CHAPTER 3
PROCESS REENGINEERING

As this study is aiming at application of reengineering in Library and Information Science in relation to the users, it is necessary to give an overview of the subject. Here an attempt is to cover the rudiments of Business Process Reengineering (BPR) in general and its different application in library, in particular.

3.1 Business Process Reengineering (BPR)

The concept of redesigning, restructuring and reviewing are too familiar even to a layman. But, the term reengineering is comparatively of recent origin. It is nearly 20 years old.

The term reengineering (also spelt, re-engineering) was coined by Michael Hammar, an eminent management consultant in association with CSC Index, the consulting wing of Computer Sciences Corporation (CSC) in early 1980s. It is defined as "the fundamental rethinking and radical redesign of business processes to achieve dramatic improvement in critical, contemporary measures of performance, such as cost, quality, service and speed."

In other words, the focus in reengineering appears to be improving performance of business processes. But, what is meant by improving performance? The definition itself offers answer. The measures of performance are cost, quality, service and speed. Therefore, there should be at least one or more of the four possibilities. Reduce cost or increase quality or service or speed.

Of all the parameters of performance, cost and speed are easy to understand, but service and quality are complex.

3.1.1 Service

The term 'service' is difficult to define. It comprises of the following characteristics.

* Services are based on relatively intangible performances
* Services are used at the time of delivery or production
* Services are heterogeneous and vary from one transaction to another
* User is usually involved in the production and delivery of service
* A user has no product to examine prior to 'purchase' and he/she must consume a process as well as an outcome. This gives a better understanding of the term.

3.1.2 Quality

Quality is just the fitness for the purpose.

Quality is a noun and not an adjective. In other words, 'quality' itself needs another adjective. e.g. High Quality or Low Quality.

It is also necessary to know what is meant by Quality of Service. It is defined as "...the extents to which actual service meets or exceeds the users' expectations for an excellent or superior service on consistent bases." But, who should decide whether the service meets or exceeds expectation. Since the expectations are that of users, naturally user makes the judgment about quality by assessing the extent .... Providing quality service on Consistent Bases is difficult. There are two approaches to such quality. These are the concepts of ISO 9000 and Total Quality Management (TQM). Thus, there is some relationship among reengineering, ISO 9000 and TQM. These ideas will be compared in the next section.

In short, quality is perceived by receivers of the service and not the provider. Therefore, size of the library does not matter. The receiver knows that it is a small library and that there is only one person to serve.

This can be compared with quality of medical treatment. Patient needs the same treatment no matter whether it is a large hospital or a small. Business Process Reengineering (BPR) is one of new management techniques aimed at improvement of quality.

3.2 Philosophy of Business Process Reengineering (BPR)

The management concept of Business Process Reengineering has a blend of both Japanese and American philosophies built in it. "Re-engineering is a management mongrel. On the one side, its ancestors are Japanese theories about lean, flexible, just-in-time production; on the other, American concepts about redesigning companies from the bottom up. In essence, BPR argues that to remain competitive, companies should forget about the old practice of dividing themselves into bureaucratic empires, focused on discrete tasks such as sales, marketing and accounts, and instead organise around continuous business processes, aimed at getting the product to the customer."

Some of the new concepts such as Re-engineering, ISO 9000, TQM, IT Strategy and change management etc have certain seemingly similar objectives and characteristics which lead to confusion. Therefore, it is necessary to distinguish these ideas.

Now it is time to compare these modern concepts of quality.

3.2.1 Total Quality Management (TQM)

TQM is the most general of all. Thus, it is the universe and everything else evolves in harmony with it. The objective of the TQM is to focus the whole organization on customer satisfaction and generates an environment of continuous improvement. If such focus on customer satisfaction is adhered, the organizations process and quality get right first time, every time.

TQM is aimed at constantly improving quality, measured against an organization's own criteria for continuous improvement. It is a state of mind; A management philosophy. TQM achieves the three Es; Economy, Efficiency and Effectiveness.

For implementing TQM there are three requirements.

- Motivation and commitment of top management and everyone in the organization to provide high quality services.

- A capable system-basis for control and measurement.

- Provision of techniques to use current performance to motivate, to set or revise targets and to achieve them.
3.2.2 ISO 9000 or BS5750

This is world-wide accepted set of standards about quality systems and framework of management processes and procedures. In short, these are a set of check-lists.

ISO 9000 is often considered as 'Write what you do and do what you write.' It means, writing increases paper work and then doing leads to bureaucracy. The elaborate documentation increases the number of procedures causing delay in production. The procedure is very expensive. The company gets caught in a situation where it can not use conventional 'short-cuts' in procedures nor can it delay its decisions in competitive market. Thus getting ISO 9000 is easy but retaining becomes difficult as the certificate need to be renewed at a regular interval.

ISO 9000 is a static effort as it depends on predetermined norms and do not accommodate the organization's requirements.

3.2.3 Information Technology (IT) Strategy

IT Strategy has a role in sustaining ISO 9000. It helps in reducing paper work and also reduces process time required for decision-making. IT strategies have a role in automating the processes.
There are two ways in which automation can be effected. First, to automate the processes as they are; ie IT merely supports the process. Or, second, to take this opportunity to obliterate most of the redundant processes in view of IT application. This second approach is the concept of re-engineering. It leads to dramatic changes in the roles of people, organizational structures etc. This calls for change management.

It is easy to see all these ideas are inter-linked and comprehensively referred as TQM. In short, reengineering is an essential component of TQM.

Similarly, reengineering should not be confused with restructuring. Restructuring can be one of the effects of reengineering. The other effects of reengineering process could be listed as below.

- Redefinition of roles and responsibilities.
- Organization-wide information systems implementation.
- Achievement motivation training.
- Business Process Obliteration.
- New Process Innovation.

Re-engineering gives strategic dimension to various processes. It may lead to new products and

services. But, to have deeper understanding of the term 'Reengineering', it is necessary to understand what is a 'Process'.

Process is a collection of activities which create an output of value to customer and often transcend departmental or functional boundaries. This means a process may cover more than one department. Some processes are extremely critical to success and survival. Therefore, such processes are the actual candidates for reengineering. This understanding helps in knowing the implementation aspects of reengineering.

3.3 Implementation of Reengineering

The implementation of Reengineering can be viewed differently in both theoretical and practical ways.

3.3.1 Theoretical Approach

Before any new method is tried it is ideal to know the conceptual base of the technique in question. Theoretically, BPR can be done in five steps.

A. Developing a process vision and determining Process Objectives

Developing a vision amounts to having a top-down approach to the needs/outcomes of reengineering.
a. The vision or the goals must be customer driven and contain survival values and factors critical to success.

b. To achieve sometimes more than one process needs reengineering.

c. The process attributes (Cost, Quality, Speed) and process measures (half the time or in less than a day etc.) need to be derived. This provides the right direction and momentum to the reengineering activity.

In short, this step leads to

i. Identification of processes for reengineering.

ii. Vision and objectives give qualitative and quantitative measures of reengineering.

B. Defining the Process to be Reengineered

At this stage start and finish of each process and process measures of each sub-processes involved are identified. Also, it should include the benchmarks of the sub-processes indirectly influencing. Further, it will help in identifying leaders of the reengineered processes.

C. Understanding and Measuring the Existing Process

This helps in identifying the response-time, waiting-time, order-process-time etc. At the
end of this process it should be possible to locate the exact places where modification need to be implemented.

D. Identifying the IT Levers

IT should not be merely viewed as a tool to speed-up or support the existing processes. In the context of reengineering, it should also serve as a tool to simplify the process through obliteration.

E. Designing the Prototype and Implementing

This stage is unique to each organization because it involves issues relating to managing the technology, changing people's attitudes and mindsets, creating new organizational structure.

After this background, now it is necessary to study the practical implications.

3.3.2 Practical Approach

Before considering the practical aspects of reengineering, it is necessary to distinguish between work and movement. A task that involves energy without actual value-addition, such as looking for a file or moving material from store to the plant, is not work. It is only movement.
With this understanding the following practical steps can be examined.

A. Order the Output

This step demands placing oneself in the customers' shoes. It implies that the leader in charge of reengineering should know what the customer expects in terms of delivery, service and quality. Also, it is essential to know what the customers do with the products/services received. This helps to know which process adds value that matters to the customer. (It is as good as the person in charge is ordering the product/service.)

B. Sketch the Process

Here the range of processes from order to delivery have to be identified. For this purpose, interviewing the concerned persons is of no great value because,

"a. People tend to tell you what they want you to know.

b. They also tell you what they think you want to hear.

c. We have a tendency to hear what we expect in what people tell us."

It is better to visit each department and watch them working. This is necessary to get good operational understanding of the process and the level of difficulties faced during work. Professional opinion about each process to know the necessity or obliteration is essential. It is also required to feel the difference between value-adding time and waiting time such as transport or que. Each form used for documentation has to be examined and simplified, redesigned or eliminated, if necessary.

C. Mapping of Work-flow

Individuals in-charge of each operation comprising various processes meet at a pre-determined place and time for this purpose. After a brief introduction about reengineering each member of the team talk about their tasks.

The following are essential stages of 'Team Formation.'

Forming: This deals with formal introduction and understanding each others' duties, status and power.

Storming: This means a conflict stage when roles, power and procedures are in dispute. Certain assumptions are challenged and personal hostilities come into open.
Norming: A sort of normalisation takes place. Rules, norms and procedures are arrived at to facilitate acceptable decision making.

Performing: The group resolves the issues and decides to get the work done.

After the team is focused, each person writes the operation, he/she is a part of in a process, on a 'Post-it' note. The operation so written should be at task level and the 'Post-it' can be of any colour other than red and blue, as these colours would be used for a distinct purpose in the mapping.

All the 'Post-its' are collected and stuck regardless of any sequence on the left-hand side of a drawing/display board. The 'Post-its' are read loudly for comprehension. If it is not clear, it may be re-written. If any 'Post-it' is irrelevant or found unnecessary, it need not be thrown away. Such 'Post-its' may be parked for the time being.

Then starting from the end-point the 'post-its' are picked-up and stuck in the reverse sequence. Thus, a detailed process-map from beginning to end is made ready. The advantage of mapping it in the
reverse direction is that no step is left uncovered.

Now the input and output points to each process or service or information or product from and to outside are clearly indicated with blue 'Post its'. Similarly, the 'Post its' representing branching in the processes are stuck at 45 degree angle.

In any process, feedback loops are time consuming. It is better to draw these rework paths distinctly. It would be required to focus on these feedback loops during the process redesigning phase.

While process mapping, it is important to involve the customers and to know what they do with the product/service. This tells which part of the process is of great value to the customers. Does process redesigning helps or harms the customer is very crucial.

Red 'Post-its' should be stuck to indicate the standard snags or problem areas noticed earlier and accepted upon. These are the areas which utilise more resources such as time, personnel and other entities.
Understanding the process is incomplete without knowing its productivity. It is difficult to measure productivity of functional processes. In case of such managerial activities where there is no product as such, the ideal indicator of value production or value addition is time.

Output
Productivity = \frac{Output}{Time}

This implies that either number of persons or workstations on the process have to be increased or people should be made to work faster. However, quality of the product should not be overlooked.

Two values of time need to be written on the board.

i. The time actually taken to do the work.
   (Time required for actual value-addition)

ii. The time the work stays at this stage of the process.
   (The difference between in-time and out-time.)

With such understanding and process map, the redesigning should be achieved.
D. Redesign the Process

Any process cannot be redesigned just for the sake of it. It should serve some specific objectives. Generally, the following are the two objectives aimed at.

a. Halve the lead-time.

Lead-time is the span of time between placing an order and delivery. Lead-time is a measure of effectiveness.

b. Zero Investment.

In other words, no extra investment is to be suggested as the result of redesigning.

In general, the problem areas of the present process may be the following.

- **Too many hands-offs**: The work passes through too many hands before it is accomplished. As a result, it gets stalled in out-trays or in-trays or in movement causing unnecessary delay.

- **No one is in-charge** could be a reason for inefficiency.

- **Obsolete assumptions** may be deep-rooted in the organisational thinking. Some examples of this are, “Product information should not be
given to customers as they might use against the manufacturer" or "Appreciation leads to laziness". These fallacies hinder progress.

- **Too many checks and controls** add to the delay that outweighs the value-addition due to these steps.

- **Automation of existing process may have created some problems**, if the underlying organizational issues were not resolved. If expert systems are built-in the generalists can do expert jobs.

- **Doing one thing at a time** avoids looping back in case of interconnected tasks.

- **Impediments to progressive ideas** come from many workers, as people normally resist change. They may react with one or more of the following comments.
  - It is not possible.
  - It is not our job.
  - It should not be like this.
  - It is obvious.
  - It was already tried.
  - I will do it tomorrow.

After knowing some of the impediments that hinder, some of the standard methods of redesigning a process are outlined below.
- Do not automate, Eliminate

Certain steps become redundant when a process is automated. These may have been required in pre-automation period. Such steps need not be automated, as the same information may be available elsewhere. Such steps should be eliminated ruthlessly.

- Parallel Processing

The processes that are dependent on each other have to be processed sequentially. However, for the lack of clarity in understanding, many independent processes also are carried out in the same manner. Such independent activities or operations have to be processed parallely. Thus, the time taken for the entire process will be reduced and some of other resources also can be utilised in a better manner.

- Split Processes

Traditionally it is believed that a process has to meet all the situations and must be fit to handle all cases. However, it is only a desirable to have such an ideal process. While majority of cases are simple and are covered by a proven process, only those few posing complex problems need additional steps. Therefore, the simple
cases should not be piled up for the sake of few complex ones. It is better to separate the two, so that both get attention and time, and the time spent does not affect the total process-time.

- **Work Where it Originates**

Work where it originates and not where experts or specialists stay. This makes the process more and more cost-effective, and it saves time that may be spent in moving things. This idea can be considered as an extension of reducing hands-off, discussed earlier on p.52.

- **Prefer Case Worker Method**

Any work can be broken into several smaller tasks and may be carried out by a team. This is a good idea depending on the nature of work. In case of certain types of work, such an arrangement may only result in adding hands-off time. In case of such work, it is better to have a case worker who does all the related work from start to finish. This is better than a case-team which takes longer time.

- **Besides...**

Besides the above stated hints, the redesigning involves the following short-cuts.
- Solving one's problem should not create them for others.

- Avoidance of unnecessary steps.

- Eliminating or minimising the number of feedback loops.

- Reducing documentations.

- Minimising unnecessary checks and cross-checks

At this stage the conceptual implementation is complete. But, there remain two more steps which are out of the purview of this academic research.

E. Check and Test, Test and Check

Each part of the reengineering plan has to be checked and tested for many technical and managerial details. Above all, the suggested ideas have to be adapted to the culture of the institution. This differs from institution to institution.

F. Implementation and Adjustments

The central idea of the adjustments referred here is the usual professional and managerial care that goes with any technical activity. This step has to be handled on the job, and there are no general rules.
The step E and F are extremely practical. Hence, no extra details can be given. These are listed just as items of a Check-lists.

With this background about the Business Process Reengineering, it is necessary to find out how the method is applied in Librarianship.

3.4 Application in Librarianship

To understand how and why library activities or services form ideal situations for the application of Business Process Reengineering one need to look at the definition of 'Process' as given on p. 44.

A process was defined as is a collection of activities which create an output of value to customer and often transcend departmental or functional boundaries.

Most of the activities like technical processing of documents or maintenance of library services or resource sharing etc conform to the definition of processing because each one of these,

- create output of value to customer
- transcend departmental or functional boundaries

Therefore, activities or processes are the ideal candidates for reengineering. A survey of literature
covered by *Library and Information Science Abstract* (LISA) from 1989 to 1998 include 46 papers about application of reengineering in librarianship. Chronologically the distribution can be shown as follows.

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While most of the studies highlight the use of reengineering in the library, the other documents emphasise on application into specific types of libraries and few are case-studies of some particular libraries. The essence of studies carried out is given in the following sections.

### 3.4.1 General Applications

According to Morice B Line the external developments in economic, political and technological

fronts have necessitated the need for libraries to change in order to survive. He discusses how TQM and BPR have altered the culture of the organization by changing the rooted attitudes or 'mindsets'. The focus of his writing is on change and coping with change.

In the opinion of T D Wilson BPR may have achieved mixed success, but it provides an approach to thinking about the digital age.

B J Shapiro and K B Long describe how reengineering can be applied to library settings.

Further, they describe the reengineering efforts at Rice University, Texas, USA. Here user services operations have been transformed due to collaborative reengineering efforts between library and computing department.

Mathaisel gives three guiding requirements or conditions before any library process is considered for reengineering.

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* Organizations need to be structured and organised along key business processes.

* Each process should be strongly client-oriented.

* Each process, by its very nature, should cut across traditional functions.

He also argues that as computer operations are becoming simple, the failures of computer trained information officers is becoming more visible and traditional librarian with some computer knowledge has a better future.

3.4.2 Special Areas

While there are some specific case-studies giving detailed procedure, J R Warren and others have focused only on Simulation Modeling. He presents an eight step approach for an effective goal-driven simulation for decision making inherent in BPR.

Some authors have studied specific aspects of services. M-h Wang feels that requests from


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readers, pressure of competition and social changes have caused great pressure on reengineering library technical services. The three major suggestions that stem from this study are outsourcing, electronic data interchange and cooperation with public services.

13 N S Bangalore has focused on reengineering On-Line Public Access Catalogues (OPAC) based on transaction logs. This is a report of reengineering carried out at the Illinois University, Chicago. This exercise lead to reduction in the mismatches during searches and alteration of the form and content of their OPAC. It not only helped in better customising but also in identifying unmet needs of users and placing order to meet such requirements.

Reporting the reengineering process at the Stanford University Libraries, S. Propas says that the way they receive and process material is changing very fast. The major changes depend on outsourcing, use of excessive technology and decentralising processes.

Approval of materials received from vendors and library selectors and outsourcing of library technical


services due to reengineering are closely related. This problem is studied by R C Wittenberg.

With the rise in the electronic publishing the type and range of services given by vendors need to be re-examined. May be these are redundant and the really required services may no longer be available. In this context, B A Winters feels the necessity of outsourcing cataloguing operations to improve quality and reduce cost. However, he also emphasise the Acquisition Managers would still be required with broad information seeking skills and qualities to deal with electronic information.

Reference to a few special types of libraries is made in the following studies.

Application of reengineering at the National Library of Canada with respect to setting up and working of Bibliographic Access Reengineering Team (BART) is discussed by L McKeen and I Parent.


On the other hand, G St Clair has applied reengineering to One-Person Libraries' day-to-day activities. Besides dealing with document delivery and outsourcing it also covers enterpreneurial and interpreneurial potential of the reengineering.

In an interview the Head of the Information Services at the Bank of Montreal, Canada feels that the information services get benefited by undergoing reengineering. It is indicated that librarians and library education need to response to this paradigm shift. It is very necessary for the library schools to be aware that they are in the era of revolution.

Six papers appearing in June 1994 issue of the Journal of the American Society for Information Science carried various aspects of reengineering information services division in University of Maryland at Baltimore, a well-known health science institute.


3.4.3 Managerial Aspects

Bloss and Lanier points at the changes that have brought in due to reengineering of technical service operations have resulted in dramatic shift in the librarian’s job from the middle management to a more commanding position.

According to V T Smith’s forecast, technical service librarians, who have to provide resources for a broad range of disciplines and an ever expanding and diverse set of users. Librarians should realise the need for the use of outsourcing in many aspects of their activities, interactive multimedia, format integration, electronic resources, quality control standards and relevant technologies as part of reengineering due to decreased resources and the changing role of libraries.

N Bunnell deals with effect of information technology on college and university libraries with respect to the on-going transformation, reengineering.


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and organizational behaviour. The focus is on strategic planning, educational aspects of internet, policy development and management of electronic data as aspects to be considered for meeting the challenge of change.

With the use of reengineering, it appears that a new role is emerging for the librarians. According to 23 T K Huwe and K L Ross, librarians have handled information technology to meet their end-users' needs more effectively than Management Information Systems (MIS) has done to meet the requirements of business transactions. Continuing the same line of thinking, one can see that alliance between librarians, technologists and consultants is going to be more successful as there are common grounds shared by them.

Looking at the managerial aspect of reengineering of libraries would mean making the exercise more result oriented. In other words, a more concrete purpose of reengineering of libraries should be laid down.

With this background knowledge about reengineering in general, and its application in Librarianship in particular, the next chapter aims at setting up the objectives of this study.