3 Chapter

BUSINESS PROCESS REENGINEERING – CONCEPTS AND TECHNIQUES

Objectives

After going through this chapter, you would be able to :

- Understand the need for bringing continuous changes in the PROCESS
- Understand the meaning of PROCESS and PROCESS MANAGEMENT
- Learn about core elements of Process Reengineering

Structure

3.1 INTRODUCTION

For the survival of any organisation, improvement is not an option but it is a compulsion. For organisations which seek to thrive, dramatic improvement is often the only key to success. Eventhough small incremental improvements are always essential, sometimes, quantum leaps are needed for an organisation to grow and sustain global competition.

Many processes in an organisation may need reengineering because:

(i) Old ways of doing things need to be changed.

(ii) Your customers are demanding a change.

(iii) Competitors are taking over your market share.

(iv) It takes too long for your organisation to move products from conception to the market place.

(v) Your manufacturing process may be too costly and time consuming.

(vi) Your budgeting process may be too complex and

(vii) your services are not compatible with your customer's needs.

Then it is time for starting process reengineering.

Process reengineering is a new approach to doing a business. Over a period of time, it has been observed that it works well and some reengineered processes have provided gains of 100 to 300 percent.

Process reengineering defined : Process reengineering is defined as ***"the fundamental rethinking and reengineering of existing process tasks and operating structure to achieve dramatic improvements in the performance of the process"***.

The word 'dramatic' improvement means 'radical' improvement. In global competitive business environment, marginal or incremental improvements in some of the key business processes may not be adequate. Eventhough small, incremental, continuous improvement in the way business is conducted may be helpful to bring about substantial improvement in the long-run, major, dramatic or radical improvements (changes for the better) in the key business processes are necessary for Indian firms to survive and grow in globally competitive market.

3.2 NEED FOR PROCESS REENGINEERING

Many manufacturing companies suffer from the problems in product development due to long lead times, a large number of design changes, manufacturing problems and ultimately excessive costs to satisfy customer

requirements. **"Product improvement"** is an area which is given more attention to in regaining the company's competitive position. Product improvement means improving product features to make it more attractive to the customer. But at the same time, the effectiveness and efficiency of the engineering, manufacturing and/or business processes that support development and delivery of the products or services are often neglected. Many firms are not competitive, not because of product or technology related problems, but because of the process – the way the firms carry out the design and development of a product and the way their teams spend their time. *For example,* when a firm might have updated its technology, its engineers might not have changed corresponding design processes or work habits accordingly. Design process means how a set of design-tasks is performed. Work-process means how a set of work tasks or job functions is performed. A **process** is defined as a set of tasks arranged in a particular manner so as to transform a set of inputs into a specified set of outputs. There can be many process possibilities of performing a set of design tasks, manufacturing tasks or work-tasks. Some could be more efficient or effective than others.

Many progressive firms are interested in maintaining a competitive edge in the world market and in producing high quality products and also keep their net cost of production at a lower level than their competitors. There are six parts (5 W 1 H) to achieve competitiveness.

- What (tasks, objects, inputs, outputs and process steps)
- Who (talents, team work, customers, suppliers)
- Why (technique, purpose, function and rationale for decision making)
- When (time, process order and structure)
- Where (technology gaps, space-process relationship)
- How (tools, method-process boundaries and process flow)

Knowing what information is required or task to perform and how this information or task satisfies the corporate goal is important to win the battle for competitiveness. The other questions to be addressed to are:

- Who makes up the team?
- Who needs it?
- Why this process or technique will not work?
- Why is this information be used?
- What is the optimum time to do it?
- Where are the right places to use this technology?

Process management is a concept often used to accomplish many **lean production goals**. In many organisations, process improvement is often perceived as a functional service referred to as **productivity improvement**. In some other organisations it is perceived as **process restructuring** rather than a process of **workforce productivity improvement (continuous process improvement)**. Process restructuring is targeted at achieving ***"one-at-a-time improvements"*** due to incremental or "add-on" approach of continuous improvement in manufacturing process, product quality etc. However, in firms following lean production principles, process improvement is seen as a pervasive set of renovation activities.

Process reengineering means one or more of the process modification strategies, which take into consideration the needs of the company as a whole. The term "reengineering" implies that the change or effort is directed toward an array of process modification strategies. More frequently, reengineering implies either starting with a clean state (a new process) or radically overhauling – which means replacing the old processes with completely new ones. Reengineering generally provides companies with opportunities to do things differently and creatively and to distinguish themselves from their immediate competitors.

3.3 UNDERSTANDING AND MANAGING CHANGE

Changes are an essential part of any improvement. When we introduce new steps or new tools in a process, we require change in the processes or workhabits.

Steps in the change process

Step 1 : The first step before we introduce a change is to understand the change process. Understanding the change process requires knowing:

(i) ***When to change,*** *(ii)* ***How to change,*** *(iii)* ***How to cause change,*** *(iv)* ***Where to change,*** *(v)* ***What to change,*** *(vi)* ***How to promote change so that the improvement cycle repeats.***

The key factors that influence the change process are **7 'T's – *tasks, talents, team work, techniques, technology, time*** and ***tools***. Sometimes the change process (where to change, what to change) has involved performing a strategic review which is *competitiveness analysis process* known as ***SWOT analysis***. SWOT stands for strengths, weaknesses, opportunities and threats.

Step 2 : The second step is to manage the change. There are six steps to managing change:

(i) Leading the change process, (ii) Setting the direction, (iii) Creating the environmental for change, (iv) Challenging past practices and excuses, (v) Removing the barriers and road blocks to change, (vi) Rewarding the right things so that change continuous to evolve.

Setting the direction involves method of data collection and determining the change frequency and change complexity. Challenging past practices and excuses involve understanding the sources of waste. Waste exists in all work activities, all tasks, all processes and at all levels in the organisation. 7 types of wastes reported by Taiichi Ohno are commonly found in manufacturing work-site.

They are: *(i)* ***waste of over production***, *(ii)* ***waste of correction***, *(iii)* ***waste of material movement***, *(iv)* ***waste of processing***, *(v)* ***waste of inventory***, *(vi)* ***waste of waiting*** and *(vii)* ***waste of motion***.

One more type of waste added to the above seven types is ***waste of information movement***. Removing business and roadblocks to a large extent involves eliminating waste and associated reworks.

The product improvement efforts can be categorised into four primary reengineering strategies:

(i) A set of continuous process improvement (CPI) tactics.

(ii) A set of restructuring tactics.

(iii) A set of organisational traits.

(iv) A set of renovation tactics (*e.g.*, best industry practices)

Benchmarking is a strategy that is common to all four **reengineering strategies**. Other strategies are *"as–is" flow charting, value engineering* and *value analysis* which will be discussed in later chapters.

3.4 UNDERSTANDING "PROCESS"

Before understanding what "Business Process Reengineering " or "Process Reengineering " or simply "Reengineering" means, it is necessary for one to understand the meaning of **"process"** itself and of **"process management"** and **"process improvement"**.

A ***"process"*** is a system composed by operators, machines, work methods, materials, tools and their immediate environment. The process consists of a certain number of activities or operations which are used in a given sequence to transform a set of inputs into useful outputs.

Process management includes the management of processes and management by processes. The **management of process** means that all

the activities or operations of a process are required, are carried out correctly, at the right time, in the right place by the right person.

Management by process is organising and managing around a process (say order fulfillment) rather than around a function (marketing, production, purchasing etc.,) as is traditionally the case. Management by process requires cross-functional teams to perform the process.

Process management involves the design of processes to develop and deliver products and services that meet the needs of customers and control so that they perform as required and their continued improvement. Well designed processes lead to better quality products and services and less waste and rework.

Process management activities strongly emphasise on prevention of defects which is best achieved by designing quality into products and services and also into the process that produce them.

In an organisation, the processes that are being carried out serve some need. These processes result from efforts to meet customers' needs, the vision, mission and objectives of the organisation, the need for cost-competitive products and the desire to provide the best product and service for the least possible cost. Common processes include the following.

(i) **Assessing** customer requirements for goods and services.

(ii) **Defining** customer desires for goods and services.

(iii) **Designing** quality goods and services to meet needs and desires.

(iv) **Producing** quality goods and services as designed.

(v) **Marketing** goods and services that are produced.

(vi) **Stocking** shelves with goods.

(vii) **Billing** for goods sold or services provided.

(viii) **Serving** customers.

(ix) **Satisfying** customers by redressing their complaints.

Planning these processes is crucial to quality because process planning and design determines the end capability of the process. All processes have the same level of built-in capability. People who design the processes are responsible to determine this capability of the process. Often the process is designed to meet some specific performance capability which was outlined as part of the design goals.

Processes are covered by various rules, operational procedure and standards. The absence of such guide-lines generally cause deterioration of performance to a level far below the process is capable of producing.

In designed processes, the actual process performance is measured against its potential capability. Actual processes are continuously evaluated by the organisations that strive to achieve excellence in performance. These evaluation processes reach the operator level so that immediate real-time results provide real-time process and performance improvement.

Process as an evolution : Process is a two cycle evolution : *(i)* the process is controlled and *(ii)* the process is improved. Each cycle has several steps that must be understood in order to achieve continuous process improvement.

Box 3.1 illustrates two cycle evolution of a process.

Box 3.1 : Two cycle evolution of process	
Control cycle	**Improvement cycle**
• **Define** the process • **Establish** ownership • **Identify** customer requirements • **Develop** standards and measures • **Audit** for conformance • **Identify** improvement opportunities • **Develop** improvement objectives	• **Determine** causes • **Develop** solutions • **Develop** action plans • **Implement** plans • **Assess** results • **Prevent** recurrence • **Reward** participants

3.5 PROCESS CONTROL

Process control is a seven step cycle:

(i) Define the process

(ii) **Establish** ownership

(iii) **Identify** customer requirements

(iv) **Develop** standards and measures

(v) **Audit** for conformance

(vi) **Identify** improvement opportunities

(vii) **Develop** improvement objectives.

These steps are briefly discussed in the following paragraphs.

(i) **Define the process :** The process definition includes process boundaries, inputs or suppliers, outputs or customers, subprocesses and major activities.

Box 3.2 illustrates process definition

Box 3.2 : Process definition		
Input/supplier	**Process**	**Output/customer**
• List all inputs to the process • List vendors • List suppliers	Define boundaries ---------- Process begins ----- Process ends ----- Major groups are : ---- Subprocesses include ------	List all outputs of the process List all customers who receive this output

- **Activity A**

Take any process in your organisation and define it completely into three parts i.e., input, process and output.

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(ii) **Establish ownership :** Ownership for a process establishes accountability with one person. This is helpful in controlling the process, establishing long-term customer satisfaction and achieving continuous process improvement. The person selected has the responsibility for the process, its results, process improvement and people involved in carrying out the process. Also the owner of the process has the authority and responsibility to effect appropriate changes and accountability for doing so.

(iii) **Identify customer requirements :** Process performance and improvement is driven by customer satisfaction. Specific customer needs and wants that determine customer satisfaction must be addressed based on priority of such requirements. Customer specification identify customer requirements.

- **Activity B**

Take any process or product in your organisation and identify its internal customers and their requirements from this process or product.

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(iv) **Develop standards and measures :** To control the process, appropriate standards must be established and measurements developed for each process. They provide the means to establish targets and determine how well the process is performing against the targets.

(v) **Audit for conformance :** Standards and measures are only useful if audits and assessments are made continuously to determine the level of conformance. The audit should include the process itself, customer feed back and market data. Attention should be given to variations and their causes. Effort must be continually applied to remove abnormal variations in all process areas.

(vi) **Identify improvement opportunities :** Improvement opportunities arise from the specific problems identified during conformance audits and process assessments. Opportunities for simplifying the process, reducing costs, improving quality, increasing customer value etc., should be investigated. Specific attention should be given to causes of rework, redundancy, waste and bottle necks.

(vii) **Develop improvement objectives :** Based on the improvement opportunities identified, problems should be prioritised and corrected accordingly. The criteria for improvement priority are safety issues, customer requirements, business concerns, profit potential, cost of improvement, resource availability and potential for success.

3.6 PROCESS IMPROVEMENT

Once the process is under control, the improvement process begins. The steps involved in the process improvement cycle are as follows:

(i) **Determining causes :** The symptoms that are present in the process are listed, the reasons for the presence of symptoms are discovered and the root causes are ascertained.

(ii) **Developing solutions :** Potential solutions are listed, possibilities are combined and tested for correction and the best solution is selected.

(iii) **Developing action plans/implementation plans :** The action plan/ implementation plan developed must address ***what must be done, when*** **and by** ***whom***. The method of implementing the plan must be decided by the team along with measures to determine success.

(iv) **Implementing the plan :** The plan for improvement is carried out as intended.

(v) **Auditing or verifying results :** The obtained results are compared against the standards and measurement criteria which was established as part of the plan.

(vi) **Preventing recurrence :** This is the control to the new level step and begins the cycle all over again.

(vii) **Rewarding participants :** Some rewards or benefits are given to the workers to motivate them to work for continuous process improvements.

3.7 CORE ELEMENTS OF PROCESS REENGINEERING

Process reengineering is more complex than CPI. It results in drastic improvement because it affects change in more than one area. To achieve break-through organisational performance, process reengineering drives change in three areas

(i) **Organisational structure**, ***(ii)*** **People/Jobs** and ***(iii)*** **Technology**.

Three core elements of process reengineering are

(i) Organisational restructuring

(ii) Work redesigning and

(iii) Technological retooling

These three elements are briefly discussed in the following paragraphs.

(i) **Organisational restructuring :** Some from of organisational restructuring is often a key ingredient of reengineering effort. The considerations involved in restructuring are

(a) reducing organisational layers

(b) realigning functions/work groups around the customer

(c) driving accountability to the front line.

(ii) **Work redesigning :** Redesigning of work is necessary to assign responsibility (and possibly accountability) to a particular employee to carryout a portion of an entire work process. When redesigning the work, the following activity must be considered.

(a) Conducting a **"customer value-added"** process analysis of job tasks.

(b) Expanding job scope and ownership.

(c) Building cross-functional teams.

(iii) **Technological retooling :** Technological retooling for gaining optimum performance through reengineering requires the following considerations.

(a) Increasing the emphasis on process tasks that happen parallely.

(b) Gathering and communicating data related to customers.

(c) Expediting access to information and data for all employees.

Understanding the improvement opportunities and challenges that underlie process reengineering happens to be the first step in discovering whether it can work successfully or not in your organisation.

3.8 THE REENGINEERING PROCESS

Process engineering is an innovative process for which a disciplined approach to the effort is essential. It involves a six-step plan. These steps are :

Step 1 : State a case for action.

Step 2 : Identify the process for reengineering.

Step 3 : Evaluate enablers for reengineering

Step 4 : Understand the current process.

Step 5 : Create a new process design and

Step 6 : Implement the reengineered process.

These steps are explained below.

(i) **State a case for action :** The need for change should be effectively communicated to the employees of the organisation through educational and communication campaigns. Two key messages to be articulated are: *(i)* a need for action and *(ii)* a vision statement.

The objectives of reengineering must be in the form of a qualitative and quantitative *vision statement.* These objectives include goals for cost reduction, time-to-market, quality and customer satisfaction levels and financial indicators. *For example,* the vision statement by Federal Express (a US courier company) in its infancy was "we will deliver the package by 10 30 a.m. the next morning".

Box 3.3 : Steps Manufacturers Take When Reorganising

	Steps	Percentage of Manufacturers
(i)	Outsourcing one or more operations	31%
(ii)	Eliminating a product line	34%
(iii)	Reducing the number of suppliers	34%
(iv)	Reducing the number of production workers	41%
(v)	Flattening the layers of management	56%
(vi)	Organising operations by customer or product line	60%
(vii)	Investing in automated equipment	76%
(viii)	Significantly improving process flows in the factory	87%

Source : Richard B. Chase, Nicholas J. Aquilano, F. Robert Jacobs, *Production and Operations Management,* Eighth Edition, Irwin McGraw-Hill Publications, p. 772.

The CEO of the company is responsible for communicating the vision statement first to the senior management and then to the rest of the firm. A senior management *steering committee* that includes the CEO typically champions the change process, sets goals, assigns resources and expedites progress.

- **Activity C**

Get information about vision statement for any three reputed companies.

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(ii) **Identify the process :** All the major processes in the firm should be initially identified and few processes should be selected for reengineering. The following questions define the criteria for selecting processes for reengineering:

- Which processes are currently more problematic?
- Which processes are critical to accomplishing company strategy and have the greatest impact on the company's customer?
- Which processes are most likely to be successfully redesigned?
- What is the scope of the reengineering project and what are the costs involved?
- What is the strength of the reengineering team and the commitment of process owners and sponsors?
- Can continuous improvement deliver the required improvements?
- Is the process antiquated or is the technology used outdated?

Response to these questions can be weighted in accordance with the company's need for improvement. The selected process should have a manageable reengineering project scope with well-defined process boundaries.

(iii) **Evaluate enablers :** Information technology and human/organisational issues act as enablers of the reengineering process. Technology evaluation has now become a core competency required of all companies. Companies should develop the ability to evaluate current and emerging information technology and identify creative application to redesign their existing processes.

The current organisational culture should also be evaluated in light of the impending change to be brought about by reengineering. Participative and customer-oriented cultures that have evolved from the quality revolution provide a suitable environment for further change. But the magnitude of change created by process redesign makes the management of change a necessity. Issues of measurement and compensation, career paths, work enrichment and new skills training should be addressed.

(iv) **Understanding the current process :** The current process must be understood by making use of process evaluation techniques such as flow charts, fishbone diagrams and quality function deployment. The purpose is to create a new, radically better process. The current process must be studied to understand the activities which are essential to completion. All activities can be classified into three types :

(a) *Value-adding work* – work for which customer is willing to pay.

(b) *Non-value adding work* – work which creates no value for the customer but is required in order to get the value adding work done.

(c) *Waste* – work that neither adds nor enables value.

Value adding work consists of all of the activities that create the goods and services that customers want. *For example,* if a customer's order has to be executed, value adding activities include inventory allocation, picking, packing, route planning and shipping. Waste work is work whose absence would not be noticed by the customer. Waste work needs to be eliminated.

Non-value adding work is the glue that binds the value-adding work in conventional processes. It is mainly the administrative overhead – the reporting, checking, supervising, controlling, reviewing and coordinating. Michael Hammer argues that it is necessary to design non-value adding work by reorganising the value-adding tasks into a new and more efficient process.

(v) **Create a new process design :** Process redesign requires beginning with a clean slate. Reengineers should suspend current rules, procedures and values so as to create new process design. They also need to utilise the principles of reengineering.

The first emphasis in reengineering a process is to *eliminate all waste work.* Next, the focus is on the elimination of non-value-adding work. Hammer has found that less than 10 percent of the activities in a process are value-adding activities.

(vi) **Implement the reengineered process :** Leadership is critical to the implementation process as well as to the entire reengineering effort. Process engineering teams are typically responsible for implementing the new designs. However, support and buy-in from line managers are crucial to success. Training employees in additional skills needed to perform in the new environment is also essential.

3.9 SOME ISSUES IN BUSINESS PROCESS REENGINEERING

Business process reengineering comprises several issues which are discussed in the following paragraphs.

(i) **Downsizing :** Also known as right sizing or man power rationalisation, downsizing in considered as the shortest route to cut costs. Employees in many organisations work under the threat of losing their jobs any time owing to the management policy of downsizing. Because of this feeling of insecurity, their productivity in affected. The impact of downsizing on the financial performance of a firm is temporary because

it can not go on reducing its manpower for ever. Besides, the image of the firm in the market may suffer and when there is a need to increase man power, competent people may hesitate to join such firms. When an organisation is going through a bad patch, instead of downsizing, the top management should consider reengineering . A few key processes can be identified and reengineered to reduce the costs. The implementation of the reengineered process may be quite inexpensive, thereby eliminating the need for downsizing. Usually reengineering should precede downsizing.

(ii) **Human resources :** Human resources are the most valuable of all the resources in an organisation. In a process-driven organisation, the employees at all levels play a major role. They act as **intrapreneurs** capable of offering valuable suggestions for process improvement. They should be provided with opportunities to play their roles effectively. The employees must be trained to develop capability to apply their skills as members of reengineering teams, gain more experience and move to the next assignment with better skills and experience. In process-oriented organisations, management should regard employees training as an investment which far exceeds the cost incurred for their training.

(iii) **Leadership :** The leader of reengineering team should be from the top management, preferably with technical background. The leader should have personality characteristics needed for the assigned job. Also the leader should be able to handle overt or covert resistance from employees at any level in the organisation.

(vi) **Quantitative objectives :** For successfully reengineering processes, one or more major objectives should be expressed quantitatively so that the employees can be motivated.

(v) **Resistance to change :** Human beings are resistant to change by nature itself. When the change is major or radical, employees at middle and junior levels of management resist change. While Kaizen involves minor changes in work practices, business process reengineering is concerned with radical changes in current business practices and hence the resistance to business process reengineering is more. Since managers are uncertain about their performance when the processes are redesigned, they are afraid of losing power, authority and even job as a result of implementation of reengineered process. The employees resist change indirectly by participating with out enthusiasm and commitment in the implementation of reengineered process. Hence, to implement business process reengineering, the top management must be totally committed to it and they should be able

to deal with resistance from employees of different departments at different hierarchical levels.

(vi) **Implementation time :** The success of BPRE greatly depends on the time taken to implement it and the benefits derived from it within that time period. According to Hammer and Stanton, it should not take more than 12 months from the time of starting to think about a process to be reengineered until some substantial benefits are achieved from the change. In this short period of one year, the reengineering team must be able to clearly understand the existing process to be reengineered, examine its sub processes/tasks and evolve ways and means of performing them in a radically improved way, design and evaluate the prototype of the new process and successfully implement the process.

(vii) **"Out-of-the-box" thinking :** In BPRE, the emphasis in on "out-of-the-box" thinking or lateral thinking or divergent thinking to generate creative or innovative ideas. People are required to deviate from their traditional paradigms and offer creative or innovative ideas to reengineer a business process. Encouragement and reward from top management sustain the motivation of employees even though few of their ideas may not be successful and find a place in the reengineered process.

(viii) **Organisational culture :** BPRE brings about major changes in organisational culture. There is a paradigm shift in the way organisations are managed – from the traditional way of exercising command and control to emphasis on business processes and team work. Vision and mission of the firm are no more confined to top management only, but are shared by middle and junior level managers.

The strategic decision of BPRE should percolate down to reach the lower levels of hierarchy and also to reach every employee of the organisation. Employee participation is crucial for the success of BPRE. The top management should create a culture that enables every employee to have role clarity in the reengineered processes so that they can play their role effectively.

(ix) **Concept of human capital :** In a process oriented firm, the concept of assets is not limited to capital assets such as machinery and equipment and cash, but encompasses human resource also. People represent the most valuable asset in a firm practicing BPRE along with knowledge capital (*i.e.,* knowledge of key business process, quality and quantity data base etc.). These assets add value to business in terms of higher customer satisfaction, bigger market share, high profitability etc.

(x) **Behavioural change :** BPRE not only involves technological change, but also behavioural change of employees. The management of behavioural change is more difficult than management of technological change. It in the responsibility of managers who are leaders of BPRE to convince employees about the need for change for the survival of business in a competitive business world.

3.10 SUMMARY

Dramatic or radical improvement in often the only key to success for any organisation that seeks to thrive. Eventhough small incremental improvements are always necessary, quantum leaps are also essential. Reengineering is needed because customers demand change and competitors snatch a firm's market share. Also, the manufacturing process may be too costly or the time to market may be too long. Reengineered business processes can bring about dramatic gains of even 100 to 300 percent.

Process reengineering is *the fundamental rethinking and reengineering of existing process tasks and operating structure to achieve dramatic improvements in the performance of the process.*

Process reengineering is needed because

(i) the firm may suffer from problems in product development due to long lead times, a large number of design changes, excessive costs, quality problems etc.

(ii) the firm may have product or technology related problems.

(iii) when a firm might have updated its technology, its engineers might not have changed the design process or work processes accordingly.

(iv) the firm may have to maintain a competitive edge in the world market by producing high quality products at low costs.

Process management is helpful in achieving lean production goals and process improvement which in turn improve productivity.

Understanding and managing change is essential in process reengineering because changes are essential in any improvement. Product improvement efforts can be categorised into four primary reengineering strategies *viz., (i)* continuous improvement tactics, *(ii)* restructuring tactics, *(iii)* organisational traits and *(iv)* renovation tactics based on bench marking.

To have a better understanding of business process reengineering (BPR) it is necessary to understand the meaning of process, process management, process control and process improvement.

Process has evolved in two cycles *viz.*, the control cycle and the improvement cycle. The process control cycle has seven steps *viz., (i)* defining the process, *(ii)* establishing ownership, *(iii)* identifying customer requirements, *(iv)* developing

standards and measures, *(v)* auditing for conformance, *(vi)* identifying improvement opportunities and *(vii)* developing improvement objectives.

The process improvement cycle has the following steps:

(i) Determining causes, *(ii)* Developing solutions, *(iii)* Developing action plans/ implementation plans, *(iv)* Implementing the plan, *(v)* Auditing or verifying results, *(vi)* Preventing recurrence and *(vii)* Rewarding participants.

The core elements of process reengineering are: *(i)* Organisational restructuring, *(ii)* Work re-designing and *(iii)* Technological retooling.

The reengineering process has six steps. They are: *(i)* State a case for action, *(ii)* Identify the process for reengineering, *(iii)* Evaluate enablers for reengineering, *(iv)* Understand the current process, *(v)* Create a new process design and *(vi)* Implement the reengineered process.

Some issues in business process reengineering are : *(i)* downsizing, *(ii)* human resources, *(iii)* leadership, *(iv)* quantitative objectives, *(v)* resistance to change, *(vi)* implementation time, *(vii)* "out-of-the-box" thinking, *(viii)* organisational culture, *(ix)* concept of human capital and *(x)* behavioural change.

3.11 Self Assessment Questions

1. State the reasons for process reengineering.
2. Define the term "Process Reengineering ".
3. What is a "Business Process"?
4. What is "Process management"?
5. What is meant by "change"? Discuss the steps involved in the change process.
6. Name the seven types of wastes found in manufacturing work-site.
7. Define the terms "process", "process management", "process control" and "process improvement".
8. Describe the evolution of process in terms of "control cycle" and "improvement cycle".
9. Discuss the core elements of process reengineering.
10. Write short notes on:
    (a) Downsizing
    (b) Resistance to change
    (c) "Out-of-the-box" thinking
    (d) Organisational culture
    (e) Concept of human capital and
    (f) Behavioural change.

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