DIVISION OF COMPUTER SCIENCE

Key Issues For Successful Exploitation of BP&ISR In Sri Lanka

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ABSTRACT

There have been few management concepts to have generated such enormous interest so quickly as the concept of business process reengineering (BPR). Case studies in the UK have revealed that in practice there are a number of key issues that needs to be in place for a BPR project to succeed. A recent study of five leading mercantile and state owned organisations in Sri Lanka identified, environmental, cultural, business and IS/IT factors relevant when considering Business Process and Information Systems Reengineering (BP&ISR) initiatives. This paper synthesises the factors identified by these studies to provide a series of key issues that need to be taken into account when implementing BP&ISR in Sri Lanka. This study also compared BPR approaches used in the UK with those used to conduct BPR related projects in Sri Lanka.

INTRODUCTION

Business Process Reengineering (BPR) is considered by many as one of the most innovative ideas to have emerged in the 1990's. It is a concept which has generated considerable interest among various levels of the business community and academics alike. BPR is formally defined as "the fundamental rethinking and radical redesign of business processes to achieve dramatic improvements in critical contemporary measures of performance, such as cost, quality, service and speed" (Hammer & Champy 1993, pp 32). However, researchers and practitioners have their own interpretations for BPR to suit their environments and needs. Demay & King (1996) state that BPR is discussed under the various rubrics of business process reengineering, business process redesign, business process innovation or business process transformation. Harrington (1991) uses the term 'business process improvement' in preference to business process reengineering.

In the present competitive market many organisations need to reengineer their business processes and information systems repeatedly to meet the changing nature of modern business (Hammer & Champy 1993, Harrington 1991, Davenport 1993). An increasing number of organisations in the west have used BPR to improve their businesses and gain competitive advantage. However, the number of BPR projects that are falling short of initial expectations are also a cause for concern (Willcocks 1995b). Some researchers attribute this to organisations overlooking factors such as organisation culture and structure, management vision and goals, business processes and systems, and human resource and skills related issues when carrying out BPR related work. Case studies by Masri et al, (1995), McCarthy et al, (1995), Heracleous (1995), and Lombroso & Boyle (1995) in both the UK and USA have revealed the importance of analysing such factors.

BPR and its benefits are now recognised in developing countries in the South Asian region. In Sri Lanka a number of large multinational companies and some state owned organisations have already embarked on improvement programs, such as total quality management (TQM) and 'reorganisation'. As in industrialised countries, large and medium sized organisations in Sri Lanka rely on IS/IT to run their day to day business activities and to some extent achieve their goals and objectives. The reliability, efficiency, productivity and cost effectiveness of their business processes depends largely on their information systems and thus, any BPR initiative will involve reengineering the information systems that support the core business processes. However, it is recognised that incorporating BPR changes into the business systems analysis and design (BSAD) life cycle is a difficult task (Childe et al, 1994). In the Sri Lankan context of limited resources and ailing legacy systems, conducting an integrated business process and information systems reengineering project will be an even more difficult and complicated task.

This paper describes case studies undertaken in five different organisations in Sri Lanka from November 1995 to January 1996. The objectives of the case studies were three fold. The first objective was to study the organisations in order to get a good understanding of the business, work and IS/IT environments. The second objective was to examine any BPR or related projects in the organisations in order to analyse the business, social, cultural, political and human impact of such projects, and to evaluate the methods and approaches used. The third and final objective was to identify factors which may influence the implementation of business process and information systems reengineering (BP&ISR) in Sri Lanka. A case study approach was used in order to get a good understanding of the work environment in the organisations and to obtain the views of employees by spending adequate time in each case study organisation. The paper compares the results of the Sri Lankan case studies with the findings of a UK based BPR case study in one of the largest multinational organisations in the world (Weerakkody et al,1995).

1 THE RESEARCH METHOD

Initial contact was made with 20 leading organisations in Sri Lanka seeking permission to carry out case study research work on BP&ISR. A short list of five organisations was drawn up on the basis of the organisation's impact on the Sri Lankan economy, its business field, ownership status (i.e. state owned, multinational, private Ltd.), size and history. One organisation was selected solely on the merit of its business background, i.e. being an educational and consultancy based organisation. This provided an opportunity to interview eight highly experienced consultants and obtain information on a wide range of issues in the context of many state and mercantile organisations in Sri Lanka. A number of personal contacts were also consulted to get a wider understanding of the general business and IS/IT environment in Sri Lanka. These included consultants involved in BP&ISR related work, leading academics, and other contacts in business and IS/IT industry.

Organisations were visited for about 8 hours a week from November 1995 to January 1996. Interviews were used as the primary method of data collection supported by non-participative observation of the day to day work environment and document collection. Issues covered were the business and IS/IT environment, management structure, work procedures and practices, general problems and environmental issues.

The atmosphere of the interviews varied depending on the interviewee. Usually it was a friendly, frank and informal atmosphere when interviewing the operational level managers, while it was the opposite with the middle and strategic level managers who appeared to be more protective of the organisation's image. The non-executive clerical staff were over protective of themselves and defensive when answering questions. However, the overall objectives of the case studies were met and sufficient information was gathered through a combined approach of interviews, observation and document reviews.

1.1 Interview Method

A semi-structured interview method was used. Two sets of separate, but formal questions were used as guidelines for interviewing IS/IT and non IS/IT employees with slight adjustments made depending on the interviewee's job specification, roles and responsibilities. During the interviews data was recorded using either a tape recorder or written notes depending on the interviewee's preference. The interview results were then transferred to a case study logbook in which factors which may influence the implementation of BP&ISR were highlighted and a chain of evidence identified as suggested by Yin (1994). On average each interview lasted between 45 minutes to 2 hours. Where possible requests were also made for documented information, and a number of documents such as company profiles and annual reports, organisation and business unit charts, mission and vision statements and business promotion brochures etc., were collected from the case study organisations.

1.2 Information, Proof and Validity

The factors and issues identified during the investigation were highlighted in the log book and grouped into seventeen different areas which are discussed in section four of this paper. Some confidential information gathered during the case studies has not been disclosed in this paper as agreed with the respective individuals in the different organisations. Case study organisations and information sources have been given code numbers in order to protect the identity of the respective organisations and interviewees. The source codes have been allocated taking into account the type of organisation, interviewee's position (i.e. management hierarchy) and the type of role or designation of the interviewee. This is explained in appendix A using tables 1, 2 and 3. The types (designations) of the different employees interviewed are shown in appendix B.

2. THE CASE STUDY ENVIRONMENT

The organisations selected covered a wide spectrum of the business and IS/IT environment in Sri Lanka. Of the five case study organisations three are state owned, one private limited and one multinational. All five of the organisations are market leaders in their respective business fields and could be considered representative of most Sri Lankan organisations and the general business and work environment.

2.1 The Business & Work Environment

Management and employees in the respective organisations agreed that their business and work environment needs to be improved. Interviews revealed that management was keen to improve and change, but were handicapped by a lack of time or qualified / skilled human resources in the related areas of IS/IT and BPR, and therefore reluctant to risk the investment of large sums of money and resources.

The business environment in three of the case study organisations is highly profitable and the work environment is prestigious and rewarding. However, for all three of these organisations there is no competition, which discourages them from making any changes or improvements to their businesses. In contrast, those organisations in relatively competitive markets have been forced to face fierce competition from foreign multinationals. In this context, three of the case organisations have been forced to react with various reorganisation, business and IS/IT improvement projects including total quality management (TQM) and ISO 9000. Yet, interviews revealed that these improvement projects are inadequate to outperform the competition and attract new customers, or the ones already lost to competition.

The organisation and management structures in all the case study organisations are hierarchical and in the case of state organisations are plagued with red tape, bureaucracy, formalities, rules and regulations. This has a negative impact on the business and it restricts the flexibility, efficiency and output of the business. It also restrains the employees from taking decisions, discourages them from giving total commitment and fails to exploit the true capability of the employees and the business processes. In contrast, the mercantile (private and multinational) organisations have less red tape and the working environment permits more flexibility to encourage quality, profitability and customer satisfaction.
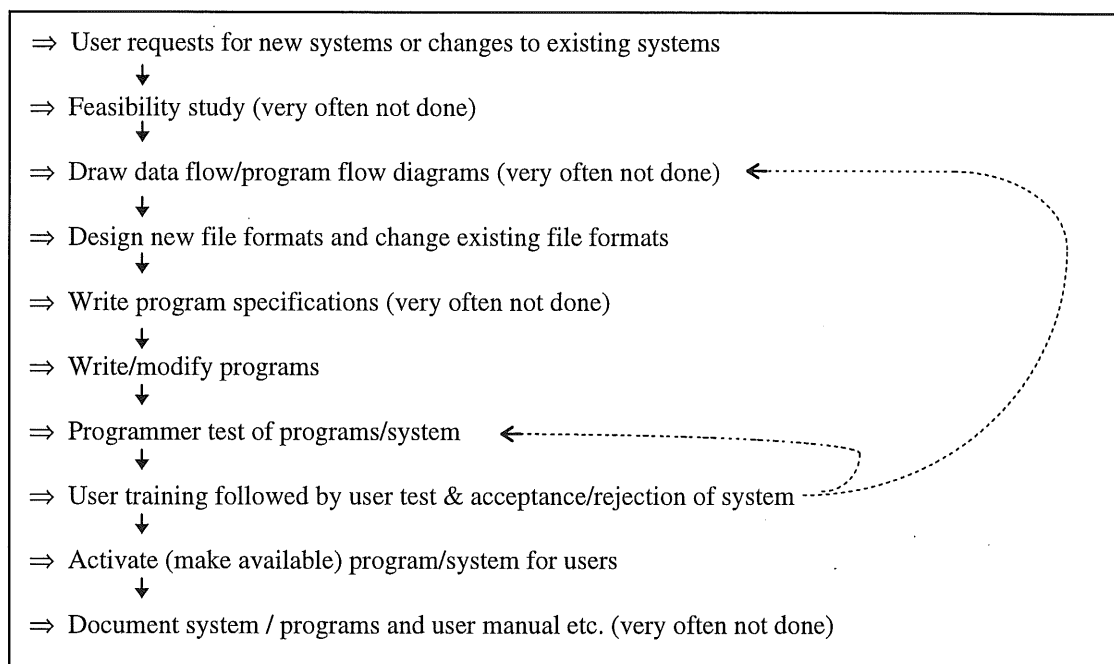
2.2 The IS/IT Environment

Evidence suggests that the information systems environment in all the case study organisations were not up to user / management expectations and clearly had the potential for improvement. Most systems appeared to be developed hastily and the organisations had the habit of adding new modules and programs on top of the core system on a regular basis. This practice has left nearly all the in-house developed software in the organisations with problems, which may explain why nearly half of the total information systems in the case study companies are causing concern to management (MMLMIT01, SFLSIT01, SFLMIT02, SIMSDR01, SIMMIT05, PMLOIT01).

The skill levels of the IS/IT people varied between the organisations. While the state owned organisations preferred and were obliged to recruit local university graduates, the mercantile organisations opt for professionally qualified experienced people or foreign graduates. Interview results suggest that the latter are more exposed to new business concepts, IS/IT techniques and are more open minded and flexible. It was also evident that IS/IT was more efficiently utilised in the mercantile sector. However, as a whole, although IS/IT tends to dominate the business and work environment in most of these organisations, sadly it appeared

that the existing IS/IT resources (i.e. hardware, software and people) were largely under-utilised.

Case studies revealed that none of the organisations conducted formal BSAD exercises or used any of the established BSAD methodologies. Figure 1 represents a general model of the IS development process used by all the case study organisations which is mostly focused on writing programs. The dangers of this practice is highlighted time and again in the literature. Downs *et al,* (1992), Checkland & Scholes (1990) and Jayaratna (1994) all stress the importance of using methodologies for business systems understanding, analysis and design. West (1996) states that modern systems development and process improvement is about understanding the problem and how the problem will be tackled, before starting on design and development.
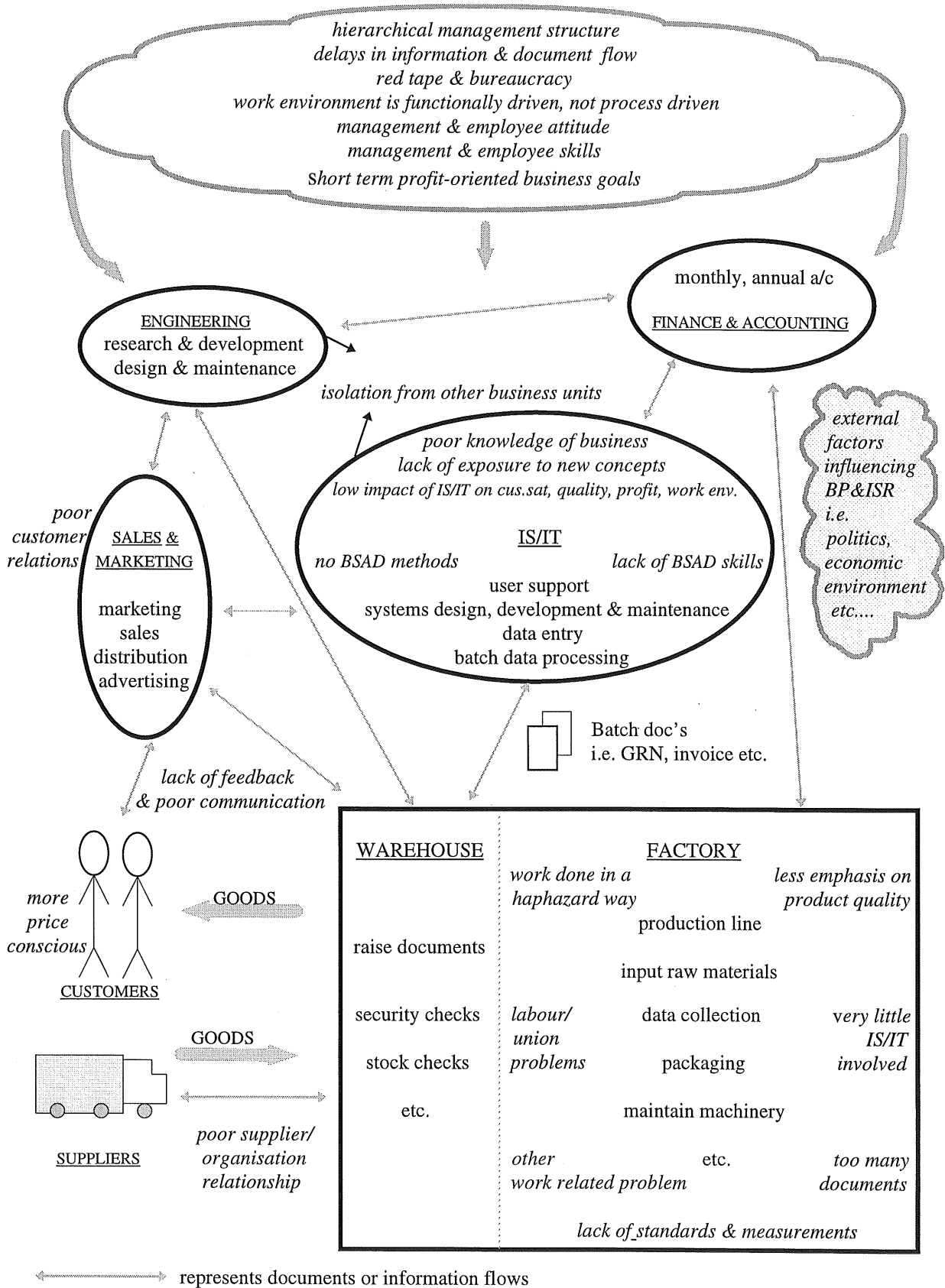
Figure 1 - OrgMML's IS Development Procedure

$\Rightarrow$ User requests for new systems or changes to existing systems
$\Rightarrow$ Feasibility study (very often not done)
$\Rightarrow$ Draw data flow/program flow diagrams (very often not done) $\longleftarrow$
$\Rightarrow$ Design new file formats and change existing file formats
$\Rightarrow$ Write program specifications (very often not done)
$\Rightarrow$ Write/modify programs
$\Rightarrow$ Programmer test of programs/system $\longleftarrow$
$\Rightarrow$ User training followed by user test & acceptance/rejection of system
$\Rightarrow$ Activate (make available) program/system for users
$\Rightarrow$ Document system / programs and user manual etc. (very often not done)

Of the IS people interviewed whose designations were *systems analyst, systems analyst / programmer* or *analyst programmer,* none had any formal training or practical experience of using any recognised BSAD methodology. It appears that, in some organisations the systems analysts were simply automating manual systems (SCMMCN01, SCMMCN02). This practice encourages computerisation of completely inefficient business processes and activities rather than finding business system solutions through computerisation (Hammer 1993, Harrington 1991). This scenario is often made worse by a 'self imposed' high pressure work environment, lack of management awareness and knowledge of the benefits of BSAD. The self imposed pressure of work is often brought about through lack of proper business processes or procedures, poor organising, and lack of standards, guidelines and methodologies.

The work and IS/IT environment in the case study organisations is summarised in the rich picture in Figure 2.

Figure 2 - A Rich Picture of the Work and IS/IT Environment and Factors Influencing BP&ISR in the Context of a Typical Sri Lankan Organisation.

hierarchical management structure
delays in information & document flow
red tape & bureaucracy
work environment is functionally driven, not process driven
management & employee attitude
management & employee skills
Short term profit-oriented business goals

monthly, annual a/c

FINANCE & ACCOUNTING

ENGINEERING
research & development
design & maintenance

isolation from other business units

external factors influencing BP&ISR i.e. politics, economic environment etc....

poor knowledge of business
lack of exposure to new concepts
low impact of IS/IT on cus.sat, quality, profit, work env.

poor customer relations

SALES &
MARKETING

marketing
sales
distribution
advertising

IS/IT

no BSAD methods   *lack of BSAD skills*
user support
systems design, development & maintenance
data entry
batch data processing

Batch doc's
i.e. GRN, invoice etc.

lack of feedback
& poor communication

more price conscious

GOODS

CUSTOMERS

GOODS

SUPPLIERS

poor supplier/ organisation relationship

WAREHOUSE	FACTORY		
	work done in a haphazard way		*less emphasis on product quality*
		production line	
raise documents		input raw materials	
security checks	*labour/ union*	data collection	*very little IS/IT*
stock checks	*problems*	packaging	*involved*
etc.		maintain machinery	
	other work related problem	etc.	*too many documents*
	lack of standards & measurements		

⟵┈┈┈┈┈┈⟶ represents documents or information flows

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3. BP&ISR IN THE SRI LANKAN CONTEXT

Many in the business community believe that Sri Lankan organisations are reluctant to change. Interviews with senior people in the business community revealed the following common excuses: risk associated with change; financial and other resources involved; lack of competition; lack of time and general resistance to change. However, the Sri Lankan business environment has become more competitive than it was in the 1980's. Most organisations have been forced to reduce operational costs and waste and thereby compelled to change the traditional work patterns. Since the early 1990's a number of organisations in Sri Lanka have been implementing various programmes of organisational change, transformation or restructuring, and many of these projects are referred to as business process reengineering. Although these projects may not 'fundamentally rethink' or achieve 'radical redesign' as Hammer & Champy (1993) would suggest, they are expected to achieve small incremental changes over a longer period of time as suggested by Harrington (1991), Davenport (1993) and Carr & Johanson (1995).

3.1 The Scope For BPR or Related Projects

Over two thirds of strategic, middle and operational level managers in the case study organisations agreed that they would like to see BPR or a similar initiative introduced to their organisations. They overwhelmingly agreed that their organisations need new or improved information systems and many agreed that a BP&ISR initiative would help them to improve their business. In contrast, there were mixed reactions from the lower level employees who were divided in their opinion for and against BP&ISR. Interestingly some organisations thought that BP&ISR may not help them to increase their profits. A senior manager in one organisation stated, "BPR, in terms of profitability is not critical for our organisation" (PMLSRD01).

Although BPR is undoubtedly one of the most notable contemporary initiatives of organisational change, in the Sri Lankan context some believe that similar quality (TQM) and 'reorganisation' programmes will have a substantial influence on organisations. According to a consultant (PCMSBP01) involved in BPR work, the main barriers preventing an organisation improving its inefficient business processes exist at a functional level. Over the years different functions / departments in many organisations have inherited or developed their own culture, work ethics and management style. Moreover, different functions appeared to have their own goals and objectives and work towards achieving these ignoring the goals and objectives of the organisation as a whole. This results in lack of co-operation and friction between business functions and encourages inefficient, inconsistent, contradicting, business processes resulting in longer cycle times.

Total quality management (TQM), a concept more popular in the 1980's is used by some organisations in Sri Lanka including OrgMML who were in the midst of a TQM project during the case study. This project was centred around incremental improvements and its main objective was to meet customer requirements at optimum (competitive) cost by harnessing everyone's commitment. Employees at all levels had the opportunity to initiate or participate in improvement sub-projects, some of which are very similar to process improvements in a BPR project. However, in a BPR project one would expect process improvement, cost saving, efficiency and speed of service and performance measurements etc., in addition to improved quality and customer satisfaction (Vowler 1993, Edwards & Peppard 1994, Childe et al, 1994). Another difference between TQM and BPR is that BPR is often practised as a top down approach while TQM is more of a bottom up or collective effort involving a cross section of employees in an organisation. Nevertheless, both BPR and TQM help the organisation to change and improve its business and IS/IT environment, although reengineering information systems may be more difficult using a continuous or incremental approach.

Many organisations and researchers have associated BPR with various reorganisation initiatives (Demay & King 1996). Although Hammer & Champy (1993) may not agree, this may be reasonable

especially if the particular initiative helps to achieve some sort of organisational change in the context of improvement, quality or profit.

During the case study OrgSFL was engaged in a project which they refer to as 'reorganisation'. According to OrgSFL's sources the project is expected to improve the efficiency of customer services, reduce the cycle time of business processes and information systems, and introduce standards and guidelines for conducting day to day business. In practical terms the project primarily involves re-arranging the physical layout of parts of the organisation with less BPR work than one would have liked to see. However, one significant improvement in this organisation in relation to BPR was, reducing the number of activities in a key customer related business process by half.

Although the reorganisation project was initiated in the early 1990's with the aid of a UK based consultancy firm, by early 1996 the organisation had still not completed the project or met its objectives despite creating a new department and appointing teams solely for the purpose of working on the project. In the meantime, the competition influenced by foreign multinationals have capitalised on the situation and managed to increase their market share, make more profit and attract new customers by copying more advanced western methods and processes. Interview results during the case studies confirm this and identifies that reorganisation alone is inadequate to achieve quantum leaps in competitive advantage or performance, as often associated with BPR.

3.2 BP&ISR Approach

Most people interviewed agreed that a radical business process reengineering approach as Hammer & Champy (1993) would suggest is not possible in the Sri Lankan context. They stressed that an incremental or continuous approach as suggested by Davenport (1993), Harrington (1991) and Carr & Johansson (1995), spread out over a period of time would be best suited for their organisations (SCMMCN01, SCMMCN02, MMLMIT01, PMLMIT02, PMLSMD01). A few managers disagreed and believed the best way to change their organisations was to use a radical approach and start with a clean sheet of paper, as most of their business practices and information systems were inefficient and out dated (PMLOIT01, SFLOIT07). Managers at OrgMML who were involved in TQM work, believed the ideal approach for BPR related work was to introduce change by combining quantum leap changes with step by step changes allowing for a period of stabilisation (MMLMIT01, MMLOAC01, MMLOAD01).

Opinions were also divided as to whether BPR and IS reengineering (BP&ISR) should be treated as simultaneous or separate exercises. Most interviewees felt that BP&ISR should be an integrated effort although one consultant stated, "reengineer the process and get the process in order first, then reengineer the system, use what ever methodology you like to do this. This should then be followed with continuous improvements to the processes and systems" (SCMMCN02).

Many managers believed that education is the most important ingredient if BP&ISR is to succeed in their organisations. One manager points out, "The success of BPR will depend on the approach and the education strategy used to educate the people. If a systematic, methodological approach is used it will not be impossible to introduce BP and IS Reengineering to our organisation" (PMLMAC03). Most of OrgMML's employees having experienced change through their TQM project believe that education and training are the key success factors in any reengineering or reorganisation initiative linked to change. This education program has to start at least six months prior to the actual project and needs to continue throughout the project, and for a further period of six to twelve months after the project ends. Due to the cultural and economic background of the operational and lower level employees, the education program should be especially tailored to facilitate grass root level training. In this environment, many believe that a participative approach is best suited for conducting BP&ISR projects. Employees should be made aware of the benefits of BPR and made to feel that it is for their own benefit and progress that BPR is introduced. Various remuneration and reward systems can also

be introduced to encourage more user participation (MMLMIT01, MMLMHR01, MMLMPR01, PMLMSRD01).

Team work was also considered as one of the most important aspects of BPR, and according to consultant (SCMMCN02) and IS/IT manager (MMLMIT01), BP&ISR teams should consist of a cross section of people from the organisation. In the TQM project at OrgMML employees at all levels have the opportunity to initiate or participate in improvement projects through TQM teams. Prospective BPR teams should be able to sell the idea of BPR to all levels of the organisation.

3.3 The Role of IS/IT

Although it is acknowledged (e.g. Hammer & Champy 1993), that IS/IT is not necessarily an element of BPR type projects of organisational change, Demay & King (1996) and Watts (1995) believe that the reality of modern business infrastructure is such that IT occupies a central role. Harrington (1991), addressing this issue states that process improvement should be combined with process automation. Moreover, the initiative to move towards BPR frequently originates in the IS/IT department (Childe *et al,* 1994), and systems analysis and design and BPR share common methods (Earl 1994). Surveys conducted by Willcocks (1995b) highlight IS/IT and its management as one of the top ten critical success factors for BPR programmes, with over 75% of the top 30% most successful BPR programmes seeing IT as critical for both enabling radical process redesign and supporting redesigned processes.

In Sri Lanka, based on the author's own industry experience of IS/IT and from the case studies, most organisations rely on IS/IT to conduct their operational procedures. However, IS/IT is predominantly used as a support service, particularly in the state sector, and in some organisations IS/IT has little bearing on the organisation's mission or long term objectives. It appears that this is primarily due to top management's lack of exposure to modern IS/IT. Many professionals across a wide spectrum of the business field believe that IS/IT has to play a major role for BPR to be successfully implemented in the Sri Lankan context.

4. FACTORS INFLUENCING THE IMPLEMENTATION OF BP&ISR IN SRI LANKA

Based on findings from the case studies, this section describes the factors that would influence the implementation of business process and information systems reengineering in a typical Sri Lankan organisation, and compares similar issues found in a case study of a large BPR project in the UK (Weerakkody 1995).

4.1 Obstacles to BP&ISR

Case studies revealed that the following factors may significantly hinder the implementation of BP&ISR in organisations.

(1) Work Environment

Some of the most significant factors that may influence BP&ISR in the context of Sri Lankan organisations are, the work culture, practices and procedures and the apparent lack of professionalism in some organisations. The work environment in some case study organisations were haphazard and lacked standard procedures. To quote one senior consultant, "We are not looking at the *process,* if we get our managers to look at the process then they will see the benefits of doing it differently" (SCMMCN02). In this context it can be difficult to introduce performance and quality measurements which is a basic requirement in a BPR environment. The work environment, given the isolation of some business units from mainstream business, deprives some employees gaining an overall knowledge of the business. This was true particularly in the context of specialised operations such as IS/IT, engineering, and research and development etc.

According to Edward & Peppard (1994), a commonly reported reason for lack of BPR success is the inability of organisations and individuals to change traditional work patterns. "Business activities should be viewed as more than a collection of individual or functional tasks; they should be broken down into processes that can be designed for maximum effectiveness, in both manufacturing and service environments" (Davenport & Short 1990). The UK based BPR case study revealed that the organisation concerned was breaking away from traditional departmental and hierarchical management structures (Weerakkody 1995). Although the different departments / business units physically existed, the barriers that exist between departments have been eliminated. Most processes are cross functional and therefore the business unit priorities are focused on processes and the end result which effects the customer, rather than individual departmental goals.

(2) IS/IT Environment

At least, three of the five case study organisations may need to rethink their IS/IT strategy / objectives if they are to achieve any substantial benefits from IS/IT. It is important that the IS/IT departments are treated as part of the business and not as a service centre, as is the case with most organisations in Sri Lanka. Many IS/IT professionals complained that their units are isolated from the mainstream business and hoped that some degree of freedom will be delegated to IS/IT management, which will encourage them to take decisions in the context of new developments (SCMMCN01, SCMMCN02, MMLMIT01, SFLMIT02). Many IS/IT staff also complained that they are not appropriately recognised and paid as professionals in comparison to other disciplines (PMLOIT01, MMLOIT04, MMLOIT05, MMLMIT01).

Some large companies have diversified into various business ventures and as a result these organisations have a number of legacy systems fragmented across the organisation and running on different hardware platforms. These organisations are still in the process of expanding and as a result new systems are being added on top of these legacy systems. The end result is duplication of information and resources and complicated systems. In some organisations reports are generated simply as a formality for a particular manager to put his seal (signature) on. Therefore, some managers have effectively become 'post boxes' where reports arrive at the 'in tray' and leave via the 'out tray'.

From the IS/IT strategic perspective, OrgMML's system analysts fear that the already high workload will be made worse in a BP&ISR environment as is the case with TQM where users are treated as internal customers, and the IS/IT staff expected to meet all their requirements. In contrast, one IS/IT manager in a state organisation complained, "only 10% of our analysts and programmers are committed workers, the rest are all time servers" (SFLMIT02).

Moreton (1995) states that both IS/IT staff and management need additional knowledge and skills, and changed attitudes to make an effective contribution to the process of transformation, and the transformed organisation. Surveys conducted in the UK by Willcocks (1995b) highlight technical deficiencies together with poor IT management as seventh out of the ten most significant barriers to BPR. With regards to the UK BPR case study, employees were more conversant with IS/IT in comparison to employees in Sri Lankan firms, as most of their routine work involved interacting with computers. However, the new BPR environment recommends major changes to legacy systems and thus requires familiarisation and a paradigm shift for some senior employees. The BPR project was also faced with a large number of gaps between the new business process models and the legacy information systems. Therefore, the project team needed to adopt a flexible approach and methodology capable of facilitating the integration and mapping of process models with new and existing information systems (Weerakkody 1995).

(3) Management

In the context of BP&ISR top management should be committed, show strong leadership qualities and be able to encourage employees at all levels, particularly key players in business units (Harrington

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1991, Hammer & Champy 1993, Higgins 1993, Richards 1993). However, some junior executives and operational level employees claim that top managers in their organisations lack vision, leadership qualities, skills and the initiative to change (SFLOIT03, SFLMIIT02, PMLOIT01, SIMSDR01). Many attribute this to the average age of most strategic managers particularly in the state sector, which is thought to be between 50 and 60. Some believe that these managers would prefer to retire with a secure pension in a few years rather than risking the failure of a BPR project, which would tarnish their good name. IS/IT manager SFLOIT06 pointed out, "most middle managers are not given authority and their hands are tied up, while on the other hand top managers have to play it safe as most of them are at the point of retirement where they don't want to take a risk" (SFLOIT06).

Both Hinterhuber (1995) and Higgins (1993) point out that managers of business processes must have sufficient authority to co-ordinate business processes across functional areas and regional units. The UK case study revealed that a more decentralised management structure instead of the present hierarchical one would provide the different BPR teams with more freedom and the opportunity to contribute positively towards the BP&ISR work. This may help to neutralise the negative feeling and hidden frustration among the various BPR teams. UK BPR team members argue that people with strong sponsorship, skilled leadership and successful project management skills are needed to take the initiative and responsibility for projects.

(4) Attitude
Although many agreed that they need to change and welcomed the idea of BP&ISR, a few employees including senior and middle managers in some organisations appeared content with their existing business environment. These managers are reluctant to change the present work scenario as long as the organisation continues to make profit. As one director stressed, "We have no time or the resources to waste on fancy ideas like BPR, we would rather deploy our resources to make more profit and further consolidate our market dominance" (PMLSMD01). To quote one consultant, "The attitude of most managers would be, if the present system works properly why change it? His attitude is, instead of trying to *do it* he always thinks *can we do it*" (SCMMCN01). Another side of the attitude problem which applies mostly to junior managers and executives is the desire to out-shine his/her subordinates (PMLSRD01, PLMOIT01, PMLOAC02, MMLMIT01, SFLOIT03). One senior manager explained, "On average our executives spend 60% of their time improving themselves rather than working to improve the company, and their intention is to shine by cutting off the others" (PMLSRD01). In this context team work and reengineering would be extremely difficult. Hinterhuber (1995) believes the initiative for process management and corporate culture should come from the employees and managers themselves, and that managers and employees should work on their own attitudes.

(5) Education, Skills and Experience
The success of many business organisations depends on its employees. The contribution and performance of these employees will depend largely on their education, exposure and professional experience. Many in the business field agree that the Sri Lankan graduates filling over two thirds of the specialised roles in state organisations lack proper exposure to the real business world and modern IS/IT concepts. In the case study organisations, the majority of IS/IT personnel lack formal qualifications and training in the use of methodologies, tools or techniques. System documentation depends on individuals and is done only if the analyst has extra time depending on the IS project targets and deadlines (SFLOIT03, SFLOIT05, SIMSDR01, SIMMIT05, SIMOIT01, MMLOIT04). This is a major weakness in many organisations, yet management seems not concerned as long as the organisation continues to make profit, and are content with whatever information the IS/IT department provides. Many of the academically qualified IS/IT, MIS or business computing people, are more technically oriented people, or as consultants SCMMCN01, SCMMCN02 and manager MMLMIT01 calls them, 'technologists'. "They lack management and business exposure and tend to always think in terms of technical solutions for management problems" (SCMMCN01). Most IS/IT managers revealed that they have excellent programmers but lack quality systems analysts (SFLMIT02, SIMSDR01, SIMMIT05, PMLOIT01, MMLMIT01).

Heracleous (1995) points out that many BPR initiatives are hindered by the lack of necessary skills required for people's new roles. In the UK case study organisation a good education program helped employees to overcome 'fear of the unknown' and cope with the paradigm shift caused by reengineering. In addition, education was needed to cover the many new IT concepts such as object-orientation, client server etc., which are being used to implement the reengineered information systems.

(6) Risk of BP&ISR

Interviews with senior managers and directors revealed that, many organisations both in the private and government sector fear risk. All three layers of management are reluctant to take the initiative regarding new technologies, IT related or otherwise, due to the high level of risk associated with it. Consultant SCMMCN01 stressed, "the common scenario in most organisations is, middle management is tied up with day to day work while top management have their own, well established, stereo type ways of thinking". One IS/IT manager described, "Very often the top does not encourage the middle manager to take risks, and although the opportunity for improvement is visible the initiative is suppressed" (SFLOIT06).

The concern for IT-enabled or IT-driven BPR brings in a technology dimension that always add further risk of failure to any major project (Willcocks 1995a). Fiedler *et al*, (1994) suggests that resistance to change lowers acceptance of the new processes and increases the risk of BPR failure. In the context of the UK case study, it was understood that if the reengineering work could be phased in several stages it would enable management to evaluate the initial process and systems deployment phases, thus minimising risks, increasing the chance of success and encouraging employees to work 'smarter' instead of 'harder' (Weerakkody 1995).

(7) Culture

Heracleous (1995) argues that there cannot be a transformational change without cultural repercussions. Many Sri Lankan professionals agree that if a new concept such as BPR is to be introduced into an organisation the prospective project team has to first understand the organisational culture, the business, work and the IS/IT environments. Many management and IS/IT consultants believe that BPR will have to be tailored to suit the local environment (SCMMCN05, SCMMCN02, SCMMCN07, SCMMCN08, SCMSDR01). The day to day work culture in most organisations is such that employees still rely on, and are most comfortable with registers, forms and signatures. Most employees preferred information on hard copy to electronic information. Management culture is such that some managers take pleasure in placing his/her signature on documents. Although many Sri Lankan employees are thought to be hardworking particularly in the mercantile sector, some academics and business experts suggest that Sri Lankan employees spend nearly half the working year off work than actually working. This is due to the number of annual holidays enjoyed by most employees in Sri Lanka.

(8) Organisational Structure

In all the Sri Lankan case study organisations the management structure was a hierarchical one. One of the most common problems faced by almost all the case study organisations was functional barriers that prevent the organisation achieving its final objective. With most organisations having a departmental structure more focus is on the function rather than the business process or the final product.

In the UK BPR environment functional barriers have resulted in the isolation of business process and information systems reengineering activities from each other and from the business unit users. This was a significant contributor to the problems encountered during the systems testing phase in the BPR work where a number of systems failed to meet the user requirements and expectations (Weerakkody 1995).

(9) Organisation Size and Business Environment

Managing an organisation can become increasingly difficult as it diversifies and the number of subsidiaries increase. Many expressed concern that corporate identity is lost in the case of large organisations with subsidiaries operating on their own with their own information systems. This discourages information and resource sharing within the group due to internal competition, and promotes duplication and low quality information systems (PMLMAC01, PMLMMK01, PMLMAC03).

It appeared that convincing management to introduce BP&ISR would be more difficult when the organisation is making a profit. One manager (PMLMAC03) points out, "Many people in the organisation will want to change only if they are put against the wall (i.e. are in some form of trouble, for example when the organisation is making a loss), until then most organisations will not be prepared to change".

(10) Goals and Objectives

Unless process management becomes a important part of the organisation strategy, it cannot achieve a real radical increase in the value of the firm (Hinterhuber 1995). "Evidence suggest that if the objective of BPR is short term cost reduction then it is likely to be unsuccessful" (Edwards & Peppard 1994, p 263). In the Sri Lankan context it was evident that corporate goals and objectives of most organisations were short term. Some managers attribute this to the prevailing situation in the country, and the fact that most top managers in particularly the state organisations prefer short term goals, especially if they are about to retire in a few years (PMMMAC01, PMLSRD01, PMLSMD01). One director did not think that IS/IT is important enough to be classified among his first five priority goals for the organisation, although it is in the first 10 priority goals (PMLSMD01).

In the UK case study organisation, although the strategic goals and objectives were clear, it was identified that the BPR project itself needed more clearly defined goals and objectives at process and work activity levels.

(11) Human Resource & Ethical Issues

The case studies revealed that many people associate IS/IT, BPR and similar initiatives with redundancies. At OrgMML, in the TQM environment many operational level employees feel threatened and are afraid of loosing their jobs. This is made worse with the introduction of performance measurements. Another issue which may have a negative influence on BP&ISR is the fact that most organisations failed to provide appropriate training for their employees (SIMSCS01). This results in a lack of skills and only a few employees who are capable are left with majority of the work. Trade union actions and strikes are common problems faced by the manufacturing and production based companies. The success of most of these companies depend on the quality of their products, which depends on the lower operational level staff such as machine operators and technicians. Therefore, extreme precaution may be needed when introducing BP&ISR into these sectors. Many managers feel the most effective way to prevent lower level employee sabotage is to get them to actively participate in the BP&ISR work, and to introduce a reward system to encourage them (MMLMPR01, PMLSDR03, PMLMPR01).

Hinterhuber (1995) believes that individuals and teams should be rewarded for exceptional achievement and should not be punished in cases where efforts towards innovation are well conceived but fail. Heracleous (1995) suggests that it is useful to distinguish between situational human resource implications and the contextual sociocultural implications in BPR. Heracleous claims that instead of making employees redundant as a result BPR they can be moved to other areas of the organisation that are expanding.

With regards to the UK case study organisation an effective strategy was in place for managing the human resources and skills required for the BPR work. The BPR environment demanded frequent

change of people's roles and responsibilities, and thus disrupted the work flow and increased the work load, requiring additional training and an increase in the number of skilled professionals to facilitate the BPR work.

(12) Team Work

One essential requirement for any project oriented work is a capable team. Building a team to conduct a BP&ISR project may be a difficult task in some of the organisations taking into account the work environment, human resource issues, personal attitudes and skill factors etc. Therefore, co-ordination, co-operation, communication and most importantly keeping a team together from the start to end of a BPR project will be an uphill task. Employees in one organisation involved in BPR related work believe that a number of sub projects failed to produce the planned results and were abandoned half way because of the poor quality of project teams and lack of good project leaders (MMLOIT05). Some employees believe that most team members are skilled and capable but find it difficult to combine team work with their day to work load. In this context, management may need to relieve the team members of some of their day to day responsibilities to enable the team members to dedicate more time towards the BPR project work.

In the UK BPR project, on some occasions project teams work in isolation so that team 'A' does not know what team 'B' is doing. Co-ordination between all the teams involved in business process reengineering work at all levels is important. BPR teams should be multidisciplinary, include unconventional individuals capable of thinking creatively, and should be drawn from important functional areas of the organisation such as IS/IT and customer services (Hinterhuber 1995). Grint (1994) points out that individuals are seldom able to complete a process and therefore reengineering fixes very firmly upon teams and not individuals.

(13) Communication

A number of employees, particularly in the state organisations in Sri Lanka, complained regarding the lack of communication and the loss of information in the process of vertical information transfer. Some operational level employees had to rely on colleagues or the 'grapevine' to receive information even regarding important policy decisions effecting their work. Many relate this issue to the hierarchical management structure (SIMMIT05, SFLOIT03, SFLOAC01). The introduction of any BPR project depends on the ability of the prospective BPR team to demonstrate and communicate substantial and convincing results to management and employees. Communicating benefits to employees will encourage them to contribute to the project (SCMMCN01, SCMMCN04, PMLSRD01, SIMSDR01).

The same issues applied to the UK BPR project. The vertical information transfer problem is more severe when communicating from lower levels to the strategic levels of management, so that issues raised at business unit level take too long to reach the level of management that has the authority to address them, leaving the BPR teams with a growing number of un-addressed issues. Heracleous (1995) suggests that it is important to use personal means of communication and to seek employees views and concerns, and to communicate a clear rationale for the change with outcomes that are important for the stake holders. Most senior executives consider open communication to be the first key success factor for process management (Hinterhuber 1995).

(14) Economic Environment

Although trading between SAARC countries has increased, the regional business environment is still not as competitive as the business environment in NIC countries in the South East Asian region. A number of management and IS/IT consultants believe that increased competition in the region would significantly boost enthusiasms for BP&ISR (SCMMCN01, SCMMCN02, SCMMCN05). Many consultants and senior managers expressed concern regarding the introduction of BPR in the present economic climate in Sri Lanka, particularly in the context of the ongoing privatisation programmes. They fear that employees will misunderstand the BPR concept as another trick or label associated with

privatisation which will result in employees loosing their jobs (SCMMCN01, SCMMCN03, SCMMCN06, SCMMCN04, SFLMAD01, SIMSDR01). The economic environment can also be applied in the context of individuals. The gap between the strategic or middle managers and the operational level employees is thought to be very wide with the basic expenditure of many clerical and lower level employees much higher than their wages (MMLOIT08, PMLOIT01, SIMMIT05). The situation of these lower level employees can be compared with Maslow's hierarchy of basic needs not being satisfied (Lucy 1991). In this context it is unlikely that these lower level employees would willingly participate in proposed BP&ISR work.

(15) Government Regulations, Organisation Policy & Politics
External politics may also have a major influence on the overall business policies and decisions of the organisation, and on many occasions has an impact on the organisation's profit. For instance, when awarding IS/IT projects to low bidders in the context of tender procedures in the state sector, many of the systems and hardware end up with problems (SFLSIT01, SFLMIT02, SFLOIT03). In this environment it is inevitable that a large number of legacy systems will have to be reengineered or replaced in the event of a BPR project, and BPR teams may have to face a number of problems particularly in the event of having to work with vendors. Labour policies and import/export policies of different governments (political parties) may also impact the implementation of BPR.

(16) Academic Environment
It is essential that the relevant institutes and universities introduce management related subjects and systems design methodologies to IS/IT related academic courses, both at undergraduate and post graduate levels. It was clear during the case studies that there was no communication and co-ordination between the universities and the leading mercantile organisations in the country. These organisations are usually the pioneers in introducing new business and IS/IT concepts, and appear to be more advanced than most of the courses conducted in the academic establishments.

(17) Consultancy
According to consultants SCMMCN01, SCMMCN02 & SCMMCN07, in the Sri Lankan environment some consultants are obliged to do things inefficiently simply to please their clients. It was also evident that most consultants lacked exposure to modern business and IS/IT developments that are taking place in the west, and were relying on primitive methodologies, tools and techniques to carry out consultancy work. In this environment it is no surprise that some organisations rarely get the opportunity to experience the benefits of modern concepts such as BPR.

4.2 Factors Facilitating BP&ISR

Some organisations, particularly the private sector and multinationals have begun to take the initiative to improve their businesses due to growing national and international competition. This has enabled BPR related concepts to become established in some organisations, resulting in cultural and attitude changes amongst top management and employees. Described below are a few encouraging factors discovered during the case studies which may have a positive impact on proposed BP&ISR efforts in Sri Lanka.

(1) IS Environment
It was encouraging to note that some top managers were strong IS/IT supporters and consider IS/IT as part of the business rather than just a support service. These managers claim that IS/IT has helped to reduce their work load considerably (SFLMXX01, MMLMIT01, SIMSDR01). The IS/IT work culture particularly in the mercantile sector was friendly and informal. Although the IS/IT organisation structures were hierarchical, most IS/IT staff felt that this was not a problem in the context of their day to day work (MMLOIT03, MMLOIT05, MMLOIT06, PMLOIT01).

(2) Business and Work Environment

Many managers and other operational staff in a number of organisations revealed that they need to change their present work environment and would like to see BP&ISR introduced to their functions. They agreed that their present work environment was inefficient and were optimistic that BP&ISR would help them to improve this situation (SFLOIT03, SFLOIT05, SFLOOP01, SIMMIT05, SIMSCS01, MMLMIT01, MMLOIT03, PMLSRD01, PMLOIT01).

(3) BPR Related Initiatives

Case studies revealed that some organisations are already engaged in business improvement initiatives similar to BPR, such as TQM and 'reorganisation', while others are engaged in quality initiatives linked to ISO9000 which are of a more elementary nature. Interviews revealed that nearly two thirds of the employees interviewed in five different organisations were 'for' these initiatives rather that 'against' them (MMLMIT01, MMLMHR01, MMLOIT03, SFLMHR01, SFLMIT02, PMLSDR04). This provides the ideal platform for future BP&ISR initiatives in these organisations as the employees will already be familiar with team work, quality, standards, guidelines, methods and documentation etc.

(4) Management & Leadership

In most mercantile organisations the majority of strategic and some middle managers appeared to lead by example, being hard working and dedicated to their task. Key operational level employees in these organisations indicated that good leadership and encouragement by top management, and an impartial reward scheme may influence most operational level employees to willingly participate in any BPR efforts introduced by management.

(5) Human Resource & Ethical Issues

Most BPR projects in the west have relied on staff redundancies as one aspect of cost saving. In the context of Sri Lankan organisations this may cause concern among top managers. However, it is encouraging to note that many organisations are still in the process of expanding with the growing economic environment in the country. Therefore, in the event of having to reduce head count with the introduction of BPR, redundant employees can in most occasions be transferred to new or existing subsidiaries (PMLSMD01, SFLMIT02).
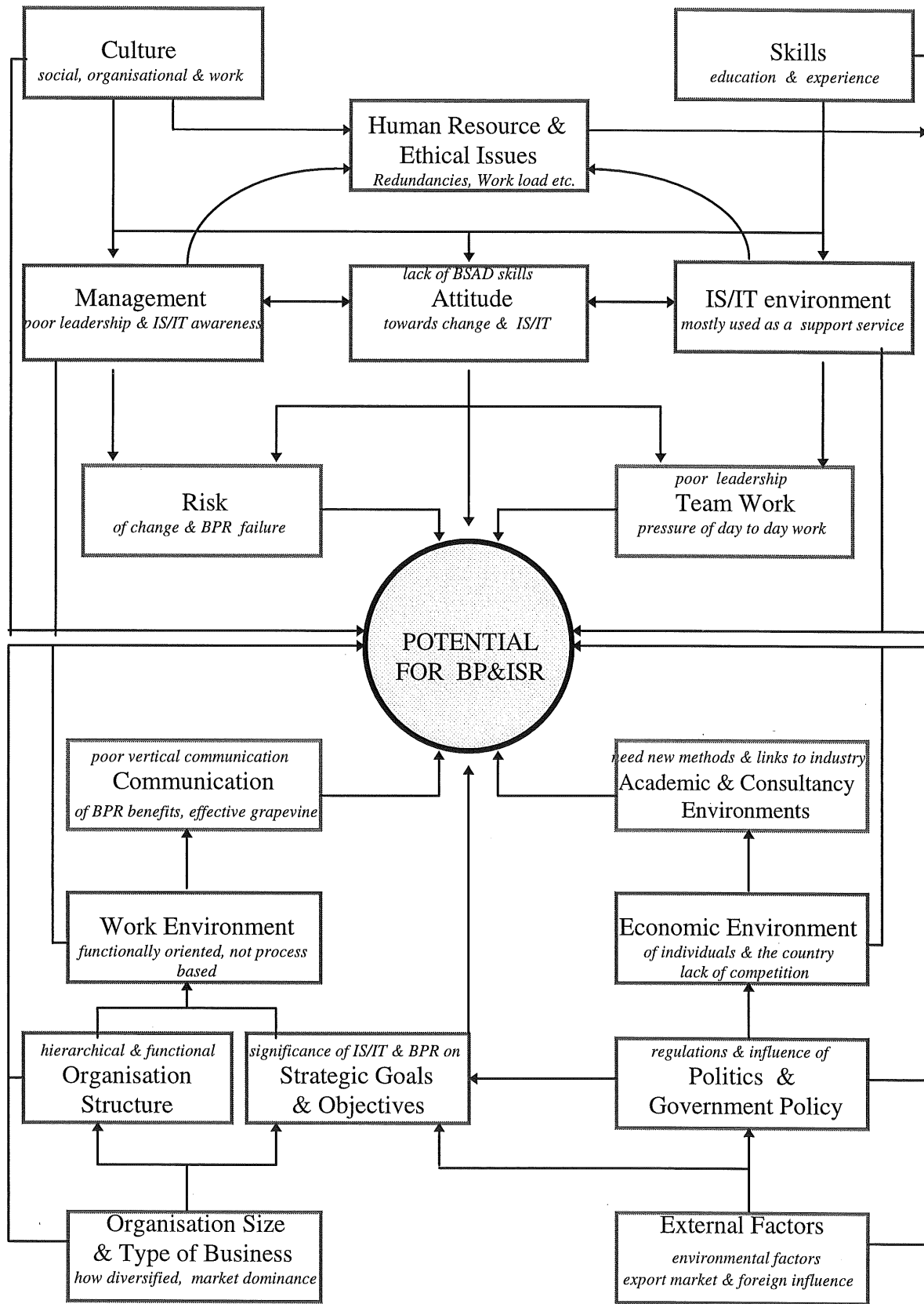
(6) Benefits of BP&ISR

One organisation has introduced a scheme where employees' annual increments will be based on the contribution to BPR related work and their participation in project teams. Interviews in this organisation revealed that most employees were encouraged by this policy except for a few senior employees (MMLMIT01, MMLMHR01, MMLOAD01). This remuneration policy when combined with other criteria such as seniority and qualifications may help to satisfy the needs of most employees, and thereby encourage a majority to contribute towards any BPR related work.

(7) Attitude

Most managers and consultants believe that younger employees are more willing to change and have the ability to easily adapt to new technologies and business concepts. Therefore, the organisations with a larger number of young employees may have a better chance of successfully introducing BP&ISR (SFLMIT02, MMLMIT01, MMLMHR01, PMLSMD01, PMLSDR02, SIMSDR01, SCMMCN05, SCMMCN07).

When examining the above factors in both sections 4.1 and 4.2, it is clear that factors that can hinder the implementation of BP&ISR outweigh the ones facilitating it. Figure 3, below is an illustration of how these factors influence each other and the potential for BP&ISR.

Figure 3   -   The Significant Direct and Indirect Factors Influencing BP&ISR in Sri Lanka

Culture
social, organisational & work

Skills
education & experience

**Human Resource &
Ethical Issues**
Redundancies, Work load etc.

Management
poor leadership & IS/IT awareness

lack of BSAD skills
Attitude
towards change & IS/IT

IS/IT environment
mostly used as a support service

Risk
of change & BPR failure

poor leadership
Team Work
pressure of day to day work

**POTENTIAL
FOR BP&ISR**

poor vertical communication
Communication
of BPR benefits, effective grapevine

need new methods & links to industry
**Academic & Consultancy
Environments**

Work Environment
*functionally oriented, not process
based*

Economic Environment
*of individuals & the country
lack of competition*

hierarchical & functional
**Organisation
Structure**

significance of IS/IT & BPR on
**Strategic Goals
& Objectives**

regulations & influence of
**Politics &
Government Policy**

**Organisation Size
& Type of Business**
how diversified, market dominance

External Factors
*environmental factors
export market & foreign influence*

17

5. CONCLUSION

The overall scope of the case studies was fairly broad and covered five leading organisations in Sri Lanka, although due to time constraints it was possible to interview only a limited number of employees from each organisation. The main objectives of the case studies, were to understand the business and IS/IT environments and identify factors which may influence the implementation of business process and information systems reengineering in Sri Lanka. A semi-structured interview method was used for gathering information and most interviewees openly and critically discussed their organisations, particularly in the context of IS/IT and BPR.

The analysis of interview results identified a range of factors which may influence the implementation of BP&ISR in Sri Lanka. These can be classified into seventeen different areas. While a few factors as described in section 4.2 are encouraging signs, most of the factors discussed in this paper will act as obstacles to BP&ISR. The most significant of these factors are,

- work environment
- IS/IT environment
- management and leadership
- employee attitude
- education, skills and experience
- risk
- culture
- and organisation structure.

Other factors that may influence BP&ISR are, organisation size and business environment, goals and objectives of the organisation, human resource and ethical issues, team work, communication, economic environment, politics/government regulations and organisation policy, and the academic and consultancy environments in the country.

To successfully implement BP&ISR in this environment, any BPR effort will have to consider these factors and prospective BPR teams will have to work tactfully to overcome them. This was evident in more than one organisation involved in change related projects. Many thought that the success of any BP&ISR effort will depend largely on the impact it will have on the employees and how the BPR approach will tackle the factors identified in section four. Many middle managers and operational level staff welcomed the idea of BP&ISR and believed that it can help their organisations to reduce waste, improve profits and efficiency of services. In contrast, some strategic managers thought that BPR would not have a direct impact on their organisations profits, however agreed that it will help to reduce cost and improve efficiency of services.

During the case studies some organisations were engaged in BPR related initiatives such as total quality management and 'reorganisation' which were centred mostly around continuous improvements. Interviews in these organisations revealed a moderate change of culture, some improved business processes and an increase in customer satisfaction. Almost all the interviewees in these organisations rejected the concept of radical BPR and instead favoured an incremental or continuous reengineering approach. However, as Hammer & Champy (1993) points out, continuous improvements may not have the same effect on an organisation as a radical approach. Continuous or incremental 'information systems' reengineering may mean constant changes to an organisation's IS/IT infrastructure, which may not be feasible. Therefore, it is the authors' view that in order to achieve any substantial benefits from BP&ISR, an approach which combines radical and incremental improvements is more suited in the context of Sri Lankan organisations. A radical approach may be helpful particularly in the case of an organisation which needs fundamental changes if they are to compete in global markets. Whatever the BPR approach, it should be 'participative' and involve a cross section of employees both IS/IT and non IS/IT.

Some organisations lacked competition while others are faced with an increased threat of competition from foreign multinationals. The business environment in all the case study organisations were similar with hierarchical management structures and functionally driven business procedures. The work environment, particularly in the state sector was laden with inefficiencies, bureaucracies, red tape and paperwork.

The IS/IT environment often failed to deliver satisfactory management information. This can be attributed to the lack of proper BSAD work in organisations and the dearth of expertise in the use of BSAD methodologies. Besides, the knowledge and awareness of IS/IT was highly insufficient at strategic and middle management levels, while IS/IT professionals lacked knowledge of the business which made it difficult for them to design proper business systems. One other significant threat to any BP&ISR effort is the attitudes of both management and employees. Most individuals resisted change or any form of work or activity that did not benefit them. Education was cited by many as the most effective way of overcoming this problem, and many believed that grass roots level education is a must for prospective BPR organisations and that it will help to make the task of introducing BP&ISR much easier.

Many of factors identified in this paper are significant not only to the case study organisations, but may apply to most other Sri Lankan organisations. This is evident when analysing the interview results with a number of management and IS/IT consultants whose combined experience covers a wide range of mercantile and most of the state organisations in Sri Lanka. When comparing these factors with the case study results from a UK BPR project, similarities in issues such as IS/IT, management, education and skills, communication, team work, risk, and human resource issues were notable. Addressing these issues appropriately prior to the actual BPR work may help to significantly improve the chances of BPR success in Sri Lankan organisations.

References

CARR, D K and JOHANSSON, H J (1995), *Best Practices in Reengineering: What works and what doesn't in the Reengineering Process,* McGraw-Hill, NY.

CHAMPY, J (1995), *Reengineering Management : The Mandate for New Leadership,* Harper Collins, UK.

CHECKLAND, P and SCHOLES, J (1990), *Soft Systems Methodology in Action,* John Wiley & Sons, UK.

CHILDE, S J, MAULL, R S & BENNETT, J (1994), *Frameworks For Understanding Business Process Reengineering,* International Journal of Operations & Production Management, 14(12).

DAVENPORT, T H (1993), *Process Innovation : Reengineering work through Information Technology,* Harvard Business School Press.

DAVENPORT, T H & SHORT, E J (1990), *The New Industrial Engineering: Information Technology and Business Process Redesign,* Sloan Management Review, Summer 1990.

DEMAY, T and KING, S (1996), *BPR and OO: Origins and Common ground,* The BCS Computer Bulletin, 8(1) pp 8-9

DOWNS, E, CLARE, P and COE, I (1992), *Structured Systems Analysis and Design,* Second edition, Prentice Hall, UK.

EARL, M J (1994), *The New & Old of Business Process Redesign,* Journal of Strategic Information Systems, 3(1), pp 5-22

EDWARDS, C & PEPARD, J W (1994), *Business Process Redesign: Hype, Hope or Hypocrisy?,* Journal of Information Technology, Vol 9, pp 251-266

FIEDLER, K D, GROVER V & TENG, J T C (1994), *Information Technology-Enabled Change: The Risks and Rewards of Business Process Redesign and Automation,* Journal of Information Technology, Vol. 9, pp 267-275

GRINT, K (1994), *Reengineering History: Social Resonance's and Business Process Reengineering,* Organisation-Articles, Sage, UK, 1(1) pp 179-201

HARRINGTON, H J (1991), *Business Process Improvement,* McGraw-Hill, NY.

HAMMER, M and CHAMPY, J (1993), *Reengineering the Corporation: A Manifesto for Business Revolution,* Harper Collins Publishers Inc., NY.

HERACLEOUS, L (1995), *Business Process Reengineering in Context: The Case of Hay Management Consultants,* Business Change & Reengineering, Official Journal of the Institute of BPR, John Wiley & Sons, UK, 2(4) pp 33-42

HIGGINS, J (1993), *Information Technology & Business Process Redesign: IT-Enabler or Disabler of BPR,* Proceedings of the BCS CASE Seminar on BPR, London, June 1993, In Software Assistance for Business Reengineering, John Wiley & Sons Ltd., UK.

HINTERHUBER, H H (1995), *Business Process Management: The European approach,* Business Change & Reengineering, Official Journal of the Institute of BPR, John Wiley & Sons, UK, 2(4) pp 63-73

HUNT, D V (1996), *Process Mapping: How to Reengineer Your Business Process,* John Wiley & Sons, UK.

JAYARATNA, N (1994), *Understanding and Evaluating Methodologies: NIMSAD a Systemic Methodology,* McGraw Hill, UK.

LOMBROSO, E J and BOYLE, K (1995), *Chemical Bank Adopts a Holistic Approach to Successfully Transforming its Retail Franchise in New York,* Official Journal of the Institute of Business Process Reengineering, 2(4) pp 43-62, John Wiley & Sons, UK.

LUCEY, T (1991), *Management Information Systems,* 6th Edition, DP Publications Ltd., UK.

MASRI, S, BIEMA, M V and KAUFMAN, W C (1995), *Solomon Brothers: The Tampa Operation,* Business Change & Reengineering, Official Journal of the Institute of Business Process Reengineering, 2(4) pp 7-20, John Wiley & Sons, UK.

McCARTHY, I, CHODARI, A, HAYNES, T and RIDGWAY, K (1995), *Reengineering Manufacturing Systems at Presto Engineers Cutting Tools,* Business Change & Reengineering, Official Journal of the Institute of Business Process Reengineering, 2(4) pp 21-32, John Wiley & Sons, UK.

MORETON, R (1995*), Transforming the Organisation: The Contribution of the Information Systems Function,* Journal of Strategic Information Systems, 4(2) pp 149-163

MUMFORD, E (1994), *New Treatments for Old Remedies: Is Business Process Reengineering really Sociotechnical Design,* Journal of Strategic Information Systems, 3(4) pp 313-326

NANAYAKKARA, G (1994), *Sri Lankan Cases in Management: For Integrative Analysis of Organisational Realities,* PIM, Sri Lanka.

OULD, M (1995), *Business Processes: Modelling and Analysis for Reengineering and Improvement,* John Wiley & Sons, UK.

RICHARDS, N (1993), *How Can We Reengineer the Business,* Proceedings of the BCS CASE Seminar on BPR, London, June 1993, In Software Assistance for Business Reengineering, John Wiley & Sons Ltd., UK.

UNDP United Nations Development Programme 1994, *Human Development Report,* As in OrgSIM Business Promotion Brochure, Sri Lanka 1995.

VOWLER, J (1993), *The Quick hits of TQM,* Computer Weekly, Feb 25, 1993.

WASTELL, D G, WHITE, P and KAWALEK, P (1994), *A Methodology for Business Process Design: Experiences and Issues,* Journal of Strategic Information Systems, 3(1) pp 23-40

WATTS, J (1995), *An Introduction to Holistic BPR,* Business Change & Reengineering, Official Journal of the Institute of BPR, John Wiley & Sons, UK, 2(4) pp 3-6

WEERAKKODY, V J P, Tagg, C and Bennett, J (1995), *Bridging the Gap between Business Process Reengineering and Information Systems: Identifying Key Issues,* Paper presented at the BIT 95 Conference in Manchester, UK, November 8, 1995.

WEERAKKODY, V J P (1995), *BPR: A UK Case Study,* Technical Report No. 230, University of Hertfordshire.

WILLCOCKS, L (1995a), *IT-enabled Business Process Reengineering: Organisational and Human Resource Dimensions,* Journal of Strategic Information Systems, 4(3) pp 279-301

WILLCOCKS, L (1995b), *False Promise or Delivering the Goods? Recent Findings on the Economics and Impact of Business Process Reengineering,* Proceedings of the Second European Conference on Information Technology Investment Evaluation, UK, July 1995, pp 12-27

WORLD BANK (1994), World Development Report, As in OrgSIM Business Promotion Literature, Sri Lanka, 1995.

YIN, R K (1994), *Case Study research - Design and Methods,* Second Edition, Sage Publications, London.

Other References

OrgSFL Annual Report, 1994/95

OrgPML Annual reports, 1993, 1994 and 1995

OrgPML internal documents and business promotional literature

OrgSIM internal documents and business promotional literature

OrgMML internal documents

APPENDICES

Appendix A

This appendix explains how the source codes have been allocated for each interviewee. Tables 1, 2 and 3 explain the meaning of the source codes. Each Source code can be divided into 4 parts.

Table 1 - Type of Organisation

The first three characters, for instance, SIM as in SIMMIT05 or OrgSIM represents part 1 which identifies the type of organisation. This can be further divided into three parts as shown in table 2.

Character	Type of Organisation (Description)
1st character	
S	State
P	Private
M	Multinational
2nd character	
A	Academic
C	Consultancy
F	Finance
I	Investments
M	Multi-discipline
3rd character	
L	Large
M	Medium
S	Small

Table 2 - Management Hierarchy (Level)

The fourth character (SIMMIT05) represent part 2 of the code and identifies the interviewees management hierarchy level or position in the organisation chart.

4th character	Description
S	Strategic
M	Middle
O	Operational

Table 3 - Interviewees Role and Designation

The fifth and sixth characters (SIMM**IT**05) represents part 3 of the source code and identifies the interviewees role and designation.

5th & 6th character	Description
IT	Information Technology
AC	Accounting & Finance
AD	Administration
MK	Marketing & Sales
PR	Production & Manufacturing
EN	Engineering
CS	Customer Services
HR	Human Resources
OP	Operations
XX	Subsidiary or Branch Manager
RO	Reorganisation
CE	Chief Executive / Chairman
MD	Managing Director
DR	Director
GM	General Manager
CN	Consultant

Note : The seventh and eighth digits represent the fourth part of the source code and identifies the number of interviewees interviewed from the same discipline. (i.e. SFLMIT<u>02</u> identifies the second IT person interviewed, or SCMMCN<u>06</u> identifies the sixth consultant interviewed).

Appendix B

This appendix shows the different types (designations) of the employees interviewed for the case studies.

Designation (IT)	OrgSFL	OrgSIM	OrgSCM	OrgPML	OrgMML	Total
IS/IT Director		1	1			2
IS/IT Managers	1	1		1	1	4
Training Manager IS/IT	1					1
Business Systems Manager	1				1	2
Systems Development Manager		1				1
Project Manager	1				1	2
Systems Analyst	1				3	4
Analyst Programmer		3		1		3
Programmer		1			1	2
System Operations					2	2
						23

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Designation (Non IT)	OrgSFL	OrgSIM	OrgSCM	OrgPML	OrgMML	other	Total
Chairman	1						1
Managing Director	1						1
Director		1		3	1		5
General Manager	1						1
Deputy General Manager	1			1			2
Assistant General Manager	1						1
Finance Manager	1			1		1	3
Planning Mgr. (Budgets & Finance)				1			1
Human Resource Manager	1				1		2
Marketing Manager				1			1
Maintenance Manager				1			1
Chief Managers (admin & finance)	2						2
Senior Manager (Customer Services)		1					1
Branch / Subsidiary Manager	1						1
Operations Manager	1						1
Plant Manager	1						1
Sales Executive					1		1
Accountant (mgnt, financial etc.)				2	1		3
Junior Executive		1			2		3
Audit Analyst	1						1
Management Consultant (general)			3			1	4
Mgt. Consultant (corporate planning)			1				1
Mgt. Consultant (organisation & methods)			1				1
Mgt. Consultant (culture & human issues)			1				1
Mgt. Consultant (IS/IT)			2				2
Mgt. Consultant (BPR)						1	1
Academics						2	2
							45
							68
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