
- Lee, S.M. and Asllani, A. (1997), "TQM and BPR: symbiosis and a new approach for integration", *Management Decision*, Vol. 35 No. 6, pp. 409-16.

- Lundquist, R. (1998), "Quality improvements of teaching and learning in higher education: a comparison with developments in industrial settings", *Teaching in Higher Education*, Vol. 3 No. 1, pp. 51-61.
- McAdam, R. (2003), "Radical change: a conceptual model for research agendas", *Leadership & Organization Development Journal*, Vol. 24 No. 4, pp. 226-35.
- McAdam, R. and Donaghy, J. (1999), "Business process re-engineering in the public sector", *Journal of Business Process Management*, Vol. 5 No. 1, pp. 33-49.
- Mabin, V.J., Forgeson, S. and Green, L. (2001), "Harnessing resistance: using the theory of constraints to assist change management", *Journal of European Industrial Training*, Vol. 25 Nos 2-4, pp. 168-91.
- Maull, R.S., Weaver, A.M., Childe, S.J., Smart, P.A. and Bennet, J. (1995), "Current issues in business process re-engineering", *International Journal of Operations & Production Management*, Vol. 15 No. 11, pp. 37-52.
- Miles, M.B. and Huberman, A.M. (1994), *Qualitative Data Analysis*, Sage, Thousand Oaks, CA.
- Moran, J.W. and Brightman, B.K. (2000), "Leading organizational change", *Journal of Workplace Learning*, Vol. 12 No. 2, pp. 66-74.
- Mumford, E. (1999), "Routinisation, re-engineering, and socio-technical design: changing ideas on the organisation of work", in Currie, W.L. and Galliers, B. (Eds), *Rethinking Management Information Systems: An Interdisciplinary Perspective*, Oxford University Press, New York, NY.
- Murray, M.A. and Lynn, M.P. (1997), "Business process re-engineering/information system development to improve customer service quality", *Business Process Management*, Vol. 3 No. 1, pp. 9-16.
- Newman, K. (1997), "Re-engineering for service quality: the case of Leicester Royal Infirmary", *Total Quality Management*, Vol. 8 No. 5, pp. 255-64.
- Pearce, J.A. and Robinson, R.B. (1997), *Strategic Planning Forecasting Tools and Techniques*, 6th ed., Irwin, Chicago, IL.
- Peppard, J. and Fitzgerald, D. (1997), "The transfer of culturally-grounded management techniques: the case of business process reengineering in Germany", *European Management Journal*, Vol. 15 No. 4, pp. 446-60.
- Ranganathan, C. and Dhaliwal, J.S. (2001), "A survey of business process reengineering practices in Singapore", *Information and Management*, Vol. 39 No. 2, pp. 125-34.
- Rowley, J. (1996), "Motivation and academic staff in higher education", *Quality Assurance in Education*, Vol. 4 No. 3, pp. 11-16.
- Senior, B. (2002), *Organisational Change*, 2nd ed., Prentice Hall, Essex.
- Smith, M. (2003), "Business process design: correlates of success and failure", *The Quality Management Journal*, Vol. 10 No. 2, pp. 38-49.
- Stoddard, D.B., Jarvenpaa, S.L. and Littlejohn, M. (1996), "The reality of business reengineering: Pacific Bell's Centrex provisioning process", *California Management Review*, Vol. 38 No. 3, pp. 57-76.
- Thomas, M. (1994), "What you need to know about business process re-engineering", *Personnel Management Review*, Vol. 26 No. 1, pp. 28-31.
- UW-Stout (2003), *2001 Malcolm Baldrige National Quality Program Application: The School of Choice for 21st Century*, University of Wisconsin-Stout, Wisconsin.
- Vakola, M., Rezgui, Y. and Wood-Harper, T. (2000), "The Condor business process re-engineering model", *Managerial Auditing Journal*, Vol. 15 Nos 1/2, pp. 42-6.

- Yin, R.K. (1994), *Case Study Research: Design and Methods*, 2nd ed., Sage, London.
- Zinser, S., Baumgartner, A. and Walliser, F. (1998), "Best practice in reengineering: a successful example of the Porsche research and development center", *Journal of Business Process Management*, Vol. 4 No. 2, pp. 1-9.

Further reading

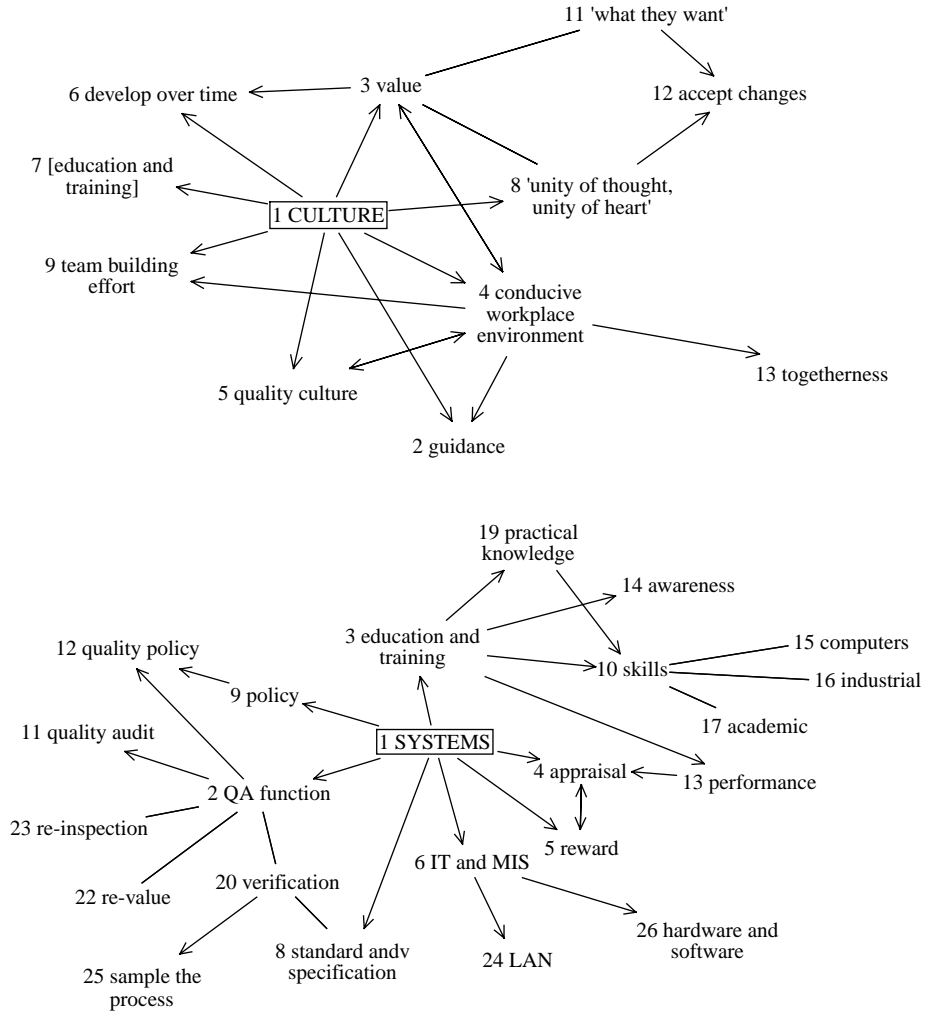
- Al-Mashari, M. (1999), *Business Process Reengineering (BPR) and Information Technology (IT) Systems: A Model of Implementation and its Applicability to Case of Enterprise Resource Planning (ERP) Using SAP R/3*, Bradford School of Management, University of Bradford, Bradford.
- Kotter, J.P. (1995), "Leading change: why transformation efforts fail", *Harvard Business Review*, Vol. 73 No. 2, pp. 59-67.

Appendix

The Appendix follows overleaf.

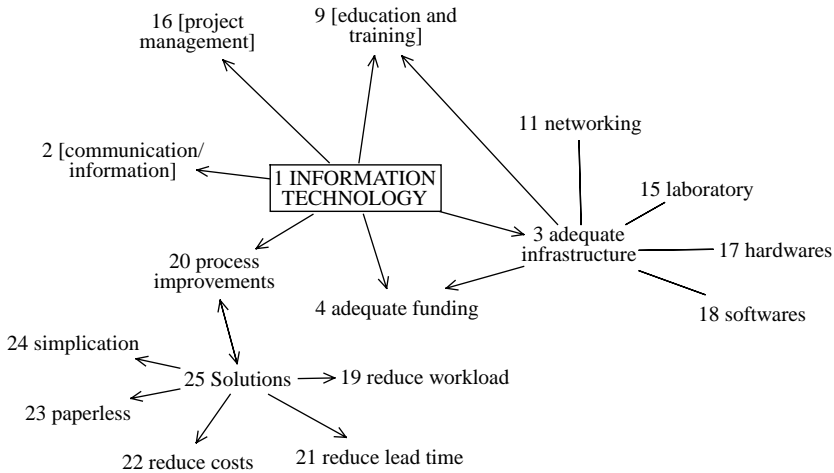
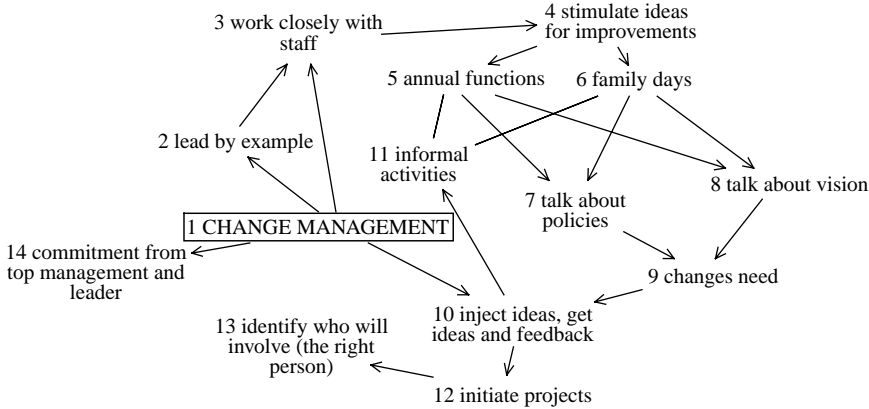
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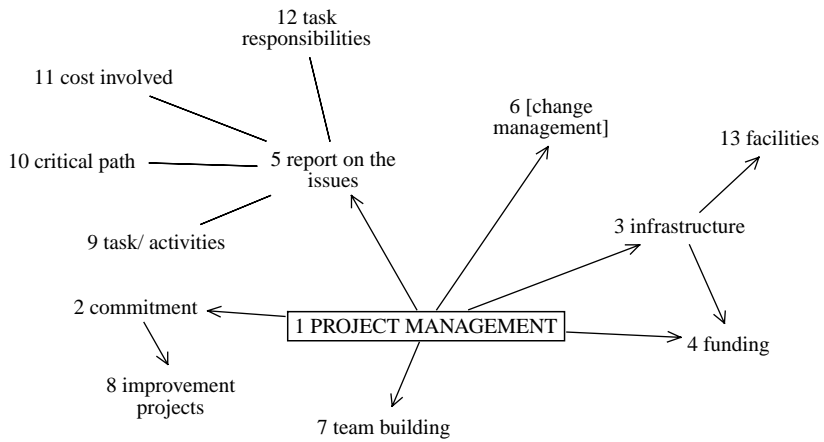
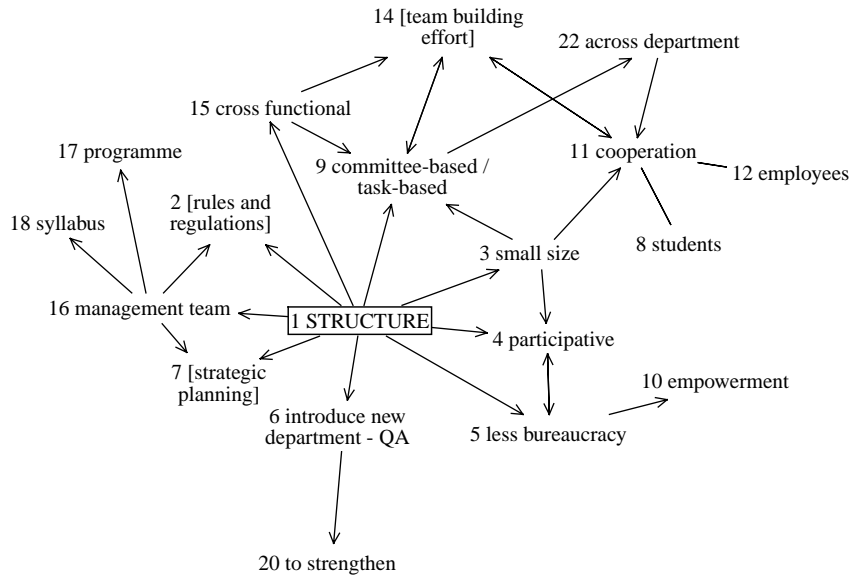
(continued)

Figure A1.
Example of Decision
Explorer output of CSFs
(case 1: HEI-A)



(continued)

Figure A1.



(continued)

Figure A1.

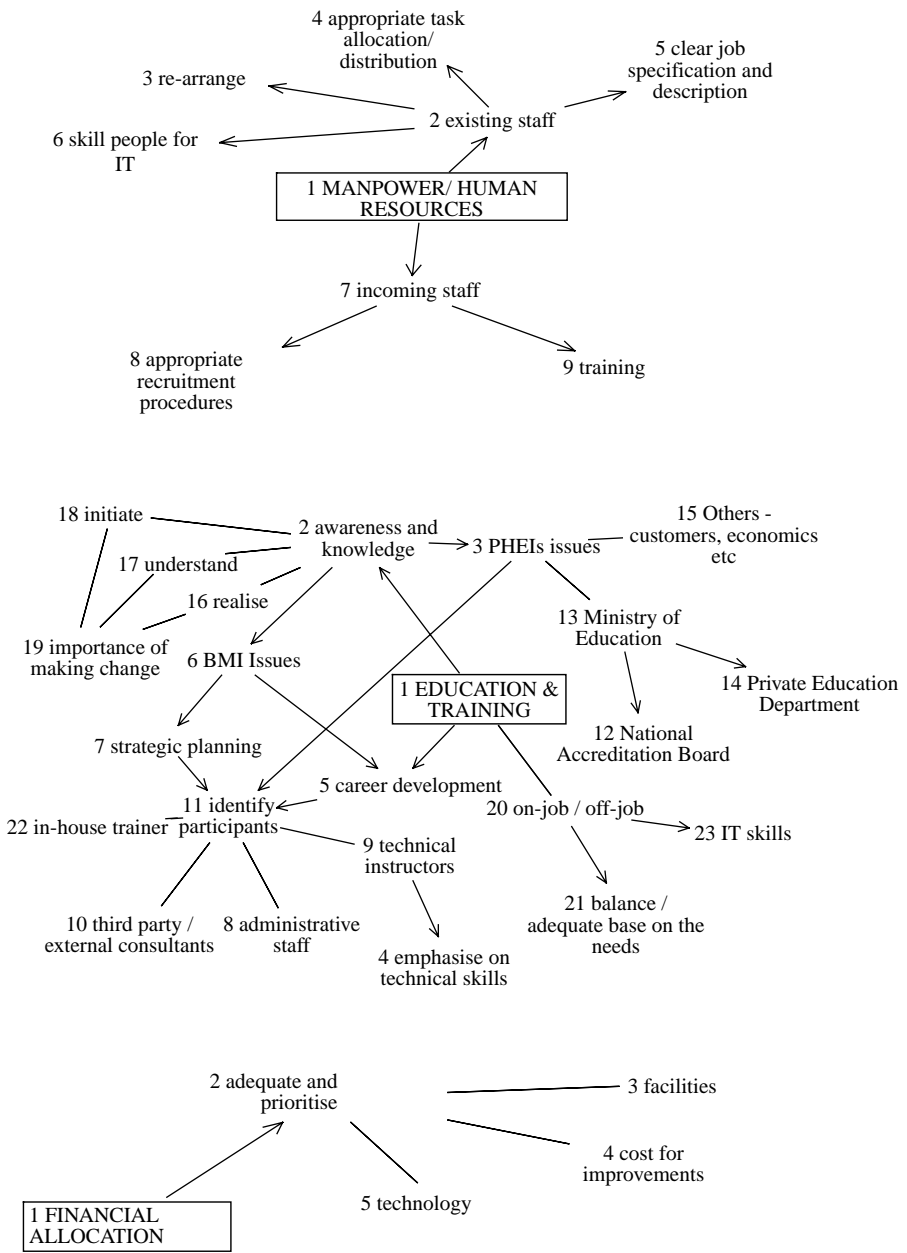


Figure A1.