

THE TOTAL PROCESS IMPROVEMENT: Integration of Business Process Reengineering and TQM (Oleh: Ir. Bernadus Nugroho, MSM.)

The concept of TQM and BPR focuses on process improvement and the implementation of process vision may take several years. Therefore, the commitment of the senior management is important to motivate the managers and employees who would make the changes work, and curb their impatience during the long course of process improvement. Although the integration of TQM and BPR is ideal and may spread over a long period of time, it can be extremely beneficial to companies that are firmly committed to process management over long term. The improvement in the information technology in the coming years may make the integration of TQM and BPR more viable in terms of time and investment.

Introduction

Competing successfully in the global marketplace in the twenty-first century will require a major change in the operating systems of world-class companies. Fierce competition has led to cost reduction, quality improvement, accessibility to the market, time reduction in product development process, service and flexibility. These new dimensions in the business has challenged the very fundamentals in which the companies conduct their business.

Hierarchical structure, bureaucracy, age old operating systems and processes are the traditional elements that have hindered the ability of organizations to respond to competitive challenges. Integrating marketing, engineering, and manufacturing capabilities is the key to successfully competing in today's marketplace. The decisions in an organization have to be made by those who are directly involved with the processes, employees should be given more opportunities to utilize their skills and knowledge.

Managers need to lead their companies in a new direction, that focuses on processes. The processes control should not only be limited to manufacturing but should encompass all key activities in the business with the entire company considered as a complex process that contains many sub-processes.

For the last two decades, quality is becoming one of competitive issues and pressures for improvement have become intense. TQM (Total Quality Management) is regarded as a powerful process that engages all divisions, departments and

levels of the organization. Many US. companies have heightened interest in quality management and have recognized the strategic importance of quality and regard quality as an aggressive competitive weapon. Companies who failed to reap the benefit of TQM, either lacked motivation at all levels or failed to understand that the road to quality improvement is long and difficult and has variety of destinations.

Leading companies, on the contrary, did not miss out on the strategic benefits of the quality revolution. The increasing global competition and pursuit to quality has led the companies to radical overhauls and operational excellence is being considered as a springboard for competitive dominance. The concept of quality improvement needs to be re-addressed and the techniques of TQM should be applied not only in specific area or function but focus should be centered on managing the process across functions.

This new trend in business is being addressed by BPR (Business Process Reengineering). BPR seeks radical rather than merely continuous improvement and makes process orientation a strategic tool and a core competence of the organization. In order to move to process orientation, the top-management needs to step back and break the mold, and challenge the very purposes, principles, and methodologies on which their business process reengineering (BPR) and explains the role of information technology in their respective applications. Although TQM and BPR are radically different by definition, but our endeavor in this article is to explain TQM as a complementary approach to BPR. We will first describe the TQM tools already in place in an

organization, then five generic stages in the application of BPR, and finally continuous improvement to consolidate the gains.

Process Improvement Through TQM

Increased competition in the global market place has called for a rethinking of traditional approaches to quality. Quality is being defined to relative to the customer rather than against fixed internal standard such as AQL (Acceptable Quality Level), and meeting specifications is no longer a major concern. Quality revolves around customer requirement of adding value, and value means quality and reliability at a reasonable price. This new perspective has added new dimensions to quality. Market research is vital to consider customer's view point about the quality of a product and may also include bench-marking in relation to the quality of competitor's product. When quality is surpassed by the competitors, there is a need to chase a new goal, and when these goals keep changing in today's competitive marketplace, these goals then become moving targets. It is imperative that organizations meet this competitive challenge through improving their processes.

It is the process improvement that will help companies to chase the moving target, improve productivity, and bring about positive changes that will save money both for the company and the customer. These new requirements are clearly innovations in the concept of total quality management and most important change of all is the interest of top managers and chief executive in quality. Now quality is linked with profitability, and is considered and important facet in strategic planning process. At this point it is important to understand that principles like inter-functional coordination, zero defect, the cost of quality and statistical process control (SPC) are as vital today as they have been for the last two decades.

The key aspects in applying TQM are commitment and participation by top management, extensive training and team building, effective communication, and focus on to establishing seriousness of purpose and long run devotion to quality. Extensive training and team building will enable employees to map business processes and develop more efficient ways operation. This includes the use of work teams and empowering employees in order to make most important operating decisions that need relatively little supervision.

The teams will have good decision making skills and understanding quality and quality measurement, and the employees can operate effectively in the teams which lead to reduction cost and improvement in customer satisfaction. Effective communication means that employees need to understand long term vision, long term goals, near term data, and their relationship to TQM. This will give employees a broader understanding, personal involvement, & will emphasize quality's connection with basic business objectives that they only provided training in the tools of quality control and did not emphasize quality's connection with basic business objectives. Finally, TQM focuses on customer satisfaction and it needs to understand customer's criteria for quality and to build strong customer relationships. The company should develop systems to communicate changes in customer expectations to the people who make strategic decisions.

TQM is considered as a tactical process-oriented technique and must be employed by the companies to understand the processes and determine the ways to improve them before they decide to undertake process reengineering.

Business Process Reengineering (BPR)

Reengineering is the fundamental rethinking and radical redesign of business processes to achieve dramatic improvements in critical, contemporary measure of performance, such as cost, quality, service and speed (Michael Hammer). The focus in reengineering is on process (Processes Oriented) and search for quantum leaps by reinvention or innovation rather than incremental betterment. The process is a specific ordering of work activities across time and place, with a beginning, and end, and clearly identifies inputs and outputs: a structure for action.

Processes are the structure by which an organization does what is necessary to produce value for its customers. The most important measure of a process is customer satisfaction with the output of the process. The larger the process, the greater the potential for radical benefit. Adopting a process oriented structure generally means de-emphasizing the functional structure of the business because a process perspective implies a horizontal view of the business that cuts across the organization, with product inputs at the beginning and outputs and customers at the end.

Information Technology (IT) and Business Process Reengineering (BPR) are natural partners and they have a recursive relationship. Information technology is part of any reengineering effort and plays a crucial role in business reengineering since it permits companies to reengineer business processes. Applying information technology to business reengineering demands inductive thinking - the ability to first recognize a powerful solution and then seek the problems it might solve, problems the company probably doesn't even know that it has. Reengineering, unlike automation, is about innovation and about exploiting the latest capabilities of technology to achieve entirely new goals. Traditionally (usually), work involving information tends to be structured sequentially, with one individual completing his or her tasks, then passing it to the next line. Database technology allows many people to use the information simultaneously. Modern database technology allows information previously available only to management to be made widely accessible. When accessible data is combined with easy-to-use analysis and modeling tools, front-line employees-when properly trained-suddenly have sophisticated decision making capabilities. Decisions can be made more quickly and problems resolved as soon as they crop up. Information technology should be considered in terms of how it supports new or redesign business processes, rather than business functions or other organizational entities. And business processes should be considered in terms of capabilities information technology can provide.

The reengineering processes must be initiated by the top management because it will affect the business unit as a whole. A reengineering effort will fail without the full commitment of the senior management. The top management must have consistency and dedication from start to finish in the reengineering effort to make it a success. The process reengineering has no definite model that can be followed but there are certain elements which are very important to consider when undertaking a reengineering project. These elements include:

- Strategic Vision
- Diagnosis
- Redesign of Prototypes
- Implementation
- Monitoring

Strategic Vision

Strategic vision is the key aspect in the process

reengineering because the success lies in choosing a direction that is aligned with the business objective driven by the customer, and thereafter steering the reengineering project in the direction already outlined. The strategic vision will not only enable everyone involved in the reengineering project to know the fruits of the unfound land but also enable them not to be detracted during difficult times. The objective of processes & information systems mustn't be outlined in isolation but they should be drawn in the light of strategic objectives. Information systems objective is a part of the process reengineering. After outlining the strategic objective, the reengineering team is assigned the task of process mapping of the whole business unit as well as identifying the process that has a radical effect on the business.

Process Mapping

This one of the most vital tools used in business process reengineering. The process map displays the work flow across various functional areas of the organization. The customer must also be included in the process map. Although the company wont reengineering all the processes in their organization, however, the whole business process should be included in the process map in order to make it easier for the reengineering team to pick which core processes should be chosen related to the objective of the reengineering effort.

There is substantial overlap in terminology between the respective tools of processes and information systems that can distract the reengineering team, therefore the focus should be on coordination between these two areas. The data structure and application requirements from systems should fit to the corresponding processes.

Diagnosis

The objective here is to determine as to why a certain task is being carried out, the ways to improve the process, and ascertain which information technology can support it. The analysis of the existing process should remain on the ways to redesign the new process without considering the constraints of the current organization. At this stage, process mapping can be augmented by data modeling to facilitate the understanding of the current process as well as to avoid duplicity of data.

Bench-marking is another tool that should be used in the diagnosis stage because it will give new ideas to the reengineering team. The team can do the bench-marking from other companies which are the best in that particular process. Hammer's view in this regard is to bench-marking from the best in the world but not only the best in it industry. However, the team can create the new world class bench-marking if they can not find a company that is the best in that particular process.

Redesign of Prototype

The prototypes are designed and evaluated at this stage by the reengineering team. The information technology can be used in a way that can support the design of the prototype processes and the existing technology infrastructure can also hinder-new approaches and methods applied towards process reengineering. The redesigns must endeavor to free themselves from the constraints of the existing technological infrastructure in the company and should seek help from generic applications. The redesign team must analyze as to whether a particular application is relevant to the process redesign or not.

Information technology tools allows the reengineering team to develop application specification on-the-fly in the form of running prototypes. Prototypes become the communication medium in organizations that use joint application design (JAD) or rapid application development (RAD) methodologies. The reengineering team generate a first pass at specifications for the application. The reengineering team review the prototype of the system and modifies their specifications, which are then coded into prototype and tested. The prototype could become the production version of the application after the approval of reengineering team. Modeling techniques and CASE tools are used to enable the management make a choice toward a final process. The close integration of data modeling tools with CASE integration frameworks and environments will further enhance the ability to draw models rapidly and make changes quickly in redesigning the new process. The ability to generate computer codes from CASE tools will facilitate the use of information system it can be rapidly modified accordingly.

The use of object-oriented data modeling is generally preferred because it includes the definition of methods and operations, inheritance.

and other object-oriented capabilities in the model itself. Object technology can be used to quickly produce applications that contain easily maintained code. The object oriented design tools starrer the software for the objects in a repository as reusable objects, the repository or the objects are screens, icons, etc. The methods can protect the object's data from corruption by other objects and simplifies design requirements because each object tracks its own data. Object oriented technology keeps the data and its processes together because they depend on each other.

Since creation of robust, well structured, non redundant databases for specific functional areas is difficult to achieve, therefore composite information systems that can draw information from multiple data bases can be one of solutions. Information warehouse concept can also be applied where information can be stored in small databases and needs to be accessible for frequent use.

While redesigning the prototype, the reengineering team should be supported by IT simulation model tools such as SIMAN/CINEMA and SPARKS. The use of simulation tools are to investigate and analysis of the process under study. The use of simulation models will help the team find the optimal prototype of the new process. The company should choose the prototype test projects of the new process so that it can not affect all the business activities in the organization.

Implementation

In the implementation stage, the company may nave to think about redrawing the organization boundaries of its organization. The new processes may also affect the culture of the organization because the operations across various functional areas may add new dimensions to the organization structure as a whole.

A new social design focusing on the human aspects of reengineering needs to be tailored for organization. This may include: identifying of job characteristics, skills, staffing needs, designing new compensation and incentive programs. The information technology has to support the empowerment given to the front-line workers by the new process. The company must not overlook the level of communication needed at the implementation stage.

A comprehensive communication program must include a variety of communication methods so as to facilitate timely feedback from employees. The most commonly used is E-mail communication where no duplication or distribution is required, as compared to memos.

However, E-mail communication is still one to one, regardless of how many cc: copies are sent. But unless each member sends a response to all the other members, there is no peer to peer communication. On the other hand, Groupware goes database. Each member of reengineering team can read and respond to it. A groupware product can replace face to face meetings, include real-time computer-based discussions, can keep all data in shared storehouse that can be organized, and can facilitate a change in corporate culture and the way people do business.

Lotus Notes from Lotus Development Corp. is one of the key player in work group products. Multimedia (use of voice and images) also allows an organization to convert paper files into computer images that can be searched, sorted, and retrieved and is a relatively inexpensive way to process documents.

Installing information technology at this stage is crucial because the right choice for information technology depends on information tools that coincide with the process objectives established at the outset. CASE tools for example, can be effectively used in the design of a prototype as well as in the implementation stage to shorten development time and improved productivity.

However, these tools assume that the end user interfaces to the application via character-based screens and the application ran on a single machine. In addition, the leading CASE tools, such as IEF from Texas instruments and ADW from Knowledge-Ware, require more discipline and create more cultural change than corresponding client/server development tools.

The second most common enable of process implementation is object oriented systems design and programming. The increased use of unstructured data, such as text, compound documents, bit-mapped images, and graphics, has challenged the ability of relational databases.

Monitoring

Most companies invest a lot of AF resources and efforts in diagnosis and redesign of the processes but fail to monitor after rolling out the process they reengineered. A comprehensive measurement system is necessary to determine the level of success and to assess the potentials of improvement in that process. New processes should be measured in terms of productivity, cycle time, cost, revenue, quality, with comparisons made against the existing processes as well as the impact on the overall performance of the whole business unit.

The performance of IT should also be measured in terms of information rates, downtime, and system use. Improvements in communication through E-mail, EIS, multimedia (video and graphics), or Groupware should be measured in terms of efficiency and paper reduction.

After the successful redesign and implementation of a new process, new areas for improvement can be identified with the help of comprehensive measurement tools for the new process as well as facilitating the reengineering other processes.

Following are main stages of BPR along with the components and tools required for implementation for each stage.

Stages	Components		
Strategic Vision	Process Mapping		
Redesign of Prototype	CASE tools or Object Oriented Methodologies	Simulation	Client Server Distr-but. Sighs.
Implementation	Social Design	Technical design	Comprehensive Implementation Program
Monitoring	Comprehensive Measurement System		

After the new process is stabilized and institutionalized, the continuous improvement techniques are applied so as to optimize the process.

Relational databases require data to be broken into separate tables for efficient retrieval. In addition, data cannot be represented as entities, attributes and relations.

Object oriented technology, on the contrary, can keep the data and its processes together and can define classes (the data) and their objects, structure, attributes, and services (functions). Indexing and cataloging are also being used to pinpoint reusable objects. These libraries of classes and objects may be stored in a repository for future use.

Continues Process Improvement

The Process has undergone a major breakthrough in performance after process reengineering. This is not the end of the improvement activities; rather it is just the beginning. Now the process must continue to improve by applying the statistical tools to minimize the unexplained variation and consolidate the gains. The important part of the continues improvement is to ensure that all changes made to the process have a positive total effect on the process without introducing sub-optimization. After this stage of continues improvement, the company may return to process reengineering and this sequence keeps moving. This sequence of TQM and BPR may look hypothetical, but keeping in view the improvement in the CASE tools and object oriented methodologies, the company can reduce the time of implementing BPR, and therefore can draw the maximum benefits by integrating these two approaches. However, during the phase of strategic vision (process mapping), the company may choose various processes for implementing TQM as well as BPR, depending on the type of improvement necessity. The sequence of continues improvement and BPR displayed in the following diagram.

Continues Improvement
 - Stabilize Process -
 Optimization

Business Process Reengineering
 -Strategic Vision
 -Diagnosis -Redesign
 and Prototype
 -Implementation
 -Monitoring

During the implementation of TQM, the company must make use of information technology. The use of IT to enhance the efficiency of quality information system will enable the company to respond to the voice of the customer, timely access the accurate information, and rapidity of feedback. The companies may also consider the use of client/server distributed system which may improve the efficiency of self managed teams by allowing them to access and process the data at their desktops.

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