SIMULATION: AN EFFECTIVE TOOL FOR BPR

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ABSTRACT

Most organizations implement business process reengineering (BPR) for improving their performances. Increasingly, companies around the world are reengineering their core business processes to be more profitable and to improve customer satisfaction. While the merits and innovative aspects of BPR are open to debate, BPR provides opportunities for management science and operations research professionals to use their skills and tools in helping shape decisions that have great implications for businesses. In exchange, these professionals can enrich BPR by contributing scientific analysis to complement the qualitative thinking currently used in the field. Investigating the business process under study and creating new process designs requires strong modeling skills and good tools. Systems engineering offers many modeling and analysis tools such as simulation, decision theory, queueing theory, optimization, utility theory, and others. The aim of this paper is to highlight the significance of Business Process Reengineering and to discuss the factors that are responsible in its successful implementation.

Keywords*: Information technology, Reengineering, Process, Decision*

I. INTRODUCTION

The business environment of the present day has become so complex that organisations are necessarily to be alert to respond to the new challenges and opportunities. This involves a continuous process of managing the change. The idea that the change is essential, desirable and constructive within the established pattern of organisation is realistic. The view that the change has the beginning and an end is no longer tenable in this continuum. Top management in its endeavor of reorienting the organisation must recognise the need and set the tone for a change. This kind of change compels either innovation or improvement or both. In such an intricate situation many organisations tend to focus their attention in identifying innovations rather than improvement. However, the latter is considered to be more appropriate in accomplishing the task. Recently, a new concept called Business Process Reengineering (BPR) has emerged as a conspicuous tool for restructuring the organisation. In fact, the process of reengineering not only fosters a favourable climate supportive of desirable change but also improves the organisations' probability of success. The aim of this paper is to highlight the significance of Business Process Reengineering and to discuss the factors that are responsible in its successful implementation.

II. DEFINITION OF BPR

The Business Process Reengineering (BPR) is a complete life cycle approach. This provides the scope for problem identification and also solutions to implement the successful business operations. There are many new elements in BPR such as extensive use of IT and new perspectives on organisational structure. There is also more about process redesign, quality improvement and so on. It is a comprehensive method of assessing the current business process planning and redesigning the methods and implementing them for business solutions. Hence, the BPR is defined as "The fundamental rethinking and radical redesign of the business systems to

achieve the dramatic improvements in critical and contemporary areas such as cost, quality, service and speed." It is a comprehensive and complete method, addressing such activities of organising the project, assessing the current business process, designing the reengineered business process, and planning and implementing the solution.

The origin and scope of BPR is derived from the concept of innovation. While the BPR recognises the process innovation, the innovation concept lays more stress on the product innovation. It is notable that redesigning the processes improves the working life of employees which in turn lead to indirectly improved quality and responsiveness to customers. In short the Reengineered processes are designed to be simpler to those they replace, several jobs might be combined into one and the number of checks and controls reduced. In the right sense, more frequently, it is the result that work is performed where it makes most sense, and workers can make more decisions themselves. New information technology (such as knowledge-based, expert system and sophisticated telecommunications equipment) is frequently employed in the design of these processes.

Reengineering recognises the following as the important areas:

- Emphasize customer satisfaction
- Use performance improvement programs and problem solving techniques
- Focus on business processes
- Use teams and teamwork
- Bring about changes in values and beliefs
- Work to drive decision making down to lower levels in the organisation
- Require senior level commitment and change management for success

The key question for organisations is how the reengineering significantly improves the cost, quality, service and speed simultaneously. To accomplish this, companies are developing new processes to produce the results important to customer. They are looking for ways to become more flexible and responsive. When environment is fairly stable, work is to be divided into simple, repetitive tasks for a largely unskilled, uneducated work force to create efficiencies of scale. Layers of supervision and controls are required to link these simple tasks together connecting people who perform complex, multi-disciplinary tasks by a general understanding and agreement on vision and processes. These phases are collectively called the Reengineering process and it will allow the organisations to grow at a rapid rate. Hence, Reengineering is a holistic solution for companies, which require radical redesigning for quantum improvement in its performance.

III. LITERATURE REVIEW

Re-engineering is a highly public field, with people expressing conflicting views. Here we attempt to present those views without necessarily endorsing or rejecting them. In fact, the authors of this paper don't hold a single collective opinion about BPR, its merits, and limitations.

Hammer and Champy (1993) provides the most frequently quoted definition of business process. Most authors seem to follow his lead in defining business processes as a set of tasks typically crossing organizational boundaries which deliver something of value to an internal or external customer. The term "re-engineering" captures the radical redesign of these processes.

Hammer (1990) asserts that historically the processes in a typical organization were never engineered at all, let alone with the broad business goals in mind. Rather they evolved over time from temporary procedures and quick fixes. Hammer argues that the typical organization evolved in an entirely different business environment than that in which we now compete. As a result, today's typical business processes contain much unnecessary content, make the leaps across organizational boundaries poorly, and actually impede optimal business performance. Thus, radical change is needed. Small incremental improvements simply won't do.

Reports of business process re-engineering work indicate that it is proceeding with vigour in spite of unsettlingly low success rates, mostly less than expected results, and

some spectacular failures (Caldwell, 1994; Hall et al., Arend, 1993). Seemingly, the trend to reengineer has impetus from the publicized successes, our own corporate cultures (Vitiello, 1993), but the fact is that competitive pressures are forcing companies to change. Re-engineering, by Hammer's definition, is a good way to go about it, in spite of uncertain results.

Hammer's (1990) definition emphasizes radical change through application of information technology. Davenport and Short (1990) also stress the role of information technology. Information technology has a dual role in the transformation of business processes (Van et al., 1993). As originally highlighted by Hammer, it enables new levels of productivity, new kinds of organizational structure and deployment, and new kinds of products and services.

Davenport and Short (1990) suggest a recursive relationship between this role for information technology and business process redesign. New technologies enable and therefore cause redesigns of business processes while, in general, process redesign should be done with the intent of exploiting technology. In the second role, information technology can help in the mechanics of the transformation itself in modeling the options and assessing the changes with the greatest impact. It is this second role that captures the essence of our work.

Van et al. (1993) argue that simple process maps do not typically provide sufficient understanding of the process to know what to change although many teams start this way. Van der Aalst (1992) suggests that the intended analysis dictates the type of modelling that is done. The goals of a re-engineering effort are most often framed as quantified business improvement measures. The process map helps the team understand the problem framework, but to aid a team in knowing what to change, the process map must be backed with numerical analysis.

If the process does not contain significant randomness in either its environment or its internal features, basic mathematical analytical techniques may be indicated. Such cases can benefit significantly from optimization employing linear programming, mixed integer programming, goal programming, and other operations research techniques. Simulation, however, is typically employed in situations where the random content does matter and cannot be modeled by other analytical techniques. Cheng (1992) views simulation as a tool of last resort to be employed only when other methods are ruled out. He cites the high computational cost and the time and effort required to build models as disadvantages of the simulation approach. On the other hand, Swain (1993) suggests that the ease of model building and cost economies in computing make simulation the tool of choice for modelling complex systems and validating analytical models before proceeding to optimization.

Van der Aalst (1993) suggests that the complexity and analytical detail are essential to sound analysis. Yet, excessive complexity and detail can impede human understanding of the process. Van der Aalst recommends a library of reusable, domain specific building blocks which themselves may be quite detailed but can be used as black boxes.

IV. THE VARIOUS PHASES IN THE REENGINEERING

Various organisations have provided different approaches to reengineering processes. Thus, there is no distinct methodology for reengineering. A defined process for bringing about change can be useful. Further, it is important to realise that implementation is far more difficult than developing the solution. The reengineering process described here is a simple change process towards the achievement of faultless result. Each step is designed to improve the organisations probability of success in implementing the reengineered business processes. The processes developed and proved to be successful in implementing the change has ***four phases***, each is composed of several stages with its own suggested activities. For each activity, the steps or tasks to be taken toward completion of the activity are also necessary.

1. Phase I: Position for change: This phase encompasses four critical stages; they are (a) Establishing the urgency and gain commitment (b) creating process map (c)

Selecting processes and assigning owners, and (d) developing project framework. In general, organisations identify the urgency and commitment for change in this phase and it requires an intense effort in communicating the key messages and overcoming the general resistance.

2. Phase II: Diagnosing the Existing process: One can begin the activities in this phase while continuing to establish urgency and gain commitment (Phase I stage (a)). The critical stages in this phase are : (a) Defining key process components (b) understanding the customer needs (c) identifying the current design weaknesses and (d) establishing performance targets.

3. Phase III: Redesigning the Process: This phase may be started before the completion of phases II. For instance, benchmarking and performance measurement activities often extended in phase III. More accurately the reengineering team identifies underlying assumptions and root causes of weaknesses in the existing process design. The stages included in this phase are: (a) Identifying the potential innovations (b) Developing initial vision of the New Process. (c) Identifying incremental improvements and (d) Developing commitment to the vision of new process.

4. Phase IV: Transition to the New Design: In this phase, it may take some time to see the performance from the first release of a newly reengineered process. Cultural changes take time and patience. Identifying and adjusting with compensation systems, career paths, new roles etc. must be a part of the long-term transition plan. The main focus in this phase is on the communication process. The critical stages in this phase include. (a) Beginning transition change management (b) creating the transition plan and teams. (c) Prototype and test initial instalment (d) completing transition and continuously improve the process.

V. NEED FOR REENGINEERING – WHEN AND WHY SHOULD REENGINEER?

Each organisation must determine itself when it is appropriate for them to reengineer. Reengineering should be done only if it can help in achieving an enhanced strategic position. Some strategic indicators that require reengineering include:

- Realisation that competitors will have advantage in cost, speed, flexibility, quality or service
- A need to build operational capabilities
- Need to revaluate strategic options, enter new market or redefine products/services
- Core operating processes are based on outdated assumptions/technologies
- Strategic business objectives seem unreasonable
- Change in market place in the form of
  - Loss of market share
  - New basis of competition/new competitors
  - New regulations
  - Shorter product life cycles
  - New technologies in play

So, if the company is at the cutting edge of an industry that has just undergone major changes reengineering might not be appropriate. However, if the organisation operates with old models instead of new technologies and approaches used by others, reengineering may be urgently needed. Even if technical performance is adequate, other improvements may be needed– such as training, organisational change, leadership development etc. In such circumstances also reengineering is required.

VI. CONCLUSION

The most direct benefit that companies derive from reengineering is significant in the process improvement (50 to 100%). Costs are lowered while speed, quality and service are dramatically improved. Unfortunately, reengineering seldom makes a significant impact on the organisation's bottom line (only 20% of the time.) Reengineering has a greater chance of success if it is viewed as leading to growth and value creation. In addition, there are costs to reengineering that must be considered before deciding for such a right strategy for an organisation. Wayne Code, President of Vallen Inc. explains, "These changes may be traumatic, but the pain is outweighed by the gains made in the move

towards the significant goals set. Change occurs when the pain of change is less than the pain of staying the same."

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