CHAPTER 7
APPLICATION OF REENGINEERING

Some select patterns of information seeking behaviour of scientists and engineers in the synthetic graphite industry were identified in the previous chapter. As referred earlier, in this study knowing information seeking behaviour is not an end in itself. Such an evaluation should lead to some improvement. Therefore, here it serves as the foundation in identifying the processes to be reengineered.

The three processes identified at the end of the previous chapter were subjected to reengineering and the detailed account is presented in this chapter. However, it is required to have an accepted plan and procedure conforming to the essence of the application of reengineering process. The following structure was used based on the contents of chapter 3.

- Suitability of the problem for reengineering
- Goals or Objectives
  (The term 'Goal' is preferred to avoid confusion that may arise with the 'Objectives' of this study. What one is precisely aiming at after reengineering is covered under goal.)
- The Present Process Mapping
- Mapping after application of Reengineering
- Gains of Reengineering
Before the application of reengineering to any process at the Graphite India Ltd’s Library the following three points explained earlier need to be remembered.

* It is a 'One-Person' library
* It is part of R & D
* The Connotation of Quality of Service

The following sections give detailed account of the reengineering as applied to the identified problems.

7.1 Book Processing

The first problem identified by the users of the library was 'Reduce the time-lag between a book being purchased and made available on the shelf.'

7.1.1 Suitability for Reengineering

This problem is customer-centred. The books are bought for the benefit of users. If the processing of books causes inordinate delay, the users do not get the new titles on shelf within reasonable time.

Sometimes, such delays may even cause purchase of second copy of the book, where it is not necessary. This is waste of resource, and that too an avoidable one.
The problem, if attended, will not only make the books available faster to the users, but also saves cost of processing and labour. Use of automation/IT can perhaps solve this problem. Therefore, the problem falls within the purview of reengineering.

7.1.2 Goals or Objectives

The following two goals were set for reengineering of this process.

1. To save processing time

2. To save redundant operations

7.1.3 The Present Process Mapping

The present operations involved in book processing need to be mapped before it is subjected to reengineering. Various steps or stages of work carried out from receipt to the book being made available on the shelf need to be identified.

Although every library follows more or less similar steps, there are bound to be some local variations.

At the Graphite India Ltd Library the following are the steps or activities that take place while processing books.
a. Books are selected either by approval or by direct purchase in case of reader's suggestion or through trade catalogue. **This stage takes 15 days.** The delay is in approval and in obtaining the invoices after the selection - irrespective of through approval or direct purchase.

b. Books along with bills/invoices are sent to the store for general entry. From here, the invoice goes to the accounts department for payment and books, to the library. **It takes minimum three days.**

c. On receiving back in the library, books are accessioned. It is done by clerical staff attached to the R & D. **It takes two days,** as it is done according to their convenience.

d. The next step is classification. **It takes just one day,** and it is a professional activity.

e. Then computerised cataloguing is done. **This takes two days.** This is done by the data-entry operator. However, the decision regarding keywords for each book is a professional activity.

f. After cataloguing, the books are sent for processing. This includes preparation of book-card, book-pocket and a sticker for spine. Then the sticker need to be pasted on the spine, book-pocket also, is pasted
inside the book and the book-card is placed in it. **This takes three days**, as it is done by the support staff of the R & D.

g. After this, the book is either sent to the person who selected the book or to its place on the shelf.

These steps suggest that it takes 15 days for approval and 11 days for processing. Even if it is considered that 15 days for approval is inevitable, in a library where hardly 30 - 35 books are added every month, 11 days for processing is really inordinate delay.

But to understand the process more vividly it is necessary to draw the process map. (Please see the process map on next page.) Such a map shows all the activities at a glance.

When a process map is seen, it is as good as reading several page description of the process. One realises the meaning of the Chinese proverb that a picture is worth more than ten thousand words.

In a process map one finds all the activities in relation to each other. Which means, it is easy to see which activity precedes, which follows, which has a feedback loop and which are independent and which are dependent. In other words, it vividly shows some of the shortcomings and helps triggering of suitable solutions.
Figure 4. Book Processing: The Process Map
7.1.4 Mapping After Application of Reengineering

One essential aspect of reengineering has to be automation or IT. In this case, it is intended to see that processing time is reduced to five and a half days or even less. In this attempt many redundant processes get eliminated.

From the process map and the description, the following two observations can be made.

i. There are 'hands off's between steps a & b, b & c, c & d, d & e and e & f. In addition, there is a feedback loop, in that books go from library to store and come back.

ii. Many of the particulars or fields or data-elements required for the general store (step b), accession register (step c), catalogue (step d) and processing (ie, book-card, book-pocket and stickers for spine are common. (Please see the Table 23 on the next page.) Writing these particulars is a redundant exercise.

iii. Since the library is part of the R & D, it is getting secretarial assistance from the parent unit. This causes substantial but not measurable delay. This is natural as the common-pool staff do not give any priority to the library work.
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<tr>
<th>Date</th>
<th>Stock Number</th>
<th>Author</th>
<th>Title</th>
<th>Edn</th>
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**TABLE 23**

Redundant and Repetitive Information
These three observations formed the base of reengineering, and the proposed line of action is presented here.

- The entire Graphite India Ltd should be covered under one Local Area Network (LAN).

- Books need not go to the General Store for entry.

- Accessioning of the books will take care of all the possible work.

- Now the Store can access library records on-line, or copy the required fields of the database and assign the stock number.

- By printing only those fields required for book-card, book-pocket and sticker on self-adhesive paper, the complete processing is over without making this into a separate activity.

- The same database serves as the catalogue.

- Classification and assigning keywords need to be done before accessioning.

- Now this system works like a case-worker arrangement where all activities pertaining to a task are being carried out by one person.

The proposed new process map is given on the next page.
Figure 5. Book Processing: Reengineered Process Map
It is now necessary to enumerate the advantages of such reengineering exercise.

7.1.5 Gains of Reengineering

The following are the gains of reengineering.

a. There is a net saving of 10 days out of 11 required for the processing. This amounts to 91% saving of time in the processing.

b. Books going out of library before accessioning and looping back was eliminated.

c. Dependency on the general-pool staff is avoided.

d. Since the entire process is being done at one desk, the librarian can exercise better control.

e. Although handled professionally trained librarian, application of management techniques yields better results.

f. Many unnecessary processes were obliviated ruthlessly.

g. The gains are directly aimed at the customers and there is saving of time, a major resource. Such quick processing avoids inadvertent duplication of titles. This is entirely in line with Dr S R Ranganathan's fourth law of Library Science. (Save the time of a reader.)
These details give a clear idea about the strength of reengineering. But not all reengineering processes need to pass through similar steps. Sometimes even a deeper understanding of the process helps in redesigning. This aspect is shown in the next section.

7.2 Current Awareness Bulletin

The issue here was not to deal with the nature and purpose of Current Awareness Bulletin. This is only to reengineer the process of the production of the Bulletin. The expressed problem is that 'There is too much time-lag in the 'Current Awareness Bulletin.'

7.2.1 Suitability for Reengineering

This problem is a serious because if Current Awareness Bulletin is lagging in time, it is no longer to be considered a current awareness bulletin; it defeats the very purpose. In the field of science and technology recent information is more valuable. Scientists and engineers, ie the customers look forward to receive it. Further, use of the periodical literature gets promoted if current awareness bulletin is current; thus, even the money spent on periodicals become more cost-effective in terms of it's use. Therefore the problem is worth reengineering.
7.2.2 Goals or Objectives

To see that the contents of the journals should be made available to the users immediately on receipt of the periodicals irrespective of their frequencies.

7.2.3 The Present Process Mapping

It is important to understand the actual problems associated with the production of the 'Current Awareness Bulletin'.

a. Immediately after registration, each journal is scanned manually.

b. Citation of each article and a brief annotation is prepared on a 6" x 8" cards. Over 55 journals are covered in eleven weeks.

c. All such cards are accumulated, entered into computer and arranged subject-wise. (Eleven weeks, but parallel processing with b.)

d. Then this is edited suitably. (Two days)

e. Finally the document is printed. Then multiple copies are taken, bound, printed and distributed. (Three days)

The process map based on the above description is given on the next page. A special characteristic of this process is that the processed citations have to
Figure 6. Current Awareness Bulletin: Process Map
wait till it is time for production of final document. Such waiting period for journals depending on their frequency is shown here in Table 24.

**TABLE 24**

Current Awareness Bulletin

<table>
<thead>
<tr>
<th>Frequency</th>
<th>Number of Issues Covered</th>
<th>Time-Lag Range</th>
</tr>
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<tbody>
<tr>
<td>Weekly</td>
<td>11</td>
<td>1 - 12 weeks</td>
</tr>
<tr>
<td>Fortnightly</td>
<td>5 or 6</td>
<td>1 - 10 weeks</td>
</tr>
<tr>
<td>Monthly</td>
<td>2 or 3</td>
<td>1 - 8 weeks</td>
</tr>
<tr>
<td>Quarterly</td>
<td>1</td>
<td>1</td>
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<tr>
<td></td>
<td></td>
<td>or 11 weeks</td>
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</tbody>
</table>
7.2.4 Mapping After Application of Reengineering

It is evident that the delay caused in the journals being covered by the ‘Current Awareness Bulletin’ is not much due to the production process. Actually the entries ready for publication wait in a queue for an unnecessary period for getting covered. This is the problem associated with any batch processing.

One probable solution could be to reduce the frequency of the ‘Current Awareness Bulletin’ to a month. This solution is not acceptable because of the following two reasons.

1. This would add extra work of producing 12 issues of the ‘Current Awareness Bulletin’ instead of four.

2. Yet, certain amount of delay is bound to be there because the frequencies of the journals and that of the Bulletin itself do not go hand-in-hand.

Further, when any process is reengineered, there should be a component of IT in it. Which is not to be seen in the above proposal. Therefore, it is ruled out.

In other words, any solution should have some IT component in it.

The following are the two suitable solutions.

A. With Company-wide LAN

B. With Company-wide LAN and Scanner
A. **With Company-wide LAN**

- The entire Graphite India should be covered by company-wide LAN.

- Each journal is manually checked. Then, bibliographic details of all the papers/ articles are prepared.

- The moment data-entry of contents and annotations of any periodical is over, it can be made available to the users instantaneously.

  This method, solves the following two problems.

  a. Delay owing to the difference in frequencies of the periodicals.

  b. Delay owing to distribution process.

But, going through the periodicals, preparing the entries with annotation, corresponding data-entry and editing remains to be done; one can not forget that even this takes time.

B. **With Company-wide LAN and Scanner**

- The Graphite India Library should not only be part of company-wide LAN but should also have a scanner.

- Contents Pages can be scanned directly on receipt of the periodical at the time of its registration.
- Even the author abstract at the beginning of each article can be scanned and stored along with the contents page.

- Now this is made available on LAN. It is accessible on-line until the next issue - irrespective of the frequency - is received in the library. Thus, this will always remain current.

- This method of producing a Current Awareness Bulletin in this form is innovative and creative.

(Please see the revised process map on the next page.)

**7.2.5 Gains of Reengineering**

The following are the gains of reengineering the process of producing the Current Awareness Bulletin.

a. The time-lag in the publication is kept to an unavoidable minimum. Current Awareness Bulletin would always be current irrespective of the periodicity of periodicals.

b. Time and effort spent in going through a periodical, preparing cards, data-entry, editing and printing is saved.

c. Paper used for printing and effort in distribution is also saved.
Figure 7. Current Awareness Bulletin: Reengineered Process Map
d. The author abstract is always better than the annotation written by a library staff; it would be more informative.

e. Users get a feel of seeing the contents page before visiting the library. This may entice the readers more than a stereotype, mimeographed Current Awareness Bulletin. Title page distribution is proved to be more popular among users than the computer output lists.

The reengineering carried out for production of Current Awareness Bulletin shows that deep understanding of the process helps in redesigning. One must also be fully aware of the strengths of IT possibilities for successful reengineering.

Being aware of the capabilities of IT may even help in running that proverbial extra mile. In other words, one can think of adding some new services hitherto not available. One such attempt is made in the next section.

7.3 Information Not Available in the Library

As a fall-out of the information-seeking behaviour study, the third expressed need was, "We get to know what is received in the library. How do we know what is available?"

not received?" The following sections focus on this problem.

7.3.1 Suitability for Reengineering

The possibility of considering this problem as a case for application of reengineering is debatable. In a strict sense, the problem does not fall under the realm of reengineering; it is only an activity which is being carried out which can be reengineered. Starting a new service is not part of reengineering.

However, on the other hand, it can be stretched to be an essential aspect of reengineering. In that, it is viewed as a collateral off-shoot of IT which is part of reengineering package. Above all, the problem is customer-centred.

7.3.2 Goals or Objectives

The objective of this process is to access all that information available in the field of graphite—both synthetic and natural—and use it to the benefit of the Organization. This can be achieved with some expenditure, but it would be a wise investment.

7.3.3 Proposed Solution

Since there is no existing process to be mapped and reengineered, it is required to propose an idea that works.
The Graphite India Ltd's library, a part of R & D, should get a password to use 'DIALOG' by paying subscription. In addition, they should get their librarian trained in effectively searching all databases covered by DIALOG.

The library can search on all the thrust areas of on-going research on DIALOG once in a month or any lesser frequency and make the results of the search available on Company LAN. The search area may range from regular articles appearing in learned journals to recently registered patents. Such access to information not received in the library would help in avoiding some duplication and even help in identifying cost-effective methods.

Subsequently, full papers and/or patents can be obtained from document supply agencies. With such arrangement detailed information is obtained only when required, instead of acquiring in anticipation of use. This is precisely moving from "Just in Case" to "Just in Time" management. Such an arrangement would have all the benefits of reengineering, in designing and launching itself.

Before concluding on the application of reengineering to the above three processes, there is an important area for discussion and that is the exact achievements of the exercise.
7.4 Achievements

As stated earlier, (see p. 52) generally, the following two objectives aimed at in reengineering.

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.

The above three problems and the respective solutions have to be subjected to this acid-test.

7.4.1 Halve the Lead-Time

When any process is subjected to reengineering the lead-time is expected to be reduced to at least half. In other words, it is supposed to save at least 50% process time. The saving in the process time is the real measure of effectiveness.

The table 25 on the next page, is an extract of the previous three sections. It shows the effect of reengineering on the process-time.
TABLE 25
Gains of Process Reengineering

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<th>The Process</th>
<th>Process-Time</th>
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<td>Before</td>
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<td>Time Saved</td>
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<td>Book Processing</td>
<td>11 days</td>
<td>1 day</td>
<td>10 days</td>
<td>90.9%</td>
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<td>Current Awareness</td>
<td>90 days</td>
<td>1 day</td>
<td>89 days</td>
<td>98.9%</td>
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<td>Bulletin</td>
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<tr>
<td>Information</td>
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<tr>
<td>Not available</td>
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<td>in the library</td>
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Since it is a new service it can not be quantified. It is only value-addition.
The findings suggest that process-time saved was far more than expected. Thus, one can conclude that the reengineering exercise was highly effective with respect to saving of the lead-time.

7.4.2 Zero Investment

The essence of reengineering is to achieve maximum effectiveness with no extra investment or zero investment. One may feel and conclude that the above referred saving in the lead-time was achieved only because of the application of IT. It is true that IT has helped in achieving such massive saving in terms of lead-time.

It is obvious that implementation of IT is expensive. Therefore, on the face of it, anyone feels that it has defeated the second objective of reengineering, ie 'Zero Investment'.

But, this is not true. Today no organization goes in for IT to reengineer the processes in the library. That the organization should have company-wide network, that it should have connectivity to internet and all its services ranging from e-mail to telnet searches and scanners, is a social need. All these facilities are there for the company's well-being. It is any company's marketing and communication requirement. Such global and internal communication is essential for survival.
If the library uses these facilities for reengineering its processes, it does not cost anything extra to the company. On the contrary, the technology was put to extra use. Its utilities were enhanced. Well, thus the IT investments were made more cost-effective. Therefore, even with respect to zero investment angle, the reengineering was an effective exercise.

Thus, it can be concluded that application of reengineering is effective.

On closely observing all that is discussed till now, one may start wondering about the effect of a professionally trained librarian. All the previously practiced procedures -except the new books being registered both in the general store and in the accession register- were designed by a professionally trained librarian. Then with or without reengineering, the same effectiveness must have been achieved. This, in other words, was the hypothesis of the study.

But, effectiveness of reengineering is established by this study, and thus, the research hypothesis is accepted. This, in short, means that in spite of having a professional trained librarian, substantial effectiveness was brought about by reengineering. However, this should not be viewed as any shortcoming of the professional training in Library and Information.
Science. It only indicates the strength of librarianship; it can embrace a new subject to improve its service to the users.

The reality is that all subjects are developing and getting enriched with the help of Management Science and Information Technology. Hospitals, newspaper industry, engineering and manufacturing firms are getting benefit of new management ideas.

This is one such example, which points at the use of reengineering for the benefit of librarianship. Such inter-disciplinary study would only helps in improving the quality of library and information services. This is the ultimate aim of any service-centred librarianship. It takes the best features of all the subjects and progresses and gets richer with every passing day.

The above three problems and the proposed respective solutions complete the cycle of the findings of the information seeking behaviour of scientists and engineers Graphite industries.

The next chapter gathers all the findings scattered and presents them cohesively and arrives at recommendations.