CHAPTER-I

INTRODUCTION

1.1 BACKGROUND

Present era is considered as an information era. After the three basic needs i.e., food, shelter and clothing, information adds to it; thereby, becoming the fourth basic need. Information is the result of the processed data. Data is the representation of facts as text, number, graphics, image, sounds or video. Facts are captured, stored and expressed as data.

The product of research is information. Consequently, information is growing at a faster rate, as the volumes of structured and unstructured data continues to increase exponentially as a result of increased research. Simultaneously, the research organizations are recognizing the importance of information, which is an asset for their research work. At this juncture, it is essential that the right user gets the right information at the right time to make the right decision. Users require the information that is not only accurate, timely and relevant but also presented and interpreted in a meaningful way. Accurate, timely and relevant information saves the time and also helps in increased efficiency and improved productivity.

When the information is generated, it needs to be shared and communicated, but, there are some impediments between the information and the right users, which restricts the flow of information. At this juncture information services become very handy.
VALUE OF INFORMATION

Generated information itself has no meaning until it reaches its intended audience. Information becomes meaningful when it is interpreted and used. ‘Normally science, research is firmly based upon one or more scientific achievements. The achievements that some particular scientific community acknowledges during a time becomes the foundation for their further practice. Information becomes the basis for the further research to be carried out. Scientists, search, read current findings in research journals, formulate and test hypothesis experimentally or computationally and then publish their findings in research journals, continuing the global cycle. Thus, the development of science or for that matter any academic field is based on a free flow of information: Value of information doubles by proper communication. Communication involves the process of transfer of information from its source to different user needs. But in this process of scientific communication, a number of impediments come in the way of scientists in accessing the literature.

REASONS FOR UNSUCCESSFUL COMMUNICATION

1. GROWTH OF SCIENTIFIC LITERATURE

The present century has witnessed a remarkable growth in most professional fields. Continuous research has been deeply probing each of the professional fields such as science. This has resulted in increase of literature in all fields.
Literature i.e. information has therefore been growing at a rapid pace resulting in the coining of the term - 'Information Explosion'. Various scholars have made an attempt to estimate the growth of information. Derek J. De Solla Price (1961), in his book “Science since Babylon”, has stated that journals multiply exponentially. By 1800 A.D. there were 100 different scientific periodicals. By 1830, there were 500, far too many for one man to assimilate or even to read. By 1850, this number had grown to 1000. By 1900 it increased to about 10,000, and in 1950 there were an estimated 100,000 scientific periodicals.

The chart below shows the total number of scientific journals and abstract journals founded as a function of date (from Science Since Babylon by Derek J. de Solla Price). This also projects the number of journals upto the year 2000.
Narin and Carpenter (1974) have assessed the growth rate of the number of articles published in seven scientific disciplines. Their study shows that in a seven year period, the growth rate was 33.6% for physics, 31.1% for chemistry and metallurgy. This represents an annual growth rate of about 4.1% to 4.2%.

The number of scientific papers published annually has been doubling every 10-15 years for the last two centuries [Price, 1956]. In many fields, there was an acceleration in the rate of growth after World War 2 to a doubling every 10 years or
less. For example, in geosciences the publications volume was doubling about every 8 years over an extended period of time [Hall, 1989]. Chemical Abstracts (Chem. Abs.) is a review journal dealing with large areas of biology, physics, and related fields as well as with chemistry. The number of abstracts it publishes was doubling every decade from 1945 to 1980, when it reached 475,000, and has grown more slowly since then, to a level of about 550,000 per year.

Apart from the growth of number of journals, there has also been an expansion of the leading journals. The Journal of Geophysical Research (JGR), for instance produced a slowly rising number of about 500-700 pages per year before the International Geophysical Year of 1958. The annual page count then rose to 6000 in just a few years, and a second spurt of growth starting in the late 1970’s appears unabated. The 1996 page count was 29,720. This represents a nearly exponential growth with a doubling time of 7 years. (Geets, 1999).

On the other hand, the time at the expense of a user, to read this fast increasing literature, is the same. This limited time and increasing literature has created a serious problem for the user.

As literature grows, the sources that cover each of the professional fields have also been growing. Chemical abstracts took 31 years (1907 to 1937) to publish its first 1 million abstracts; the second million took 18 years; the most recent million took only 1.75 years. Thus more articles in Chemistry have been published in the past 2 years than throughout history before 1900. [Noam, 1995]. This increase has not only
been in number of books or journals, but also in the form in which information is
maintained and communicated – such as e-books, e-journals, conference proceedings,
etc. The exponential growth of literature, the increasing sources that cover the
literature and the increase in the mode of conveyance of information has aggravated
the problem for the users, since physical scanning of all the literature to locate
required material is impossible. Such physical scanning will only result in the coverage
of a very meager percentage of available literature. There is always a fear that the
information, which may have been missed during this physical search, could be
crucial.

2. Literature Scatter

With increasing research, each subject field is being probed deeper and
deeper. The quantum of research being done in any field and the number of articles
being published have increased exponentially. Each subject has been sub-divided into
a number of areas, resulting in increasing specialisation. This increased specialisation
has resulted in even the prominent journals in any field incapable of covering all the
aspects of the subject. If the journal becomes specialised, it would have lesser number
of subscribers / readers and hence would be able to cover the needs of fewer users.
On the other hand, if the journal covers a wider aspect of the subject i.e. larger
number of areas, it would be able to cater to the general demands of a larger number
of readers, but would not be able to satisfy all the information needs of specialists.
This increased specialization, coupled with the exponential growth of literature, has
rendered the prominent journals, covering broad area of Science, insufficient in meeting the information needs of the professionals, since only a few papers covered by any of the issues of these journals would be of interest to any one individual. It is accepted that any particular article in a highly specialised periodical is likely to be of interest to only about ten percent of the professionals in the subject area covered, an article in a general periodical may be of interest to only two percent of the readers, and an article in a local publication may be of interest to as few as one-quarter of one percent of the scientists in the field (Elson - Dew, 1955).

The increasing specialisation, in turn has led to dispersion or ‘scatter of literature’. According to Bradford, for a specified period, a comprehensive literature search on a subject would reveal that the relevant articles required by a particular reader would be dispersed over a very large number of journals. His analysis further revealed that a comparatively small number of 'key' journals contributed a high percentage of articles on a subject. When all the journals contributing the articles are arranged in an order of decreasing productivity of articles, the list of journals can be divided into zones, each succeeding zone consisting of journals of decreasing productivity. If this division into zones is made on the basis of contribution of approximately equal number of articles, then the relationship between the zones can be represented as $1 : n : n^2 : n^3 \ldots n^n$, where 1 represents the number of journals in the first zone (nucleus) and $n$ is multiplier (Bradford, S.C., 1948). This distribution of papers is referred to as the Bradford Distribution and the phenomenon as Bradford’s Law of Scattering.
The figure below provides a graphical representation of literature scatter.

![Graph of literature scatter](image)

The net result of such proliferation of professional publications has been to raise a question regarding how widely one must read in order to maintain command of the key developments in a discipline. The field of library and information science refers to this issue as the problem of literature scatter (Lancaster, 1988). Bibliometric studies of the literature in a discipline provide evidence regarding the concentration or scatter of relevant information. An example would be the study examining the scatter of literature on learning disabilities, which found that while articles about
learning disabilities could be found in 248 journals, a core of 9 journals accounted for 67% of the articles (Summers, 1986).

This dispersion has become so widespread that it has become impossible for any professional / scientist to keep himself / herself abreast of literature relevant to their profession by scanning primary literature directly. This finding applies equally to all professional areas.

3. Cost of the Literature

It can also be seen that the cost of most of the publications has increased substantially over the past few years. (De Gennaro, 1977) indicates that Inorganic Chemica Acta raised its price to libraries from $26 in 1970 to $235 in 1975, an increase of 804%. King, et al have shown that the average increase in the cost of a medical book was 41% from 1960 to 1965 and 52% from 1965 to 1970. As regards secondary publications, the increase in cost has been equally high. As an example, the subscription cost of Chemical Abstracts was $1000 in 1963, whereas it became $2400 in 1973, an increase of 140%. This increased to $3500 in 1976. Similarly the subscription charge of Biological abstracts was $225 in 1963 and increased to $1000 in 1973, an increase of 340% (King et al, 1976). King and Tenopir, (1998) have worked out the following cost data regarding the cost of journals:
Scholarly Journal Model Costs for Journals Published in 1975 and 1995: 1995 Dollar Values

<table>
<thead>
<tr>
<th>Total and Unit Costs</th>
<th>1975</th>
<th>1995</th>
</tr>
</thead>
<tbody>
<tr>
<td>Total Cost / Title</td>
<td>$351,667</td>
<td>$633,745</td>
</tr>
<tr>
<td>Cost per Issue</td>
<td>$54,103</td>
<td>$76,355</td>
</tr>
<tr>
<td>Cost per Article</td>
<td>$4,137</td>
<td>$5,152</td>
</tr>
<tr>
<td>Cost per Subscriber</td>
<td>$58</td>
<td>$109</td>
</tr>
</tbody>
</table>

This increasing cost inhibits an individual's capacity to personally subscribe to all required journals and books, and thereby inhibits the person’s access to relevant literature. In fact, most libraries in India, would find it impossible to subscribe to all relevant journals.

These major impediments come in the way of all the library users, be they scientists, professionals or academicians. The net result of literature scatter, increasing information and increased cost of literature and information, is that no individual has either the time or resources to access all the information required for their work. This is where on-line access and Internet come useful, for libraries need not have to purchase all the publications, as long as they can provide access to them – through online access or through Internet.

**NEED FOR INFORMATION SERVICES**

Today, most professionals need information for carrying out their work, be they scientists, engineers, doctors, managers, economists etc. This need for information has to be satisfied by the libraries / information centers. The main reason for libraries being known in many circles as information centers is that their role is no
more limited to stocking and issuing books and journals, but ensuring that the
information needs of the users is met either by its own resources or through other
resources accessed either through on-line access or internet.

As the number of professionals requiring information has increased
tremendously, the nature of demand for information has also changed. Research now
being done in more number of countries, the demand now is for a wider geographical
coverage, and a wider cross-discipline and cross-specialty coverage. The increase in
demand and change in the nature of demand, has called for an increase in supply of
information.

In the field of library and information science, unlike others, the increased
supply of information has not solved the problem. Rather, it has aggravated it. It is at
this juncture, that the Libraries and Information Centres play a major role in
Information Transfer Cycle. Information Centres identify the needs of the users,
collect the information and information bearing documents on the basis of the needs,
process, organise, store the information collected, and disseminate the information
through various services.

The prime function of any information service is to bridge the communication
gap between the population of users and the vast universe of information resources
and to act as an interface between them. Its aim has to be to bridge these two
populations as efficiently and economically as possible. It has to also ensure that any
information or document needed by a member of the user community is made
available to him, as and when he needs it. To fulfill its interface role, an information service is engaged in three major activities, viz., Acquisition and Storage of Documents / information, their Organisation and Control, and their Distribution through various Services.

As mentioned earlier in the section on “Growth of literature”, (Noam, 1995) the present century has witnessed an increase in the number of research projects being carried out and hence in the increase in the number of articles and papers being published. This increasing research has created a number of problems, viz.,

a. Information Explosion and Information overload.

b. Interdisciplinary nature of information.

c. Scatter of information in numerous sources.

d. Geographical, technological, language and other barriers to communication.

These factors, have in turn, made it difficult to handle the information manually and thereby rendered the process of communicating the information difficult

Technology and Library

Initially, the only technology to enter the library was the micro-forms – a more compact and longer lasting method for storing information. Later, computers were
used in the library for maintaining record of books and in assisting the users in searching for specific books and journals. But later – specially in the last decade of the twentieth century, the infusion of technology in libraries has been very fast.

First came on-line access. This enabled different libraries to network amongst themselves. This ensured that libraries could offer their users not only information they possessed, but also access to information available at the networked libraries. This increased the quantum of information available to the users, as at a single place, the user could obtain access to resources of a number of libraries due to networking of libraries. Further, networking allows access only to electronic material, but not the physical books and journals. But on-line access enables the user to find out the books and journals available at other networked libraries, which then could be obtained through inter-library loans.

Internet was the next major development. Internet enabled the user to search for information from a very large number of web-sites. Further, the search engines such as google, altavista etc., helped the user to access the relevant information required with far lesser effort. Through the search engines, the user was able to enter the key words of the information being searched, and the search engines searched and displayed all sites and documents which matched the user fed key words. The search engines to some extent helped the user to overcome the problem imposed by literature scatter. Internet and tools such as search engines enabled the user to
access information beyond the networked libraries, and from any source available on the ‘net’.

The technological innovations mentioned above, are capable of helping the user to overcome the problems of increase of quantum of information, increase in the number of sources of information, literature scatter etc. Today, there exists a vast array of Electronic tools and techniques for accumulating, storing, organising, retrieving, interpreting and communicating information on a world-wide scale in large volumes, at high speeds and with an accuracy that would have been impossible hardly a few years ago.

The application of computers and allied technologies to libraries has created wonders in the handling, organisation and dissemination of information. These technologies have helped the Information Scientists in conquering space and time and rendered it possible to retrieve information from any corner of the world, instantaneously, and provide it to the users efficiently and effectively.

From the Librarian's standpoint, computerisation assists in the organisation, storage and dissemination of information. For the user, the electronic media assists in efficient, specific and exhaustive retrieval of information. The decision to offer computerised information services is taken mainly to help the user in fast retrieval of relevant data from a vast store of information. Computer mediated communication has become an integral part of the society.
USER AND THE NEW TECHNOLOGIES

Any service introduced in a library is meant to serve the user of the library. The success of any change in the library has to be measured in terms of how much this change has benefited the user and also by how much the user is using these newly introduced services and how much the user is satisfied by these changes.

It is necessary that research be carried out to ascertain the usage of these new technologies and also the impact of these on the users. This research would provide a clear picture about the users’ needs, attitudes and opinions to the new technology based services. This would also help assess the efficiency and effectiveness of the new technologies and how responsive it is to the needs of the users.

The result arrived at would assist in employing, altering or redesigning the services and also to identify the need for orientation or training of the users, in order to familiarise them to the new technologies provided. This would ensure maximum usage of the services provided.

Information seekers who come to the library will have certain expectations, when they enter the information center. These expectations would include availability of the information they seek, easy access to the required information, exhaustive information whenever they require and information availability within a reasonable period of time i.e. information availability at a fast rate.
When the user uses the new technology based services, the mind evaluates or assesses the service in the background of the expectations with which the service was used. This assessment results in the formation of attitude.

**Attitude:**

Attitude is an evaluation of an object, stored in memory; in other words, it is a relatively enduring cognition about the value of an object (Ramachandran, V.S., 1994). Thus attitude is "state of mind" or "readiness to respond" to a certain class of objects with a specified type of response, usually connoting liking or disliking for that class of objects (Ramachandran, 1994).
Attitudes are formed very easily. It is formed when people judge an object, considering various features of the object, including the evaluation of an object. The strongest attitudes are usually formed when a person has direct experience with the attitude object. Even exposure to an object can contribute in the formation of attitude. Research has shown that repeated exposure to an object leads to liking towards the object. In other words, people tend to have a positive attitude toward familiar things (Ramachandran, 1994).

Familiarity reduces resistance. There could be a resistance to the changed environment. Status Quo Bias, a contemporary psychology model of choice process, can be considered here. Status quo bias refers to the tendency to prefer the current state of affairs rather than a changed situation. This bias, thus represents a form of conservatism in judgement and preference. As a model of choice, it predicts a tendency (often a non-normative tendency) to choose the option that one already has, rather than to trade it or give it up for another, even if the alternative is a better option. (Houston and Shermann, 1994).

In the background of the above model, it is possible that some of the users have not been exposed to computers or the allied technologies introduced in the libraries, and others would have had various degrees of exposures to them. This non-exposure or differential exposures would result in varied behaviour towards introduction of computers and new technologies. Further, few users are resistant to any change. Depending upon the degree of exposure, and the type of experiences
they have had with computers (beneficial, difficulty in using etc.), users can be expected to exhibit different types of attitudes towards computers and other new technologies.

Attitude has a pervasive influence on the person. Once developed, attitude can be used as a guide for behaviour. Attitude once formed leads to Satisfaction.

**Satisfaction:**

Satisfaction is a measure of how services provided by an institution meet or surpass customer’s expectation. Customer satisfaction is defined as the number of customers or percentage of total customer whose reported experience with a firm, its products or its services exceeds specified satisfaction goals. (Farris, 2010).

When there is a match between the expectations of the user and the facilities provided by the library, the user derives satisfaction from the service. The acceptance or resistance towards any service is dependent on the degree of satisfaction the user derives from the newly introduced service. Satisfaction is derived, when a user finds that the service fits the framework of his/her expectations and meets his/her requirement and also within his/her capability to use the technology based service. This can be supported by the Theory of Reasoned Action (TRA) put forth by Fishbein and Ajzen (1975) and
Technology Acceptance Model (TAM), introduced by Davis and others (1986). According to TRA, a person’s performance of a specified behavior is determined by his or her Behavioural Intention (BI) to perform the behavior, and BI is jointly determined by the person’s Attitude (A) and Subjective Norm (SN) concerning the behavior in question. BI is a measure of one’s intention to perform a specified behavior and Attitude represents an individual’s feelings about performing the behavior.

Technology Acceptance Model of Davis and others (1986) combines these two concepts with Perceived Usefulness (PU) and Perceived Ease Of Use (PEOU).

**PU** is defined as the user’s subjective probability that using a specific system will increase his or her job performance within an organizational context.

**PEOU** refers to the degree to which user expects the target system to be free of effort. Both PU and PEOU predict attitude toward using the system, defined as the user’s desirability of his or her using the system. Attitude and PU influence the individual’s BI to use the system.
This satisfaction will have an ever lasting impact on the users.

**Impact :**

Impact can be defined as the change the user experiences after using the service. This change in the state of mind that takes place before the use of the service and after using the service can be termed as Impact. According to Brophy (2005), Impact, in the context of library services, can be defined as an effect of a service, product or other ‘event’ on an individual or group.

**Positive and Negative Impact :**

Impact can be positive or negative, depending upon the level of satisfaction derived by the user. This varied level of satisfaction depends upon varied level of exposure resulting in varied behaviour. When the user is satisfied with the service, it results in positive impact. Dissatisfaction with the service results in negative impact.
Positive impact results in preference to the service and negative impact results in rejection of the service. When a user prefers the service, the service is used and a non-preference results in non-usage of the service. Thus, impact has a major role in the usage of the service.

The reasons for negative impact can be various, starting from the initial problems faced by the user, when exposed to computers for retrieval of information to the innumerous information. As more and more technology entered the libraries, reluctance in the form of aversion to computers became more and more marked. New terms came to be coined at this juncture. Rather terms already coined in other fields now also came to be applied to the field of Library Science. These were:

- Computer Phobia
- Computer Stress
- Computer Anxiety
- Technophobia
- Technostress etc.

These terms defined the basic fear of the user about the new technology.

The classic definition of technostress has been provided by Brod (1984) when he defines technostress as ... a modern disease of adaptation caused by an inability to cope with the new computer technologies in a healthy manner. It manifests itself in two distinct and related ways: in the struggle to accept computer technology and in
the more specialized form of over identification with computer technology.

Technostress is expressed at three levels:

- **Anxious Technophobe**: Exhibits the classic signs of an anxiety reaction when using technology: Sweaty palms, Heart Palpitations, Headaches.

  ➢ **Cognitive Technophobe**: On the surface is calm and relaxed, but internally seethes with negative messages: “Everybody but me knows how to do this” or “I’ll hit the wrong button and mess this machine up!”

  ➢ **Uncomfortable User**: May be slightly anxious or use some negative statements, but generally not in need of one-on-one counseling” (Rosen, Sears & Weil, 1987).

Technostress is not merely a psychological problem. Rather, it has been physically measured. Research has shown that persons experience higher level of adrenaline and noradrenaline during work periods with computers (Ametz & Berg, 1993). Adrenaline and noradrenaline are catecholamines secreted by the adrenal gland. Increased secretion rates of adrenaline and noradrenaline are associated with both underload and overload (stress) stimulation and emotional arousal (Frankenhaeuser, 1978). Other effects of the increased catecholamines levels, as part of sympathetic nervous responses, are increased heart rate and blood pressure. Increased heart rate and blood pressure has been observed in persons performing a computer task. There is also a Skin Conductance Level (SCL) while performing a computer task (Muter, Furedy, Vincent & Pelcowitz, 1993).
Added to this is the problem of information overload, expressing itself in increasing availability of information sources and also the way to access these information. Frequent upgradation of hardware and software also triggers technostress.

**IMPACT MODEL**

**Computer Avoidance:**

Problems discussed above results in the avoidance of using computers and computer mediated services, such as Internet, e-mail, on-line access etc. and manage without it.

Computer avoidance is a normal outcome of techno-phobia or computer anxiety. Merely making technology available does not produce appropriate or adequate use of technology. Assuming that properly designed instruction or Orientation programmes for users will always change anxiety, attitudes and confidence are strong predictors of
actually voluntary behaviours (such as whether to use new technological tools or not). If computer anxiety is combined with low confidence, low motivation or negative attitudes, individuals will strive to avoid interactions with computers.

It is a reality that in the modern day, it is difficult to avoid computers. The users must be trained to deal with computers and their hassles. The various reasons for technostress must be analysed and the users must be helped to overcome technophobia, by teaching them the methods or techniques to cope up with technostress.

In the present study, an attempt has been made to study the usage pattern, variations in the behavior of the users based on background of the users and the impact of electronic information services on the users of Research and Development Libraries.

1.2 REVIEW OF LITERATURE

The advent of the technology and its adoption in the libraries have resulted in rapid changes in the libraries. These changes have a bearing on the users of the libraries, since it is the users who face these challenges of adjustment to these changes in the libraries. In the present study existing literature on the topic has been collected exhaustively and has been presented under five subheadings:

a. Problems introduced by the introduction of Information Technology in the libraries.
Information technology has revolutionized the modern day libraries, but has also brought new problems. More and more information is available in a wide variety of formats. The computer operating system and software versions are changing so fast that, by the time users and librarians get used to one version of the software the next versions get released. This by itself brings with it a feeling of insecurity, the fear of not being able to keep up with the technological changes and form of technology fatigue.

b. Usage & non-usage of Electronic services.

The usage of EIS is growing rapidly (Marriot, 2002). A decreased use of print journals is observed after the introduction of online journals and with availability of online catalogues, bibliographic databases and full text database, the number of patrons entering the library has decreased (Groot and Dorsh, 2001).

Browsing printed journals was the favored source of current information. Although there was interest in using internet sources. It was also observed that the users did not have the time and or access to right software, and there was a general agreement that using the world wide web and internet can be laborious and frustrating (Brunskill, 1996)

Drawing on the work of social psychology, a number of theoretical models have been proposed to understand the dynamics of human decision making in the context of In Reasoned Action (TRA) and Technology Acceptance Models (TAM) provide a theoretical nexus for measuring beliefs and attitudes to predict future behaviours.
c. Measures to enhance use.

Users have to be made to accept the fact that the computer technology will always be changing with some periods of slower change than others. Not resisting change (Champion, 1988; Clark and Kallin, 1996) is important because resistance is more emotion focus and less effective in reducing the stressor. Users will have to be convinced that resisting change will only add to their problems as they would find it still more difficult to adjust to later technological change.

d. Impact of Electronic Services on the users.

In 1980’s the notion of impact/output assessment techniques in librarianship was formalized (Van house et al, 1987; Van house et al 1990). This approach continues even today in the networked environment as well (Bertot et al; 2002 Shim et al 2001; Bertot et al, 2001) and is in the process of incorporation of various national and international standard reviews. Indeed, entire library data collection system centres on this approach on library use, user and performance.

Chapter III on Review of Literature analyses the subject in greater detail.

1.3 NEED FOR THE STUDY

Library is a service-oriented organisation. In order to serve the users better, the libraries have introduced new technological services. Any service introduced in the library is meant to help the user, since ...the library is “bionic” in the sense that it comprises not only facilities and formats, but also the essential human elements: users and staff. The success of any library system, after all, rests not on how well the design works on paper,
in the abstract, but on how readily people will accept it and how effectively they can use it. And it is the biological components of the library that embrace or reject the new technologies, who will fulfill or frustrate the intentions of system designers. (Kupersmith, 1998). It is therefore, very essential to analyse the users of the library, and to know their reaction to the services. It is the user who ultimately decides the success or the failure of a service, by accepting or resisting it. As mentioned earlier, satisfaction results when the user finds the service befitting his expectation and satisfaction will have a permanent impact on the user. Impact can be positive or negative, depending upon the level of satisfaction derived by the user. When the user is satisfied with the service, it results in positive impact and dissatisfaction with the service results in negative impact. Positive impact results in the formation of positive attitude and preference to the service, while negative impact results in the formation of negative attitude and rejection of the service. When a user prefers the service, the service is used and a non-preference results in non-usage of the service. Thus, impact has a major role in the usage of a service.

An analysis of the literature available on this subject indicated that no study on Impact of Electronic Services on the users in libraries have been undertaken in India Therefore, it was felt necessary that a study of this nature would provide useful information which could help maximise the use of technological services in libraries.

1.4 STATEMENT OF THE PROBLEM

Impact of Electronic Information Services on the Users of Research Libraries in Bangalore City.
Operational Definitions:

**Impact**: Impact can be defined as the change the user experiences after using the service.

**Electronic Information Services**: Information Services or facilities made available in the library using Electronic media.

**Users**: Members of the library who come to the library or access the library seeking information.


Research institutions provide well-equipped libraries for the use of their researchers and other staff. Information is crucial for success of any research institution. Hence these libraries are normally well equipped and have the latest technological facilities. In Research institutions users include R & D personnel, the management staff and administrative staff.

1.5 **OBJECTIVES OF THE STUDY**

The main objectives of the study are the following:

a. To find out the main purposes for which the Library facilities are used.

b. To identify the awareness of the users to the Electronic Information services provided.
c. To identify the Use of Electronic Information Services by the users of the Libraries under study.

d. To identify whether the users of these libraries are satisfied with the Electronic information Services.

e. To measure the Impact of Electronic Services on the users of these libraries.

1.6 **HYPOTHESES**

➢ There is no significant difference in the purpose of use of Library facilities between

- Technical and non-technical,
- Male and female,
- Younger and older respondents.

➢ There is no significant difference in the Awareness, Usage, Satisfaction and Impact of Electronic Information Services between:

- Technical and non-technical,
- Male and female and between,
- Younger and older respondents.

1.7 **RESEARCH DESIGN AND METHODOLOGY**

Information required from the study.
The objectives of the present study have been stated in the earlier part of this chapter. In order to fulfill the objectives of the study, the following data had to be obtained.

- To identify the purpose of use of library facilities
- To identify the awareness of EIS.
- To identify the sources from which they learnt about EIS.
- To identify the extent of use of EIS.
- To identify the benefits derived from EIS.
- To find out how difficult or easy the users find the use of EIS.
- To identify the reasons for finding the use difficult or very difficult from users who found the EIS difficult or very difficult.
- To identify the satisfaction of the users of EIS.

In order to elicit data regarding the above since secondary data would not be of much use primary data was collected from the users through questionnaire and at times through interview. The major tool used is questionnaire. Interviews were held with a sample of respondents to gain a better understanding of the nature of problems / constraints faced by them in the use of library and IT facilities.

**Selection of the Institutes:**

Research Institutions in Bangalore were selected for this study. A list of the Research Organisations selected for the study are the following:

List of Research Institutes in Bangalore City:
1. Indian Institute of Science 1899
2. National Dairy Research Institute 1947
3. Raman Research Institute 1948
4. National Tuberculosis Institute 1959
5. Central Power Research Institute 1960
6. National Aerospace Laboratory 1960
7. National Silkworm Seed Organisation 1961
8. Indian Plywood Industries Research and Training Institute 1962
9. Indian Institute of Astrophysics 1971
10. National Institute of Mental Health and Neuro Sciences 1974
11. Central Silk Technological Research Institute 1983
12. CSIR Centre for Mathematical Modelling and Computer Simulation 1988
13. Institute of Wood Science and Technology 1988
14. Jawaharlal Nehru Centre for Advanced Scientific Research 1989
15. Centre for Liquid Crystal Research 1991
16. National Centre for Biological Sciences 1992
18. Indian Statistical Institute 1996

01. Indian Space Research Organisation 1969

02. Defense Avionic Research Establishment (DRDO) 1986

The above two Institutes have not been included in the study for lack of permission.

Sample Size:

Respondents were selected on the basis of ‘Required Sample Size Table’ from the Research Advisor (2006), with a margin of Error at five percent and Confidence Level at 95 percent.

The total number of users from the 18 Research institutes were 3661. Of which, 2334 were from technical section and 1327 were from non-technical section. According
to the sample table 869 were to be selected from the technical section and 291 from the non-technical section. Anticipating non – response, the questionnaires distributed were more than required, i.e. 1080 for technical and 415 for non-technical.

<table>
<thead>
<tr>
<th>Category of users</th>
<th>Total number of users</th>
<th>Number of Questionnaires Distributed</th>
<th>Number of filled-in Questionnaires received</th>
<th>Percentage</th>
</tr>
</thead>
<tbody>
<tr>
<td>Technical</td>
<td>2334</td>
<td>1080</td>
<td>909</td>
<td>84.17</td>
</tr>
<tr>
<td>Non-technical</td>
<td>1327</td>
<td>415</td>
<td>327</td>
<td>78.79</td>
</tr>
</tbody>
</table>

909 filled-in questionnaires were received back from technical and 327 from the non-technical, with a response rate of 84.17 and 78.79 percent respectively.

**Selection of the respondents :**

Respondents were selected on the basis of random sample from each of these institutes. The questionnaires were distributed amongst these research institutions proportionate to the number of users of the libraries in each of these institutes.

\[
\text{Sample size for Institution ‘A’} = \frac{\text{Number of users of library in Institution ‘A’}}{\text{Total number of library users in all the institutions selected for the study}} \times 869 \text{ and } 291
\]
Questionnaire Design:

A questionnaire was designed for the collection of data from the respondents. The questionnaire is annexed at the end of the thesis as Appendix – I. The questionnaire was designed to collect relevant data in relation to the objectives listed in the earlier part of this chapter.

Testing of the Questionnaire:

The questionnaire was first tested on respondents who were not in the selected sample of the respondents, in order to ensure that the respondents did not face any problem in understanding the question in the questionnaire.

Later the questionnaires were administered to the selected respondents in each of these institutions.

Data Analysis:

The data was analysed using MS Excel Spreadsheet. The statistical tests used are

a. Z Analysis Test


The details of the data analysis and interpretation are given in Chapter – IV “Analysis and Interpretation”.
1.8 **SCOPE AND LIMITATION**

The Research Institutions in Bangalore city have been selected for the study. Out of twenty Research Institutes in Bangalore, two institutes, viz., Indian Space research Organisation and Defense Avionic Research establishment, could not be covered. Because of the sensitive nature of the institutes, permission was not granted.

1.9 **CHAPTERIZATION**

- Introduction
- An overview of Electronic Information Services
- Literature review
- Analysis and Interpretation
- Conclusion, Findings and Suggestion
References


Clark, Kate and Kalin, Sally (1996), Technostressed out? How to cope in the Digital Age, Library journal, 121(13), 30-32.


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[www.research-advisor.com/tools/samplesize.htm](http://www.research-advisor.com/tools/samplesize.htm)

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